

Lucent Technologies
Bell Labs Innovations



SLC[®]-2000 Access System

User/Service Manual

363-208-001
Issue 9
April 1998

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Identification No.: 363-208-001 Issue No.: 9 Date: April 1998

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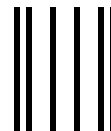
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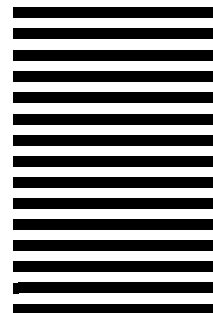
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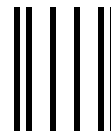
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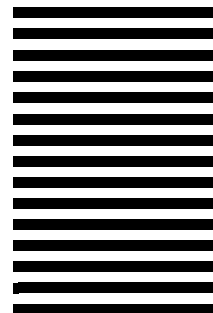
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About This Document

Purpose

The User/Service Manual provides the information needed by installation, operation, and maintenance personnel to turn up, operate, and maintain the *SLC*®-2000 Access System.

Scope

This document contains the following descriptive and procedural information:

- High-level description of the system and the network
- Product description
- Operations interfaces description
- Procedures for major post-installation service (for example, acceptance testing, turnup, trouble clearing) presented in task-oriented practices (TOP) format
- Administration and provisioning description
- Job aids (quick reference cards).



NOTE:

This document does not contain system applications, engineering, installation procedures, or details of system commands. Refer to the section on related documentation and training for documents that provide additional information on the system.

Intended Audience

The User/Service Manual is intended for the following customers who participate in the engineering, installation, and maintenance of the system:

- Equipment engineers and outside plant engineers
- Transmission engineers
- Installation, operation, and maintenance personnel
- Central office operations personnel
- Operations center personnel that use centralized operations systems for surveillance or provisioning
- System administrators
- Technical support personnel
- Training personnel.

This document is based on an understanding of basic digital transmission principles and familiarity with digital loop carrier systems. Background on digital loop carrier systems may be found in document 363-205-010, *SLC Series 5 Carrier System, Applications and Planning Guide*.

Reason for Reissue

This document is being reissued for the following reasons:

- To add the following new channel units:
 - AUA293
 - *SPQ*®401B
 - *SPQ*440D.
- To add the following Software Release 4.6 (R4.6) capabilities:
 - Voice frequency data enhancement (VFDE) feature: This feature improves the connect rate, or throughput, of analog modems served by switched single-party loop-start and ground-start lines.
 - The use of the *SPQ*811 DT Server with the enhanced FiberReach/MSDT feature. The *SPQ*811 Server can be installed in slots 11 and 23 of a metallic distribution assembly (MDS) provisioned for fiber in the loop (FITL) distribution when it and the server in slots 9 and 21 are provisioned for 12-line operation.

How to Use This Document

This document has the following organization:

- "About This Document"

This section defines the purpose, scope, and intended audience for this document; provides introductory and support information on this document; includes the bibliography (*references*); lists training courses; and lists information on how to obtain technical support.

- Chapter 1, "System Overview"

This chapter describes the system and its architecture.

- Chapter 2, "Product Description"

This chapter includes diagrams of each part of the system showing the location of the circuit packs and a reference to each circuit pack data sheet. It also includes information on software release compatibility and common unit configurations as well as cabling information.

- Chapter 3, "Operations Interfaces"

This chapter describes the operations interfaces including the craft interface terminal, user interface panel, equipment indicators, office alarms, TL1/X.25 interface, serial telemetry, parallel telemetry, miscellaneous discrete environmental alarms and controls, other alarms, and circuit maintenance.

- Chapter 4, "Operations and Maintenance Procedures (TOP)"

This chapter contains procedures for acceptance testing, access resource manager (ARM) shelf turnup, high density optics shelf (HDOS) turnup and end-to-end testing, metallic distribution shelf turnup and end-to-end testing, circuit order procedures (including channel unit installation), and trouble clearing. The trouble-clearing procedures include the maintenance philosophy and quick reference tables. The tables provide frequently used maintenance information such as a summary of user interface panel features and a list of circuit pack alarms/indicators.

- Chapter 5, "Administration and Provisioning"

This chapter describes the software administration and security for each subsystem and provides details on setting system and channel options (provisioning) using the software.

- Chapter 6, "Plug-In Data Sheets"

This tab provides a convenient place to store *SLC-2000* Access System Data Sheets.

- Chapter 7, "Software Release Descriptions"

This tab provides a convenient place to store software release descriptions (SRDs). The SRDs contain the latest workarounds to supplement the TOP procedures.

- Chapter 8, "Technical Reference(s)"

This tab provides a convenient place to store Technical References that contain specific information for the local companies.

- Appendix A, "Fiber Service Module (FSM)"

This appendix provides an overview of the FSM.

- Glossary

This section spells out the abbreviations and acronyms used in this document.

- Index.

Conventions Used

Special fonts are used in this document for text that requires emphasis. The following conventions are used to highlight specific text:

- Uppercase letters (or literal spelling) denote panel stampings located on the equipment.
- Italic typeface denotes the titles of documents referenced in the text. However, italic typeface may also be used to highlight an important word or phrase.
- Double quotes (") surround text to represent chapter titles referenced in the text.
- Special symbols (icons) denote safety labels and notes.
- **Constant-width** (monospace) font is used in the display of the input/output screens.

Trademarks

The trademarks used in this document are identified on the back of the title page. Trademarks are presented in a specific way — they stand out from the rest of the text by using a different font or capital letters, and they modify a noun. For example, the system name contains a trademark — *SLC*®-2000 Access System. The trademark is never used by itself — the trademark always modifies a noun (for example, *SPOTS*® channel units).

Lucent Technologies trademarks are identified on first use in *each chapter* (in the table of contents, text, and headings) with the registered mark (®) or trademark (™) symbol. Also, they are identified on first use in each table and figure. Trademarks of other companies are identified with a footnote on the first use in the document.

Terms Used

This section explains terms used in this document that may have a different meaning than the general or common use of the term.

- In the *SLC*-2000 Access System, the term *access* means that the system provides the primary service interface for the customer to enter the network.
- The term *distant terminal (DT)* (Software Release 4.4 and later) refers to both the *SLC*-2000 multi-services distant terminal (MSDT) and DDM-2000 Multiplexer FiberReach narrowband shelf (NBS).

- Task-oriented practice procedures may be referred to as TOP, TOPs, or TOP procedures.
- The term *pipe* in customer DS1 pipes means to transmit the complete 1.544-Mb/s signal through the network without demultiplexing it to individual (DS0) channels (clear channel DS1 path).

Product Safety



WARNING:

Only trained service personnel should perform the procedures in this document. These procedures allow exposure to high electrical energy that may result in electric shock and/or injury to untrained personnel during servicing, maintenance, and installation of this system.

Safety Labels

This document may contain safety labels as DANGERS, WARNINGS, and CAUTIONS. These safety labels have the following definitions.



DANGER:

Danger indicates the presence of a hazard that will cause death or severe personal injury if the hazard is not avoided.



WARNING:

Warning indicates the presence of a hazard that can cause death or severe personal injury if the hazard is not avoided.



CAUTION:

Caution indicates the presence of a hazard that will or can cause minor personal injury or property damage if the hazard is not avoided. The caution is also used for property-damage-only accidents. This includes equipment damage, loss of software, or service interruption.

The safety alert symbol  is used on product labels and in this document to alert the user to important operating and maintenance instructions.

Lightwave Safety



WARNING:

Never view any unterminated optical connector with optical instruments other than indirect image-converting devices such as the FIND-R-SCOPE infrared optical viewer, since viewing optics tends to collimate the energy from an optical connector and, hence, increases the potential risk for injury.

A Lucent Technologies lightwave digital transmission system and associated optical test sets use semiconductor laser transmitters. The lasers emit lightwaves, at or near infrared wavelengths, into lightguide fibers. This light is at the red end of the visible spectrum.

Although, at present, the transmitter power levels are below those known to cause injury to the eye (for example, from a direct inadvertent exposure to the end of an energized fiber), direct exposure at close distances should be avoided.

Electrostatic Discharge (ESD) Considerations



CAUTION:

Industry experience has shown that all integrated circuit packs can be damaged by static electricity that builds up on work surfaces and personnel. The static charges are produced by various charging effects of movement and contact with other objects. Dry air allows greater static charges to accumulate. Higher potentials are measured in areas with low relative humidity, but potentials high enough to cause damage can occur anywhere.

The following list of precautions should be observed when handling circuit packs to prevent damage by electrostatic discharge.

- Assume all circuit packs contain solid state electronic components that can be damaged by ESD.
- When handling circuit packs (storing, inserting, removing, etc.) or when working on the backplane, always wear a grounded wrist strap or wear a heel strap and stand on a grounded, static-dissipating floor mat. If a static-dissipating floor mat is used, be sure that it is clean to ensure a good discharge path.
- Handle all circuit packs by the faceplate or latch and by the top and bottom outermost edges. Never touch the components, conductors, or connector pins.
- Observe warning labels on bags and cartons. Whenever possible, do not remove circuit packs from antistatic packaging until ready to insert them into slots.

- If possible, open all circuit packs at a static-safe work position, using properly grounded wrist straps and static-dissipating table mats. If a static-dissipating table mat is used, be sure that it is clean to ensure a good discharge path.
- Always store and transport circuit packs in static-safe packaging. Shielding is not required unless specified.
- Keep all static-generating materials such as food wrappers, plastics, and foam packaging away from all circuit packs. On removal from the bay, immediately put circuit packs into static-safe packages.
- Whenever possible, maintain relative humidity above 20 percent.

To reduce the possibility of ESD damage, shelves are equipped with grounding jacks to enable personnel to ground themselves using wrist straps (Figure 1) with a minimum resistance of 250 k-ohms while handling circuit packs or working on a shelf/shelves. The jacks for connection of wrist straps are located at the upper left-hand corner of the user interface panel (UIP) and the fan unit. When grounding jacks are not provided, an alligator clip adapter enables connection to bay frame ground.

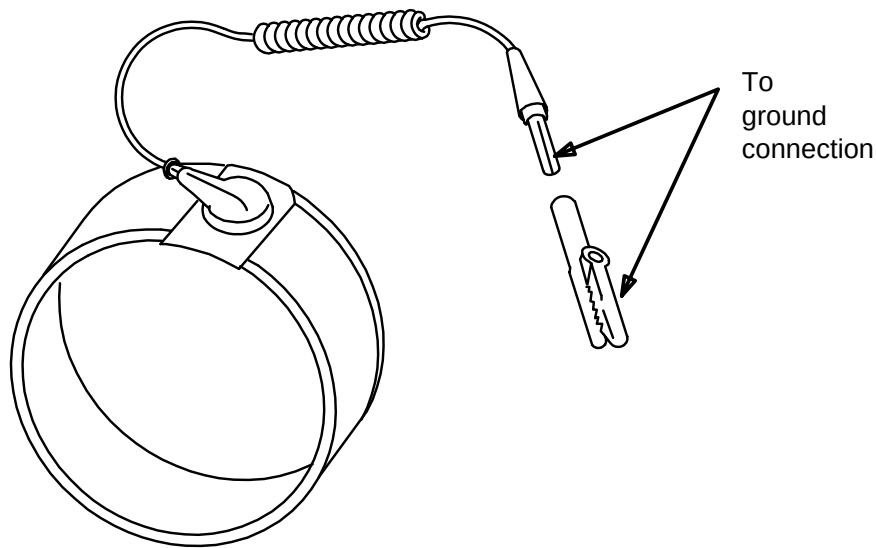


Figure 1. Static Control Wrist Strap

Customer Assistance and Technical Support

Lucent Technologies provides customer assistance on the *SLC-2000* Access System including, but not limited to, troubleshooting assistance, technical consultation, operational problem consultation, procedural advice, and emergency recovery assistance from a qualified system support professional from the Regional Technical Assistance Center (RTAC).

Service is provided from the RTAC at **1-800-225-RTAC**. This telephone number is monitored 24 hours a day, 7 days a week. During regular business hours your call will be answered by your local regional RTAC. Outside normal business hours all calls will be answered at a centralized technical assistance center where service-affecting problems will be dispatched immediately to your local RTAC. All other problems will be referred to your local RTAC on the next regular business day.

Related Documentation/Training

This section contains the system documentation plan, bibliography (list of references), and how to get information on training courses.

SLC-2000 Access System Documentation Plan

The following documents provide additional information about the *SLC-2000 Access System*:

- 363-205-004, *SLC-2000 Multi-Services Distant Terminal (MSDT) Feature, User/Service and Ordering Manual*

Audience — Engineers, network planners, product evaluators, standardization groups, installers, administrators, operation and maintenance personnel, and technical support.

Content — Applications, physical and functional description, administration, powering, technical specifications, construction and installation, operation and maintenance [in task-oriented practices (TOP) format], and ordering information.

- 363-206-218, *DDM-2000 OC-3 Multiplexer, Software Release Description, Release 7.0.2*

Audience — Installers, technicians, engineers, and troubleshooters.

Content — Provides information about the software release and procedures for implementation. Describes the features and capabilities provided in the release. Lists operating issues from the previous release that have been resolved, the operating issues in this release, and any workarounds.

- 363-206-242, *DDM-2000 OC-3 Multiplexer, Software Release Description, Release 6.2*

Audience — Installers, technicians, engineers, and troubleshooters.

Content — Provides information about the software release and procedures for implementation. Describes the features and capabilities provided in the release. Lists operating issues from the previous release that have been resolved, the operating issues in this release, and any workarounds.

- 363-206-243, *DDM-2000 OC-3 Multiplexer, Software Release Description, Release 7.1*

Audience — Installers, technicians, engineers, and troubleshooters.

Content — Provides information about the software release and procedures for implementation. Describes the features and capabilities provided in the release. Lists operating issues from the previous release that have been resolved, the operating issues in this release, and any workarounds.

- 363-206-245, *DDM-2000 OC-3 Multiplexer, Software Release Description, Release 9.0*

Audience — Installers, technicians, engineers, and troubleshooters.

Content — Provides information about the software release and procedures for implementation. Describes the features and capabilities provided in the release. Lists operating issues from the previous release that have been resolved, the operating issues in this release, and any workarounds.

- 363-206-246, *DDM-2000 OC-12 Multiplexer, Software Release Description, Release 2.2*

Audience — Installers, technicians, engineers, and troubleshooters.

Content — Provides information about the software release and procedures for implementation. Describes the features and capabilities provided in the release. Lists operating issues from the previous release that have been resolved, the operating issues in this release, and any workarounds.

- 363-206-247, *DDM-2000 OC-12 Multiplexer, Software Release Description, Release 3.1*

Audience — Installers, technicians, engineers, and troubleshooters.

Content — Provides information about the software release and procedures for implementation. Describes the features and capabilities provided in the release. Lists operating issues from the previous release that have been resolved, the operating issues in this release, and any workarounds.

- 363-206-300, *DDM-2000 FiberReach Multiplexer, Wideband/Narrowband Shelf, Applications, Planning, and Ordering Guide*

Audience — Network planners, engineers, product evaluators, standardization groups, and ordering personnel.

Content — Benefits and features, applications, services, product description, parts list, ordering information, system specifications and requirements, and environmental data.

- 363-206-301, *DDM-2000 FiberReach Multiplexer, Wideband/Narrowband Shelf, User/Service Manual*

Audience — Operation, maintenance, technical support, and training personnel.

Content — Acceptance, system turnup/circuit order, operation, and trouble-clearing procedures.

- 363-208-000, *SLC-2000 Access System, Applications, Planning, and Ordering Guide*

Audience — Network planners, engineers, product evaluators, standardization groups, and ordering personnel.

Content — Benefits and features, applications, services, product description, parts list, ordering information, system specifications and requirements, and environmental data. Refer to the customer assembly manual for ordering configurations for central office and remote terminal frame arrangements.

■ 363-208-003, *SLC-2000 Access System, Commands and Messages*

Audience — Installers, technicians, engineers, and troubleshooters.

Content — A tutorial on system commands and messages, also detailed information about the system commands in manual-page format. The document pages are organized by user interface panel (UIP) commands and craft interface terminal (CIT) commands.

■ 363-208-010, *SLC-2000 Access System, Customer Assembly Manual for remote terminal (RT) Frames*

Audience — Customers that plan to install the equipment.

Content — Configuration drawings and detailed instructions for ordering, installing, assembling, and connecting the equipment in an RT frame arrangement. This document includes installation procedures, cabling and wiring diagrams, the application schematic diagrams (SDs), a parts list, and supporting information. Shelf assembly, cable routing, and frame installation are provided.

■ 363-208-011, *SLC-2000 Access System, Customer Assembly Manual for COT Frames*

Audience — Customers that plan to install the equipment.

Content — Configuration drawings and detailed instructions for ordering, installing, assembling, and connecting the equipment in a central office terminal (COT) frame arrangement. This document includes installation procedures, cabling and wiring diagrams, the application schematic diagrams (SDs), a parts list, and supporting information. Shelf assembly, cable routing, and frame installation are provided.

■ 363-208-020, *SLC-2000 Access System, Software Release Description, Release 3.0, Issue 3*

Audience — Installers, technicians, engineers, and troubleshooters.

Content — Provides information about the software release and procedures for implementation. Describes the features and capabilities provided in the release. Lists operating issues from the previous release that have been resolved, the operating issues in this release, and any workarounds.

- 363-208-022, *SLC-2000 Access System, Software Release Description, Release 3.3*

Audience — Installers, technicians, engineers, and troubleshooters.

Content — Provides information about the software release and procedures for implementation. Describes the features and capabilities provided in the release. Lists operating issues from the previous release that have been resolved, the operating issues in this release, and any workarounds.

- 363-208-023, *SLC-2000 Access System, Software Release Description, Release 4.0*

Audience — Installers, technicians, engineers, and troubleshooters.

Content — Provides information about the software release and procedures for implementation. Describes the features and capabilities provided in the release. Lists operating issues from the previous release that have been resolved, the operating issues in this release, and any workarounds.

- 363-208-024, *SLC-2000 Access System, Software Release Description, Release 4.2*

Audience — Installers, technicians, engineers, and troubleshooters.

Content — Provides information about the software release and procedures for implementation. Describes the features and capabilities provided in the release. Lists operating issues from the previous release that have been resolved, the operating issues in this release, and any workarounds.

- 363-208-026, *SLC-2000 Access System, Software Release Description, Release 4.4*

Audience — Installers, technicians, engineers, and troubleshooters.

Content — Provides information about the software release and procedures for implementation. Describes the features and capabilities provided in the release. Lists operating issues from the previous release that have been resolved, the operating issues in this release, and any workarounds.

- 363-208-027, *SLC-2000 Access System, Software Release Description, Release 4.5*

Audience — Installers, technicians, engineers, and troubleshooters.

Content — Provides information about the software release and procedures for implementation. Describes the features and capabilities provided in the release. Lists operating issues from the previous release that have been resolved, the operating issues in this release, and any workarounds.

- 363-208-028, *SLC-2000 Access System, Software Release Description, Release 4.6*

Audience — Installers, technicians, engineers, and troubleshooters.

Content — Provides information about the software release and procedures for implementation. Describes the features and capabilities provided in the release. Lists operating issues from the previous release that have been resolved, the operating issues in this release, and any workarounds.

- 824-102-149, *SLC-2000 Operations Systems Engineering Guide (OSEG)*

Audience — Installers, technicians, engineers, and troubleshooters.

Content — Provides detailed information about the Operations System (OS) interface to the *SLC-2000 Access System* (and other systems) for engineering an OS.

The documents listed in the documentation plan support the following tasks:

- Planning
 - 363-208-000, *SLC-2000 Access System, Applications, Planning, and Ordering Guide*
 - 363-205-004, *SLC-2000 Multi-Services Distant Terminal (MSDT) Feature, User/Service and Ordering Manual*
 - 824-102-148, *2000 Family of Products, Operations Systems Engineering Guide (OSEG)*.
- System engineering
 - 363-208-000, *SLC-2000 Access System, Applications, Planning, and Ordering Guide*
 - 363-208-010, *SLC-2000 Access System, Customer Assembly Manual for RT Frames* (equipment required for RT frame arrangements)
 - 363-208-011, *SLC-2000 Access System, Customer Assembly Manual for COT Frames* (equipment required for COT frame arrangements)
 - 363-205-004, *SLC-2000 Multi-Services Distant Terminal (MSDT) Feature, User/Service and Ordering Manual*.
- Ordering
 - 363-208-000, *SLC-2000 Access System, Applications, Planning, and Ordering Guide* (parts list)
 - 363-205-004, *SLC-2000 Multi-Services Distant Terminal (MSDT) Feature, User/Service and Ordering Manual*.

- Circuit order and channel unit applications
 - 363-208-000, *SLC-2000 Access System, Applications, Planning, and Ordering Guide*
 - 915-710-116, *SLC Series 5 Carrier System, Channel Unit Application and Prescription Setting*.
- System Installation
 - 363-208-010, *SLC-2000 Access System, Customer Assembly Manual for RTs*
 - 363-208-011, *SLC-2000 Access System, Customer Assembly Manual for COT Frames*.
- Acceptance, turnup, maintenance, and system provisioning
 - 363-208-001, *SLC-2000 Access System, User/Service Manual* (TOP procedures and Data Sheets)
 - 363-208-003, *SLC-2000 Access System, Commands and Messages* (command pages)
 - 363-205-004, *SLC-2000 Multi-Services Distant Terminal (MSDT) Feature, User/Service Manual*.
- Cabling/wiring maintenance
 - 363-208-010, *SLC-2000 Access System, Customer Assembly Manual for RT Frames*
 - 363-208-011, *SLC-2000 Access System, Customer Assembly Manual for COT Frames*.
- Channel unit installation
 - 363-208-001, *SLC-2000 Access System, User/Service Manual* (TOP procedures)
 - 915-710-116, *SLC Series 5 Carrier System, Channel Unit Application and Prescription Setting*.
- Administration
 - 363-208-001, *SLC-2000 Access System, User/Service Manual*.
- Remote Operations
 - 824-102-148, *2000 Family of Products Operations System Engineering Guide (OSEG)*
 - 363-208-003, *SLC-2000 Access System, Commands and Messages*.

Training

The National Product Training Center in Dublin, Ohio, provides management courses for planning, engineering, and ordering as well as training for telecommunications technicians in installation, operations, and maintenance. Suitcasing of these courses may be available. Consult your local Lucent Technologies Account Executive for more information or reservations.

The following courses are provided by the National Product Training Center:

- LE2000, *SLC-2000 Planning and Engineering Overview*

Audience —Telecommunication managers responsible for the planning, implementation, and maintenance of the *SLC-2000 Access System*.

Length —3 days

Content —Applications, planning considerations, features and benefits, functional description, testing, basic maintenance, and ordering procedures.

Media —Instructor-led format with visual media and class discussion. End-of-unit review exercises are used to reinforce the lecture. Each student will be provided with 363-208-000, *SLC-2000 Access System, Applications, Planning, and Ordering Guide*.

Prerequisite —Students should have a general knowledge of transmission principles obtained by previous transmission experience or attendance in course TR0510 — Transmission Principles.

- LE2010, *SLC-2000 Access System Overview*

Audience —This course is designed for anyone who would like a high level overview of the *SLC-2000 Access System*.

Length —4 hours

Content —This interactive multimedia course is intended to provide students with an overview of the *SLC-2000 Access System*. Many topics are covered in an overview fashion that will help the student better understand the purpose of the *SLC-2000 Access System* and how it fits into the telephony network.

Media — Compact disk - read only memory (CD-ROM) based self-paced course. Students who wish to take this training must have an MPCII compatible computer. All software needed to view the training is included on the CD-ROM.

Prerequisite —Students need to be familiar with basic transmission concepts as provided by TR0510, *Transmission Principles*.

■ TR4610, *SLC-2000 Access System Operations and Maintenance*

Audience —Telecommunication personnel responsible for installing and maintaining the system.

Length —5 days

Content —A comprehensive study of the *SLC-2000 Access System* and the MSDT that includes a physical description, functional description, testing, basic maintenance, and system turnup.

Media —A combination of instructor lectures and class discussion. The information will be reinforced with a quiz and hands-on exercises on operational systems that are typical of those in the field.

Prerequisite —Students should have an understanding of the DDM-2000 OC-3 rings applications as obtained from course LW2604 — DDM-2000 OC-3 Multiplexer Ring/Linear Network Operations and Maintenance, or its predecessors:

LW260a3 — DDM-2000 OC-3 Multiplexer Operations and Maintenance

LW2608 — DDM-2000 OC-3 Multiplexer Rings Networks Operations and Maintenance.

For information on these and other training courses available, on schedules, fees, and registration, call the training coordinator for your company. If your company does not have an assigned training coordinator, call this toll-free number (Monday through Friday, 8:00 a.m. to 6:00 p.m. EDT) to order a product training catalog, get more information on a course, find out about new courses, or register for a class:

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System Overview

1

Introduction

This chapter describes the Lucent Technologies *SLC*[®]-2000 Access System and its architecture. Refer to 363-208-000, *SLC-2000 Access System, Applications, Planning, and Ordering Guide* (APOG), for details on system features and benefits, planned feature releases, Service Net-2000 architecture, and the synchronous optical network (SONET) along with engineering and ordering information. The APOG also contains the system applications and a comprehensive list of services.

SLC-2000 Access System Description

The *SLC*-2000 Access System is a software-driven digital loop carrier (DLC) system with built-in SONET multiplexer. The system provides up to 1,152 plain old telephone service (POTS) or 480 integrated services digital network (ISDN) subscriber lines per system, if fiber in the loop (FITL), or 768 lines per system, if metallic. The system also provides 28 subscriber DS1s and has an option to equip a built-in loop test system test head [the integral test head (ITH)]. The *SLC*-2000 Access System supports the following:

- Basic telephone service
- A full complement of special services including Integrated Services Digital Network (ISDN)
- Distant terminals (DTs) using both Fiber-in-the-Loop (FITL) and DSX-1 metallic distribution

- Metallic distribution
- TR-08^{*} standard interface
- TR-303[†] interface
- INA interface (PUB43801).

The system consists of three functional subsystems (SONET, DLC, and ITH). The SONET subsystem provides an OC-3/OC-12 feeder for point-to-point and linear drop configurations and path-switched ring applications. [The linear drop arrangement allows synchronous transport signal level 1 (STS-1) or virtual tributary 1.5 (VT1.5) signals to be *dropped off* at intermediate points along a SONET feeder route instead of running feeders from the central office to each separate remote terminal in the route. The path-switched ring arrangement allows several remote sites to share the two-fiber ring facility back to the central office.] The SONET subsystem also provides an OC-3/OC-12 ring network connection to an OC-3/OC-12 linear network and an OC-3 ring connection to another OC-3/OC-12 ring.

SONET Subsystem

The SONET subsystem provides access to two function groups of the OC-3/OC-12 signal, each with a bandwidth of 28 DS1s.

- **Function Group A** — supports DS0 services (for the DLC subsystem)
- **Function Group C** — supports the following:
 - Digital services (DS1, DS3, etc.)
 - Optical extensions (OC-3, OC-12, IS-3)
 - Electrical extensions (EC-1).
 - The system may be used as a SONET multiplexer (no DLC) to transport up to 28 customer DS1 pipes (through the low-speed interface) and grow in DS0 services later.

* Bellcore Technical Reference TR-TSY-000008, Issue 2, August 1987, *Digital Interface Between the SLC 96 Digital Loop Carrier System and a Local Digital Switch*.

† Bell Communications Research, Inc., "IDLC System Generic Requirements, Objectives, and Interface: Operations (ROS/CMIS/ASN.1) Messages Release 1.0", TR-TSY-000303, Supplement 3, Issue 1, March 1990, Revision 1, August 1992.

DLC Subsystem

The DLC subsystem supports all of the transmission, signaling, alarming, and maintenance features for the 1,152 FITL subscriber lines. TR-08 Mode 1 supports 672 lines organized into seven 96-line virtual remote terminals (VRTs). Mode 2 supports 768 lines organized into eight 96-line VRTs. The TR-303 interface will provide up to two TR-303 VRTs (large line size — combined total of up to 1,152 lines).

Circuit Maintenance Subsystem

The ITH serves as a built-in remote test unit (RTU) that supports on-demand subscriber loop tests. The mechanized loop testing (MLT) system controls the ITH using two dedicated DS0 channels. For RT applications, if the ITH is not equipped, a direct current (DC) bypass pair, a digital bypass pair, or an external remote measurement unit (RMU) is required for loop testing.

Feeder Configurations

The *SLC-2000* Access System allows for two types of feeder configurations:

- ***DS1 Feeder.*** The system provides a DSX-1 metallic interface that supports up to 28 DS1 metallic feeders.
- ***SONET Feeder.*** The system provides interfaces for either OC-3, IS-3, or EC-1. SONET subsystem Software Release R11 or later allows the SONET subsystem to also interface directly with OC-12 ring.

User Access

User Interface Panel (UIP)

The *SLC-2000* Access System has an easy-to-use user interface panel (UIP) that provides a single point in the system for most turnup and trouble-clearing activity. This panel contains the system alarm/status indicators and a 24-character display for summary messages on system faults. For more detailed reports, a craft interface terminal (CIT) may be connected to the system either locally or remotely. Using the CIT along with the UIP, you can set system options and perform provisioning tasks. The UIP also provides basic system turnup in certain configurations without a craft interface terminal. Local test access for special services alignment is provided by the jacks on the UIP when the following ITH circuit packs are present:

- Test head controller (THC)
- Power converter unit (PCU)
- Craft access unit (CAU).

Craft Interface Terminal (CIT)

To support more complex applications and maintenance, you can connect a CIT to a port on the UIP. The CIT can be either an American Standard Code for Information Interchange (ASCII) terminal or a personal computer (PC) running software that emulates an ASCII terminal. For software downloads, you must have a PC with the following capabilities:

- *MS-DOS** Release 3.0 or later operating system
- Serial port
- At least one diskette drive (either a 5 1/4 inch 360 kB or a 3 1/2 inch 720 kB)
- At least 512 kB of random access memory (RAM).
- Higher capacity drives must be read compatible with one of these formats.
- Menu-driven and prompt command modes are available as well as extensive help features. The CIT supports local or remote provisioning, maintenance, configuration, administration, inventory, and performance monitoring activities. You can use the same CIT with both the DDM-2000 multiplexer and the *SLC-2000* Access System.

Terminal Applications

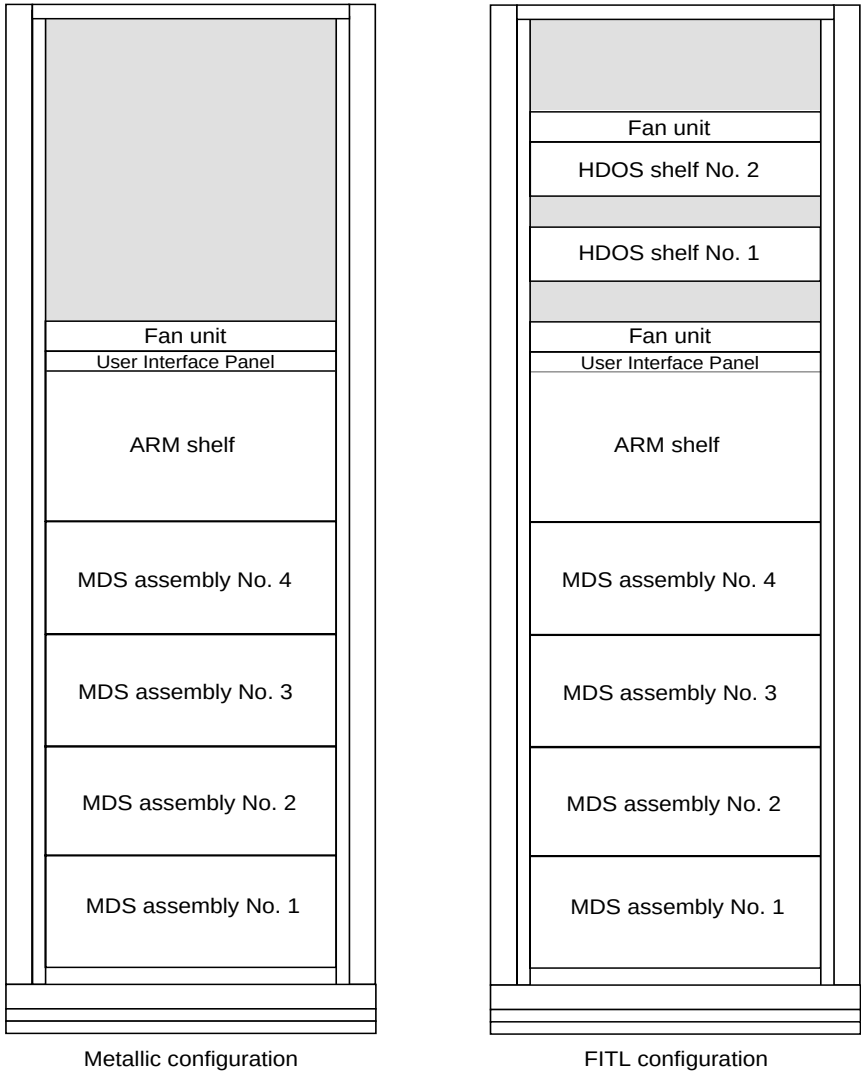
Remote Terminal or Host Digital Terminal (RT/HDT)

You can use the *SLC-2000* Access System as a remote terminal (RT) or a host digital terminal (HDT). The RT or HDT is usually located in a separate facility closer to the customer. The two applications differ as follows:

- **Remote Terminal:** Access lines from customer equipment terminate *directly* on metallic distribution shelf (MDS) assembly channel units in the RT.

*Registered trademark of Microsoft Corporation.

- **Host Digital Terminal:** Access lines from customer equipment terminate on a distant terminal (DT) that is "hosted" by the *SLC-2000* system. In this case, the *SLC-2000* HDT "extends" its MDS assembly channel slots to a DT that is usually located even closer to the customer. The DT is normally hosted by HDTs using optical feeders, but a DT can occasionally be hosted by an HDT connected to the DT over a metallic feeder such as a T1 facility. The DT can be one of the following:
 - *SLC-2000* multi-services distant terminal (MSDT) (*SLC-2000* Software Release 2.0 and later)
 - DDM-2000 FiberReach Narrowband Shelf (NBS) (*SLC-2000* Software Release 4.4 and later).
 - The system architecture is modular and completely connectorized for installation in RT bays (Figure 1-1) and cabinets. System components include the following:
 - Access resource manager (ARM) shelf
 - Metallic distribution shelf (MDS) assembly
 - High density optics shelf (HDOS) (for FITL applications)
 - User interface panel (UIP)
 - Fan(s).



rtbays02.eps

Figure 1-1. SLC®-2000 Access System Remote Terminal Bays

Central Office Terminal (COT)

The central office terminal (COT) system architecture is also modular and completely connectorized for installation in COT bays (Figure 1-2). System components include the following:

- ARM shelf
- MDS assembly
- Heat baffles
- Alarm and test unit (ATU) panel
- UIP.

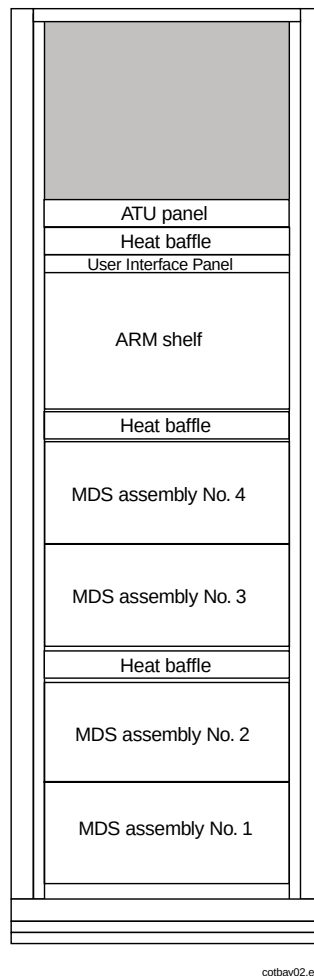


Figure 1-2. The SLC®-2000 Access System Equipped for COT Applications

SLC-2000 COT and RT Compatibility

The *SLC-2000* COT and the *SLC-2000* RT must be running the correct software release as shown in Table 1-1. (The *SLC-2000* Release 2.0 RT is not compatible with the *SLC-2000* Release 3.1/3.2/3.3 COT.)

Table 1-1. COT/RT DLC Software Release Compatibility (Note)

RT Release	COT Release
2.0 [*]	SLC [®] 96 COT
3.1	3.1
3.2	3.2, 3.3
4.0	3.2, 3.3
4.1	3.2, 3.3
4.2 [†]	3.2, 3.3 [‡]
4.4 [†]	3.2, 3.3 [‡]
4.5 [†]	3.2, 3.3 [‡]
4.6 [†]	3.2, 3.3 [‡]

Note: Refer to document 363-208-000, *SLC-2000 Access System, Applications, Planning, and Ordering Guide*, for any restrictions that may apply to a specific release compatibility.

* The *SLC-2000* Release 2.0 RT is not compatible with the *SLC-2000* software Release 3.1/3.2/3.3 COT.

† The *SLC-2000* Release 4.2 or later RT is required to obtain complete end-to-end compatibility with the new channel units supported by Releases 3.3 and 4.2 or later.

‡ The *SLC-2000* Release 3.3 or later RT is required to obtain complete end-to-end compatibility with the new channel units supported by Release 4.2 or later.

Software Feature Releases

Lucent Technologies adds new features to the *SLC-2000* system using *software feature releases*. This allows an economical upgrade of your current system by downloading software containing the desired features with a minimum of investment in new hardware.

Each software feature release is a set of system features that support the standard interfaces and various service categories with specific equipment and software. A software release description will be available for each future release of the product, along with updated engineering and ordering information.

Related Systems

The *SLC-2000* Access System is a basic element in the Lucent Technologies Network Systems Service Net-2000 integrated SONET architecture. Service Net-2000 is based on standard interfaces and uses common network elements from the 2000 Product Family:

- DDM-2000 Multiplexer (OC-3 and OC-12)
- DDM-2000 FiberReach Narrowband Shelf (NBS)
- FT-2000 Lightwave System
- DACS III-2000
- DACS IV-2000
- 5ESS®-2000 Switch
- *SLC-2000* MSDT.

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Introduction

This chapter gives a high-level description of the *SLC*®-2000 system and the common unit configurations.



NOTE:

For a detailed description of the *SLC*-2000 Access System and its equipment, features, applications, and operational information, see 363-208-000, *SLC-2000 Access System Applications, Planning, and Ordering Guide*. For detailed information on the *SLC*-2000 host digital terminal/multi-services distant terminal (HDT/MSDT) and its equipment, features, applications, and operational information, see 363-205-004, *SLC-2000 Multi-Services Distant Terminal (MSDT) Feature, User/Service and Ordering Manual*. For detailed information on the DDM-2000 FiberReach multiplexer and its features, applications, and operational information, see 363-206-300, *DDM-2000 FiberReach Multiplexer, Applications, Planning, and Ordering Guide*.

The *SLC*-2000 system architecture consists of the following:

■ **Remote Terminal (RT):**

- Access resource manager (ARM) shelf
- Metallic distribution shelf (MDS) assemblies
- User interface panel (UIP)
- Fan unit.

- **Host Digital Terminal (HDT) [fiber in the loop (FITL) application]:**
 - ARM shelf
 - MDS assemblies
 - High density optics shelves (HDOSs)
 - UIP
 - Fan units.
- **Host Digital Terminal (HDT) [FiberReach application]:**
 - ARM shelf
 - MDS assemblies
 - UIP
 - Fan units.
- **Central Office Terminal (COT):**
 - ARM shelf
 - MDS assemblies
 - UIP
 - Alarm and test unit (ATU) panel
 - Heat baffles.

The SLC-2000 system can contain the following shelves, panels, and assemblies depending on the terminal type:

- **ARM Shelf.** The ARM shelf provides feeder interface, bandwidth management [time slot interchange/bandwidth management processor (TSI/BMP)], and circuit maintenance features.
- **MDS Assemblies.** MDS assemblies provide DS0 distribution interfaces and interfaces for FITL.
- **UIP.** The UIP allows you to interface the system either through the display or through a craft interface terminal (CIT) connection. It also contains light-emitting diodes (LEDs) and other interfaces to communicate the status of the system.
- **HDOS.** HDOSs provide an interface between the MDS assemblies and the MSDTs.
- **ATU Panel.** The ATU panel is used on the COT version and reports alarms and trouble indicators using telemetry and audible and visual closures.
- **Fan Unit.** The fan unit provides forced air cooling for system and equipment in the frame or cabinet.
- **Heat Baffles.** Heat baffles are used in the COT version to allow the system to cool itself by natural convection.

Access Resource Manager (ARM) Shelf

The ARM shelf includes the entire synchronous optical network (SONET) and integral test head (ITH) subsystems, and a part of the digital loop carrier (DLC) subsystem. The ARM shelf is divided into the following functional groups (sections) (Figure 2-1):

- Provisioning and display controller (PDC) complex
- SONET feeder
- DS1 distribution
- DS1/virtual tributary (VT) feeder interfaces
- Bandwidth management complex
- ITH
- UIP.

Provisioning and Display Controller (PDC) Complex

Figure 2-2 shows the location of the PDC complex in the ARM shelf and its slots:



NOTE:

While the system memory unit (SMU) or PDC is failed or when it has been removed from the shelf, do not remove other circuit packs from the DLC subsystem or perform any provisioning functions.

PDC Slot

The BBF240 or BBF241 PDC is a microprocessor-controlled circuit pack that provides high-level control of user interactions with the system. Software on this circuit pack is installed from the SMU. Failure of a PDC does not affect service. However, while the PDC is failed, the UIP and CIT interfaces are unavailable for any operation, administration, maintenance, and provisioning (OAM&P) activities, and no alarms will be reported.

The BBF240 is used with Releases 3.1, 3.2, and 3.3. The BBF241 is used with Release 4.0 and later.

The PDC collects alarm information and reports it through indicators and the UIP alphanumeric display. It also controls the dialog between the UIP or CIT and the system. The PDC shares control with the system controller (SYSCTL) located in the SONET feeder section.

System Memory Unit (SMU) Slot

The BBF261 SMU contains the DLC subsystem software for the *SLC-2000* Access System. Failure of an SMU does not affect service as long as the system is not installing software when the failure occurs.

The SMU and a working PDC must be present in the ARM shelf to ensure that the common circuit packs in the DLC subsystem will have the correct software. If a controller pack in the DLC subsystem [PDC, TSI/BMP, virtual tributary unit (VTU), metallic distribution controller (MDC)] is inserted with no software or with incompatible software, the system automatically installs the DLC software from the SMU into the circuit pack when the SMU is enabled.

Software is downloaded to the SMU from floppy disks using a personal computer as a CIT. Installation of the software into the DLC subsystem is enabled using UIP or CIT commands.

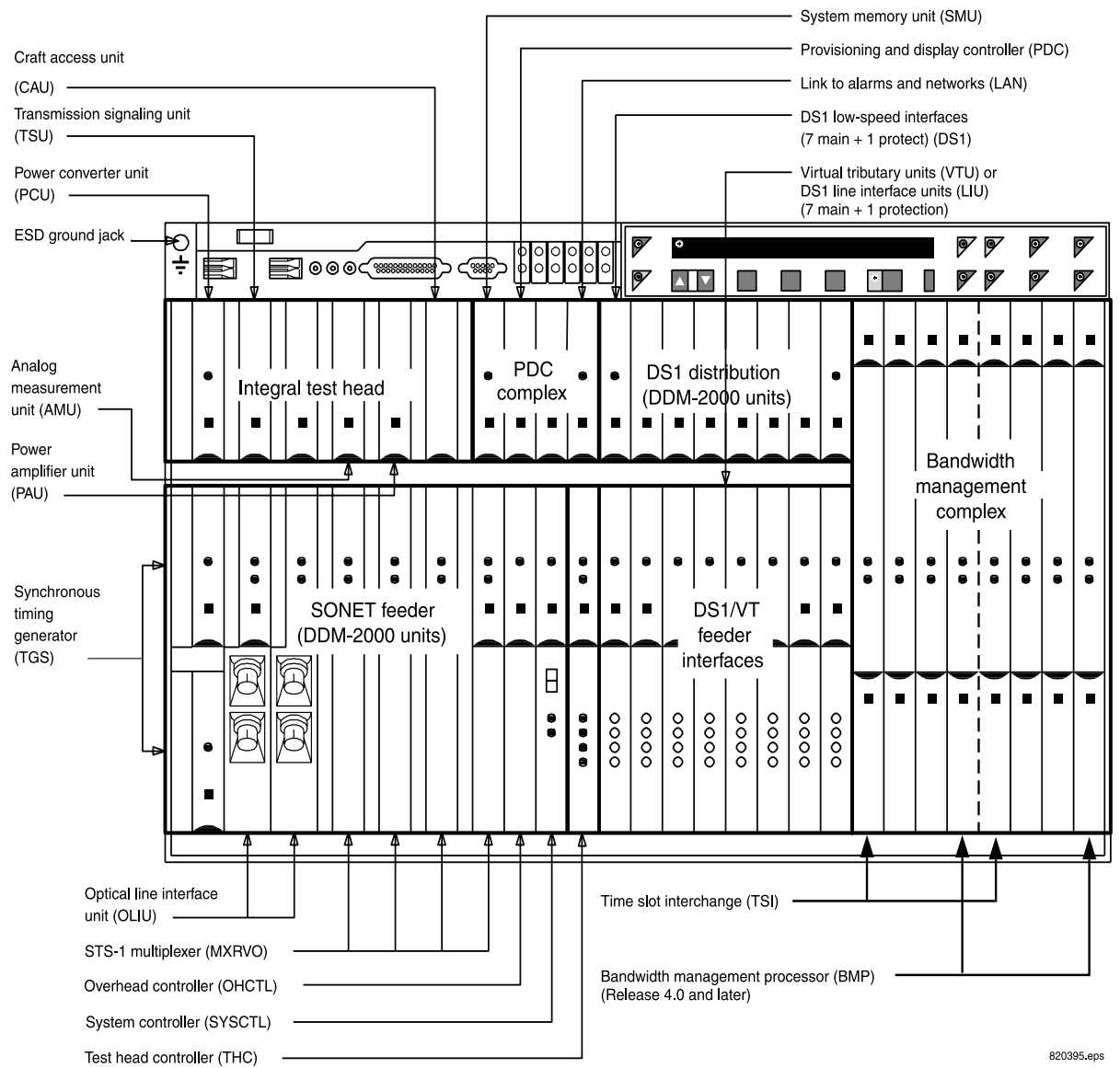
Link to Alarms and Networks (LAN)

The BBF250 LAN card is required at the COT. It is needed at the RT only if an external remote test unit (RTU) is to be used for special services testing or if access to the rear CIT port is needed. It provides the interface to the following three ARM control ports:

- **Rear CIT Port (J182) (Release 3.2 and later).** This port provides an EIA-232 interface for the CIT. It is configured as a data terminal equipment (DTE) interface. You may connect a modem to this interface for remote CIT operations. A null modem, providing the following connections, is required for connection of a CIT directly to this port:

Side 1	Side 2
Transmit Data	Receive Data
Receive Data	Transmit Data
Data Terminal Ready	Data Set Ready

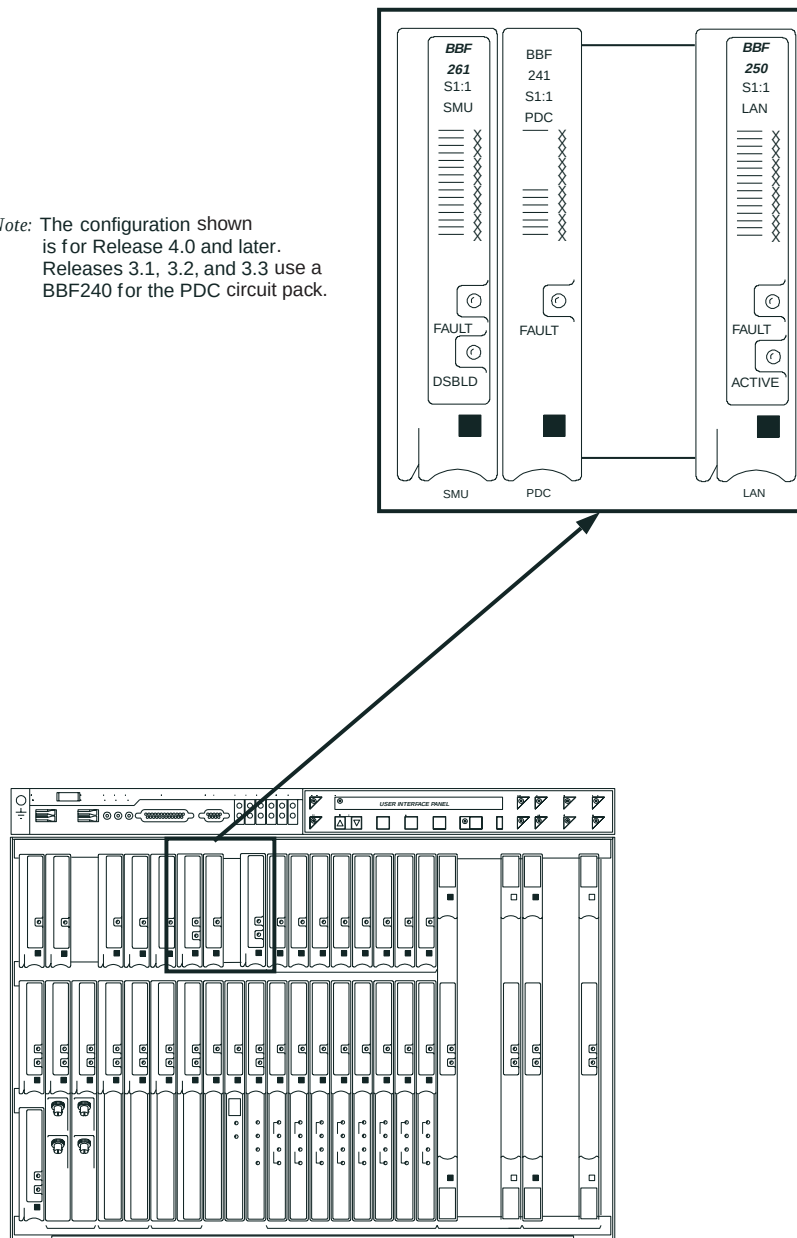
- **1A ATU Control Port (J183) (Release 3.2 and later).** This port provides the interface between the ARM shelf and the ATU panel.
- **RTU Control Port (J44).** This port provides an interface between the ARM shelf and an external RTU for special service testing.



820395.eps

Figure 2-1. Access Resource Manager (ARM) Shelf Slots

Note: The configuration shown is for Release 4.0 and later. Releases 3.1, 3.2, and 3.3 use a BBF240 for the PDC circuit pack.



pdcR4.eps

Figure 2-2. PDC Complex

Synchronous Optical Network (SONET) Feeder Section

Figure 2-3 shows the SONET feeder section in the ARM shelf and its slots.

System Controller (SYSCTL) Slot

The system controller (SYSCTL) and the overhead controller (OHCTL) supervise the circuit packs in the SONET feeder and DS1 distribution sections of the ARM shelf. Failure of the system controller does not affect service. However, while the system controller is in a failed condition or has been removed from the shelf, do not remove other circuit packs from the SONET subsystem.

The system controller handles part of the user interface to the SONET circuit packs, including virtual tributary unit/line interface unit (VTU/LIU) protection switching and control of the craft interface terminal (CIT) dialog (shared with the PDC). Also, the system controller terminates the alarm inputs for the power minor (PMN) alarm, external minor, and 14 miscellaneous alarms.

There are two versions of the SYSCTL depending on the SONET subsystem software release:

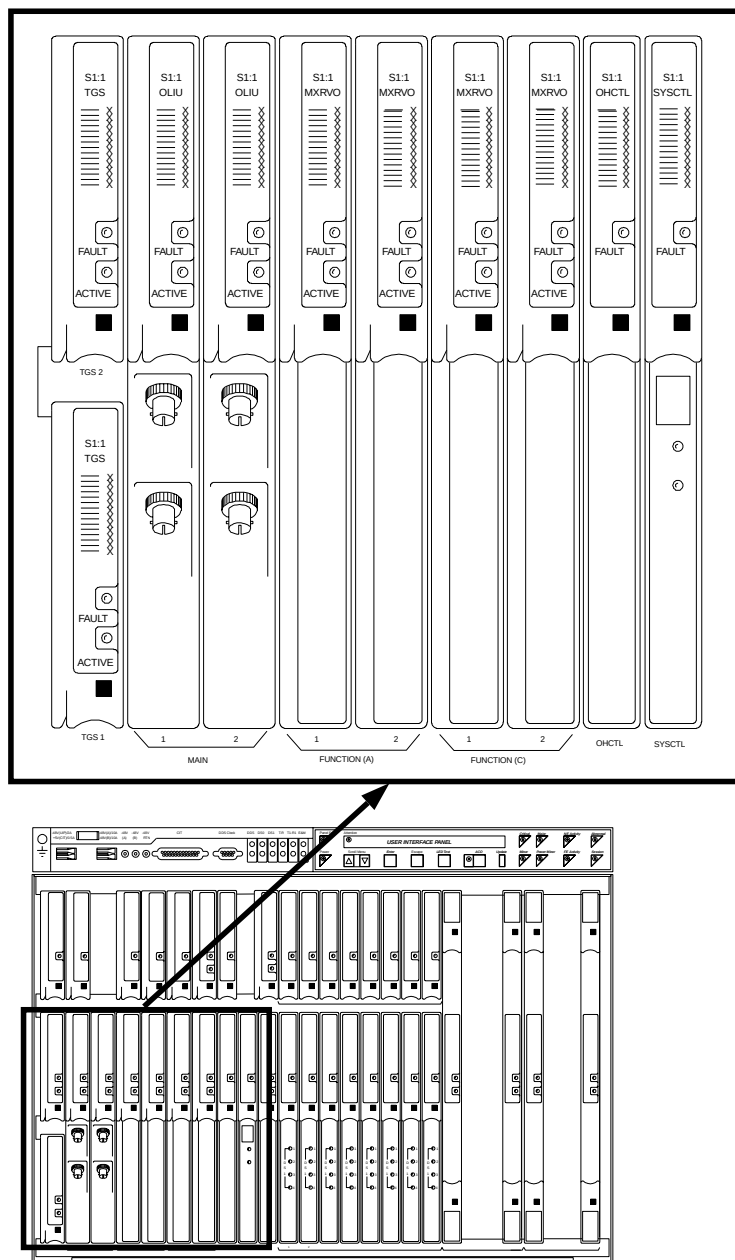
- **SONET Subsystem Software Release 7.2 and earlier:** These software releases use the BBG5 SYSCTL. It has option switches that set system parameters and identification. The user may override some switch settings with the UIP and/or CIT. Default settings are provided.
- **SONET Subsystem Software Release 9.0 and later:** These software releases use the BBG8 SYSCTL. Unlike the BBG5, this controller only has two sets of option switches that set the following:
 - Product identification
 - Telemetry byte-oriented serial (TBOS) termination.

All other parameters normally set by hardware switches on the BBG5 are now set using the CIT.



NOTE:

Never update the system with the UPD/INT button on the SYSCTL circuit pack. To update the system, use the **Update** button on the UIP.



sonetR4.eps

Figure 2-3. SONET Feeder Section

Overhead Controller (OHCTL) Slot

The overhead controller (OHCTL) and the system controller provide control and interface functions for the SONET subsystem. Failure of the overhead controller does not affect service. However, while the overhead controller is in a failed condition or has been removed from the shelf, do not remove other circuit packs from the SONET subsystem. The overhead controller terminates the overhead channel from the MAIN slots (and the FUNCTION slots when OC-3 extensions are used). The SONET overhead channel includes a 19.2-kb/s data communications channel (DCC) and 64-kb/s order-wire channel.

There are two versions of the OHCTL depending on the SONET subsystem software releases:

- ***SONET Subsystem Software Release 7.2 and earlier:*** BBG7
- ***SONET Subsystem Software Release 9.0 and later:*** BBG9.

Synchronous Timing Generator (TGS) Slots

The BBF2 or BBF2B TGS circuit pack provides loop-timing, external timing, or free-running synchronization for the SONET feeder. The circuit pack is protected using a 1x1 configuration (TGS 1 and TGS 2).

Main and Function Unit Slots

The MAIN slots provide the OC-3 interface for the SONET feeder in linear, ring, and add/drop applications. The function unit slots provide two multiplexer groups:

- The "A" SONET multiplexer group (FUNCTION A) — interfaces with the DLC subsystem
- The "C" SONET multiplexer group (FUNCTION C) — supports the following:
 - Digital services (DS1, DS3, etc.)
 - Optical extensions (OC-3, IS-3, OC-1)
 - Electrical extensions (EC-1).

The FUNCTION A slots are equipped with VT to STS-1 multiplexer (MXRVO) units that interface the DLC subsystem.

The FUNCTION C slots support MXRVO multiplexer units for DS1 distribution applications or optical line interface units (OLIUs) for linear drop applications. In VT1.5 path switched ring applications, the FUNCTION C slots may be equipped with MXRVO multiplexer units. FUNCTION C slots also support DS3 and STS1E (EC-1) circuit packs.

In SLC-2000 Software Release 4.4 and later, FUNCTION C can contain 27G-U OLIUs. These OLIUs can provide a "host" for the DDM-2000 FiberReach wideband shelf (WBS) OC-1 ring (SONET subsystem Software Release 9.0 and later). When used in this configuration, the WBS uses FUNCTION C for an X.25 interface. It also derives its timing from the TGS circuit packs in the ARM shelf.

Since they affect service, the MAIN, FUNCTION A, and FUNCTION C slots are protected using a 1x1 configuration.

Optical Line Interface Unit (OLIU) Operation

Transmit Direction. The STS-1 router selects three of the STS-1 signals received from other main and function unit slots or from the VT1.5 cross-connection, depending on the application. In VT1.5 cross-connect applications, SONET *path* overhead is added before the STS-1 signals are sent to the multiplexer. The multiplexer circuitry takes the three STS-1 signals from the output of the router, adds SONET *transport* overhead, then byte-interleaves and scrambles the signal in a frame synchronous scrambler. The output from the multiplexer is an STS-3 format and is used to amplitude modulate the laser or LED transmitter, which converts the electrical signal to a non-return to zero (NRZ)-encoded OC-3 or IS-3 optical signal, respectively.

When interfacing an OC-12 signal, the SLC-2000 ARM shelf must be equipped with 24G-U OLIUs. A description of the 24G-U OLIU is presented later in this chapter.

Receive Direction. In the receive direction, the optical receiver converts the light pulses from an NRZ-encoded OC-3 or IS-3 signal to equivalent electrical pulses. The output from the optical receiver goes into a timing recovery device. The device recovers received clock (155.520 MHz) and uses it to re-time the received data. The demultiplexer circuit accepts the re-timed STS-3 bit stream, frames on the incoming signal, descrambles it, demultiplexes it into three STS-1 signals, and processes SONET transport overhead. The overhead information is sent to the SYSCTL by means of the intrashelf control bus and the transport overhead channel interface.

The STS-1 outputs from the demultiplexer are sent to the pointer processor that performs pointer interpretation and generation on each received STS-1 using the local timing signals. The output of the pointer processor is three STS-1 signals, frame synchronous to each other. The STS-1 router sends each of the three STS-1 signals to the main or function unit slots or VT1.5 pointer processor, as appropriate.

In VT1.5 cross-connect applications, VT1.5 pointer processing is done on each STS-1 that is to be VT1.5 cross-connected. STS-1 path overhead termination is also done on these VT1.5 bases signals. STS-1s that do not require VT1.5 cross-connections are passed through without VT1.5 pointer processing or STS-1 path overhead termination. The output from the VT1.5 pointer processor is sent to the STS-1/VT1.5 router. The router cross-connects the appropriate VT1.5 tributaries and sends each of the three STS-1 signals to the appropriate main or function unit slots.

Control Functions. The OLIUs provide maintenance elements for reporting circuit pack status, status of the incoming optical and electrical signals, as well as inventory information (*COMMON LANGUAGE** *CLEI* code, date of manufacture, etc.). The OLIUs also process transport overhead and respond to control signals from the SYCTL for functions such as STS-1 routing, protection switching, and LED lighting. If VT1.5 cross-connected, the 22-type OLIUs also process path overhead and provide VT1.5 routing functions.

Maintenance Signal Functions. The OLIU circuit pack provides maintenance signaling for the STS-1 path alarm indication signals (AIS), OC-3 line AIS, STS-1 path unequipped, and line far-end-receive failure (FERF) signals. The 22-type OLIUs (if VT1.5 cross-connected) also provide maintenance signaling for VT1.5 path AIS and STS-1 path yellow signals.

OLIU Applications

The code of the OLIUs used in the main or function slots generally depends on several factors, as follows:

- System application (linear, ring, add/drop)
- Fiber mode (single-mode or multimode)
- Fiber connection (*ST*[®] lightguide cable connectors or universal optical connectors).

Table 2-1 highlights the differences between each code of OLIU.

For details of any of the OLIUs, refer to one of the following documents depending on the SONET subsystem software release:

- **SONET Software Release 7.2 and earlier:** 363-206-202, *DDM-2000 OC-3 Multiplexer, User/Service Manual, Releases 2, 3, 5, 6, and 7, Volume I*
- **SONET Software Release 9.0 and later:** 363-206-280, *DDM-2000 OC-3 Multiplexer, User/Service Manual, Releases 8 and 9, Volume I.*

* *COMMON LANGUAGE* is a registered trademark and *CLEI*, *CLLI*, *CLCI*, and *CLFI* are trademarks of Bell Communications Research, Inc.

Table 2-1. Optical Line Interface (OLI) Comparison

OLI Code	System Application	Reach	Fiber Mode	Connector	Typical SLC®-2000 Slot Location
21D	OC-3 Linear	Short	Multimode	ST® lightguide	Main
21D-U	OC-3 Linear	Short	Multimode	Universal optical	Main
21G	OC-3 Linear	Long	Single- or multimode	ST lightguide	Main
21G-U	OC-3 Linear	Long	Single- or multimode	Universal optical	Main
22D-U	OC-3 Linear or ring	Short	Multimode	Universal optical	Main
22F	OC-3 Linear or ring	Intermediate	Single- or multimode	ST lightguide	Main
22G-U/ 22G2-U	OC-3 Linear or ring	Long	Single- or multimode	Universal optical	Main
24G-U	OC-12 Ring	Long	Single-mode	Universal optical	Main
26G2-U	OC-1 Ring	Intermediate	Single- or multimode	Universal optical	Function C
27G2-U	OC-1 Ring	Long	Single- or multimode	Universal optical	Main or Function C

21D/21D-U Optical Line Interface Unit (21D/21D-U OLI). The 21D/21D-U OLI circuit pack multiplexes three STS-1 signals to an STS-3, inserts the SONET transport overhead bytes (line and section), and scrambles the resulting signal. This STS-3 signal drives an LED transmitter to create the IS3 output.

The received IS3 signal is converted back to an electrical STS-3. This STS-3 signal is descrambled and demultiplexed to three STS-1 signals, and transport overhead is accessed. Some of the overhead (for example, section datacom channel) is passed by means of serial data links to the control packs, while other bytes (for example, framing, parity check) are processed on-board. The STS-1 signals go through a pointer processor to guarantee frame alignment to the local system clock before being routed to the other main and function unit slots.

The 21D/21D-U OLI circuit pack provides timing signals to and receives timing signals from the TGS circuit packs.

Fiber access for the 21D OLI is by means of a pair of ST lightguide cable connectors from the 21D OLI circuit pack faceplate. A faceplate-mounted universal optical connector allows the 21D-U OLI to accept fiber terminated with ST, SC, or FC connectors. The 21D-U OLI comes with a 0-dB ST buildout.

Various combinations of buildouts and connectors are also available. The 21D/21D-U OLIU circuit pack provides cost-effective interconnect for intraoffice applications and is used only for DDM-2000 OC-3 and OC-12 interworking over multimode fiber.

21G/21G-U Optical Line Interface Unit (21G/21G-U OLIU). The 21G/21G-U OLIU multiplexes three STS-1 signals to an STS-3, inserts the SONET transport overhead bytes (line and section), and scrambles the resulting signal. This STS-3 signal drives the laser transmitter to create the OC-3 output.

The received OC-3 signal is converted back to an electrical STS-3. This STS-3 is descrambled and demultiplexed to three STS-1 signals, and transport overhead is accessed. Some of the overhead (for example, section datacom channel) is passed by means of serial data links to the control packs, while other bytes (for example, framing, parity check) are processed on-board. The STS-1 signals go through a pointer processor to guarantee frame alignment to the local system clock before being routed to the other Main and Function Unit slots.

The 21G/21G-U OLIU circuit pack provides timing signals to and receives timing signals from the TGS circuit packs.

Fiber access for the 21G OLIU is by means of a pair of *ST* lightguide cable connectors from the OLIU circuit pack faceplate. A faceplate-mounted universal optical connector allows the 21G-U OLIU to accept fiber terminated with *ST*, *SC*, or *FC* connectors. Various combinations of buildouts and connectors are also available. The 21G/21G-U OLIU photonics comply with SONET long-reach specifications. While single-mode fiber is suggested for optimum performance, multimode facilities are also supported.

22D-U Optical Line Interface Unit (22D-U OLIU). The 22D-U OLIU circuit pack multiplexes three STS-1 signals to an STS-3, inserts the SONET transport overhead bytes (line and section), and scrambles the resulting signal. This STS-3 signal drives an LED transmitter to create the IS3 output.

The received IS3 signal is converted back to an electrical STS-3. This STS-3 is descrambled and demultiplexed to three STS-1 signals, and transport overhead is accessed. Some of the overhead (for example, section datacom channel) is passed by means of serial data links to the control packs, while other bytes (for example, framing, parity check) are processed on-board. The STS-1 signals go through a pointer processor to guarantee frame alignment to the local system clock before being routed to the other Main and Function Unit slots.

If an incoming STS-1 signal from the fiber is to be VT1.5 cross-connected, VT1.5 pointer-processing is performed on this pack and STS-1 path overhead termination is performed on these signals. All signals entering this pack from either the backplane or from the optical interface may be routed as STS-1s. If appropriate, VT1.5 routings may be established between STS-1s using a VT1.5 cross-connection.

The 22D-U OLIU circuit pack provides timing signals to and receives timing signals from the TGS circuit packs.

22F Optical Line Interface Unit (22F OLIU). The 22F OLIU circuit pack multiplexes three STS-1 signals to an STS-3, inserts the SONET transport overhead bytes (line and section), and scrambles the resulting signal. This STS-3 signal drives the laser transmitter to create the OC-3 output.

The received OC-3 signal is converted back to an electrical STS-3. This STS-3 is descrambled and demultiplexed to three STS-1 signals, and transport/path overhead is accessed. Some of the overhead (for example, section datacom channel) is passed by means of serial data links to the control packs, while other bytes (for example, framing, parity check) are processed on-board. The STS-1 signals go through a pointer processor to guarantee STS-1 frame alignment to the local system clock before being routed to the other Main and Function Unit slots.

If an incoming STS-1 signal from the fiber is to be VT1.5 cross-connected, VT1.5 pointer-processing is performed on this pack and STS-1 path overhead termination is performed on these signals. All signals entering this pack from either the backplane or from the optical interface may be routed as STS-1s. If appropriate, VT1.5 routings may be established between STS-1s using a VT1.5 cross-connection.

The 22F OLIU circuit pack provides timing signals to and receives timing signals from the TGS circuit packs.

Fiber access for the 22F OLIU is by means of a pair of *ST* lightguide cable connectors from the OLIU circuit pack faceplate. The 22F OLIU photonics comply with SONET intermediate-reach specifications. While single-mode fiber is suggested for optimum performance, multimode facilities are also supported as long as a single-mode jumper is placed between the 22F OLIU optical output connector and the multimode fiber. The 22F OLIU provides full VT1.5 and STS-1 add/drop capability. If the VT1.5 signals in an incoming STS-1 are to be cross-connected, the 22F OLIU pack provides VT1.5 pointer processing and STS-1 path termination for that STS-1 signal. All VT1.5 signals that enter the 22F OLIU, whether from the backplane or the optical interface, may be cross-connected to STS-1 signals.

The 22F OLIUs cannot be mixed with 21G or 21D OLIUs within a *SLC-2000* ARM shelf. The 22F and 21G OLIUs are compatible, however, at opposite ends of a point-to-point system. The 22F OLIU supports shorter optical span lengths than the 21G OLIU.

22G-U/22G2-U Optical Line Interface Unit (22G-U/22G2-U OLIU). The 22G-U/22G2-U OLIU circuit pack multiplexes three STS-1 signals to an STS-3, inserts the SONET transport overhead bytes (line and section), and scrambles the resulting signal. This STS-3 signal drives the laser transmitter to create the OC-3 output.

The received OC-3 signal is converted back to an electrical STS-3. This STS-3 is descrambled and demultiplexed to three STS-1 signals, and transport/path overhead is accessed. Some of the overhead (for example, section data communications channel) is passed by means of serial data links to the control packs, while other bytes (for example, framing, parity check) are processed on-board. The STS-1 signals go through a pointer processor to guarantee STS-1 frame alignment to the local system clock before being routed to the other Main and Function Unit slots.

If an incoming STS-1 signal from the fiber is to be VT1.5 cross-connected, VT1.5 pointer-processing is performed on this pack and STS-1 path overhead termination is performed on these signals. All signals entering this pack from either the backplane or from the optical interface may be routed as STS-1s. If appropriate, VT1.5 routings may be established between STS-1s using a limited VT1.5 cross-connection.

The 22G-U/22G2 OLIU circuit pack provides timing signals to and receives timing signals from the TGS circuit packs.

24G-U Optical Line Interface Unit (24G-U OLIU). The 24G-U OLIU circuit pack used in the SONET subsystem of the ARM shelf interfaces with a 1310-nm OC-12 optical line in the transmit and receive directions. The 24G-U has the following similar functions with the 22-type OLIU circuit packs except that it supports OC-12 long-reach applications:

- Add/Drop configurations
- Ring configurations with its VT1.5 and STS-1 capabilities.

The distributed feedback laser supplies an NRZ-coded signal. Optical transmit power is monitored by a companion device to the laser transmitter that monitors the backface diode current and adjusts the laser diode bias current to maintain a constant average optical power output. This mechanism corrects any power variations because of laser aging or environmental conditions.

A pair of ST, SC, or FC-PC lightguide connectors on the faceplate provide access to the fiber. Because of the increased data rates, this OLIU interfaces with single-mode fiber only.

The 24G-U OLIU's time slot interchange (TSI) performs cross-connections from the MAIN slot and it has access to the entire capacity of the OC-12 signal. Up to three of the 12 STS-1s in the OC-12 are available to the TSI, but all 12 STS-1s are passed through a faceplate connector to the 24G-U in the other MAIN slot for ring functionality.

The TSI function for STS-1 channel is provisionable for VT1.5 or STS-1 operations. When VT1.5 cross-connections are performed, STS-1 path overhead is inserted and accessed. In addition to these cross-connect functions, the TSI provides VT1.5 and STS-1 path selection (protection switching) between MAIN slots 1 and 2 for self-healing ring applications. This path selection is based on hard failures as well as VT1.5/STS-1 signal bit error rate (BER) degradation.

In the transmit direction, STS-1 signals from the backplane first encounter the TSI function. In the MAIN slot, the TSI is controlled by user provisioning. It connects time slots from function group A toward the MAIN fiber, or back to function group C. Incoming time slots from function group C may be connected back out to A (dropped traffic) or connected to the MAIN OC-12 transmitter.

The three STS-1 outputs of the TSI are cross-connected with the 12 STS-1s from the companion 24G-U passed in from the faceplate connector. The pointers are aligned and transport overhead is inserted. Finally, these 12 STS-1 signals are multiplexed to an STS-12 signal (622 Mb/s), that is converted to the transmitted OC-12 optical signal.

In the receive direction, the incoming OC-12 optical signal is converted to an electrical STS-12 signal and demultiplexed to 12 STS-1 signals, and the transport overhead bytes are extracted. After pointers are realigned to the local system clock, three of the 12 STS-1s are selected for input to the TSI and all 12 STS-1s are passed through the faceplate connector to the companion 24G-U in the other MAIN slot. The TSI cross-connects time slots from the fiber to the function unit time slots.

26G2-U Optical Line Interface Unit (26G2-U OLIU). The 26G2-U OLIU circuit pack interfaces with a 1310 nm OC-1 optical line in the transmit and receive directions and supports SONET subsystem self-healing ring configurations through its VT1.5/STS-1 TSI capabilities. The 26G2-U OLIU circuit pack photonics exceed the SONET span lengths specified for the intermediate reach requirements. Fiber access is by means of a pair of universal optical connectors. While a single mode fiber is suggested for optimum performance, multimode facilities are also supported.

The 26G2-U OLIU is installed in Function Unit C of the ARM shelf. It provides an interface between an OC-1 optical line and electrical VT-G signals. In the Transmit direction, it multiplexes up to seven VT-G signals from the low-speed slots into an STS-1 signal. VT1.5 signals can be cross-connected and switched as needed. The SONET path overhead, as well as transport overhead bytes, are added on this circuit pack. The STS-1 signal is then scrambled and converted to an OC-1 optical signal.

In the receive direction, the 26G2-U OLIU terminates an OC-1 signal, converts it into an electrical signal, recovers timing, unscrambles the signal, synchronizes with the incoming SONET STS-1 frame, and processes the overhead. Then the signal goes through STS-1 pointer interpretation and the path overhead is removed and processed. The VT-G signals are removed from the STS-1 payload and transmitted by means of the backplane to the low-speed or function slots.

27G-U Optical Line Interface Unit (27G-U OLIU). The 27G-U OLIU, for each STS-1, inserts SONET transport overhead bytes (line and section), and for VT1.5 applications, inserts STS path overhead bytes and scrambles the resulting signal. Each STS-1 signal drives a separate laser transmitter to create the two OC-1 outputs.

A received OC-1 signal is converted back to an electrical STS-1. This STS-1 is descrambled and demultiplexed and transport/path overhead is accessed. Some of the overhead (for example, section data communications channel) is passed by means of serial data links to the control packs, while other bytes (for example, framing, parity check) are processed on-board. The STS-1 signals go through a pointer processor to guarantee STS-1 frame alignment to the local system clock before being routed to the other Main and Function Unit slots.

If an incoming STS-1 signal from the fiber is to be VT1.5 cross-connected, VT1.5 pointer-processing is performed on this pack and STS-1 path overhead termination is performed on these signals. All signals entering this pack from either the backplane or from the optical interface may be routed as STS-1s. If appropriate, VT1.5 routings may be established between STS-1s using a limited VT1.5 cross-connection.

Each 27G-U OLIU circuit pack provides timing signals to and receives timing signals from the TGS circuit packs.

Multiplexer Applications

The FUNCTION A slots are equipped with multiplexer units that convert the virtual tributary groups (VT-Gs) (containing the DS1s) into an STS-1 signal.

VT to STS-1 Multiplexer (MXRVO)

The VT to STS-1 BBG2 multiplexer circuit pack (MXRVO) multiplexes seven VT-G signals from the VTU packs (in the DS1/VT feeder interface) or from the DS1 packs (in the DS1 distribution section) into an STS-1 signal.

DS1 Low-Speed Interface Section (Eight Slots)

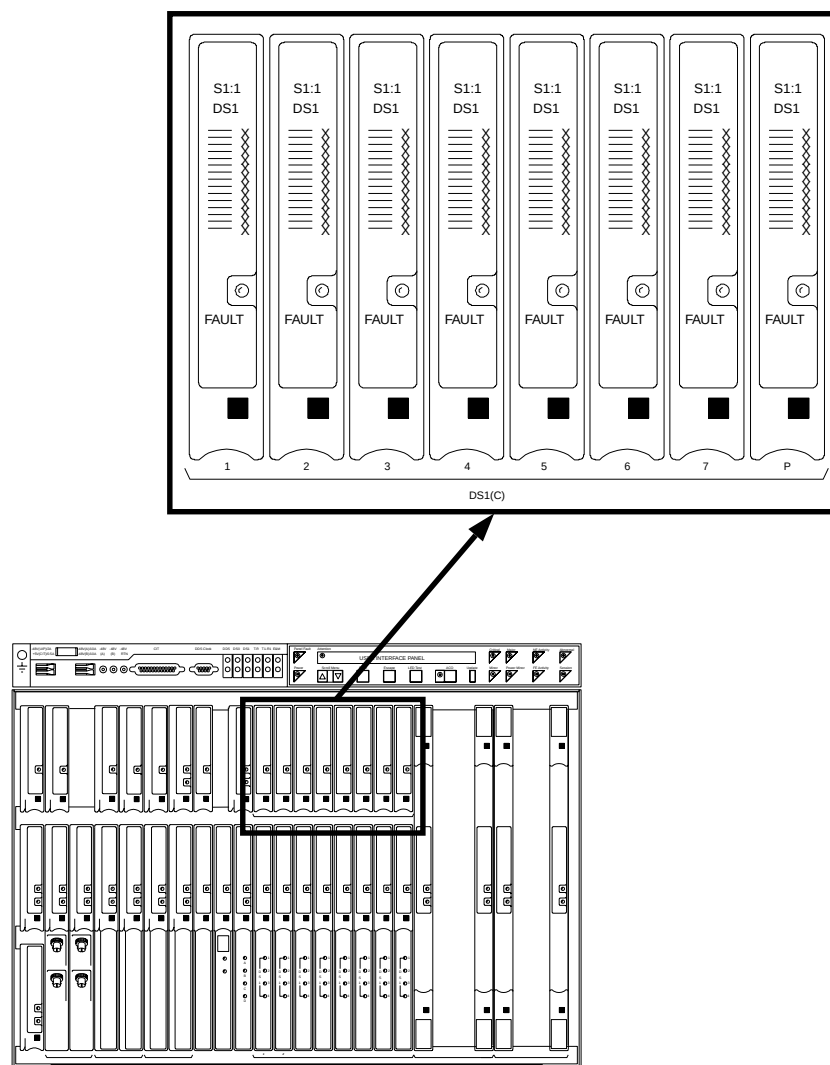
The DS1 low-speed interface section (Figure 2-4) provides DS1 distribution from the "C" SONET multiplexer group (FUNCTION C) for up to 28 DS1 *pipes* (customer DS1 inputs). Each slot in this section accepts up to four DS1 signals (at standard DSX-1 levels) for clear channel transport.

The slots are protected using a 1xN configuration, where N = 1 to 7 depending on the number of equipped slots. The 177A retainer card is used in the empty slots in this section so that protection switching will operate properly. If the retainer card is not used, transmission may be corrupted. The maximum number of circuit packs in this section is eight (1 through 7 service plus P for protection).

The DS1 circuit pack (BBF1B or BBF3) interfaces the DSX-1 on the *low-speed* side and the "C" SONET multiplexer group on the *high-speed* side. The DS1 circuit pack multiplexes four external DS1 interfaces into a SONET virtual tributary (VT) group (VT-G) signal. The VT-G is an intermediate step in multiplexing between DS1 and STS-1 signals and contains four DS1 signals.

In the transmit direction, four DS1 signals are mapped into floating mode asynchronous VT1.5s with VT path overhead then multiplexed into the VT-G signal. The VT-G signal is sent to the STS-1 multiplexer circuit pack (MXRV0 for the "C" SONET multiplexer group).

In the receive direction, a VT-G received from the STS-1 multiplexer circuit pack is demultiplexed into four VT1.5 signals and passed through circuitry to interpret VT pointers and access path overhead. Finally, the DS1 payload is extracted from each VT1.5 and transmitted to the DSX-1.



ds1pipe.eps

Figure 2-4. DS1 Low-Speed Interface Section

Feeder Section (DS1/VT Feeder Interface) (Eight Slots)

The DS1/VT feeder interface section (Figure 2-5) interfaces between the core (bandwidth section) and the SONET feeder or DS1 feeder (DSX-1) interface.

- **For SONET configurations:** This section contains the virtual tributary units (VTUs) that convert the SONET VT-Gs to the internal transmission format for the bandwidth management complex.
- **For DS1 feeder configuration:** This section contains metallic DS1 feeder cards, also called line interface units (LIUs).

Slot protection: The slots are protected using a 1xN configuration, where N=1 to 7 depending on the number of equipped slots. The maximum number of circuit packs in this section is eight (1 through 7 service plus P for protection).

The VTU/LIU circuit terminates feeder DS1 signals. The VTU/LIU detects and reports failures associated with the DS1 signals such as alarm indication signals (AISs) and loss of frame (LOF). The DS1 indicators on the VTU/LIU faceplate (Figure 2-5) show failure of the DS1 inputs to the VTU/LIU and indicate received TR-08 digroup alarms and TR-303/integrated network access (INA) received yellow alarms.

At least one working CORE* must be present in the bandwidth management complex for the VTU/LIU to operate properly. The SYSCTL and PDC also are required to power up a VTU/LIU. The system automatically installs the software on the VTU/LIU from the system memory unit (SMU) when the VTU/LIU is inserted into the shelf and the SMU is enabled.

To change the system configuration to SONET or DS1 feeder, use the **SET-FEEDER** command on the UIP.

Virtual Tributary Unit (VTU)

The VTU (BBG266) provides transmission for four DS1/VT1.5 signals. It converts signals from the VT group format (between the MXRVO and VTUs) to DS1 signals in the internal format (between TSI and VTUs).

* TSI circuit pack for R3.2, TSI/BMP pair for R4.0 and later.

DS1 Line Interface Unit (LIU)

The BBG267 LIU circuit pack maps four sets of 24 DS0 channels (from the TSI/BMP) into DS1 signals for a DSX-1 cross-connection. The LIU replaces the VTU in Figure 2-5 for DS1 feeder applications. With metallic feeder, the SYSCTL (with software) and OHCTL circuit packs are required; however, the *SLC-2000* Access System is not compatible with other network elements in a SONET network.

The BBG268 retainer card is required in the empty slots in this section so that circuit pack protection switching will operate properly. If the retainer card is not used, transmission may be corrupted.

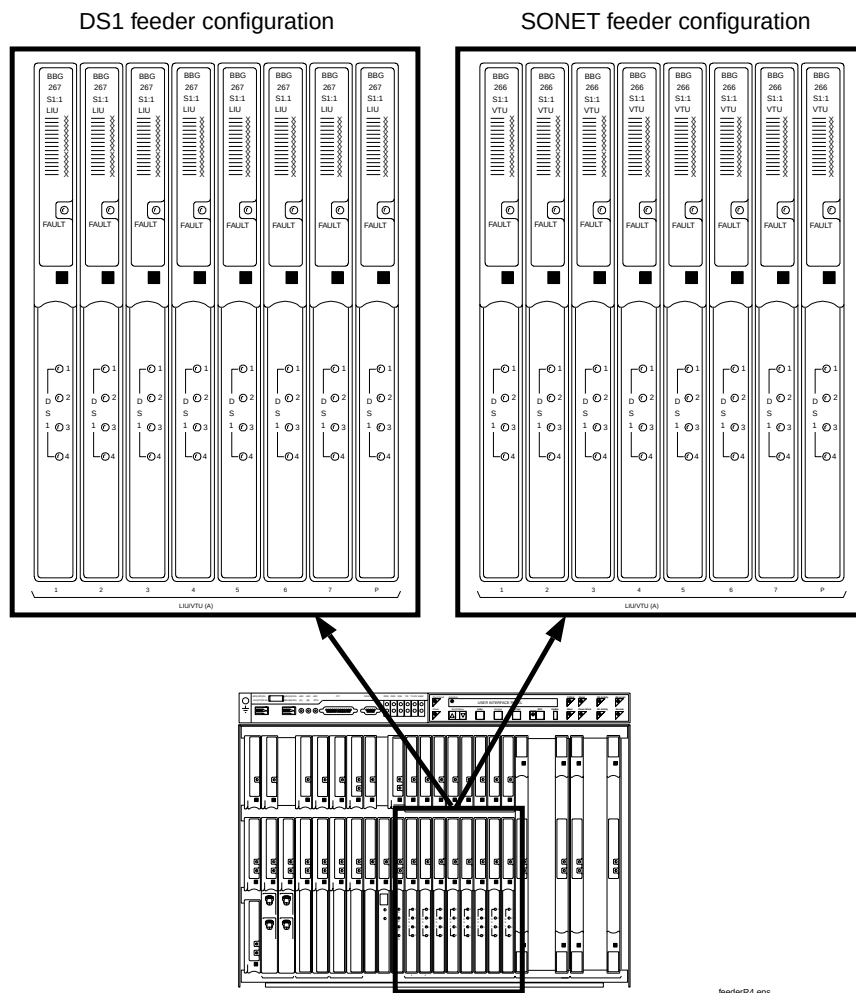


Figure 2-5. DS1/VT Feeder Interface Section

Bandwidth Management Section

The bandwidth management section is the transmission hub of the *SLC-2000* Access System and provides the interface between the SONET or DS1 feeder and the subscriber distribution. The bandwidth management section provides synchronization and time slot interchange functions. For TR-303 operation, the bandwidth management section also supports the time slot management channel (TMC) and embedded operations channel (EOC) interfaces to the local digital switch.

To ensure that call processing functions are protected from failures, the bandwidth management section contains two sides:

- CORE (1)
- CORE (2).

In Releases 3.1 and 3.2, the CORE (1) and CORE (2) slots are equipped with the TSIs shown in Figure 2-6. For Release 4.0 and later, CORE (1) and CORE (2) slots are additionally equipped with BMPs. The remaining slots are reserved for future use.

The system designates one of the COREs as *active*. The circuit packs in the active CORE will have a lighted green ACTIVE indicator. The system designates the other CORE as *standby* to provide protection for the slots in the active CORE. If the system detects a fault on a circuit pack in the active CORE, it switches all activity from the active CORE to the standby CORE. (All slots in the core are switched as a unit.)

After the system has been turned up, it executes an *automatic side switch* of the CORE at 3:00 a.m. each day for internal diagnostic purposes. For a TR-303 VRT, active jobs may be terminated with a processing failure response when the daily side switch occurs.

Time Slot Interchange (TSI) Slot

The *BDK*®250 TSI allows a nonblocking, full access, time slot interchange of a maximum number of distribution time slots (768 or 1,152) onto 672 feeder time slots. In TR-08 Mode 1 digroups, TR-303 VRTs, and integrated network access (INA) DS1s, the TSI allows any distribution channel to be mapped to any feeder channel. It also supports the following bandwidth management applications:

- Grooming of nonswitched special services to INA DS1s
- Shedding of the unused bandwidth in fiber in the loop (FITL) and fractional DS1 applications such as:
 - With FITL, where the service assigned will likely be 12- and 24-line distant terminals (DTs) with widely varying applications
 - With special service circuit packs that support only single or dual circuits, the used feeder circuits are not wasted (each MDS channel unit slot will support four circuits)
 - With the re-use of *SLC* Series 5 single or dual circuit packs, feeder capacity is not lost.
- Simplifying procedures for growth, load balancing, and RT/HDT line moves with VRTs
- Automatic packing of TR-303 Integrated Services Digital Network (ISDN) D-channel quarter time slots using 4:1 time division multiplexing (Release 4.0 and later).

Bandwidth Management Processor (BMP) Slot

The *BDK*270 BMP consists of two processors that support the TR-303 interface. Both processors support the data link path switching required by TR-303 as follows:

- ***Timeslot Management Channel (TMC) processor:*** This processor supports the TMC protocol with the local digital switch for call processing. It interfaces with the channel units to detect on-hook/off-hook signaling and reports these actions to the local digital switch. It also interfaces the TSI for transmission communication and control as requested by the local digital switch (LDS).
- ***Embedded Operations Channel (EOC) processor:*** This processor supports EOC functions of TR-303. These functions include provisioning of line terminations, semipermanent time slot assignment (nailup at the RT), reporting of alarms events, circuit testing, setting of performance monitoring parameters, and reporting of performance monitoring data.

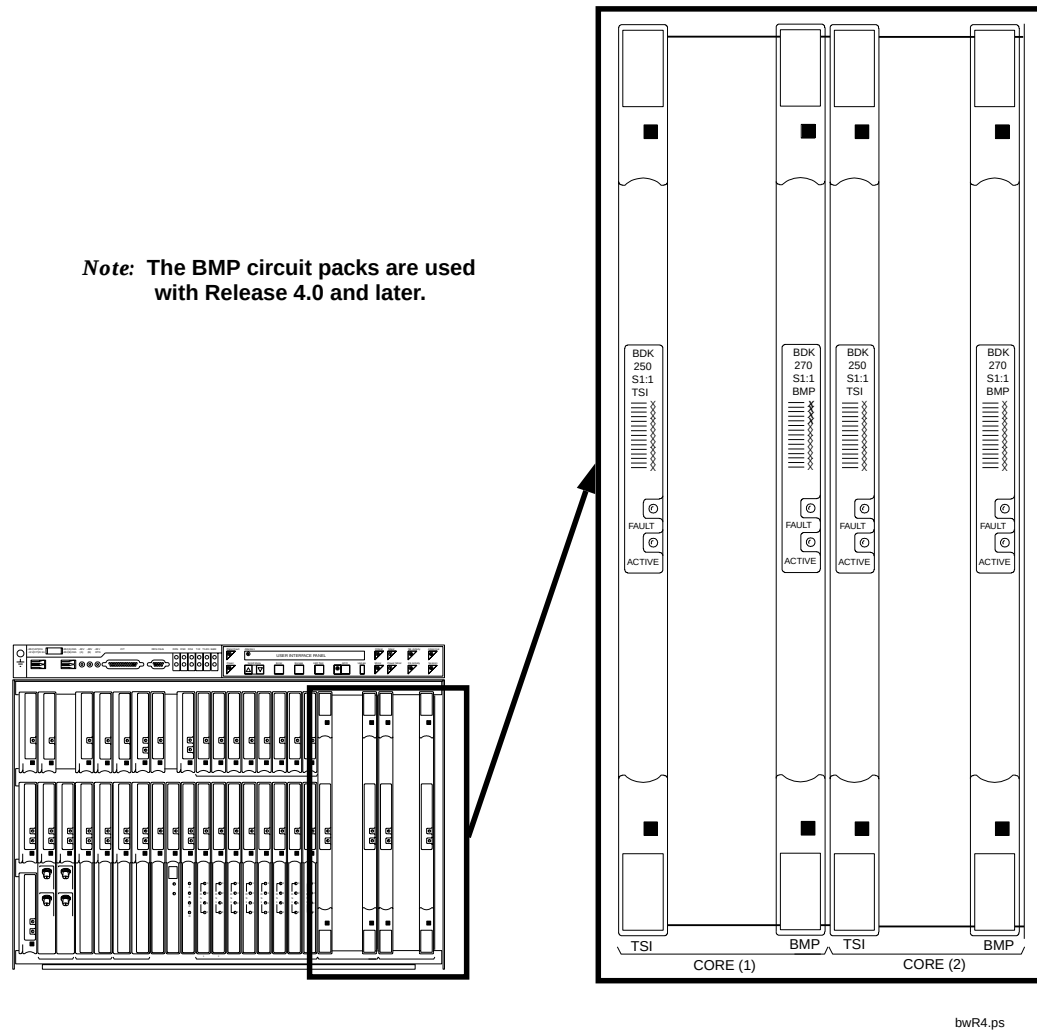
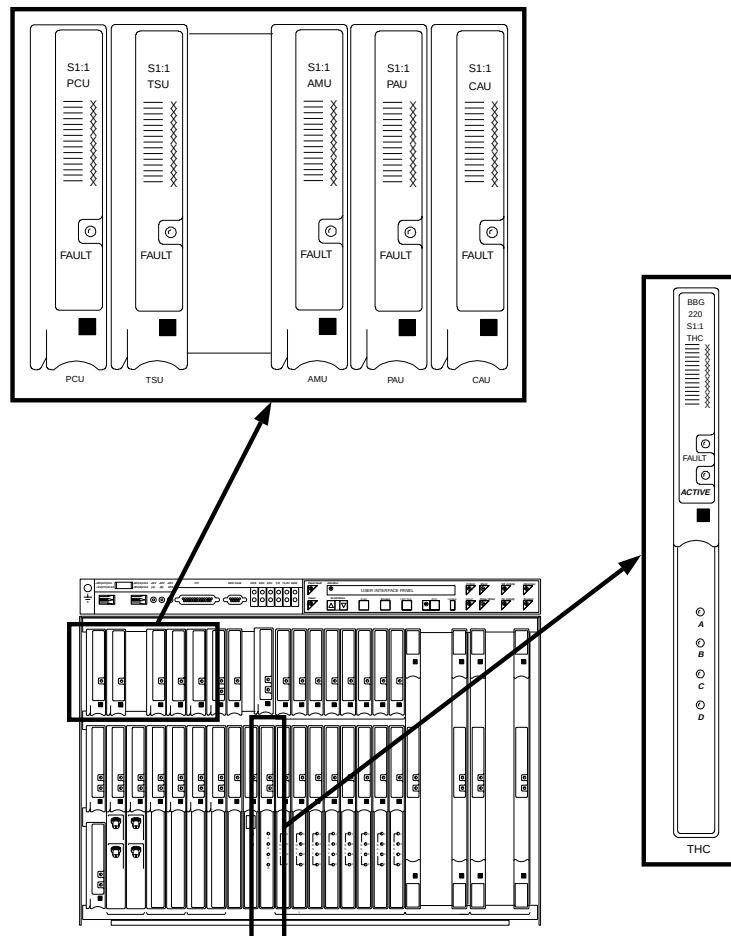


Figure 2-6. Bandwidth Management Section

Integral Test Head (ITH) Section

The ITH provides local test access. The ARM shelf contains the ITH (optional) (Figure 2-7) which consists of the following components:

- Test head controller (THC)
- Analog measurement unit (AMU)
- Power amplifier unit (PAU)
- Craft access unit (CAU)
- Transmission signaling unit (TSU)
- Power converter unit (PCU).



ithR4.eps

Figure 2-7. Integral Test Head Location

Test Head Controller (THC) Slot

The BBG220 THC is a microprocessor-based circuit pack that handles all processing and control functions for the integral test head (ITH). The THC configures the ITH measurement modules (the PAU, AMU, and TSU) for testing.

Analog Measurement Unit (AMU) Slot

The BBF221 AMU contains precision analog measurement circuits for plain old telephone service (POTS) testing. The AMU and power amplifier unit (PAU) together form the multimeter function for the ITH.

Power Amplifier Unit (PAU) Slot

The BBF222 PAU contains a programmable voltage source and works with the AMU.

Craft Access Unit (CAU) Slot

The BBF225 CAU provides maintenance personnel with local test access, metallic access, and digital data service (DDS) access through jacks located on the UIP (in response to CIT commands). The CAU is required only for local test access.

Transmission Signaling Unit (TSU) Slot

The BBF223 TSU provides a two- or four-wire transmission interface and the required signaling features such as ringing, source battery, and loop closure.

Power Converter Unit (PCU) Slot

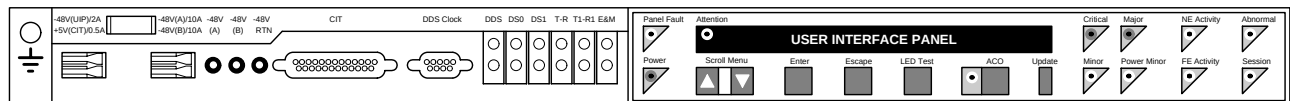
The BBF220 PCU provides power to the ITH circuit packs.

User Interface Panel (UIP)

The UIP (Figure 2-8) supports the following installation and maintenance functions:

- Alarm display
- Alarm and fault reports
- Basic provisioning
- Maintenance jacks
- Craft terminal connection.

➡ **NOTE:**
See Chapter 3, "Operations Interfaces," for detailed information on the UIP.



ipa 81386/2/01

Figure 2-8. User Interface Panel (UIP)

Alarm Test Unit (ATU) Panel (COT Only)

The ATU panel (Figure 2-9) reports alarms and trouble indicators using telemetry and audible and visual closures. It provides the following capabilities:

- Office alarm closures for audible and visual alarms
- Parallel telemetry outputs for the COT
- The interface to the pair gain test controller (PGTC) for channel testing
- DC bypass pair connections.

See Chapter 3 for more details on office alarms and parallel telemetry. Also, see document 363-208-011, *SLC-2000 Access System, Customer Assembly Manual for COT Frames*, for more details on the ATU panel.

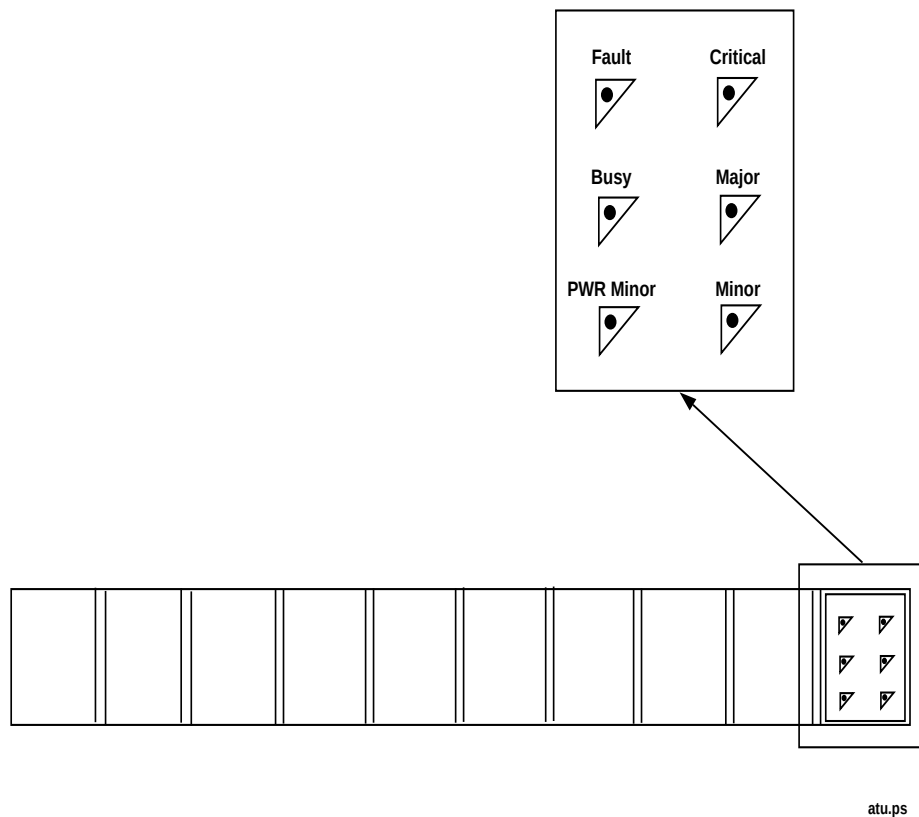


Figure 2-9. Alarm Test Unit (ATU) Panel

MDS Assembly

The metallic distribution shelf (MDS) assembly (Figure 2-10) provides control and distribution for DS0-based metallic services using common units and channel units. Also, the MDS assembly provides control and distribution for DS0-based 12- and 24-line fiber in the loop (FITL) fiber services (Figure 2-11 for Software Release 4.4 or earlier, Figures 2-12 and 2-13 for Software Release 4.5 or later) using common units and DT servers.

Each MDS assembly contains two shelves. Each shelf can be equipped for up to 96 lines and configured as a Mode 1 or Mode 2 TR-08 VRT or as part of a TR-303 VRT, with the restriction that both shelves of the MDS assembly must be assigned the same mode. The system supports up to 28 feeder DS1s for up to 768 DS0s (eight MDS assembly shelves). Concentration must be used to support all 768 lines. The system capacity can be allocated in several ways depending on the configuration.

Figure 2-10 shows an MDS assembly with both shelves provisioned for metallic distribution. The full assembly can be equipped with up to 192 lines using quad channel units that provide four channels per circuit pack. The MDS assembly also accepts the *SLC* Series 5 channel units.

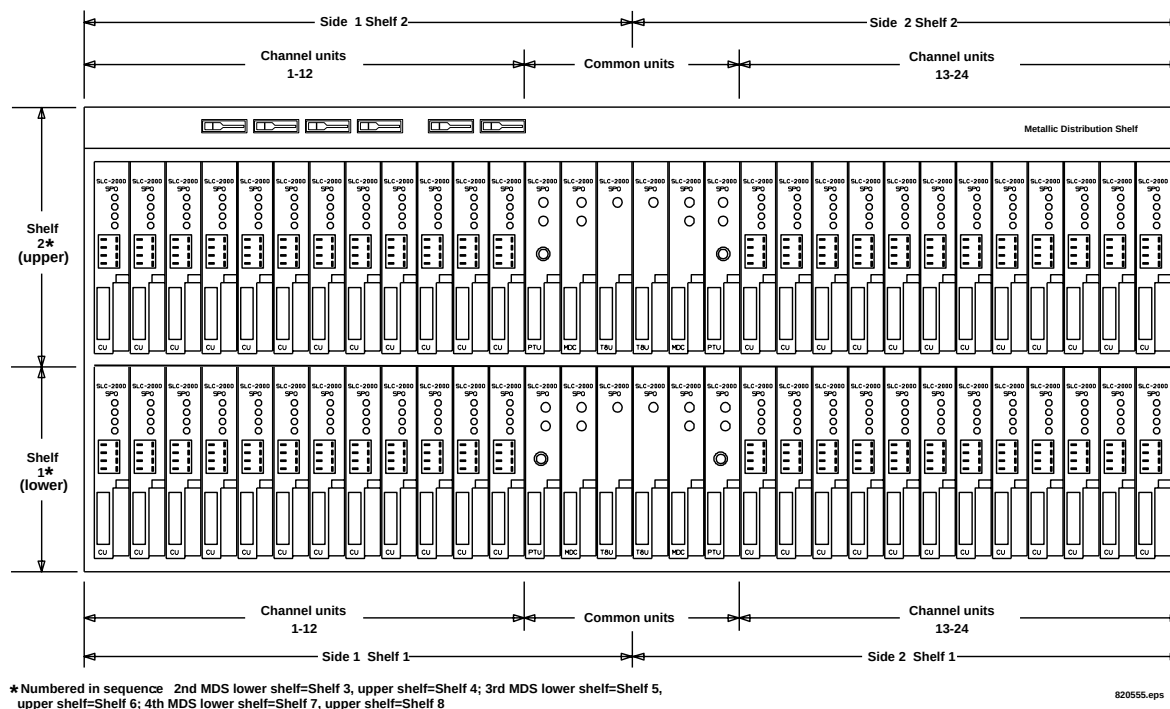


Figure 2-10. MDS Assembly — Metallic Configuration

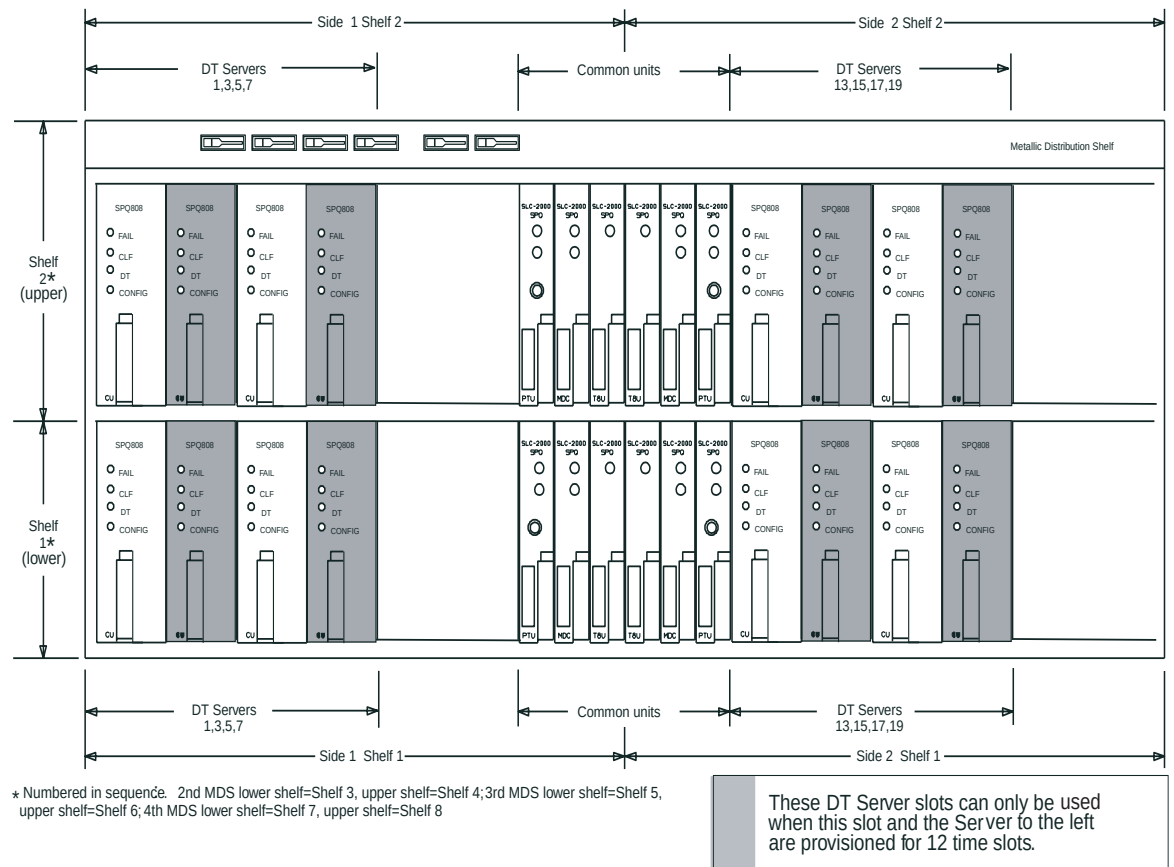
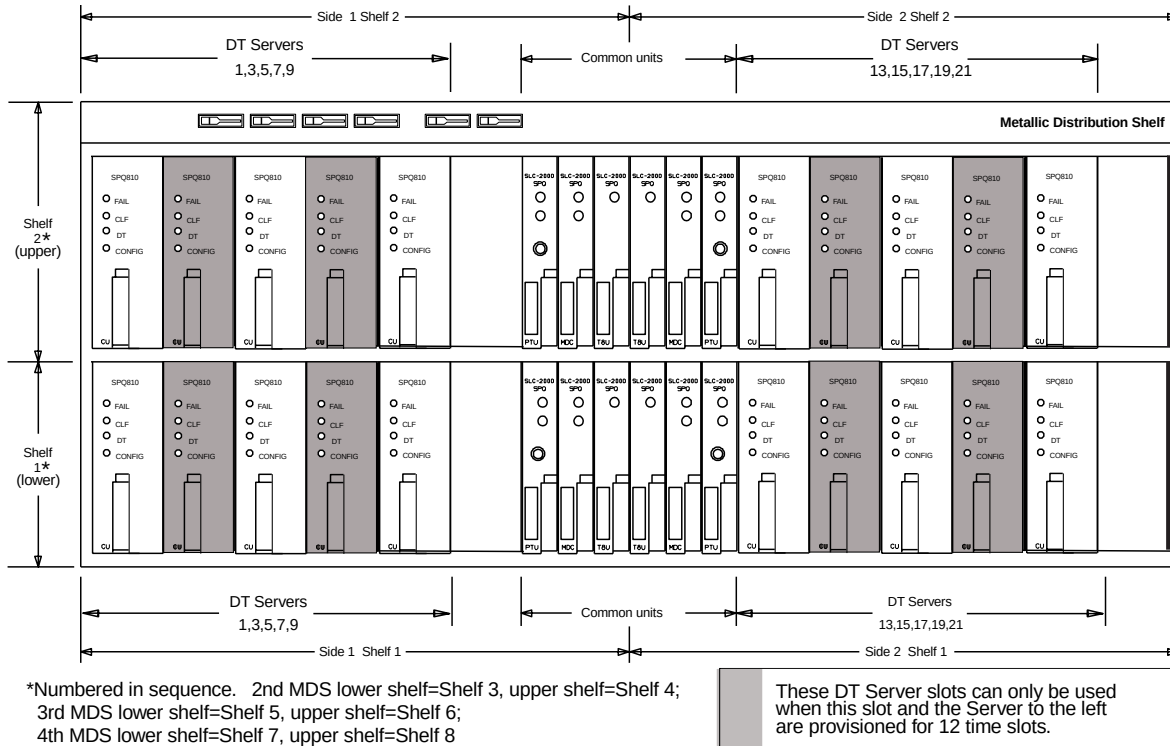


Figure 2-11. MDS Assembly — 12- and 24-Line FITL Configuration (R4.0 to R4.4)



mdsft145.eps

Figure 2-12. MDS Assembly — 12- and 24-Line FITL Configuration (R4.5 or Later With SPQ 810 Servers)

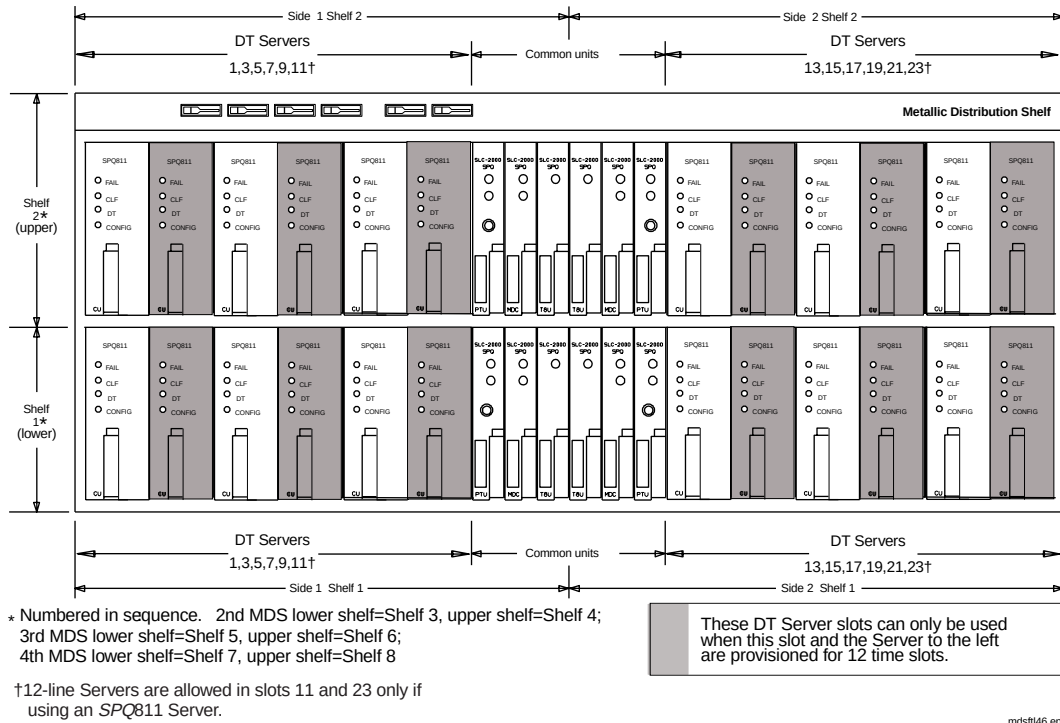


Figure 2-13. MDS Assembly — 12- and 24-Line FITL Configuration (R4.5 or Later With SPQ811 Servers)

For FITL distribution, the MDS assembly shelves can be configured in one of the following three ways as determined by the version of DLC software and DT Server type installed:

- Software Release 4.0 (R4.0) to 4.4 (R4.4):** Figure 2-11 shows a full MDS assembly when the SLC-2000 Access System contains R4.4 and earlier software. Each shelf can host DTs containing up to 96 DS0s. This can be one DT (a DDM-2000 FiberReach NBS with each DT server's DSX-1 output provisioned in the octet mode) or up to eight 12-line DTs. Figure 2-12 shows the slot restrictions of DT servers in the MDS shelves. The shaded servers in the figure must be provisioned as 12-line servers and can only be used if the server to the left is provisioned as a 12-line server. This allows you to provision each shelf of the MDS assembly with either 24-line servers in slots 1, 5, 13, and 17 or 12-line servers in slots 1, 3, 5, 7, 13, 15, 17, and 19; totaling 96 lines.

- **Software Release 4.5 or Later With SPQ810 Servers:** Figure 2-12 shows a full MDS assembly when the *SLC-2000* Access System contains R4.5 or later software with *SPQ810* DT Servers. Each shelf can host DTs containing up to 144 DS0s. Figure 2-12 shows the slot restrictions of DT servers in the MDS shelves. The shaded servers in the figure must be provisioned as 12-line servers and can only be used if the server to the left is provisioned as a 12-line server. Slots 9 and 21 can contain a 12- or 24-line *SPQ810* Server whereas, slots 11 and 23 *cannot* contain *SPQ810* Servers. This allows you to provision 24-line servers in slots 1, 5, 9, 13, 17, and 21 in each shelf of the assembly; totalling 144 lines. If needed, you can provision 12-line servers — following the above restriction — in slots 1, 3, 5, 7, 9, 13, 15, 17, 19, or 21. However, when all servers are provisioned for 12 lines, the shelf will only serve 120 lines.
- **Software Release 4.5 or Later With SPQ811 Servers:** Figure 2-13 shows a full MDS assembly when the *SLC-2000* Access System contains R4.5 or later software with *SPQ811* DT Servers. Each shelf can host DTs containing up to 144 DS0s. Figure 2-13 shows the slot restrictions of DT servers in the MDS shelves. The shaded servers in the figure must be provisioned as 12-line servers and can only be used if the server to the left is provisioned as a 12-line server. If slots 11 and 23 are to be used, they must contain a 12-line *SPQ811* Server. This allows you to provision 24-line servers in slots 1, 5, 9, 13, 17, and 21 in each shelf of the assembly. If needed, you can provision 12-line servers — following the above restriction — in slots 1, 3, 5, 7, 9, 11, 13, 15, 17, 19, 21, or 23. Both arrangements provide a total of 144 lines.

Common Units

The MDS common units include the following circuit packs:

- ***Metallic Distribution Controller (MDC)***. *BDJ*®240 MDC (Data Sheet 363-005-366)
- ***TR-08 Unit (T8U)***. *BDJ*205 T8U (Data Sheet 363-005-365) (Not for use in TR-303 applications)
- ***Power and Test Unit (PTU)***. *BDJ*200 PTU (Data Sheet 363-005-367).

Channel Units

Table 2-2 lists the channel units supported at the RT, COT, MSDT, and FiberReach narrowband shelf (NBS). The table divides the channel units into three groups:

- ***Nonprovisionable*** — requires no provisioning by the user from the user interface panel (UIP) or craft interface terminal (CIT), or no option switch/jumper settings.
- ***Manually Provisionable*** — requires the user to *manually* set switches and/or jumpers on the printed wiring board or the faceplate.

- **Electronically Provisionable** — requires the user to *electronically* provision the channel unit or channel unit slot using the CIT, the X.25 interface to an operations support system (OSS), or the user interface panel (UIP).

Table 2-2 lists the following information for each channel unit:

- **Code** — channel unit code.
- **Description** — brief description of the service provided by the channel unit.
- **Data Sheet** — the number of the data sheet that gives detailed information on the channel unit.
- **Terminal** — shows where the CU can be used:
 - **COT**: central office terminal.
 - **RT**: remote terminal.
 - **MSDT**: SLC-2000 Multi-Services Distant Terminal (MSDT).
 - **NBS**: DDM-2000 FiberReach NBS (see Note).



NOTE:

Unless otherwise specified in Table 2-2, *NBS* denotes a channel unit compatible with SLC-2000 Software Release 4.4 when used in the DDM-2000 FiberReach NBS. For a detailed description of the DDM-2000 FiberReach NBS, including the *virtual MSDT* (V-MSDT) or *virtual DT* (V-DT) concept, refer to document 363-208-000, *SLC-2000 Access System, Applications, Planning, and Ordering Guide* (APOG).

- **#Ch** — (number of channels) column specifies how many channels or lines are available on the channel unit.
- **Range** — gives the supervision or operating range of the unit if used in a remote terminal/distant terminal (RT/DT).
- **Rel** — (release) shows the earliest SLC-2000 system release required to support the channel unit. (No entry in the Rel column means the channel unit is supported in Software Release 3.1 or later.)
- **Inven** — (inventory) column specifies whether the channel unit provides a valid *COMMON LANGUAGE CLEI* code for the **RTRV-EQPT** command.

A complete list of services is provided in document 363-208-000, *SLC-2000 Access System, Applications, Planning, and Ordering Guide* (APOG).

DT Server

The DT Server plugs into channel unit slots in the MDS assembly. The DT Server provides the interface function between the MSDT or DDM-2000 FiberReach narrowband shelf (NBS) and the host digital terminal (HDT). The valid DT Server slots in the MDS assembly for Software Release 4.0 to 4.4 are 1, 3, 5, 7, 13, 15, 17, and 19. The valid DT Server slots in the MDS assembly for Software Release 4.5 and later with *SPQ810* Servers are 1, 3, 5, 7, 9, 13, 15, 17, 19, and 21. The valid DT Server slots in the MDS assembly for Software Release 4.5 and later with *SPQ811* Servers are 1, 3, 5, 7, 9, 11, 13, 15, 17, 19, 21, and 23.

- ***SPQ*[®]808 DT Server.** The *SPQ808* DT Server (Data Sheet 363-005-288) provides Release 3.1 and 3.2 services. It also supports TR-303 basic POTS and locally switched services in Release 4.0 and supports both 12- and 24-line MSDTs. The *SPQ808* DT Server is compatible only with the *SLC-2000* MSDT and is *not* used with the DDM-2000 FiberReach NBS.
- ***SPQ809* DT Server.** The *SPQ809* DT Server (Data Sheet 363-005-387) supports 0, 12, or 24 DS0 rate services on a *SLC-2000* MSDT. The *SPQ809* unit provides the primary interface between the DT and the *SLC-2000* HDT, terminates the DS1 rate transmission link to the HDT, and terminates the extended superframe format (ESF) data link between the HDT and DT. The *SPQ809* unit is required in Release 4.0 and later to support the enhanced FITL features in a TR-303 configuration.
- ***SPQ810* DT Server.** The *SPQ810* DT Server (Data Sheet 363-005-389) supports 0, 12, or 24 DS0 rate services when installed in a *SLC-2000* system hosting a DDM-2000 FiberReach NBS. The *SLC-2000* system must be running Software Release 4.4 or later and the DS1 signals feeding the NBS must be provisioned for either quad or octet mode of operation. The *SPQ810* unit also supports 12 or 24 DS0 rate services to an MSDT when installed in a *SLC-2000* system running Software Release 4.5 or later.
- ***SPQ811* DT Server.** The *SPQ811* DT Server (Data Sheet 363-005-390) supports all the features of the *SPQ810* DT Server in addition to allowing the system to support the voice frequency data enhancement (VFDE) feature in Software Release 4.6 (R4.6) when used to host a DT containing VFDE channel units.

The *SPQ811* supports 0, 12, or 24 DS0 rate services when installed in a *SLC-2000* system hosting the following DT types:

- DDM-2000 FiberReach NBS (R4.4 or later)—The DS1 signals feeding the NBS must be provisioned for either quad or octet mode of operation.
- *SLC-2000* MSDT (R4.5 or later).

Table 2-2. SLC®-2000 Access System Channel Units

Code	Description	Data Sheet	Terminal	#Ch	Range	Rel.	Inven.
Nonprovisionable							
SPQ®300()	POTS CS + OHT/CLASS* + LSAS	363-005-380	COT/RT/MSDT/NBS	4	—		Yes
SPQ318	Quad Coin CS	363-005-330	COT	4	—	3.3	Yes
SPQ328	Quad EBS (P-Phone)	363-005-397	COT	4	—	3.3	Yes
SPQ333	Dual Coin CS	363-005-331	COT	2	—	3.3	Yes
SPQ336	Quad DID	363-005-334	COT	4	—	3.3	Yes
SPQ340	POTS/SPOTS® CU CS + OHT/CLASS + LSAS	363-005-381	COT/RT/MSDT/NBS	4	—		Yes
SPQ400	ALC POTS CF + OHT/CLASS	363-005-368	COT/RT/MSDT/NBS	4	900Ω		Yes
SPQ400B	ALC POTS CF + OHT/CLASS	363-005-368	COT/RT/MSDT/NBS	4	1200Ω†		Yes
XSPQ400	ALC POTS CF + OHT/CLASS	363-208-345	COT/RT/MSDT/NBS	4	1200Ω†		Yes
SPQ401()	ALC POTS CF + OHT/CLASS, VFDE (SPQ401B)	363-005-344	COT/RT/MSDT/NBS	4	1400Ω		Yes
SPQ419	Quad Coin CF	363-005-340	RT/MSDT/NBS	4	900Ω	4.2	Yes
SPQ429	Quad EBS (P-Phone)	363-005-398	RT/MSDT/NBS	4	750/200Ω‡	4.2	Yes
SPQ440(B)	ALC POTS/SPOTS CU CF + OHT/CLASS+LSAS	363-005-369	COT/RT/MSDT/NBS	4	900Ω/CSA		Yes

Legend:

ALC - automatic level compensation; ALIC5 - analog line to integrated SLC carrier at 5ESS® switch cutover

CF - current feed, CS - current sink; CSA - carrier serving area; CU - channel unit

LSAS - line side answer supervision, also carrier line side supervision; NBS - Narrowband Shelf (R4.4 and later)

OHT - on-hook transmission; wo OSIP - without open switching interval protection

SPOTS CU - channel unit provides locally switched loop- and ground-start service

* Service mark of Bellcore.

† On the SPQ400B and the XSPQ400, range can be increased to 1450 ohms if full power is available.

‡ The range for this channel unit depends on the type of EBS telephone set: Basic EBS Telephone Set – 750 ohms; Enhanced EBS Telephone Set – 200 ohms.

Continued on next page

Table 2-2. SLC®-2000 Access System Channel Units (Continued)

Code	Description	Data Sheet	Terminal	#Ch	Range	Rel.	Inven.
Nonprovisionable							
SPQ440(C,D)	Quad Extended Range <i>SPOTS</i> , VFDE (<i>SPQ440D</i>)	363-005-369	COT/RT/MSDT/NBS	4	1500Ω	*	Yes
SPQ450	ALC POTS/ <i>SPOTS</i> CU CF + OHT/ <i>CLASS</i> ALIC5 +LSAS	363-005-384	RT/MSDT/NBS	4	900Ω/CSA		Yes
SPQ453	Dual Coin CF	363-005-342	RT/MSDT/NBS	2	900Ω	4.2	Yes
SPQ478	ALC C-POTS CF OHT/CLASS	363-005-377	RT/MSDT/NBS	4	900Ω		Yes
SPQ909()	Low-Power POTS CF + OHT/CLASS	363-005-295	MSDT/NBS	4	20Ω 170Ω (B)	3.2	Yes
SPQ494†	Quad ISDN ANSI-U	363-005-388	RT/NBS	4	CSA	4.1/4.2‡	Yes
AUA25(B)	POTS/M <i>SPOTS</i> CU CF	363-005-124	RT/MSDT/NBS§	2	6 dB		No
AUA26	POTS CS + OHT (VerSus feature not avail.)	363-005-127	COT	2	—		No
AUA27	POTS CF + OHT (VerSus feature not avail.)	363-005-128	RT/MSDT/NBS	2	900Ω		No

Legend:

ALC - automatic level compensation; ALIC5 - analog line to integrated SLC carrier at 5ESS switch cutover

CF - current feed, CS - current sink; CSA - carrier serving area; CU - channel unit

LSAS - line side answer supervision, also carrier line side supervision; NBS - Narrowband Shelf (R4.4 and later)

OHT - on-hook transmission; wo OSIP - without open switching interval protection

SPOTS CU - channel unit provides locally switched loop- and ground-start service

* Channel unit is supported by Software Releases 3.3, 4.1, and 4.2 and later. *SPQ440D* is supported by R4.6.

† In Release 4.4 or earlier, the *SPQ494* is recent change provisionable from the LDS. It is *not* provisionable from the SLC-2000 CIT. In Release 4.5 or later, the *SPQ494* can be provisioned from the CIT.

‡ Lucent Technologies recommends the use of Software Release 4.2 or later if you are equipping more than 200 ISDN lines.

§ The NBS can contain the AUA25B. It does not support the AUA25.

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Table 2-2. SLC®-2000 Access System Channel Units (Continued)

Code	Description	Data Sheet	Terminal	#Ch	Range	Rel.	Inven.
Nonprovisionable							
AUA31	POTS CS	363-005-101	COT	2	—		No
AUA32	POTS/ <i>SPOTS</i> CU CS	363-005-102	COT/RT/MSDT	2	—		No
AUA33()	Coin CS	363-005-103	COT	1	—	3.3*	*
AUA35	Multiparty	363-005-109	COT	2	—		No
AUA36()	DID	363-005-114	COT	2	—		Yes†
AUA37	FSR CS	363-005-121	COT	1	—		No
AUA38()	POTS CS +OHT/ <i>CLASS</i> + LSAS	363-005-118	COT	2	—		No
AUA39‡	POTS/ <i>SPOTS</i> CU CS +OHT/ <i>CLASS</i>	363-005-120	COT/RT/ MSDT/NBS	2	—		No
AUA39B‡	POTS/ <i>SPOTS</i> CU CS +OHT/ <i>CLASS</i> + LSAS	363-005-120	COT/RT/MSDT	2	—	R3.2 only	Yes
AUA51	POTS/ <i>SPOTS</i> CU CF	363-005-110	RT/MSDT	2	1500Ω/CSA		No
AUA53	COIN CF	363-005-112	RT/MSDT/NBS	1	1500Ω		No
AUA53B	Single Coin CF	363-005-112	RT/MSDT/NBS	1	900Ω		Yes
AUA55(B)	Multiparty CF	363-005-116	RT/MSDT/NBS	2	1500Ω		No
AUA56	DID (DPT)	363-005-115	RT/MSDT/NBS	2	CSA		No
AUA58()	POTS CF +OHT/ <i>CLASS</i>	363-005-117	RT/MSDT/NBS	2	900Ω		No

Legend:

ALC - automatic level compensation; ALIC5 - analog line to integrated *SLC* carrier at *5ESS* switch cutover

CF - current feed, CS - current sink; CSA - carrier serving area; CU - channel unit

LSAS - line side answer supervision, also carrier line side supervision; NBS - Narrowband Shelf (R4.4 and later)

OHT - on-hook transmission; wo OSIP - without open switching interval protection

SPOTS CU - channel unit provides locally switched loop- and ground-start service

* AUA33B is available with Software Releases 3.3 and later. Inventory: AUA33 — No, AUA33B — Yes.

† Inventory information available for the AUA36B only.

‡ BUSY light emitting diode (LED) is on continuously.

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Table 2-2. SLC®-2000 Access System Channel Units (Continued)

Code	Description	Data Sheet	Terminal	#Ch	Range	Rel.	Inven.
Nonprovisionable							
AUA59	SPOTS CU CF +OHT/ CLASS	363-005-119	RT/MSDT / NBS	2	1500Ω/CSA		No
AUA90	ISDN T-BRITE	363-005-129	COT/RT/ MSDT/NBS	1	1 km		No
AUA94()*	ISDN Dual ANSI-U	363-005-135	RT/MSDT/ NBS	2	AUA94 CSA AUA94B 18kf	4.0	AUA94: No AUA94B:Yes
AUA150	POTS/SPOTS CU CF +OHT/CLASS	363-005-133	COT/RT/ MSDT/NBS	2	1500Ω/CSA		No
AUA150C	Dual POTS/SPOTS CF+OHT/CLASS+ALC	363-005-133	COT/RT/ MSDT/NBS	2	1500Ω	†	Yes
AUA151	POTS/SPOTS CU CF wo OSIP +OHT/CLASS	363-005-134	RT/MSDT	2	1500Ω/CSA		No
AUA158(B,C)	ALC POTS CF +OHT/ CLASS	363-005-303	RT/MSDT / NBS‡	2	900Ω		Yes
AUA158D	ALC POTS CF +OHT/ CLASS	363-005-303	RT/MSDT / NBS	2	1400Ω		Yes
AUA159(B,C)	ALC POTS/SPOTS CU +OHT/CLASS	363-005-304	RT/MSDT / NBS‡	2	900Ω/CSA		Yes
AUA178()	ALC C-POTS CF OHT/ CLASS	363-005-314	RT/MSDT/ NBS	2	900Ω		Yes
AUA179	ALC POTS/SPOTS CU +ALIC5 +OHT/CLASS	363-005-311	RT/MSDT / NBS	2	900Ω/CSA		Yes

Legend:

ALC - automatic level compensation; ALIC5 - analog line to integrated SLC carrier at 5ESS switch cutover

CF - current feed, CS - current sink; CSA - carrier serving area; CU - channel unit

LSAS - line side answer supervision, also carrier line side supervision; NBS - Narrowband Shelf (R4.4 and later)

OHT - on-hook transmission; wo OSIP - without open switching interval protection

SPOTS CU - channel unit provides locally switched loop- and ground-start service

* In Release 4.4 or earlier, the AUA94() is recent change provisionable from the LDS. It is *not* provisionable from the SLC-2000 CIT. In Release 4.5 or later, the AUA94 () can be provisioned from the CIT

† Inventory feature is supported by Software Releases 3.3, 4.1, and 4.2 and later.

‡ The AUA158B and AUA159B are not supported in Software Release 4.4 or later when installed in the NBS.

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Table 2-2. SLC®-2000 Access System Channel Units (Continued)

Code	Description	Data Sheet	Terminal	#Ch	Range	Rel.	Inven.
Manually Provisionable							
AUA45(B)	Dual Ringing Repeater (Manual Ring)	363-005-123	COT/RT/MSDT/NBS*	2	10 dB		No
AUA56B	Dual DID (DPT)	363-005-115	RT/MSDT/NBS	2	750Ω (CSA)		Yes
AUA57	FSR CF	363-005-122	RT/MSDT / NBS	1	900Ω		No
AUA75	Private Line Automatic Ring (PLAR)	363-005-132	COT/RT/MSDT/NBS	2	10 dB		No
AUA92	ISDN BRITE II ANSI-U	363-005-130	COT	1	—		No
AUA93 †	ISDN BRITE II ANSI-U	363-005-131	RT/MSDT / NBS	1	CSA		No
AUA200	2-wire Switched 56-kb/s DPX	363-005-313	RT/MSDT / NBS	1	42 dB	3.2	No
AUA232	RS-232 DSU Dataport	363-005-312	COT/RT/MSDT/NBS	1	RS-232	3.2	No
AUA293†	ISDN BRITE II ANS-U	363-005-347	COT/RT/MSDT/NBS	1	18kf	3.1	Yes

Legend:

ALC - automatic level compensation; ALIC5 - analog line to integrated SLC carrier at 5ESS switch cutover

CF - current feed, CS - current sink; CSA - carrier serving area; CU - channel unit

LSAS - line side answer supervision, also carrier line side supervision; NBS - Narrowband Shelf (R4.4 and later)

OHT - on-hook transmission; wo OSIP - without open switching interval protection

SPOTS CU - channel unit provides locally switched loop- and ground-start service

* The NBS can contain the AUA45B. It does not support the AUA45.

† When used in the MSDT, the AUA93/AUA293 is manually provisionable for software releases earlier than Release 4.2 and electronically provisionable in Software Releases 4.2 and later.

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Table 2-2. SLC[®]-2000 Access System Channel Units (Continued)

Code	Description	Data Sheet	Terminal	#Ch	Range	Rel.	Inven.
Manually Provisionable							
<i>MCU</i> [*] -5205	Metallic Channel Unit (Tollgrade)	TLGD5205 [†]	COT/RT/MSDT/NBS	1	‡		No
<i>MCU</i> -5405	Digital Bypass Pair (Tollgrade)	TLGD5405 [†]	COT/RT	1	‡	3.2	No
<i>PGM</i> [*] -2000 [§]	Program Channel Unit	TLGD2000 [†]	COT/RT	1	‡	3.3/ 4.2	No
Electronically Provisionable							
<i>SPQ</i> 334	Dual DS0 Dataport	363-005-332	COT	2	—	3.3	Yes
<i>SPQ</i> 442	E <i>SPOTS</i> CU CS	363-005-382	COT/RT/MSDT/NBS	4	CSA	3.2	Yes
<i>SPQ</i> 443	E <i>SPOTS</i> CU CF	363-005-383	COT/RT/MSDT/NBS	4	CSA	3.2	Yes
<i>SPQ</i> 444	4-Wire CS (FXO/TDM)	363-005-385	COT/RT	4	2800Ω	3.2	Yes
<i>SPQ</i> 452	Dual OCU Dataport	363-005-341	COT/RT/MSDT/NBS	2	45 dB	3.3/ 4.2	Yes

Legend:

ALC - automatic level compensation; ALIC5 - analog line to integrated *SLC* carrier at *5ESS* switch cutover

CF - current feed, CS - current sink; CSA - carrier serving area; CU - channel unit

LSAS - line side answer supervision, also carrier line side supervision; NBS - Narrowband Shelf (R4.4 and later)

OHT - on-hook transmission; wo OSIP - without open switching interval protection

SPOTS CU - channel unit provides locally switched loop- and ground-start service

* Trademark of Tollgrade Communications, Inc.

† Obtain data sheet from Tollgrade Communications, Inc.

‡ See the data sheet for range.

§ The bandwidth capability of the *PGM*-2000 channel unit is set by printed wiring board (PWB)-mounted switches.

Release 4.2: The function code of the channel unit is provisioned electronically to allow the remote terminal (RT) software to configure the system bandwidth to match the bandwidth setting on the *PGM*-2000 unit.

Release 3.3: The central office terminal (COT) software treats the *PGM*-2000 channel unit as a POTS unit and does not prompt for the function code. This is because the bandwidth setting is communicated to the system automatically upon channel unit installation.

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Table 2-2. SLC®-2000 Access System Channel Units (Continued)

Code	Description	Data Sheet	Terminal	#Ch	Range	Rel.	Inven.
Electronically Provisionable							
SPQ454	4-Wire E&M/PLR	363-005-386	COT/RT	2	500Ω	3.2	Yes
SPQ456	Quad DID	363-005-343	RT/MSDT/ NBS	4	750Ω (CSA)	4.2	Yes
AUA34	DS0 Dataport	363-005-104	COT	1	—		No
AUA34B	DS0 Dataport (All-rate)	363-005-104	COT	1	—		Yes
AUA41()	4-wire CF (FXS/ETO/DX)	363-005-105	COT/RT/ MSDT/NBS	1	15 dB		*
AUA42()	E SPOTS CU CS	363-005-106	COT/RT/ MSDT/NBS	2	CSA	3.2	*
AUA43()	E SPOTS CU CF	363-005-107	COT/RT/ MSDT/NBS	2	CSA	3.2	*
AUA44()	4-Wire VF CS (Includes TDM signaling)	363-005-108	MSDT/NBS	1	15 dB		No
AUA52	OCU Dataport	363-005-111	COT/RT/ MSDT/NBS	1	34 dB		No
AUA52B	OCU Dataport (All-rate)	363-005-111	COT/RT/ MSDT [†] /NBS	1	34 dB		Yes

Legend:

ALC - automatic level compensation; ALIC5 - analog line to integrated SLC carrier at 5ESS switch cutover

CF - current feed, CS - current sink; CSA - carrier serving area; CU - channel unit

LSAS - line side answer supervision, also carrier line side supervision; NBS - Narrowband Shelf (R4.4 and later)

OHT - on-hook transmission; wo OSIP - without open switching interval protection

SPOTS CU - channel unit provides locally switched loop- and ground-start service

* Inventory:

YES = AUA41B, AUA42B, and AUA43B

NO = AUA41, AUA42, and AUA43.

[†] MSDT AUA52B application requires switch settings (Software Release 4.1 and earlier).

Continued on next page

Table 2-2. SLC®-2000 Access System Channel Units (Continued)

Code	Description	Data Sheet	Terminal	#Ch	Range	Rel.	Inven.
Electronically Provisionable							
AUA54()	4-Wire VF Types I & II E&M/PLR	363-005-113	MSDT/NBS	1	500Ω		No
AUA93 *	ISDN BRITE II ANSI-U	363-005-131	RT/MSDT / NBS	1	CSA		No
AUA141	4-Wire VF CF (GTE)	363-005-300	COT/RT/ MSDT	1	15 dB		No
AUA142	E <i>SPOTS CU CS (GTE)</i>	363-005-301	COT/RT/ MSDT	2	CSA		No
AUA152	OCU Dataport (GTE)	363-005-302	COT/RT/ MSDT/NBS	1	34 dB		No
AUA252() [†]	OCU Dataport	363-005-212	COT/RT/ MSDT/NBS	1	34 dB		No
AUA293 *	ISDN BRITE II ANS-U	363-005-347	COT/RT/ MSDT/NBS	1	18kf	3.1	Yes

Legend:

ALC - automatic level compensation; ALIC5 - analog line to integrated *SLC* carrier at *5ESS* switch cutover

CF - current feed, CS - current sink; CSA - carrier serving area; CU - channel unit

LSAS - line side answer supervision, also carrier line side supervision; NBS - Narrowband Shelf (R4.4 and later)

OHT - on-hook transmission; wo OSIP - without open switching interval protection

SPOTS CU - channel unit provides locally switched loop- and ground-start service

* When used in the MSDT, the AUA93/AUA293 is manually provisionable for software releases earlier than Release 4.2 and electronically provisionable in Software Releases 4.2 and later.

† Switched 56-kb/s services must be manually provisioned for all terminal applications.

High Density Optics Shelf (HDOS)

The high density optics shelf (HDOS) (Figure 2-14) is used in FITL applications. The HDOS contains optical units (OUs) that provide the interface between the electrical signals on the MDS assembly backplane and the optical fiber that serves as the link between the HDT and MSDT.

The HDOS contains the following circuit packs:

- **AYB1C/AYB3/AYB5 Optical Unit (OU).** AYB1C OU (Data Sheet 363-005-262) and AYB5 OU (Data Sheet 363-005-296)
- **AYB2 Power Conversion Unit (PCU).** AYB2 PCU (Data Sheet 363-005-286).

The HDOS interfaces the MDS assemblies depending on the *SLC-2000* software releases:

- **Release 4.4 or Earlier.** The HDOS interfaces with up to two MDS assemblies fully configured to provide service to thirty-two 12-line MSDTs. Each OU slot is connected through bay cabling to one CU slot in the MDS assembly. For ease of reference, OU slots in the HDOS are numbered using the corresponding MDS CU slot numbers.
- **Release 4.5 or Later.** The HDOS interfaces the DT Servers in the MDS assembly through a DSX cross-connect panel. Providing there is an HDOS OU slot available, any DT Server slot in the MDS assembly can connect to any HDOS OU through the DSX cross-connect. When all MDS assemblies in an RT bay are fully equipped with 12-line DT Servers (1,152 POTS lines), a third HDOS is required to assure an adequate number of OUs. This third HDOS must be miscellaneously mounted, preferably in an adjacent bay so that cabling restrictions between the HDOS and MDS assembly are not exceeded.

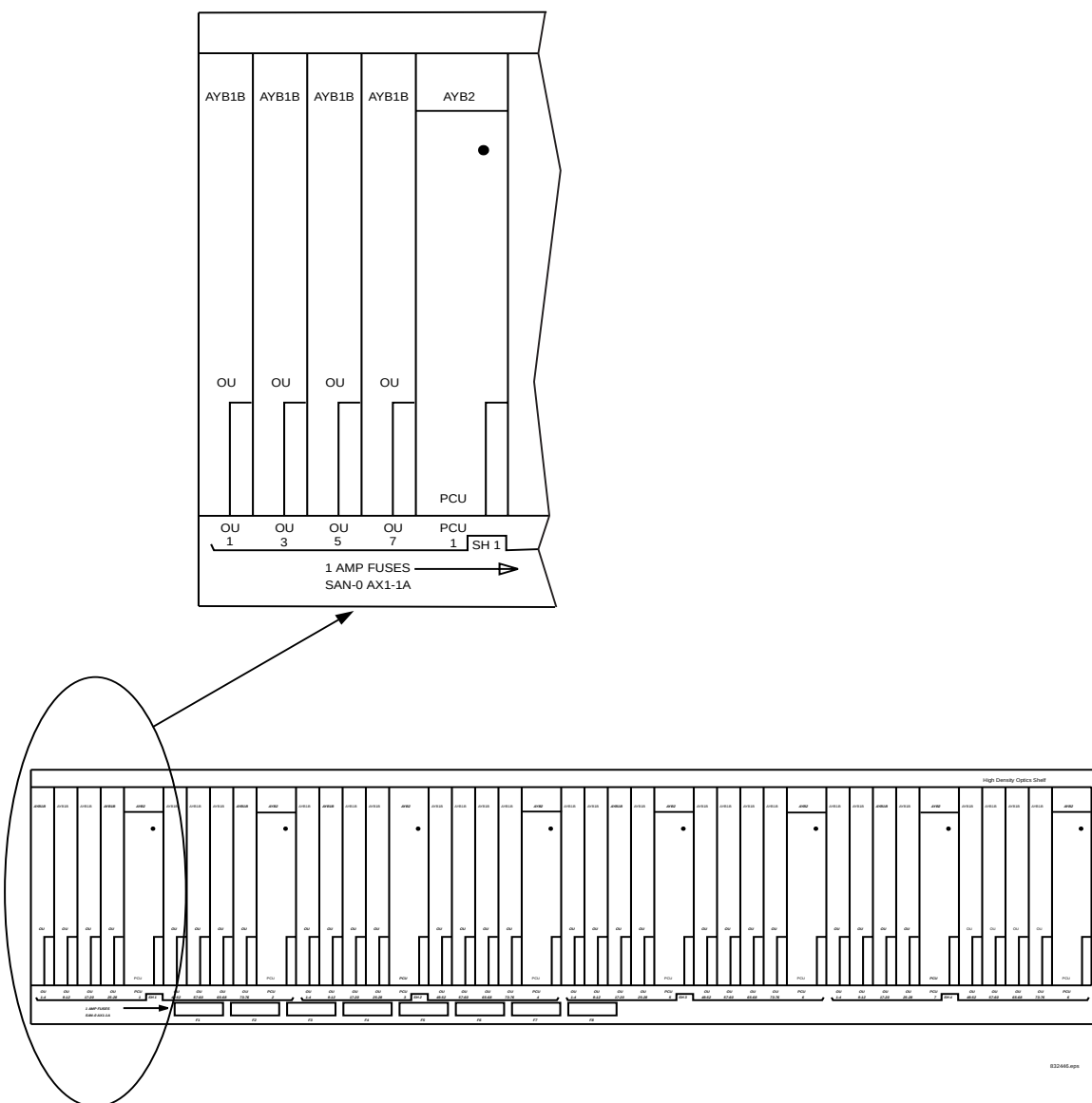
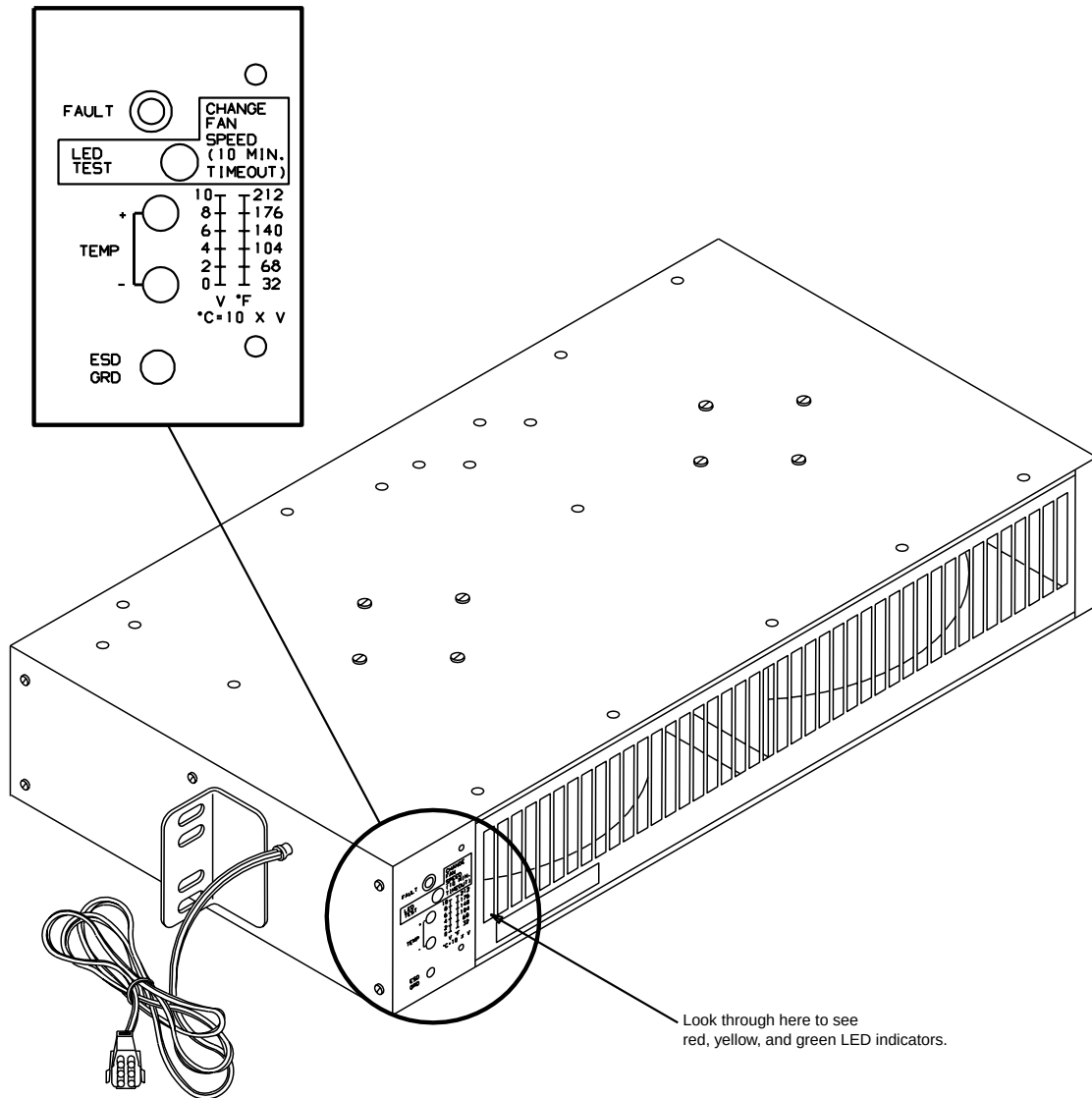


Figure 2-14. High Density Optics Shelf (HDOS)

Fan Unit

The 4-type fan unit (Figure 2-15) (Data Sheet 363-005-370) is required with the *SLC-2000* Access System RT/HDT. It provides ventilation for the systems and equipment in the frame or cabinet.



814067.eps

Figure 2-15. Fan Unit

Software Release Compatibility and ARM Shelf Common Unit Configurations

Software Release Compatibility

Table 2-3 shows the compatibility between the *SLC-2000* software releases and the SONET releases (DDM-2000), ITH package releases, and local digital switch (LDS) type interface generics.

ARM Shelf Common Unit Configurations

Point-to-Point Applications

TR-08 and TR-303 Interface

The ARM shelf common units required for point-to-point SONET feeder applications with a TR-08/TR-303 interface to support DLC subsystems are listed below:

- SMU — BBF261
- PDC — BBF240 [Releases 3.1, 3.2, and 3.3 (COT only)] or BBF241 (Release 4.0 and later)
- LAN (optional at the RT) — BBF250
- SYSCTL — BBG5
- OHCTL — BBG7
- MAIN — 21G OLIU
- FUNC A — BBG2 MXRV0
- LIU (A) — BBG266 VTU
- CORE — *BDK250* TSI and *BDK270* BMP (Release 4.0 and later).

Table 2-3. SLC®-2000 Access System Software Package Compatibilities

SLC®-2000 Access System Release	SONET Releases			TR-303 Integrated Applications - Switch Generics (Note)				
	OC-3	OC-12*	ITH Package	5ESS® Switch	DMS-100† Switch	EWSD‡ Switch	GTD-5§ Switch	DDM-2000 FiberReach
R3.1 COT¶/RT	R6.2 (linear) R7.0 (rings)	R2.2 (linear)	AT2.0.0	All	N/A	N/A	N/A	N/A
R3.2 COT¶/RT	R6.2 (linear) R7.1 (rings) R11.0 (rings)	R2.2 (linear) R3.1 (rings)	AT2.0.0	All	N/A	N/A	N/A	N/A
R3.22 COT¶/RT	R6.2 (linear) R7.1 (rings) R11.0 (rings)	R2.2 (linear) R3.1 (rings)	AT2.0.0	All	N/A	N/A	N/A	N/A
R3.3 COT¶	R6.2 (linear) R7.1 (rings) R7.2 (rings) R9.0 (rings) R11.0 (rings)	R2.2 (linear) R3.1 (rings)	AT2.0.0	N/A	N/A	N/A	N/A	N/A
R4.0 RT	R6.2 (linear) R7.1 (rings)	R2.2 (linear) R3.1 (rings)	AT2.0.0	5E9.2** or 5E9.1††	N/A	N/A	N/A	N/A
R4.1 RT	R6.2 (linear) R7.0 (rings) R7.1 (rings) R7.2 (rings)	R2.2 (linear) R3.1 (rings)	AT2.0.0	5E9.2** or 5E9.1††	ESMA interface w/ NA004	N/A	N/A	N/A
R4.2 RT	R6.2 (linear) R7.0 (rings) R7.1 (rings) R7.2 (rings) R9.0 (rings)	R2.2 (linear) R3.1 (rings)	AT2.0.0	5E10, 5E9.2** or 5E9.1††	ESMA interface w/ NA004	R13	R1.7.2.2 EB1	N/A
R4.4 RT	R6.2 (linear) R7.0 (rings) R7.1 (rings) R7.2 (rings) R9.0 (rings) R9.1 (rings) R11.0 (rings) R11.1 (rings) R13 (rings)	R2.2 (linear) R3.1 (rings)	AT2.0.0	5E12(1)‡‡, 5E11(1)‡‡, 5E10, 5E9.2,** or 5E9.1††	ESMA interface w/ NA007	R13	R1.7.2.2 EB1	R2.1

See footnotes at end of table.

Continued on next page

Table 2-3. SLC®-2000 Access System Software Package Compatibilities (Continued)

SLC®-2000 Access System Release	SONET Releases		ITH Package	TR-303 Integrated Applications - Switch Generics (Note)				DDM-2000 FiberReach
	OC-3	OC-12*		5ESS® Switch	DMS-100† Switch	EWSD‡ Switch	GTD-5§ Switch	
R4.5 RT	R6.2 (linear) R7.1 (rings) R7.2 (rings) R8.0 (linear) R9.1 (rings) R11.0 (rings) R11.1 (rings) R13 (rings)	R2.2 (linear) R3.1 (rings)	AT2.0.0	5E12(1)††, 5E11(1)††, 5E10, 5E9.2,** or 5E9.1††	ESMA interface w/ NA007	R13	R1.7.2.2 EB1	R2.1 R3.0
R4.6 RT	R6.2 (linear) R7.1 (rings) R7.2 (rings) R8.0 (linear) R9.1 (rings) R11.0 (rings) R11.1 (rings) R13 (rings)	R2.2 (linear) R3.1 (rings)	AT2.0.0	5E13(1)††, 5E12(1)††, 5E11(1)††, 5E10§§, 5E9.2,** or 5E9.1††	ESMA interface w/ NA007	R13	R1.7.2.2 EB1	R2.1 R3.0

Note: The following switch generics are integrated TR-08 compatible:

- 5ESS switch, 5E1.2 and later
- DMS-100 switch, Release BCS20
- EWSD switch, Release 9.0. The TR-303 software compatibility testing with the Siemens EWSD Switch was performed and documented by Siemens. Lucent Technologies assumes no responsibility for the software compatibility when the SLC-2000 Access System is used with the EWSD Switch.
- GTD-5 switch (not compatible with integrated TR-08 configurations).

* SLC-2000 Access System will interface with OC-12 releases.

† Trademark of Northern Telecom, Ltd.

‡ Registered trademark of Siemens Aktiengesellschaft.

§ Registered trademark of GTE Corporation.

¶ The COT is used in universal applications only and can be used with any switching system.

** 5E9.2 with BWM95-0005 (or higher).

†† 5E9.1 with BWM95-0004 (or higher). Integrated digital carrier unit (IDCU) only for TR-303.

‡‡ The 5ESS switch Software Release 5E11(1) software update (SU) package 98-0008, 5E12(1) SU package 98-0007, or the Beginning Managed Introduction (BMI) of 5E13(1) is required for the VFDE feature.

§§ The 5ESS switch Software Release 5E10 is not compatible with the VFDE feature.

DS1 Low-Speed Interface

The ARM shelf common units required for point-to-point SONET feeder applications with a DS1 low-speed interface are listed below:

- SMU — BBF261
- PDC — BBF240 [Releases 3.1, 3.2, and 3.3 (COT only)] or BBF241 (Release 4.0 and later)
- LAN (optional at the RT) — BBF250
- SYSCTL — BBG5
- OHCTL — BBG7
- TGS — BBF2
- MAIN — 21G OLIU
- FUNC C — BBG2 MXRV0
- DS1 (C) — BBF1 DS1
- CORE — *BDK250* TSI and *BDK270* BMP (Release 4.0).

Linear Drop Applications

STS-1

The ARM shelf common units required for linear STS-1 drop applications are listed below:

- SMU — BBF261
- PDC — BBF240 [Releases 3.1, 3.2, and 3.3 (COT only)] or BBF241 (Release 4.0 and later)
- LAN (optional at the RT) — BBF250
- SYSCTL — BBG5
- OHCTL — BBG7
- TGS — BBF2
- MAIN — 21G/21D OLIU
- FUNC C — 21G/21D OLIU
- DS1 (C)* — BBF1 DS1
- CORE — *BDK250* TSI and *BDK270* BMP (Release 4.0).

* Used only at the last *SLC-2000* node in the SONET system.

VT1.5

The ARM shelf common units required for linear VT1.5 drop applications are listed below:

- SMU — BBF261
- PDC — BBF240 [Releases 3.1, 3.2, and 3.3 (COT only)] or BBF241 (Release 4.0 and later)
- LAN (optional at the RT) — BBF250
- SYSCTL — BBG5
- OHCTL — BBG7
- TGS — BBF2
- MAIN — 22F OLIU
- FUNC C — 22F OLIU
- DS1 (C)* — BBF1 DS1
- CORE — *BDK250* TSI and *BDK270* BMP (Release 4.0).

VT1.5 Path Switched Ring Applications

The ARM shelf common units required for VT1.5 or STS-1 path switched ring SONET applications with TR-08/TR-303 interface DLC subsystems are shown below:

- SMU — BBF261
- PDC — BBF240 [Releases 3.1, 3.2, and 3.3 (COT only)] or BBF241 (Release 4.0 and later)
- LAN (optional at the RT) — BBF250
- SYSCTL — BBG5
- OHCTL — BBG7
- TGS — BBF2()
- MAIN — 22F OLIU
- FUNC C — BBG2 MXRV0
- DS1 (C) — BBF1 DS1
- CORE — *BDK250* TSI and *BDK270* BMP (Release 4.0).

* Used only at the last *SLC-2000* node in the SONET system.

Metallic DS1 Feeder RT and COT

The ARM shelf common units required for metallic DS1 feeder RT and COT applications are listed below:

- SMU — BBF261
- PDC — BBF240 [Releases 3.1, 3.2, and 3.3 (COT only)] or BBF241 (Release 4.0 and later)
- LAN (optional at the RT) — BBF250
- SYSCTL — BBG5
- OHCTL — BBG7
- TGS(1) — BBF2() (SONET Software Release 9.1.1 only)
- LIU — BBG267
- CORE — *BDK250* TSI and *BDK270* BMP (Release 4.0).

OC-1 Ring Off of a SLC®-2000 RT (FiberReach NBS)

The ARM shelf common units required for OC-1 ring off of a SLC-2000 RT applications are listed below:

- SMU — BBF261
- PDC — BBF241
- LAN (optional) — BBF250
- SYSCTL — BBG8
- OHCTL — BBG9
- TGS — BBF2()
- MAIN — 22F OLIU or 27G2-U OLIU (SONET R9.1 or later)
- FUNC C — 26G2-U OLIU* or 27G2-U OLIU
- CORE — *BDK250* TSI and *BDK270* BMP (DLC R4.0 or later).

* The ARM shelf must be a J1C265AA-1, L4 (*COMMON LANGUAGE CLEI* code SAMA3R0ARA) with R4.4 or later, the SONET subsystem Software Release must be R13 or later, and the wideband shelves in the ring must be running Software Release R3.0 or later.

Integral Test Head (ITH) Configurations

The ITH subsystem is an optional part of the *SLC-2000* Access System that allows direct test access by the mechanized loop testing (MLT) system using a dial-up link to the ITH or local test access or both. The ITH circuit packs are installed in the ARM shelf. The ITH circuit packs are not service affecting and are not protected.

For MLT testing, the ITH is equipped with circuit packs as follows:

- Power converter unit (PCU - BBF220)
- Analog measurement unit (AMU - BBF221)
- Power amplifier unit (PAU - BBF222)
- Test head controller (THC - BBG220) with software for the ITH subsystem
- Transmission signaling unit (TSU - BBF223).

For local test access, the ITH is equipped with circuit packs as follows:

- Test head controller (THC - BBG220) with software for the ITH subsystem
- Power amplifier unit (PAU - BBF222)
- Craft access unit (CAU - BBF225).



NOTE:

If you are using the direct current (DC) bypass pair or the Tollgrade DC bypass pair channel unit, you do not need the ITH for plain old telephone service (POTS) testing.

MDS Assembly Common/Channel Unit Configurations

The following MDS assembly common units are required for a TR-08 or TR-303 interface:

- *BDJ240* MDC
- *BDJ200* PTU
- *BDJ205* T8U (not required for TR-303 applications).
- The MDS assembly channel units are listed in Table 2-2.

COT Cable Assemblies

The COT bay is precabled and shipped with the shelves already mounted. Figure 2-16 illustrates the cable assemblies for the COT bay.

RT Cable Assemblies

Figures 2-17 through 2-21 illustrate the cable assembly for the RT/HDT bay.

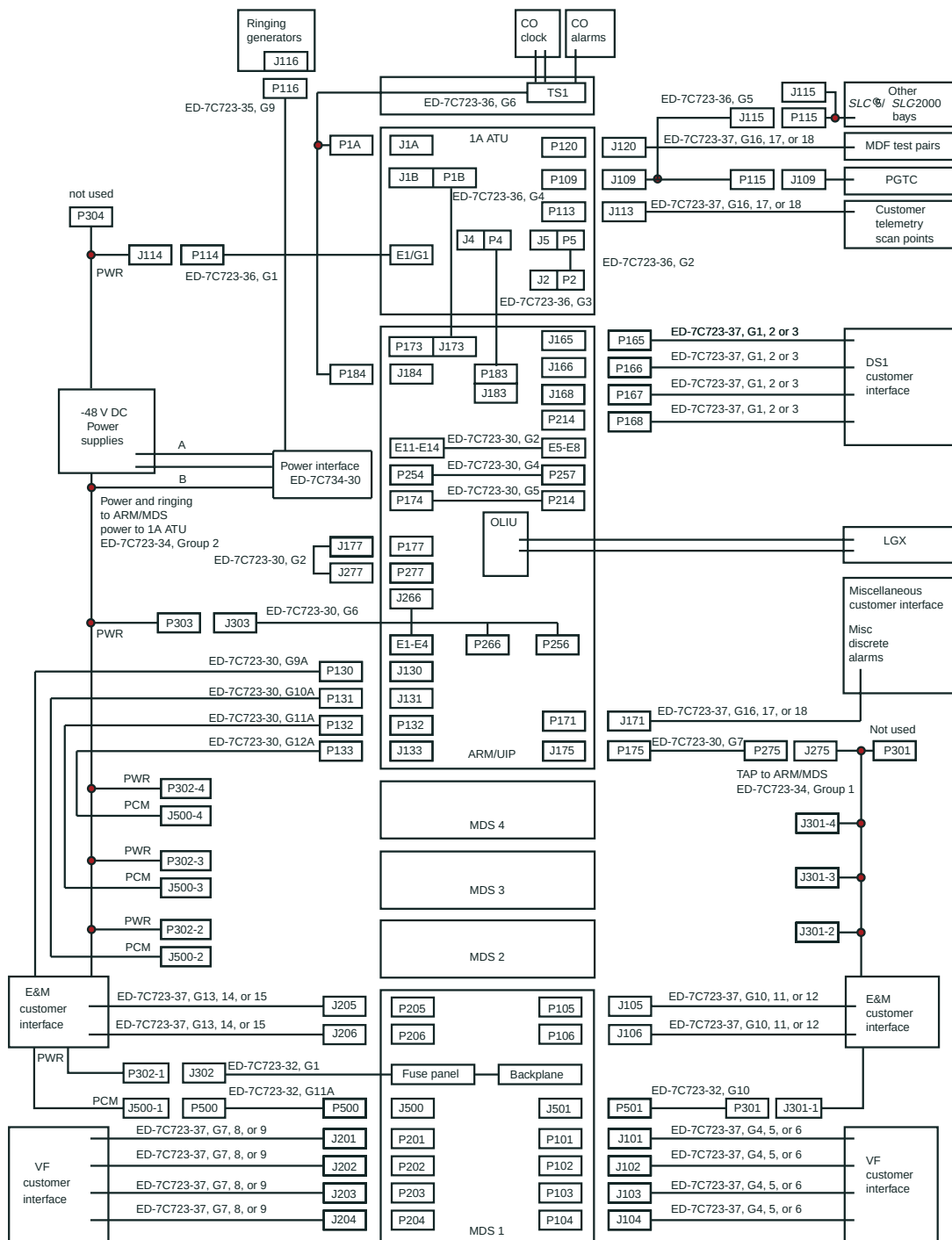


NOTE:

The convention used to identify the particular cabling on each illustration is a darkened block.

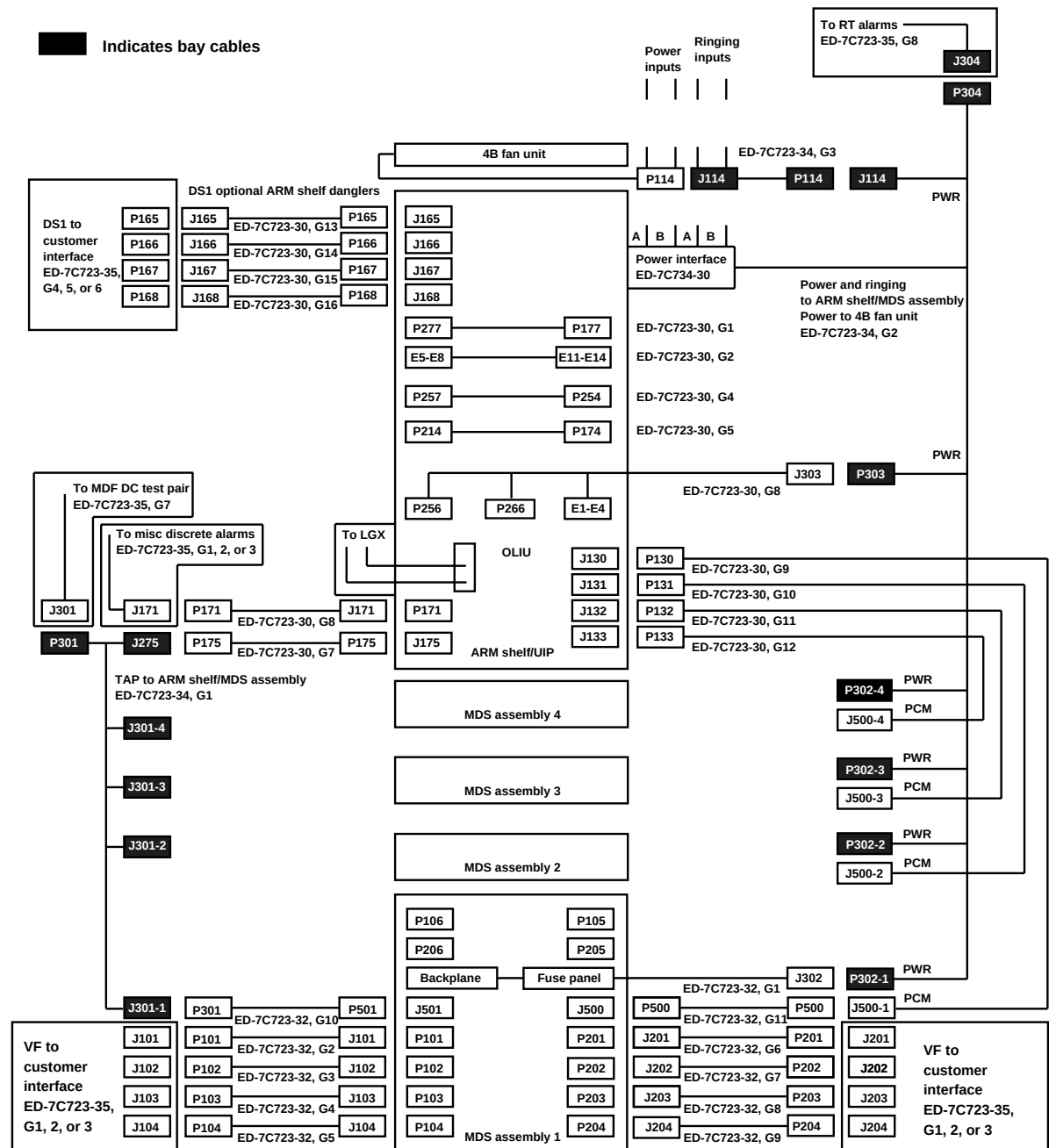
Figure 2-22 illustrates the MDS to DSX-1 cable assembly for the DLC R4.5 and later enhanced FITL system with HDOS or FiberReach narrowband shelf (NBS).

Figure 2-23 illustrates the DSX-1 cable assembly for the DLC R4.5 and later enhanced FITL system with HDOS.



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Figure 2-16. COT Bay Cable Assemblies

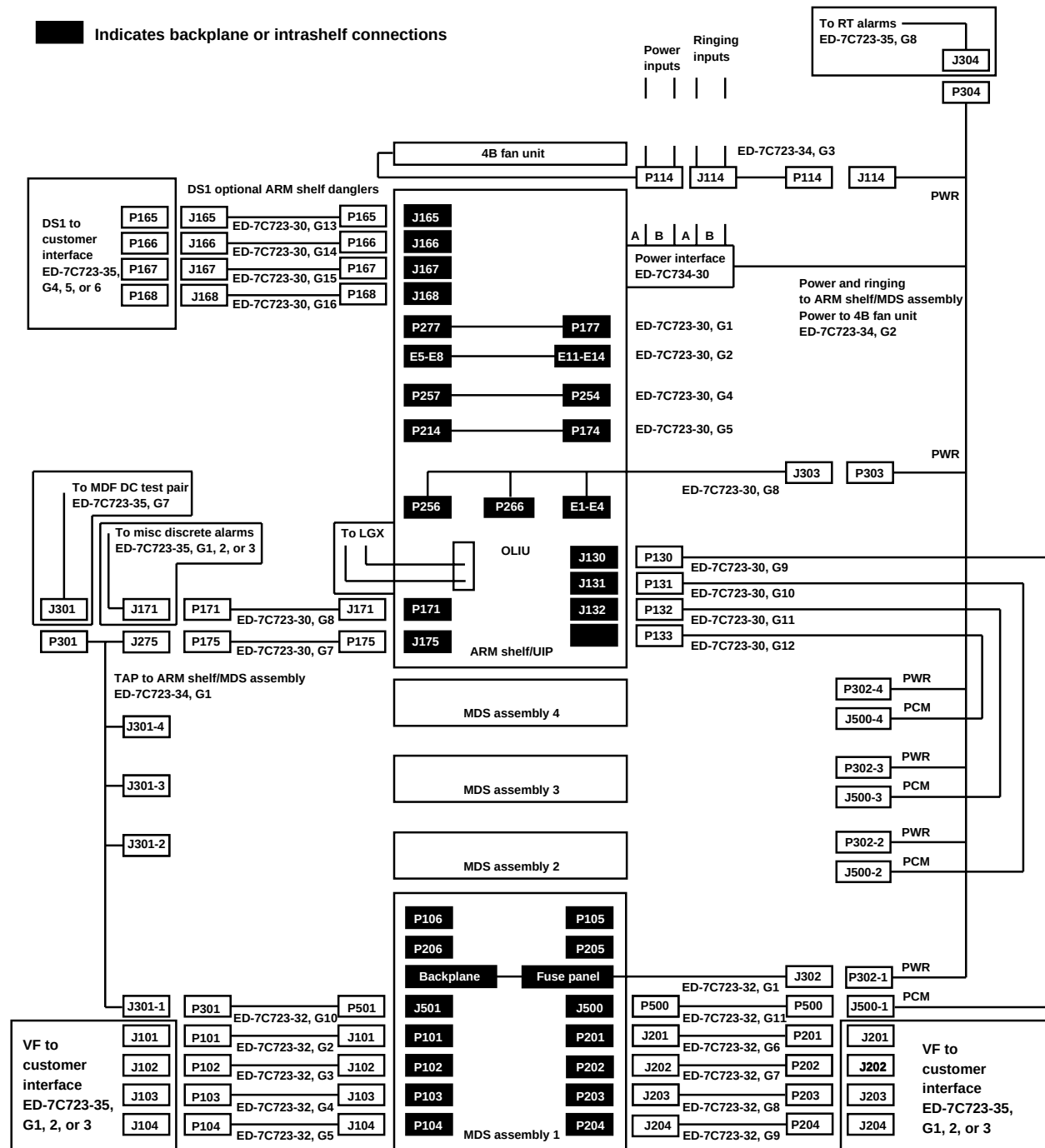


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Figure 2-17. RT/HDT Bay Cable Assembly — Bay Cables

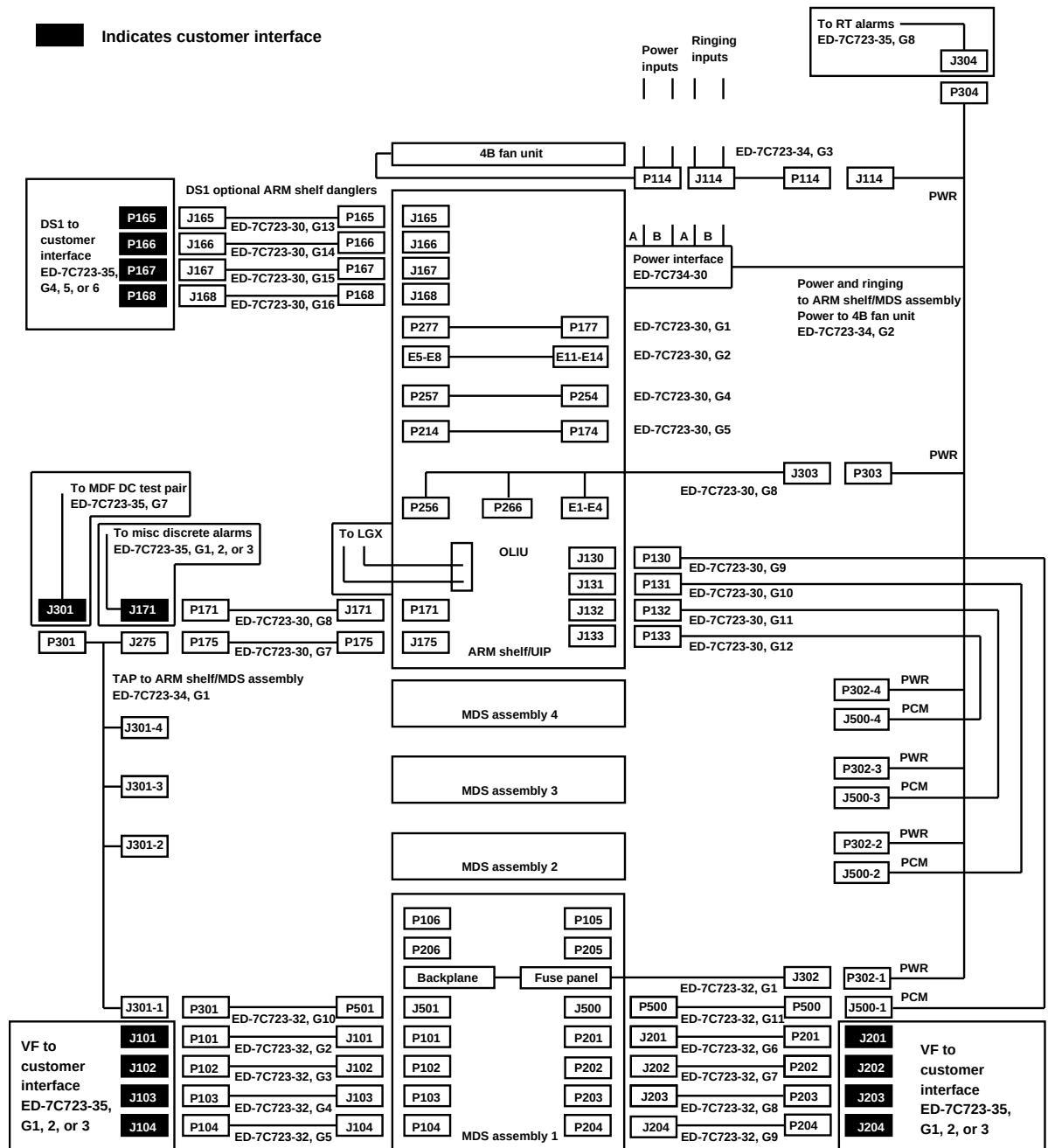






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Figure 2-20. RT/HDT Bay Cable Assembly — Backplane or Intrashelf Connections



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Figure 2-21. RT/HDT Bay Cable Assembly — Customer Interface

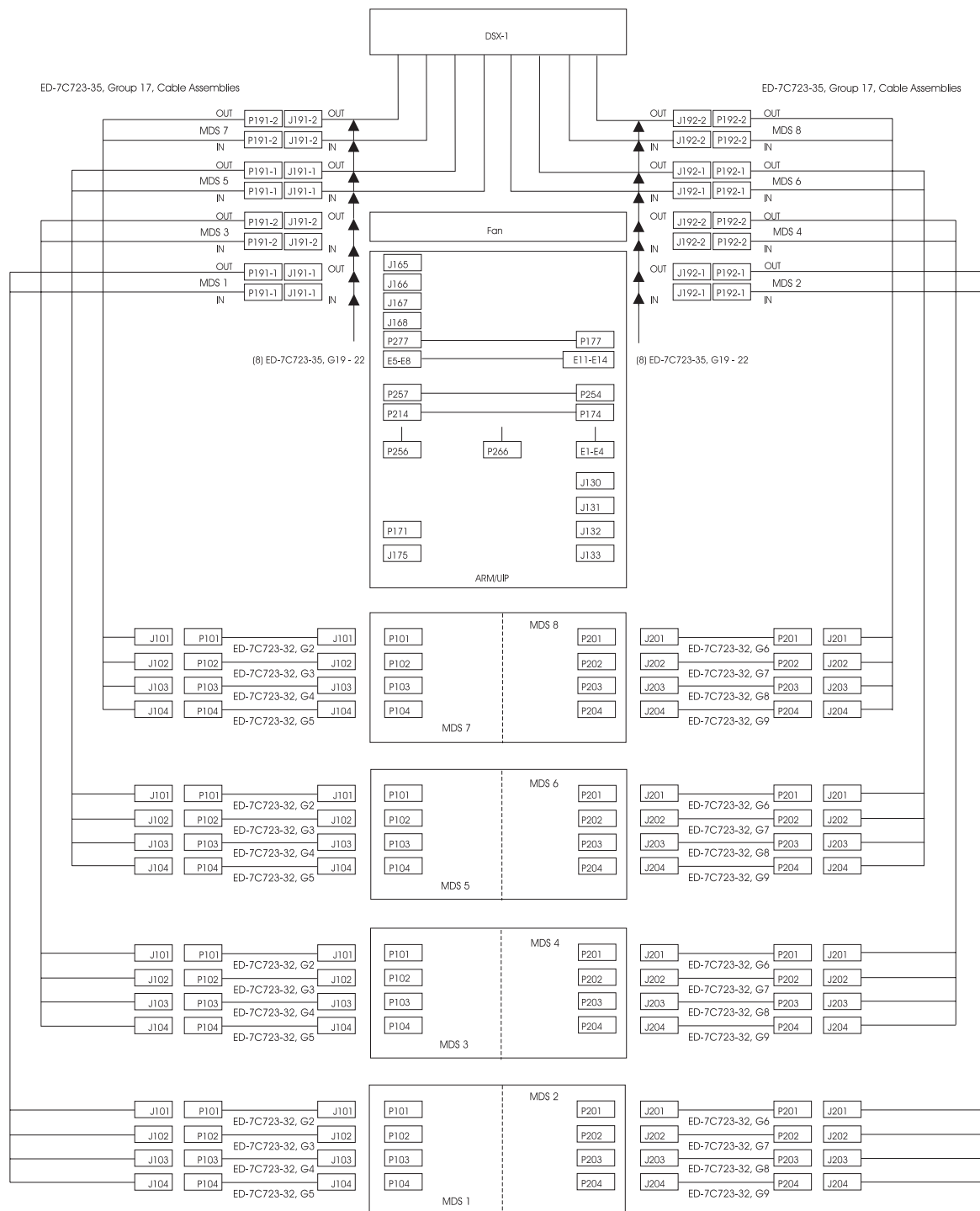


Figure 2-22. MDS/DSX-1 Cabling Connections

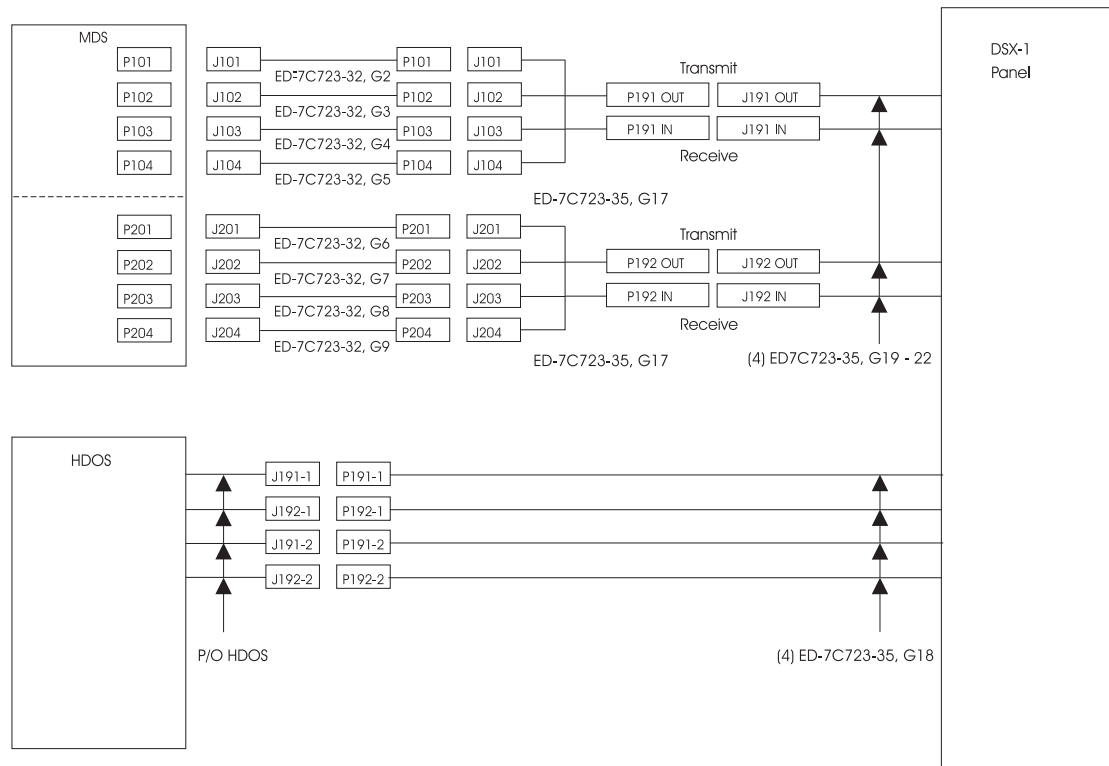


Figure 2-23. DSX-1 Panel Cabling Connections

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Introduction

This chapter describes the operations interfaces that support technicians and provisioning access to the *SLC*®-2000 Access System. These interfaces also allow the system to report alarms and status information. There are differences in the synchronous optical network (SONET) and digital signal level one (DS1) interfaces that will be pointed out in detail later in this chapter.

The operations interfaces include the following:

- One Electronic Industries Association (EIA) Standard, RS-232-D craft interface terminal (CIT) interface
- User interface panel (UIP) controls and indicators
- Equipment status indicators
- Office alarms [central office terminal (COT) only]
- TL1/X.25 interface to an alarm surveillance operations system such as Bellcore's Network Monitoring and Analysis (NMA) and Operations Systems/Intelligent Network Elements (OPS/INE) operations systems along with other operations systems
- Serial telemetry [telemetry byte-oriented serial (TBOS)] for the SONET subsystem
- Parallel telemetry
- User-defined miscellaneous discrete environmental alarms and controls
- Other alarms such as *power minor* and *external major*
- Order wire (external)
- Circuit maintenance such as loop testing and special services.

For detailed information on the operations system interfaces, see document 824-102-148, *2000 Family of Products Operations Systems Engineering Guide*.

Craft Interface Terminal (CIT)

To support more complex applications and maintenance, the user interface panel (UIP) has a port for connecting the CIT. The CIT can be used to support local or remote provisioning, maintenance, configuration, administration, inventory, and performance monitoring activities for both the SONET and digital loop carrier (DLC) subsystems. The same CIT can be used with the DDM-2000 multiplexer and the *SLC-2000* Access System.

A CIT can be either an American standard code for information interchange (ASCII) terminal or a personal computer (PC) running software that emulates an ASCII terminal. For software downloads, you must have a PC with the following capabilities:

- *MS-DOS*^{*} Release 3.0 or later operating system
- Serial port
- At least one diskette drive (either a 5¼ inch 360 kB or a 3½ inch 720 kB)
- At least 512 kB of random access memory (RAM).

Higher capacity drives must be read compatible with one of these formats.

For DLC Software Release 3.2 and later, you can also connect the CIT to the CIT port (J182) located on the rear of the access resource manager (ARM) shelf. This port provides an RS-232 interface and in order to be used by the CIT, the BBF250 link to alarms and networks (LAN) circuit pack must be installed and the SONET subsystem must be configured as a gateway network element (GNE) using the **set-ne** CIT command.

After a connection to the rear CIT port has been made, you must enter a "1" followed by a RETURN in order to initiate a session and get the login prompt. For more information on the rear access port, see "Link to Alarms and Networks (LAN)" in the "Product Description" chapter.

For more details on the CIT, refer to the "Ordering" chapter in document 363-208-000, *SLC-2000 Access System, Applications, Planning, and Ordering Guide*.

* Registered trademark of Microsoft Corporation.

User Interface Panel (UIP)

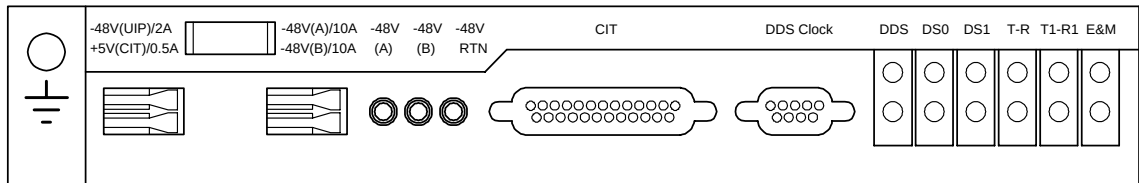
The UIP provides a central focus for system alarms, status displays, various controls, and control interfaces. It contains a one-line 24-character alphanumeric display that can provide system status, maintenance, and alarm reporting. It also contains test jacks, an RS-232 port for CIT access, and a set of push buttons that control the display and certain maintenance activities.

The UIP has two sections (a maintenance section with test jacks, fuses, and the RS-232 port; and a display and control section with indicators, push buttons, and the alphanumeric display). The display section is not covered; thus, system status and alarm indicators are always visible. For safety, a flip-down panel (with a push-to-release latch) covers the jacks and fuses in the maintenance section.

For more details on the UIP, see document 363-208-003, *SLC-2000 Access System, Commands and Messages*.

Maintenance Section

The left-hand side of the UIP contains the maintenance and testing interface for the system (Figure 3-1).



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Figure 3-1. User Interface Panel (UIP) — Maintenance Section

Electrostatic Discharge (ESD) Ground Jack

The ESD jack is a static ground pin jack that provides grounding to the frame for the static control wrist strap.

CIT Connector

This front panel connector is the operations interface for an asynchronous display terminal. The CIT connector is a 25-pin D-subminiature type that follows the RS-232 standard for asynchronous data exchange.

Power Test Points

A set of nonfused power test points (pin jacks) is provided for monitoring the –48 V DC feeders.

Power Fuses

Power fuses are provided on the UIP to protect the UIP and CIT electronics and to fuse the redundant –48 V DC power feeders for the access resource manager (ARM) shelf (see document 363-208-000, *SLC-2000 Access System, Applications, Planning, and Ordering Guide*, for more details).

Digital Data System (DDS) Clock

The DDS clock connector provides a local DDS clock source for standard test sets for testing dataport channel units.

Maintenance Jacks

DDS

The DDS maintenance jacks provide a digital signal level 0 (DS0) access port for standard test sets for testing dataport channel units.

DS0

The DS0 maintenance jacks provide voice-frequency (VF) access for standard test sets to the bit stream side of voice-frequency channel units during testing and alignment.

DS1

The DS1 maintenance jacks are provided for future test and maintenance operations and are not active.

T-R, T1-R1, and E&M Drop Jack

The tip-ring (T-R), tip 1 ring 1 (T1-R1), and E&M maintenance jacks provide metallic access to the drop side of subscriber channel units for testing and alignment. Drop jacks are not available for Fiber in the Loop (FITL) distribution.



NOTE:

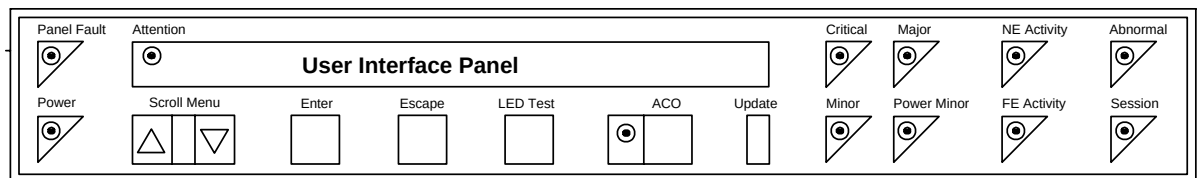
Only the top portion of the E&M jack area is used. The bottom portion is not used. The top portion provides channel access towards the channel unit.

Display and Control Section

The display section of the UIP (Figure 3-2) contains alarm and status indicators, an alphanumeric display, and push buttons to control the system and the display.

The *command entry* push buttons are coordinated with the display to allow the technician to perform basic operations that otherwise would require a CIT. The command entry push buttons scroll the display through the menus to select options and execute commands.

The UIP must be ordered separately. If the display and control section of the UIP fails, the *display module* may be replaced.



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Figure 3-2. User Interface Panel (UIP) — Display and Control Section

Alarm and Status Indicators

The UIP contains the following light-emitting diode (LED) indicators.

- **Power (Green)** — Incoming –48 V DC is present at the UIP.
- **Attention (Yellow)** — The alphanumeric display has new fault or alarm messages to be reviewed.
- **Critical (Red)** — A system failure has caused loss of service to more than 128 customers (critical alarm).
- **Major (Red)** — A system failure has caused loss of service to 24 or more customers (major alarm).
- **NE Activity (Yellow)** — Local (remote terminal) end of the system has active alarm/status condition(s) (near-end activity).
- **Abnormal (Yellow)** — The system is configured for testing or some arrangement other than providing service. See "Trouble-Clearing Tab Index, TAD-100 Maintenance Philosophy" in Chapter 4, "Operations and Maintenance Procedures (TOP)," for specific conditions (listed in the table of UIP indicators).
- **Panel Fault (Red)** — The UIP has detected a failure in its circuits or in the display module.
- **ACO (Green)** — The alarm cutoff (ACO) push button has been pressed during an active alarm condition.
- **Minor (Yellow)** — A system failure that has not interrupted service but may cause loss of service if not corrected (minor alarm).
- **Power Minor (Yellow)** — The system is operating on battery power, usually caused by loss of AC power at the remote terminal (power minor alarm).
- **FE Activity (Yellow)** — Far end of the system has active alarm/status condition(s) (NE ACTY lighted at far end or far end transmitted alarm to remote terminal).
- **Session (Yellow)** — The remote CIT session is in progress at this remote terminal (alerts the local technician at the remote terminal to CIT maintenance from the other end).

Alphanumeric Message Display (AMD)

The AMD is a 5- by 7-inch window to the 24-character, single-line, red dot matrix LED. The AMD shows one line at a time of the main menu (of basic system commands) and of system alarm and status reports, without a CIT.



NOTE:

The UIP does not display new alarms or faults while CIT commands are in progress. This means that the system delays alarm reporting at the UIP until the in-progress CIT command completes. The UIP then displays the delayed alarms or faults.

Display and Control Push Buttons

The UIP has four command entry push buttons that control the AMD and select or execute the menu item or command.

- a. **Scroll Menu (two buttons)** — The first push button is labeled with a down arrow and is used to scroll forward through various menu selections. The second push button is labeled with an up arrow and is used to scroll backwards (up) through various menu selections.
- b. **Enter** — This push button will select the item or execute the command currently displayed.
- c. **Escape** — This push button returns the user to the command menu.

The following three push buttons control other miscellaneous system functions.

- a. **LED Test** — This button lights all the indicators on the system except the LEDs on the SLC® Series 5 Carrier System channel units. This function is cabled internally to the ARM shelf and metallic distribution shelf (MDS) assembly so the indicators can be lighted from one push button. The MDS assembly also has an LED test push button that provides this function for arrangements that mount the ARM shelf out of sight of one or more metallic distribution shelves.
- b. **ACO** — This push button will be used in future central office applications. (If this push button is pressed while an alarm is active, the ACO indicator will light.)
- c. **Update** — This push button updates the equipment list in the system data base to reflect the current hardware configuration and incoming signals.



NOTE:

Although pressing the UPDATE push-button switch clears all feeder alarms, alarm conditions may still be present. This may cause the RT to be out of sync with the local digital switch (LDS).

Equipment Indicators

Fault Indicators

Each circuit pack in the ARM shelf contains a red FAULT indicator LED. All common circuit packs in the MDS assembly also contain red FAULT indicators. Channel units and retainer cards do not contain these LEDs.

The FAULT indicator on the circuit pack operates in the following modes:

- **LED Off.** The circuit pack is operating normally.
- **LED Lighted (but not flashing).** The system may have isolated a failure to the circuit pack. To confirm failures, use the UIP **RETRIEVE-FAULTS** command or the **rtrv-alm** command at the CIT.



NOTE:

The system lights the LED on the virtual tributary unit (VTU) when it is receiving a software load.

- **LED Flashing Slowly.** On transmission interface and timing circuit packs, the system flashes the LED when the pack detects an incoming signal failure. Examples of an incoming signal failure include:
 - Loss of signal
 - Loss of frame
 - Loss of pointer
 - Crossing the threshold for signal fail or signal degrade.

On the overhead controller (OHCTL) circuit pack (BBG7), the LED flashes when the pack detects a failure of the data communications channel (DCC) from a far-end shelf.

- **LED Flashing Fast.** The system flashes the LED on circuit packs when they are receiving a new software load.

ACTIVE Indicators

Each 1 × 1 and 1 + 1 protected circuit pack contains a green ACTIVE indicator LED. This LED indicates which circuit packs — *service* and/or *protection* circuit pack — are active or carrying service at any given time.

The low-speed and quad low-speed circuit packs do not contain a green ACTIVE LED to indicate they are carrying service. However, you can normally determine the status of the pack without using the CIT as follows:

If ...	Then ...
A DS1 or VTU/LIU circuit pack red FAULT LED is lighted AND the DS1 protection circuit pack FAULT LED is not lighted AND the ABN LED on the UIP is <i>not</i> lighted.	The protection circuit pack is carrying service. You can safely remove the failed circuit pack.
The ABN LED on the UIP is lighted.	Use the UIP or a CIT to check the status of the system.

Other Indicators

Some SLC-2000 Access System circuit packs contain other indicator LEDs. Refer to the data sheet of the specific circuit pack for a description of these indicators.

Office Alarms

The SLC-2000 system alarm and test unit (ATU) at the COT provides relay contacts for wiring alarms to the office's audible and visual alarm system. The system provides for the following alarm conditions:

- **CR** (critical)
- **MJ** (major)
- **MN** (minor).

When the ARM shelf is equipped with a system controller (SYSCTL) and overhead controller (OHCTL) circuit pack, you can provision the system to activate the office MJ or MN when it detects a power MN (PMN) alarm condition at a remote site. Otherwise, the PMN alarm condition always raises a minor alarm. If you are using a DDM-2000 in the CO, see document 363-206-202, *DDM-2000 OC-3 Multiplexer User/Service Manual*.

The MJ and CR contact closures allow these office alarms to be ORed together and reported as an office MJ alarm.

The CR alarms are fail-safe against power failures. They are activated even if the shelf loses both power feeders.

Alarm conditions detected at any other sites in the SONET subnetwork cause the system to activate the appropriate central office audible and visual alarms.

Alarm Cutoff (ACO) Function

You can silence the audible office alarms at the COT or the DDM-2000 in the CO by pressing the ACO push button at any system at that site within the same subnetwork. The ACO push button does not extinguish visual alarms.



NOTE:

The SYSCTL and the OHCTL circuit packs (SONET subsystem) must be installed and working for the ACO to operate properly. (In a *SLC-2000* COT system, these packs control the contact closures to the alarm system through the ATU.)

Alarm Hold-Off Delay and Alarm Clear Delay



NOTE:

The *alarm hold-off delay* and the *alarm clear delay* are used on the SONET subsystem only.

For the SONET subsystem, an *alarm hold-off delay* prevents transient failures from causing unnecessary maintenance activity. With this delay, the system will not activate the alarm unless the condition causing the alarm lasts longer than the provisioned delay time. When a failure clears, an *alarm clear delay* prevents premature clearing of the alarm.

Alarm Priority Levels

The *SLC-2000* system assigns the following priority levels to both audible and visual alarms:

1. **CR** (critical)
2. **MJ** (major)
3. **MN** (minor).

As with the user panel indicators, when more than one alarm is active, the system activates the highest office alarm (both audible and visual). When an alarm clears leaving one or more alarms active, the office alarm *bumps down* to the highest level active alarm then active.

If you have pressed the ACO push button to silence all active audible alarms, then, when a bump-down occurs, the audible alarms remain silent while the system activates the next highest level visual alarm. This visual alarm is activated even though its corresponding audible alarm remains silent.

If another alarm occurs **after** you have pressed the ACO, the system activates the highest level audible alarm even if the new alarm is a lower priority level. For example, if both an MJ and MN alarm were active and silenced with the ACO and another MN alarm occurred, the MJ audible alarm would sound.

TL1/X.25 Interface

The *SLC-2000* Access System supports a TL1/X.25 interface. This interface is used to control and report alarm and status conditions along with performance monitoring data to an alarm surveillance operations system (OS) such as Bellcore's Network Monitoring and Analysis (NMA) operations system. This interface may also be used to provide remote and automated provisioning from an OS such as Bellcore's Operations System/Intelligent Network Element (OPS/INE) operations system. The interface also supports both provisioning and alarming with the ACD *FNESS** operations system in Release 3.3 (COT only) Maintenance and later.

The TL1/X.25 interface provides significantly more detailed information than the parallel telemetry or telemetry byte-oriented serial (TBOS) interfaces. An example of the more detailed information includes identifying specific circuit packs and facilities.

The system provides a rear access, synchronous, RS-232 port for this interface. This port is capable of supporting the following speeds:

- 1,200 baud
- 2,400 baud
- 4,800 baud
- 9,600 baud
- 19,200 baud.

Lucent Technologies recommends a baud rate of at least 9,600 for alarm interfaces. This port is supported on *SLC-2000* COTs in either SONET or DS1 feeder configurations and on *SLC-2000* RTs in a DS1 feeder configuration. The interface to a *SLC-2000* RT with SONET feeder is provided by means of a Gateway Network Element (GNE) that is part of the same SONET subnetwork and located in the central office (CO). A GNE may be either a *SLC-2000* COT or a *DDM-2000* system. The interface for a *SLC-2000* RT with a DS1 feeder requires a remote 9,600-baud communications circuit to each RT with DS1 feeders. For more information, see document 824-102-149, *SLC-2000 Access System Operations Systems Engineering Guide*.

* FNESS is an operations system being developed by Applied Computing Devices (ACD) for GTE telephone operating companies.

The *SLC-2000* Access System TL1 messages are based on the following Bellcore references:

- **Maintenance Messages:** TR-NWT-000833, Issue 3, Rev. 1, Issue 4, Supplement 1, and Issue 5, Rev. 1
- **Provisioning Messages:** TR-NWT-000199, Issue 2; and TA-NWT-000199, Issue 6, Supplement 1.

Document 824-102-149, *SLC-2000 Access System Operations Systems Engineering Guide*, provides the full list of supported messages along with detailed information about the input and output parameters for these messages. It also provides detailed specifications for the X.25 interface.

Serial Telemetry Byte-Oriented Serial (TBOS)



NOTE:

The TBOS link includes SONET subsystem alarms only.

TBOS is a protocol that defines one physical interface for direct connection between the telemetry remote and the monitored equipment. The *SLC-2000* system provides a TBOS link to and from an operations system for detailed alarm, status, and control information. This link only provides alarm information for the SONET subsystem.

The TBOS link is provided through a rear access RS-422 interface port at a *SLC-2000* system. Data transmits over the link at 2,400 baud. TBOS information from the *SLC-2000* RTs can be carried in a *SLC-2000* COT TBOS link or in a *DDM-2000* TBOS link in the same SONET subnetwork.

Each *SLC-2000* system uses one TBOS display. The TBOS display contains 63 alarm/status points to carry information from the *SLC-2000* system to the OS and 64 control points to carry commands from the OS to the *SLC-2000* system. Switch positions on the SYSCTL pack determine the number of the display assigned to each system. Each TBOS link can support up to eight displays in a network with *SLC-2000* systems and *DDM-2000* OC-3 and OC-12 systems.



NOTE:

The SYSCTL pack also has switches for a *DDM-2000* TBOS backup function although this feature is not supported in the *SLC-2000* system.

The system provides two types of TBOS displays:

- A central office system display
- A remote terminal system display.

The CO/RT selector switch on the SYCTL pack determines the type of display used for each shelf. An option switch on the SYCTL pack can enable or disable the sending and receiving of TBOS information over the data communications channel (DCC).

The alarm/status portion of the TBOS displays contains system alarm and status indications. The system defines each TBOS point as a status or alarm point. It designates alarm points as either service-affecting (SA) or non-service-affecting (NSA).

The SONET subsystem *alarm hold-off delay* and *alarm clear delay* set for office alarms also apply to the TBOS interface. In addition, the system holds the alarm and status indications on the TBOS interface for a minimum of 20 seconds to ensure that they can be received by the OS.

The TBOS control displays contain the following control points:

■ ***Remote terminal systems control points:***

- Protection switching
- Alarm cutoff
- Processor reset
- Control points to turn the miscellaneous discrete environmental controls on and off.

■ ***Central office control points:***

- Protection switching
- Alarm cutoff
- Processor reset.

See document 824-102-148, *2000 Family of Products Operations Systems Engineering Guide*, for more information on the TBOS interface and provisioning. This document also contains tables that define the meaning of each point in the alarm and status displays and control displays for the SLC-2000 system.

Parallel Telemetry

The ATU panel on the SLC-2000 COT provides a parallel telemetry interface. This allows the COT an option to remote a minimum subset of alarm and status information to an operations center. Parallel telemetry is also available at a CO DDM-2000 system, although it provides fewer closures. A SLC-2000 COT provides additional closures for the TR8 virtual remote terminals (VRTs) and TR8 digroups. When a CO DDM-2000 system is used, this information must be obtained from the COTs or local digital switch(es) (LDS) that terminate the VRTs from the SLC-2000 RTs.

To provide a single point of access for office wiring, you can wire the telemetry outputs of multiple shelves together. This provides a physical ORing of the outputs for the shelves.

Since the parallel telemetry alarm closures reflect the office alarms, the SONET subsystem *alarm hold-off delay* and *alarm clear delay* set for office alarms also apply to the parallel telemetry. In addition, the system holds the parallel telemetry points for a minimum of 20 seconds to ensure that they can be received by the OS.

The system provides the following contact closures:

■ **Alarms:**

- The system provides individual closures for CR, MJ, MN, and PMN alarms conditions.
- As with the user panel indicators and office alarms, when more than one alarm is active, the system activates the highest parallel telemetry alarm. When an alarm clears leaving one or more alarms active, the parallel telemetry output *bumps down* to the highest level active alarm then active.

■ **Statuses:** The system provides the following status contact closures to transmit maintenance information to an operations center:

- ***Near-End (NE) Status.*** This closure identifies the near end as the location where an alarm was detected.
- ***Far-End (FE) Status.*** (SONET feeder configuration only.) These six closures identify the far end as the location where an alarm was detected. The system provides six FE closures to identify which remote site is reporting a fault.
- ***Multiplexer Carrier Line Failure (MUX CLF) Status.*** (SONET feeder configuration only.) This closure indicates detection of failures in a SONET optical or electrical line. This applies to SONET optical or electrical line failures detected incoming to the system.
- ***DLC Carrier Line Failure (DLC CLF) Status.*** This closure indicates detection of facility failures in the DLC subsystem.
- ***Incoming (INC) Status.*** (SONET feeder configuration only.) This closure indicates detection of asynchronous electrical signal failures (that is, loss of signal or crossing of the signal fail threshold). Asynchronous electrical signal failures include low-speed DS1 or DS3 failures incoming to the system from the digital signal cross-connect (DSX).
- ***System Identification (SID) Status.*** This closure identifies the system raising alarms when alarms are paralleled among several systems. The system ID contact closures are not wired together, as can be done for other parallel telemetry outputs.

- **Bank (BNK) Statuses.** These eight bank status closures identify which shelf is in an alarm state.
- **Shelf (SHLF) Statuses.** These four shelf status closures indicate which TR8 digroup (a digroup pertains to a shelf in a *SLC-96* carrier system and contains 24 lines) is in an alarm condition.
- **Abnormal (ABN) Status.** This closure indicates the presence of an abnormal condition.
- **ACO Output (ACO).** This closure indicates that the ACO function is active. The system provides an ACO parallel telemetry response output to acknowledge the ACO parallel telemetry control input.

■ **Controls:**

- The system provides an ACO parallel telemetry control. This control input is accepted from the associated maintenance center to silence all telemetry outputs except for the system identification and ACO status in systems that are wired in parallel.
- Activating the ACO function silences the office audible alarms and turns on the ACO LED on the user panel.

■ **User-Definable Miscellaneous Discretes — Parallel Telemetry Access:**

- In addition to the parallel telemetry alarm, status, and control points described previously, the *SLC-2000* system provides user-definable miscellaneous discrete environmental alarms and controls accessed through the parallel telemetry interface.

For more information on parallel telemetry provisioning and interface, see document 824-102-148, *2000 Family of Products Operations Systems Engineering Guide*.

Miscellaneous Discrete Environmental Alarms and Controls (User-Definable)

The *SLC-2000* system provides a set of user-definable miscellaneous discrete environmental alarms and controls to allow monitoring and control of collocated equipment at a remote site. It includes alarms and controls for both:

- SONET feeder configuration
- DS1 feeder configuration.

SONET Feeder Configuration



NOTE:

This information is the same whether there is a *SLC-2000* COT or a *DDM-2000* in the CO.

Fifteen miscellaneous discrete alarm/status points monitor environmental conditions at remote terminal sites. These include such conditions as *open door* and *high temperature*. Contact closures activate the first 14 points. The fifteenth point monitors the remote structure power and fan apparatus (for example, DC power shelf failure). A –48 volt input activates this point.

Four control points control equipment, such as pumps and generators, at the remote terminal site. When activated, the control points provide a contact closure between the control point output and ground.

The SONET section DCC transmits the miscellaneous discrete alarms/statuses and controls between remote *SLC-2000* systems and the following:

- CO *SLC-2000* systems
- *DDM-2000* OC-3 systems.

The TBOS link, TL1/X.25 link, and parallel telemetry interfaces at the CO provide OS access to the miscellaneous discrete alarm/status points as shown in Figure 3-3 and Figure 3-4. The UIP and CIT interfaces provide access to the miscellaneous discrete alarm/status points. However, the UIP and CIT can only report, and **not** control, the state of the control points.

You can use the CIT in remote terminal systems to provision the following data:

- **15 Alarm/Status Points** — alarm types (names) and alarm levels
- **4 Control Points** — names.

In multispan applications (for example, STS-1 drop and hubbing), the control points operated through the parallel telemetry interface at the *SLC-2000* or *DDM-2000 OC-3* in the CO are "broadcast" to all remote terminals connected to the system in the CO.

In multispan applications, the miscellaneous discrete environmental alarm and status points from all remote terminals connected to one *SLC-2000* system or *DDM-2000 OC-3* in the CO are "ORed" by the system in the CO for transmission to the OS through the parallel telemetry interface. The far-end status points described previously can be used to determine the location of a miscellaneous discrete environmental alarm.

Unlike the other parallel telemetry alarm, status, and control points described previously, the miscellaneous discretes are not ORed among different systems in the CO. Each system has its own set of miscellaneous discrete environmental alarms and controls.

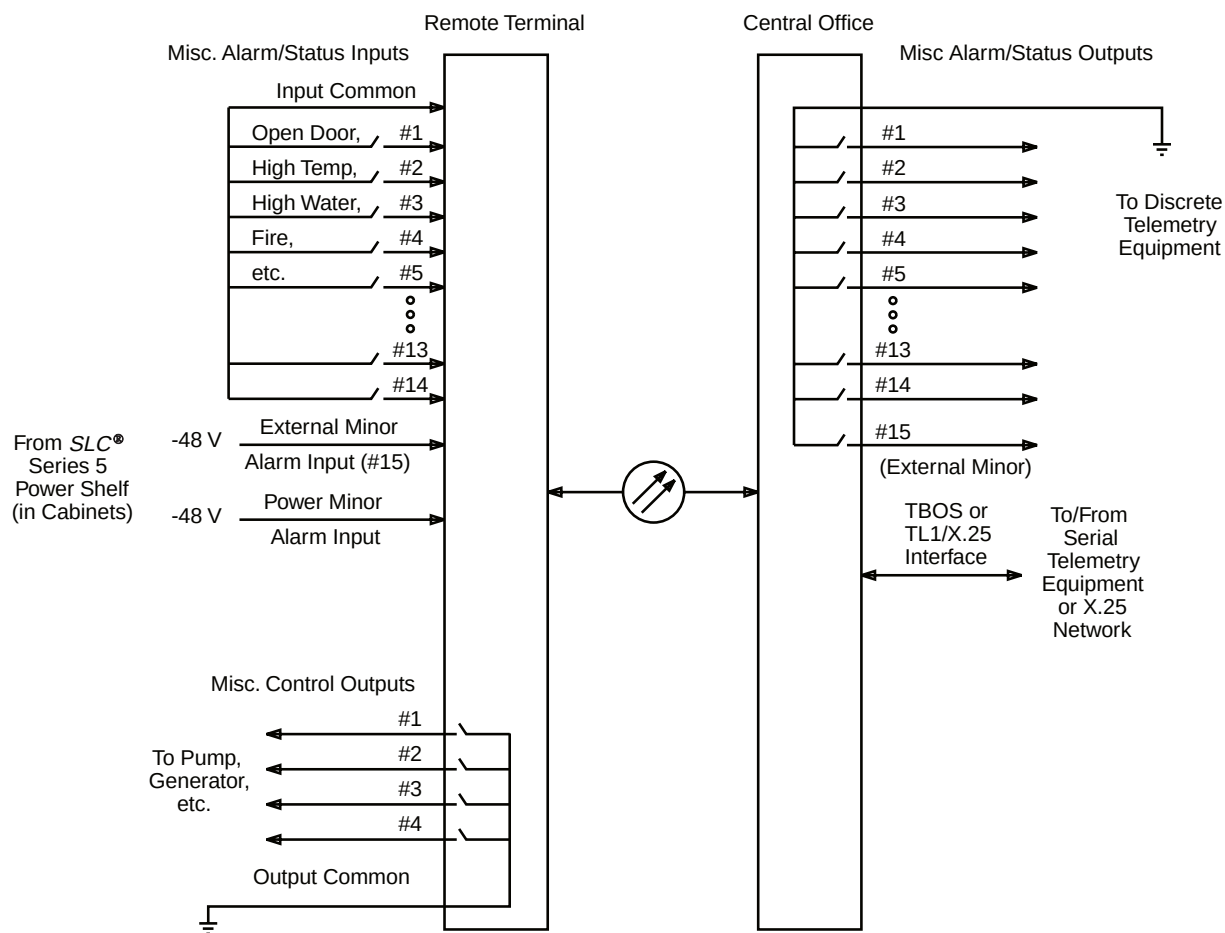


Figure 3-3. Miscellaneous Discrete Environmental Alarms and Controls (TBOS or TL1/X.25 at Central Office)

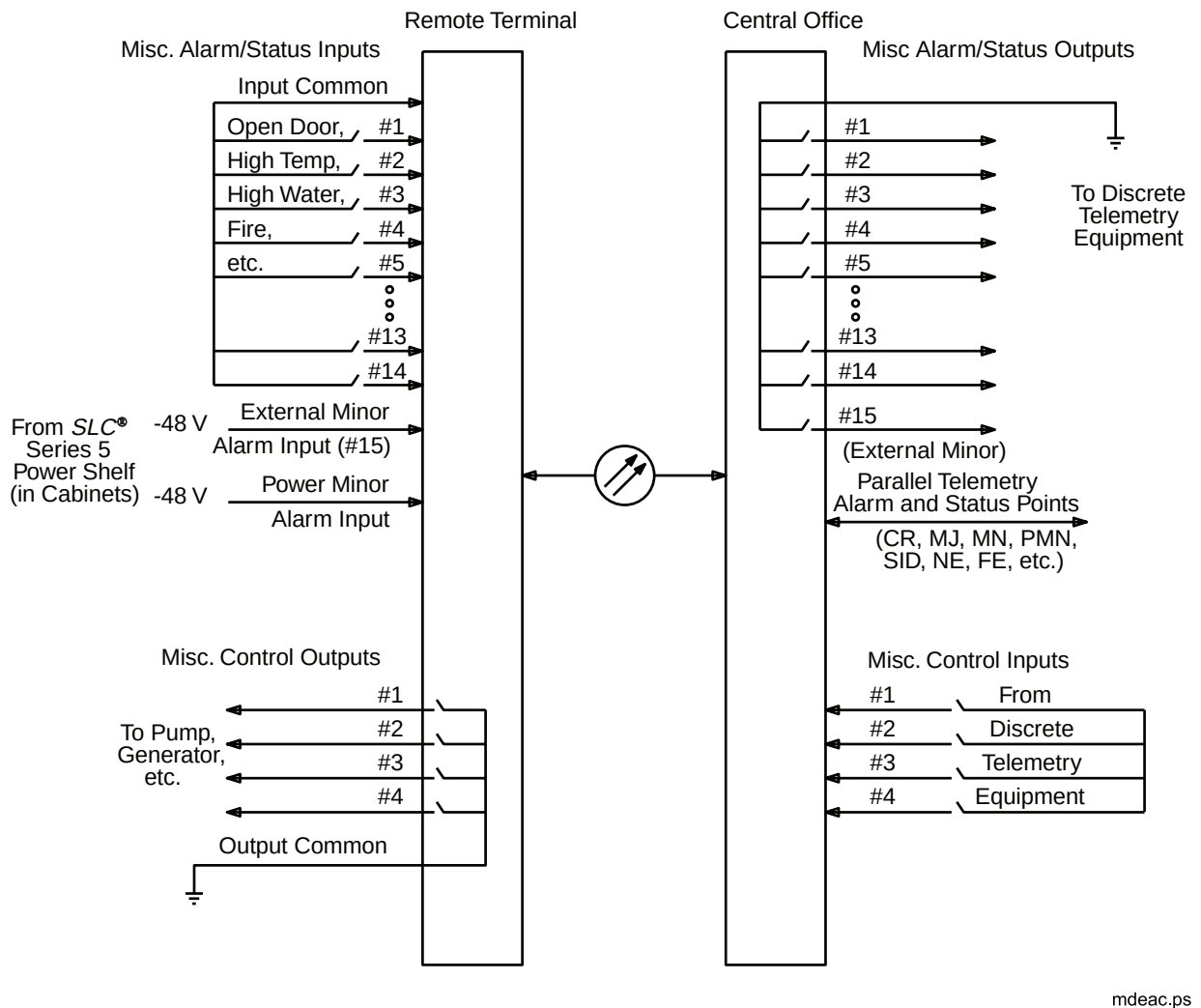


Figure 3-4. Miscellaneous Discrete Environmental Alarms and Controls (Parallel Telemetry at Central Office)

DS1 Feeder Configurations

In *SLC-2000* RTs with DS1 feeder, a maximum of seven of the miscellaneous discrete alarm/status points may be used. The control inputs and outputs are not supported. Each miscellaneous discrete input is *mapped* to the TR8 data link of a VRT. A VRT must be in-service (that is, terminated on an in-service COT or LDS) for the alarm to appear at an output closure at the CO.

The mapping is as follows:

Input	VRT
2	2
3	3
4	4
5	5
6	6
7	7
8	8

The power minor (PMN) alarm input is mapped to VRT Number 1 as described in the "Other Alarms" section in this chapter. The external minor (MN) input is mapped as a minor alarm (with no miscellaneous alarm indication) on each in-service VRT's TR8 data link.

In *SLC-2000* COTs with DS1 feeder, the COT supports up to seven VRTs, so only miscellaneous inputs/outputs numbers 2 through 7 and the external minor are supported. If another COT or LDS that supports mode 2 interfaces to VRT8 and VRTs 7 and 8 are set for mode 2, then miscellaneous input number 8 can also be used.

Unlike the other parallel telemetry alarm, status, and control points described previously, the miscellaneous discretes are not ORed among different systems in the CO. Each system has its own set of miscellaneous discrete environmental alarms and controls.

Other Alarms

The *SLC-2000* RT provides the following alarms in addition to the miscellaneous discrete inputs:

- **Power Minor (PMN):** This alarm detects the loss of alternating current (AC) power at the RT. An alarm output is provided over the parallel telemetry and TBOS interfaces in the CO (using the *SLC-2000* COT or CO DDM-2000). In a DS1 feeder RT, this input is mapped to TR8 VRT number 1. VRT number 1 must be in-service in this configuration for this alarm input to be supported. For DS1 feeder equipped RTs without VRT number 1 configured, the AC power TR8 MISC alarm can be sent on another VRT simply by connecting the PMN input to the appropriate miscellaneous input for the desired VRT.
- **External Major:** This alarm detects dual ringer failures. When the alarm is active, it generates a CR alarm on the *SLC-2000* RT, and an MJ alarm is sent on the TR8 data link of each in-service VRT. In a DS1 feeder configuration, only an MJ indication will be seen at the CO end.



NOTE:

For RTs without virtual remote terminal 1 (VRT-1) configured, an AC Power failure can be alarmed as a TR8 PWR/MISC data link alarm for another VRT simply by connecting the PMN input to the appropriate Miscellaneous input for the desired VRT. The alarm will be reported at the UIP/CIT interfaces as a Miscellaneous Input Active and an AC Power failure.

Order Wire

The *SLC-2000* system uses the E1 byte in the SONET overhead and provides a 64-kb/s complementary logic [transistor to transistor logic (TTL)] compatible interface to an external order-wire shelf. This provides point-to-point voice communication between *SLC-2000* systems. You must install the order-wire shelf within 3 feet of the *SLC-2000* system to which it is connected.

The order wire is available only between *SLC-2000* and DDM-2000 OC-3 shelves connected to each other using the optical line interface units (OLIUs) in the main slots. In multispan applications (for example, STS-1 drop or hubbing), order-wire communication is available only between the CO and the first RT.

Order wire is not currently available in ring applications.

The *SLC-2000* system has been tested with the *Dantel** order-wire assembly A18-04588-02.

* Dantel is a registered trademark of Dantel, Inc.

Circuit Maintenance

This section describes how the *SLC-2000* system supports the following circuit maintenance features:

- Plain old telephone service (POTS) circuit testing
- Special services testing
- Local test access.

Depending on your application, the *SLC-2000* system integral test head (ITH) may be required to support circuit maintenance. Chapter 2 describes the ITH and shows you which circuit packs are required for the different applications.



NOTE:

Local test access will prevent remote special services testing. If the ITH is equipped for local test access [with the craft access unit (CAU)], switched access remote test system (SARTS) and external remote test unit access will be blocked. This is because the UIP jacks access the test pair. However, installing *dummy bantam plugs* in the following UIP jacks will enable external remote testing:

- ***T-R jacks*** — both CHAN and DROP
- ***T1-R1 jacks*** — both CHAN and DROP
- ***E&M jack*** — CHAN.

When local test access is needed, you may temporarily remove the plugs to use the jacks, but you must replace the plugs as soon as local testing is completed to restore external remote test access.

Circuit Testing (POTS)

The *SLC-2000* Access System provides the following four pathways to the remote terminal (RT) for loop testing:

- Integral test head (ITH)
- Remote test unit (RTU) or remote measurement unit (RMU)
- Metallic (DC) bypass pair or test pair
- Tollgrade DC bypass pair channel unit.

The mechanized loop testing (MLT) system can access the loop using any of the four paths.

For RTs only, to support the ITH, you must dedicate two DS0 time slots to the ITH for the talk and monitor links with MLT. This is done using the **ENT - CRS - T0** CIT command (also supported on the TL1/X.25 interface) to cross-connect the ITH links (ithlink-{1,2}) to VRT logical lines or to INA DS0 time slots.



NOTE:

In a TR-303 system (Release 4.0 and later), the ITH must be cross-connected to INA DS0 time slots.



NOTE:

When deleting this link (cross-connection) in a Mode 2 VRT, make sure that the physical line associated with the ITH link does not have any *checkerboard* (nonstandard) cross-connections to it (see document 363-208-000, *SLC-2000 Access System, Applications, Planning, and Ordering Guide*, for an explanation of cross-connections). In other words, the logical line to physical line cross-connection must be a standard DS0 cross-connection. Otherwise, when the ITH link is deleted, it will momentarily interrupt service on the physical line.

Note that if an ITH link is connected to a TR8 Mode 2 VRT, it will be concentrated onto one TR8 digroup along with 46 other lines. No external connections are required for the ITH links.

The *SLC-2000* system provides a test access path connection if testing is to be supported via a metallic bypass pair, external RTU, or Tollgrade direct current (DC) bypass pair channel unit.



NOTE:

For the Tollgrade DC bypass pair channel unit, the first two DS0s (for example, drops) must be cross-connected (using the **ent - crs - t0** command) to successive logical line terminations on a TR8 mode 1 VRT or INA DS1 (not supported on the TR-303 VRT).

The *SLC-2000* alarm and test unit (ATU) in a *SLC-2000* COT provides a pair gain test controller (PGTC) interface for channel testing in universal *SLC-2000* system arrangements. For integrated arrangements, the local digital switch provides the interface to MLT. For arrangements with other COTs, the other COT must provide the PGTC interface.

Circuit Testing (Special Services)

The *SLC-2000* system allows Special Services testing using switched access remote test system (SARTS). This requires an external RTU. Refer to document 824-102-148, *2000 Family of Products Operations Systems Engineering Guide*, for more details.

The Tautron *ngRTH** test head, which is collocated with the *SLC-2000* RT (Software Release 3.2) or COT (Software Release 3.3.1 or later), can also be used by the appropriate testing OS at a maintenance center to test subscriber circuits. For special service testing, the *ngRTH* test head sets up the test access through the *SLC-2000* metallic test access unit (MTAU) and connects to the test access path (TAP) for testing out toward the subscriber loop and in toward the channel unit. After accessing the circuit, it can perform electrical measurements, transmit and measure frequency level, measure noise, impulse noise, and return loss, and provide monitor/talk, loopback, and quiet termination functions. These tests may be applied to any of the 2-wire or 4-wire circuits selected. For additional information concerning the Tautron *ngRTH* test head, refer to document 363-208-000, *SLC-2000 Access System, Applications, Planning, and Ordering Guide*.

Local Test Access

The *SLC-2000* system provides splitting metallic and splitting digital local test access using the UIP for lines terminated on the MDSs. Both the RT and COT can use local test access. Digital access only is available on lines served through an optical network unit (ONU).

The UIP jacks for both 2-wire (T/R) and 4-wire (T/R and T1/R1) circuits provide metallic drop (towards the customer) and channel (towards the channel unit) access. Only channel side access for the E&M leads is provided.

The DS0 jacks on the UIP provide access to the digital bit stream into the channel units. The ITH must be equipped with the power converter unit (PCU), craft access unit (CAU), and test head controller (THC) circuit packs for this feature. CIT commands (**CONN - TACC** and **DISC - TACC**) are used to establish and disconnect test access. You can use the **CONN - TAP** command to loop around the test access path on an MDS. See document 363-208-003, *SLC-2000 Access System, Commands and Messages*, for more details.

* Trademark of Tautron Inc.

Operations and Maintenance Procedures (TOP)

4

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Operations and Maintenance Procedures (TOP)

4

Introduction

**WARNING:**

Only trained service personnel should perform the procedures in this document. These procedures allow exposure to high electrical energy and/or current that may result in electric shock and/or injury to untrained personnel during servicing, maintenance, and installation of this system.

This chapter contains task-oriented practice (TOP) procedures to accept, equip, turn up, establish service, and clear trouble on the SLC®-2000 Access System remote terminal (RT). In this chapter it is assumed that the system has been planned and engineered, and that you know what tasks you are required to do when you start.

This chapter includes the following procedures:

- Acceptance
- Access resource manager (ARM) shelf turnup [equip ARM shelf, establish synchronous optical network (SONET) subsystem, and establish digital loop carrier (DLC) subsystem support circuit packs, including SONET end-to-end tests]
- Metallic distribution shelf (MDS) assembly turnup and end-to-end DLC subsystem test
- Circuit order [channel unit installation and testing, establish (add) DS1 services, and establish OC-3/OC-12 extension SONET subsystem (muldem C), and establish Fiber in the Loop (FITL) systems]
- Trouble clearing
- Detailed level supporting procedures
- Channel unit installation procedures.

⇒ **NOTE:**
The turnup procedures *do not* include power or ringing equipment. Refer to the vendor's documentation for procedures on turning up the power and ringing equipment.

⇒ **NOTE:**
A craft interface terminal (CIT) is required when turning up the SONET subsystem to clear alarms associated with installing the ARM shelf circuit packs and to turn up a Release 3.1 and later system.

The *acceptance* procedures verify that the equipment is not damaged (visual inspection), power is present, and fuses can be installed without blowing. These procedures also test the cooling (fan) shelf before turning up the system.

The *ARM shelf turnup* procedures are used to install and test circuit packs in the ARM shelf to establish an end-to-end SONET OC-3/OC-12 or metallic feeder subsystem. *These procedures must be done before MDS assembly turnup or before circuit order procedures are started.*

The *MDS assembly turnup* procedures are used to install and test common circuit packs in the MDS assembly and to establish the DLC subsystems end-to-end *after the SONET or metallic feeder subsystem has been turned up end-to-end* for either metallic or fiber distribution.

The *circuit order* procedures are used to supply, change, or disconnect customer services and system configurations.

The *trouble-clearing* procedures are used when alarms are present to clear system troubles.

The *detailed level* (support) procedures (DLPs) provide detailed instructions to perform a task.

The *channel unit installation* procedures provide detailed instructions to install and test channel units. The procedures to establish FITL systems are also in this section. This includes equipping the high density optics shelf (HDOS), installing distant terminal (DT) Servers in a metallic distribution shelf, and verifying the connection to the DT.



NOTE:

Before removing or installing any circuit packs in a subsystem, make sure that the following control circuit packs are installed and working:

- ***SONET subsystem*** — System controller (SYSCTL) and overhead controller (OHCTL) circuit packs
- ***DLC subsystem*** — system memory unit (SMU) and provisioning and display controller (PDC) circuit packs.

If either of the above control circuit packs is missing or failed when a circuit pack is removed and/or installed, or if one of the above control circuit packs is removed during software download, the system may display misleading or incorrect faults or alarms.

How to Use Task-Oriented Practice (TOP) Procedures

The procedures in this chapter are grouped into three basic types of activities (nontrouble procedures, trouble analysis description/procedures, and detailed level procedures) done at the *SLC-2000* Access System RT. The top outside page heading indicates the type of procedure.

To find the instructions for performing acceptance, ARM shelf turnup, MDS assembly turnup, circuit order, or trouble-clearing tasks, proceed using the following steps.

Step	Procedure
1.	Go to the <i>Overall Task Index List (IXL-001)</i> behind the <i>IXLs</i> tab. From the Overall: IXL-001, find the specific IXL that corresponds with the task you will be performing. There are two types of IXLs in this document: ■ Procedural IXLs. These IXLs contain tasks that <i>must</i> be performed in the order shown in the IXL. Start with the first task and continue until the IXL tells you to stop. An example of this type of IXL is IXL-002, "Accept <i>SLC-2000</i> Access System." ■ Random Access IXLs. These IXLs contain tasks that do <i>not</i> have to be performed in a specific order. Simply select your task from the list. An example of this is IXL-007, "Perform Trouble-Clearing Procedures."
2.	After finding your task in the IXL, turn to the director level non-trouble-clearing procedures (NTP), detailed level procedure (DLP), or trouble analysis procedure (TAP) listed for your task. All procedures in each section are in numerical order, regardless of type. Procedures in this TOP are of the following three types: ■ Non-trouble-clearing procedure (NTP) — A director level procedure that lists normal work items to perform other than trouble clearing. The NTPs may have a <i>Summary</i> or other text preceding the first item in the procedure. These are provided for a craftsperson who is familiar with the task and just needs a <i>memory jogger</i>. The procedure may contain a summary of the steps or general information, but if you are not experienced with the task, you must perform the steps in the procedure. These <i>summaries</i> may also appear in DLPs. ■ Detailed level procedure (DLP) — Detailed step-by-step instructions. ■ Trouble analysis procedure (TAP) — Detailed step-by-step trouble-clearing instructions.

3. Perform all the items in the director level procedure (NTP) in the indicated order unless it sends you to another director level procedure. When you complete a director level procedure, you have finished the task (***go back to the IXL***).
4. Where more detailed information is required, you will be sent to a detailed level procedure **DLP-()**. You may also be sent to a detailed level procedure by another detailed level procedure.



NOTE:

When you complete a DLP, you *must* return to the procedure that sent you there. However, in most cases, if one director level procedure (NTP) sends you to another director level procedure, you should *not* return to the first director level procedure after you complete the second procedure unless either procedure specifically says to return.

5. Sometimes you will be asked to verify that an action has occurred. This may be given in a formal statement of the expected response. Otherwise, the instructions will merely state *verify that ...*. If the expected response is not observed and a specific trouble-clearing reference is not made, refer to IXL-001 or TAP-102 to clear the trouble.
 6. If you need assistance after completing all the applicable procedures in this chapter, call the Lucent Technologies Regional Technical Assistance Center (RTAC). The telephone number is **1-800-225-RTAC**.
-

Safety Labels and Notes

Safety labels in TOP procedures have the following definitions.



DANGER:

This indicates the presence of a hazard that will cause death or severe personal injury if the hazard is not avoided.



WARNING:

This indicates the presence of a hazard that can cause death or severe personal injury if the hazard is not avoided.



CAUTION:

This indicates the presence of a hazard that will or can cause minor personal injury or property damage, if the hazard is not avoided. This includes equipment damage, loss of software, or service interruption.

Notes generally contain information to help you understand how to perform a procedure or how the system works and should be read before doing the required action statement.

These safety labels and notes are printed in the required step in the procedure.

UIP and CIT Input Command Conventions

The TOP procedures use the following conventions for user interface panel (UIP) and CIT input commands:

- ***UIP input messages.*** UIP input messages are shown in a bold-italics font. For example:

RETRIEVE-PROG-VRSN <ent>

- ***CIT SONET subsystem input messages.*** CIT SONET subsystem input messages are shown in a lowercase bold-monospace font. For example:

rtrv-crs-sts1

- ***CIT digital loop carrier (DLC) subsystem input messages.*** CIT DLC subsystem input messages are shown in an uppercase bold-monospace font. For example:

RTRV-CRS-T0

Equipment and User Considerations



CAUTION:

An electrostatic discharge (ESD) wrist strap, with a resistance between 250 K and 1.5 M ohms, should be worn when handling SLC-2000 Access System circuit packs to prevent possible damage to the circuit packs. Before using the wrist strap, check it for shorts, opens, and proper resistance value. If the strap does not pass these checks, it should not be used. To avoid possible personal injury while using the wrist strap, do not connect it to the power shelf or adjacent portions of the RT frame.

The access resource manager, metallic distribution shelf, and associated equipment provide high-voltage ringing current and high-amperage power distribution. Remove any metal jewelry before working on this equipment, particularly when working around the backplane. *Follow local personnel safety procedures when working on any Lucent Technologies product.* Refer to product safety information in "About This Document" section for more details.

Lightwave Safety



WARNING:

*Never view any unterminated optical connector with optical instruments other than indirect image-converting devices such as the **FIND-R-SCOPE** infrared optical viewer, since viewing optics tends to collimate the energy from an optical connector and, hence, increases the potential risk for injury. Personnel performing these procedures must be trained in laser safety.*

A Lucent Technologies lightwave digital transmission system and associated optical test sets use semiconductor laser transmitters. The lasers emit lightwaves, at or near infrared wavelengths, into lightguide fibers. This light is at the red end of the visible spectrum.

Although, at present, the transmitter power levels are below those known to cause injury to the eye (for example, from a direct inadvertent exposure to the end of an energized fiber), direct exposure at close distances must be avoided.

Circuit Pack Installation



CAUTION:

Take care to avoid damaging the light-emitting diodes (LEDs) that protrude through the openings in the faceplate of the circuit packs during handling and circuit pack installation.

When replacing circuit packs, replace only one circuit pack at a time and wait for transient alarms to stabilize. Never replace (or remove) more than one circuit pack at a time.

When installing circuit packs, use your thumb on the latching lever positioned at the bend to insert the circuit pack. If necessary, use your other thumb on the opposite side (above or below) of the lever (away from LEDs) to assist. Do not use the palm of your hand to insert the circuit pack because your hand may slip and break the LEDs that protrude through the openings of the faceplate.

To remove a circuit pack, pull on the latching lever to disengage the circuit pack from the assembly.

When a circuit pack is installed, diagnostic tests are performed and the "system" is updated to know about the new circuit pack. Often there will be transient alarms (for example Major, then Minor) while the system is updating. These transient alarms may take several minutes to stabilize. Wait at least 3 minutes for the required alarm response before replacing a circuit pack.

Tools

The following basic tools and equipment are needed to install and maintain the SLC-2000 Access System:

- Phillips head and flat blade screwdrivers
- Volt-ohm-multimeter (VOM)
- Electrostatic discharge (ESD) wrist strap
- Two optical jumper fibers per optical line interface unit (OLIU)
- A test telephone set for channel testing
- DSX-1 patch cords to perform loopbacks for DS1 channels
- Optics cleaning kit (alcohol-moistened dust-free wipes and compressed air)
- 216-type tool and hex key to open cabinets

- A personal computer (PC) with 25-pin RS-232 connector cable to load generic software (also must have the generic software and terminal emulator software). The PC is required for a CIT interface to turn up and maintain systems equipped with Software Release 4.0 and later
- A WP-90247, L201 fuse extractor tool
- Spare 10, 5, 2, and 0.5 amp fuses
- Channel unit adapter test cord (optional)
- Optical power loss meter (optional)
- Loop and DS1 3B-type protectors.

Use local procedures to obtain these tools and equipment. Refer to document 363-208-000, *SLC-2000 Access System, Applications, Planning, and Ordering Guide* (APOG), for ordering information.

Cabling, Wiring, Assembly, and Application Schematic Diagrams

Refer to one of the following documents for a list of cabling, wiring, assembly, and application schematic diagrams for your particular system:

- **Remote terminal/host digital terminal (RT/HDT) Systems** — 363-208-010, *SLC-2000 Access System Customer Assembly Manual for RT Frames*
- **Central office terminal (COT) Systems** — 363-208-011, *SLC-2000 Access System Customer Assembly Manual for COT Frames*.

Turnup Philosophy

Because of the wide variety of applications, it is impractical to document every possible system configuration. You may want only digital loop carrier (DLC) DS0 services, only DS1 services, a combination of both types of services, or you may want to turn up the SONET subsystem and add service "as required" at a later date. The turnup procedures in this section are generic in that they refer to other procedures that must be done before a particular procedure can be done and are biased toward a growth or *as required* turnup philosophy. But the procedure will allow you to equip the system with the appropriate circuit packs if you know your system configuration requirements when you start.

Before You Start

Before you start turning up any *SLC-2000* equipment, you must have a –48 V DC power source, preferably with battery backup. If metallic distribution DLC DS0 services are required, you must have a ringing current power source. The J1C182BD power plant is designed to meet the powering requirements for the *SLC-2000* equipment. Refer to document 640-250-296, *JC182BD 20-Amp Bulk Power Shelf, Turnup Procedure*, to turn up this power equipment. Refer to document 363-208-000, *SLC-2000 Access System Applications, Planning, and Ordering Guide*, for information on power and ringing and how it is connected to the system.

The First Step

Before you install any circuit packs in the *SLC-2000* equipment, you must perform the acceptance procedures to install fuses in the access resource manager (ARM) shelf. Fuses for the metallic distribution shelf (MDS) assembly also can be installed at this time. Then you must install the user interface panel complex support circuit packs [see "ARM Shelf Turnup: NTP-010 (Release 3.1 and later) or NTP-019 (Release 4.0 and later)"]. For systems with metallic feeder line interface units (LIUs), use one of the following procedures:

- **Release 3.1, 3.2, or 3.3 (COT only).** Arm Shelf Turnup: NTP-016
- **Release 4.0 or later.** Arm Shelf Turnup: NTP-024.

The SONET Subsystem

The SONET subsystem is turned up with the optical lines looped back at the OLIUs using one of the following procedures:

- **Release 3.1, 3.2, or 3.3 (COT only).** ARM Shelf Turnup: NTP-011
- **Release 4.0 or later.** Arm Shelf Turnup: NTP-020.

With the system looped back, tests should be performed to verify that function groups A and C are working properly using one of the following procedures:

- **Release 3.1, 3.2, or 3.3 (COT only).** ARM Shelf Turnup: NTP-014
- **Release 4.0 or later.** Arm Shelf Turnup: NTP-022.

Other Subsystems

The ARM shelf also provides support for DS1 services, the DLC subsystem, and an optional integrated test head (ITH) subsystem. The ITH subsystem provides channel testing capabilities. Refer to document 363-208-000, *SLC-2000 Access System Applications, Planning, and Ordering Guide*, for specific information relating to the configurations that support the ITH subsystem. The ITH subsystem

can be equipped (see "ARM Shelf Turnup: NTP-013") at any time after the SONET system has been equipped (looped back or connected end-to-end). (See "ARM Shelf Turnup: NTP-015".) The ITH channel testing subsystem requires DLC system 1 to be turned up to provide DS0 channels used for test access.

The DLC subsystem requires the bandwidth management complex to be equipped [see "ARM Shelf Turnup: NTP-012 (Release 3.1, 3.2, or 3.3) or NTP-021 (Release 4.0 and later)"] and function group A to be equipped with the appropriate circuit packs to provide the interface between the SONET subsystem and the digital loop carrier systems in the MDS assembly.

Preservice Tests (Looped Back)

Lucent Technologies recommends that the ARM shelf be tested while in the preservice (looped back) state. These tests verify that the function groups can be equipped with the appropriate circuit packs and pass diagnostic tests. Mode 1 MDS assemblies may be tested while the SONET subsystem is in the preservice state.

Establishing the SONET Subsystem



NOTE:

The following information *does not apply* to ring configurations.

Before establishing an end-to-end SONET network, you should remove any unnecessary low-speed circuit packs [digital signal level ones (DS1s) or virtual tributary units (VTUs)] in the function groups at both ends of the network. If the two ends are not equipped to provide the same type of service capabilities, alarms (typically Minor) will be generated.

Service Growth

After the SONET or metallic feeder facility is established, the *SLC-2000* is ready to provide customer services. DLC services require that the MDS assembly be equipped and connected to digital loop carrier equipment at the central office. Procedures in the section "MDS Assembly Turnup" are used to establish end-to-end carrier systems.

Message telephone service (channel unit installation) and DS1 service are added on a work order basis, and these procedures are found in the section "Circuit Order."

Turnup Summary

The *SLC-2000* Access System services are built on a SONET or metallic feeder subsystem foundation. To turn up services you must perform the following steps:

Step	Procedure
1.	Install fuses.
2.	Install the user interface panel support circuit packs.
3.	Install and test the SONET or metallic feeder subsystem circuit packs and establish an end-to-end SONET or metallic feeder network.
4.	For digital loop carrier systems, do the following: a. Equip function group A, the bandwidth management core, and integral test head (if used). b. Equip and establish end-to-end carrier system in an MDS assembly. c. Add DS0 channel unit services.
5.	For DS1 service, equip function group C.

The corresponding function groups in the *DDM-2000* at the central office must also be equipped when adding services.

For Software Release 4.0 and later, take care to ensure that the line coding and format for DS1 feeders are consistent across all local digital switch (LDS) carriers. Table 4-1 shows the DS1 line coding and format for each virtual remote terminal (VRT) feeder type.

Table 4-1. DS1 Line Coding and Format

VRT Feeder	DS1 Line Coding	DS1 Line Format
TR-303	B8ZS	ESF
TR-08	AMI	SF
INA	AMI/B8ZS*	ESF/SF*

* The user has the choice as established by the far end. Use **ED-INA** and **ED-T1** CIT commands to select.

DS1 Cross-Connect Philosophy

TR-08 Standard Cross-Connections

Table 4-2 shows the virtual tributary unit/line interface unit (VTU/LIU) slot to MDS standard DS1 system map for TR-08.

Table 4-2. VTU/LIU Slot to MDS Standard DS1 System Map (TR-08)

VTU/LIU Slot	MDS Assembly	DLC System (Note)	
		Mode 1 Shelf	Mode 2 Shelf
1	1	1	1 and 2 (Mode 2)
2		2	(VTU/LIU Slot 2 empty)
3	2	3	3 and 4 (Mode 2)
4		4	(VTU/LIU Slot 4 empty)
5	3	5	5 and 6 (Mode 2)
6		6	(VTU/LIU Slot 6 empty)
7	4	7	7 and 8 (Mode 2)
8	All	Protection VTU/LIU for VTU/LIUs 1 through 7	

Note: In a TR-08 system, a physical relationship exists between the VTU/LIU slots and the shelves as shown. Both shelves in an MDS assembly are provisioned for the same mode (default is Mode 1). Slot 8 is the VTU/LIU protection slot.

TR-303 Cross-Connections

In a TR-303 system, there is no physical relationship between the VTU/LIU slots and the shelves. Logical to physical mapping is flexible and can be assigned as needed using the appropriate CIT commands.

Integrated Network Access (INA) Cross-Connections

Table 4-3 shows the VTU/LIU feeder relationship for INA systems.

Table 4-3. VTU/LIU and Corresponding INA System

DS1/INA Feeder	VTU/LIU Slot	DS1 LED	Physical DS1 Port
1 through 4	1	1 through 4	a-1-1 through 4
5 through 8	2	1 through 4	a-2-1 through 4
9 through 12	3	1 through 4	a-3-1 through 4
13 through 16	4	1 through 4	a-4-1 through 4
17 through 20	5	1 through 4	a-5-1 through 4
21 through 24	6	1 through 4	a-6-1 through 4
25 through 28	7	1 through 4	a-7-1 through 4

Fiber in the Loop (FITL) Turnup

After the SONET or metallic feeder subsystem has been established, digital loop carrier (DLC) systems must be provisioned for FITL and the metallic distribution shelf (MDS) turned up to establish a FITL serving DLC shelf. The MDS is equipped with *SPQ*[®]808, *SPQ*809, *SPQ*810, or *SPQ*811 DT Servers in order to provide FITL service. Table 4-4 provides a description of the features provided by each of the DT Servers and the applicable Software Release.

Table 4-4. SLC[®]-2000 Access System DT Servers

DT Server	Software Release	Features
<i>SPQ</i> 808	3.1, 3.2, 4.0	Supports both 12- and 24-line MSDTs. Cannot provide service to FiberReach NBS.
<i>SPQ</i> 809	4.0 and later	Supports 12 or 24 DS0 rate services on MSDT. Supports 12 or 24 DS0 rate services on FiberReach NBS for systems equipped with Software Release 4.3 and later.
<i>SPQ</i> 810	4.4 and later	Supports FiberReach NBS octet service.
<i>SPQ</i> 811	4.4 and later	In addition to supporting all the features of the <i>SPQ</i> 810, the <i>SPQ</i> 811 also allows the system to support the voice frequency data enhancement (VFDE) features in R4.6 when used to host a DT containing VFDE channel units.

The *SLC-2000 Multi-Services Distant Terminal (MSDT)* is turned up using procedures in document 363-205-004, *SLC-2000 Multi-Services Distant Terminal (MSDT) feature, User/Service Manual*. The *DDM-2000 FiberReach NBS* is turned up using procedures in document 363-206-301, *DDM-2000 FiberReach Multiplexer, Wideband/Narrowband Shelf, User/Service Manual*.

Channel units can then be installed at the DT to provide the desired customer services.

Numerical List of TOP Procedures

The numerical list of TOP procedures (Table 4-4) lists all procedures (elements) that are present in this issue. This information should not be used for direct access to a particular element because *most elements are not stand-alone procedures*.

Table 4-5. Numerical List of TOP Procedures

Element	Title
IXLs Tab Index	
IXL-001	Overall IXL
IXL-002	Accept <i>SLC</i> ®-2000 Access System
IXL-003	Turn Up <i>SLC</i> -2000 Access System with Metallic Feeder — Release 3.1, 3.2, or 3.3
IXL-004	Turn Up <i>SLC</i> -2000 Access System with Metallic Feeder — Release 4.0 or Later
IXL-005	Turn Up <i>SLC</i> -2000 Access System with SONET Feeder — Release 3.1, 3.2, or 3.3
IXL-006	Turn Up <i>SLC</i> -2000 Access System with SONET Feeder — Release 4.0 or Later
IXL-007	Perform Trouble-Clearing Procedures
IXL-008	Perform Circuit Order Tasks
IXL-009	Install Channel Units
Acceptance Tab Index	
Introduction	Introduction
Contents	Contents of This Tab
NTP-002	Accept <i>SLC</i> ®-2000 Access System
NTP-003	Accept and Install ARM Shelf Fuses
NTP-004	Accept and Install MDS Assembly Fuses
NTP-005	Accept and Install HDOS Assembly Fuses
ARM Shelf Turnup Tab Index	
Introduction	Introduction
Contents	Contents of This Tab
NTP-010	Install User Interface Panel Complex Support Circuit Packs (Release 3.1, 3.2, or 3.3)
NTP-011	Equip <i>SLC</i> ®-2000 SONET OC-3 Subsystem (Looped Back) (Release 3.1, 3.2, or 3.3)

Continued on next page

Table 4-5. Numerical List of TOP Procedures (Continued)

Element	Title
ARM Shelf Turnup Tab Index (Continued)	
NTP-012	Equip <i>SLC-2000</i> Bandwidth Management Complex Circuit Packs (Release 3.1, 3.2, or 3.3)
NTP-013	Equip <i>SLC-2000</i> Integral Test Head Circuit Packs (Optional)
NTP-014	Preservice ARM Shelf Turnup Tests (VTU/DS1 Unit Installation with System Looped Back) (Release 3.1, 3.2, or 3.3)
NTP-015	Establish End-to-End System <i>SLC-2000</i> OC-3 Optical Fiber Spans (Release 3.1, 3.2, or 3.3)
NTP-016	Establish <i>SLC-2000</i> System with Metallic Feeders Interfacing Through LIUs (Release 3.1, 3.2, or 3.3)
NTP-017	Equip Bandwidth Management Complex Circuit Packs for <i>SLC-2000</i> Systems Configured with Metallic Feeders (Release 3.2 or 3.3)
NTP-018	Install Line Interface Unit (LIU) for Metallic Feeders (Release 3.1, 3.2, or 3.3)
NTP-019	Install User Interface Panel Complex Support Circuit Packs (Release 4.0 or Later)
NTP-020	Equip <i>SLC-2000</i> SONET OC-3 Subsystem (Looped Back) (Release 4.0 or Later)
NTP-021	Equip <i>SLC-2000</i> Bandwidth Management Complex Circuit Packs (Release 4.0 or Later)
NTP-022	Preservice ARM Shelf Turnup Tests (VTU/DS1 Unit Installation with System Looped Back) (Release 4.0 or Later)
NTP-023	Establish End-to-End System <i>SLC-2000</i> OC-3 Optical Fiber Spans (Release 4.0 or Later)
NTP-024	Establish <i>SLC-2000</i> System with Metallic Feeders Interfacing Through LIUs (Release 4.0 or Later)
NTP-025	Equip Bandwidth Management Complex Circuit Packs for <i>SLC-2000</i> Systems Configured with Metallic Feeders (Release 4.0 or Later)
NTP-026	Install Line Interface Unit (LIU) for Metallic Feeders (Release 4.0 or Later)
NTP-027	Initialize <i>SLC-2000</i> Integral Test Head Circuit Packs (Optional)
MDS Assembly Turnup Tab Index	
Introduction	Introduction
Contents	Contents of This Tab
NTP-040	Install Metallic Distribution Shelf (MDS) Support Circuit Packs in ARM Shelf

Continued on next page

Table 4-5. Numerical List of TOP Procedures (Continued)

Element	Title
MDS Assembly Turnup Tab Index (Continued)	
NTP-041	Equip an MDS Assembly
NTP-042	Establish End-to-End DLC System with a <i>SLC</i> 96 COT or Integrated into a TR-08 or TR-303 Digital Switch
NTP-043	Establish End-to-End DLC System for <i>SLC</i> -2000 COT with a <i>SLC</i> -2000 RT
NTP-044	Establish End-to-End DLC System with an Integrated Network Access (INA) System
Circuit Order Tab Index	
Introduction	Introduction
Contents	Contents of This Tab
NTP-060	Establish DS1 Services for SONET
NTP-061	Establish End-to-End System <i>SLC</i> -2000 OC-3 Optical Fiber Span Extension STS-1 (Whole Function Group) Taper
NTP-062	Discontinue Service at a <i>SLC</i> -2000 Remote Terminal (RT) for a TR-08 Universal System
NTP-063	Install and Test <i>SPQ</i> 450 Channel Unit at RT for Analog to Integrated <i>SLC</i> Precutover
NTP-064	Convert a Point-to-Point System to a Ring System
NTP-065	Add New <i>SLC</i> -2000 OC-3 Node (Shelf) to OC-3 VT1.5 Path Switched Ring
NTP-067	Convert (Upgrade) <i>SLC</i> -2000 Access System to DS1 Add/Drop System
NTP-068	Convert Service from Mode 1 to Mode 2 or from Mode 2 to Mode 1
NTP-069	Upgrade DLC Subsystem Software from Release 3.1 to Release 3.2 or Higher
NTP-071	Convert Integrated TR-08 Service to TR-303 Service at the <i>SLC</i> -2000 Remote Terminal (RT)
NTP-073	Upgrade DLC Subsystem Software (Release 3.02.01 to Release 4.02.00 or Higher)
NTP-074	Upgrade DLC Subsystem Software (Release 4.0X.0X to Release 4.02.00 or Higher)
NTP-075	Upgrade DLC Subsystem Software from Release 3.2 to Release 3.3
NTP-076	Upgrade DLC Subsystem <i>SPQ</i> 809 to <i>SPQ</i> 810

Continued on next page

Table 4-5. Numerical List of TOP Procedures (Continued)

Element	Title
Circuit Order Tab Index (Continued)	
NTP-077	Upgrade SONET Subsystem OC-3 Ring Network to OC-12 Ring Network Using OC-3 Shelves In Service
NTP-078	Add DS1 Service to an In-Service <i>SLC</i> ®-2000 TR303 System
NTP-079	Provision Individual DS0 Circuits for Service
Trouble Clearing Tab Index	
Introduction	Introduction
Contents	Contents of This Tab
TAD-100	Maintenance Philosophy
TAP-101	Isolate Trouble to a <i>SLC</i> ®-2000 Access System COT or RT
TAP-102	Clear Alarms at a <i>SLC</i> -2000 Access System
TAP-103	Clear OLIU or Fiber Trouble on a <i>SLC</i> -2000 Access System When OLIU FAULT LED Is Flashing
TAP-104	Use UIP or CIT to Isolate Trouble on a <i>SLC</i> -2000 Access System
TAP-105	Clear Blown Fuse Trouble at a <i>SLC</i> -2000 Access System
TAP-106	Clear SONET Subsystem Trouble at a <i>SLC</i> -2000 Access System
TAP-107	Clear Customer Channel Failure Trouble Report at a <i>SLC</i> -2000 Access System
TAP-108	Clear Trouble During Program Upgrade at a <i>SLC</i> -2000 Access System
TAP-109	Isolate Fiber Distribution (FITL) Trouble at a <i>SLC</i> -2000 Remote Terminal
TAP-110	Clear Data Link Related Trouble Reports at a <i>SLC</i> -2000 Access System
TAP-111	Clear Trouble with the Tollgrade Digital DC Bypass Pair Channel Units
TAP-112	Clear Blown Fuse in the MDS or HDOS Assembly During Acceptance Testing
TAP-113	Clear Lighted DS1() VTU/LIU LED During MDS Assembly Turnup
TAP-114	Clear Powering Trouble
TAP-115	Clear FAULT LED Lighted But Not Flashing
TAP-116	Clear Flashing FAULT LED(s)
TAP-117	Clear Brownout Condition — Flashing Letter "L" in SYSCTL FE ID Display

Continued on next page

Table 4-5. Numerical List of TOP Procedures (Continued)

Element	Title
Detailed Level Procedures Tab Index	
Contents	Contents of This Tab
DLP-500	Perform Commands from the User Interface Panel
DLP-501	Install OHCTL Circuit Pack
DLP-502	Install or Replace BBG5 SYSCTL
DLP-503	Install TGS Circuit Packs
DLP-504	Install OLIU Plug-Ins with Optical Fibers Not Connected
DLP-505	Connect Optical Loop
DLP-506	Clean Optical Fibers, Connectors, and Lightguide Build-Outs
DLP-507	Perform LED Test
DLP-508	Perform Automatic Local Transmission Test
DLP-509	Test the SONET Feeder Protection Switching Function
DLP-510	Install DS1/DS1PM Low-Speed Interface Plug-Ins
DLP-511	Connect <i>SLC</i> ®-2000 Access System to Point-to-Point or Taper/Drop Optical Facility
DLP-512	Perform Automatic End-to-End OC-3 Line Test
DLP-513	Install New SONET Generic Program
DLP-514	Check 4A, 4B, and 4G Fan Unit Operation
DLP-515	Test Single-Party POTS Channel End to End
DLP-516	Perform Automatic DSX Transmission Test
DLP-517	Change Site ID, Network Element Address, Target Identification (TID), or TBOS Display Number
DLP-518	Install or Replace the User Interface Display Panel
DLP-519	Connect <i>SLC</i> -2000 Access System to Ring Optical Facility
DLP-520	SONET Ring or Taper Cross-Connect Philosophy
DLP-521	Connect CIT and Establish Session (Releases 3.1, 3.2, and 3.3)
DLP-522	Establish Standard T1 Cross-Connections
DLP-523	Establish Standard T0 Cross-Connections
DLP-524	Install New DLC Generic Program
DLP-525	Connect CIT and Establish Session (Release 4.0 or Later)
DLP-526	Establish INA T1 Cross-Connections
DLP-527	Establish INA T0 Cross-Connections
DLP-528	Replace CORE Circuit Packs
DLP-529	Replace VTU/LIU Circuit Packs
DLP-530	Determine If Shelves or Assemblies Are Misaligned, Bowed, Bent, or Twisted During Acceptance Testing

Continued on next page

Table 4-5. Numerical List of TOP Procedures (Continued)

Element	Title
Detailed Level Procedures Tab Index (Continued)	
DLP-531	Test Individual DS1 Circuits During Turnup
DLP-532	Verify That Alarms Will Activate During MDS Assembly Turnup
DLP-533	Perform Channel Tests During MDS Assembly Turnup
DLP-534	Install or Replace BBG8 SYSCTL
DLP-535	Convert FiberReach NBS Quadrant from Quad to Octet Mode
DLP-536	Convert FiberReach NBS Quadrant from Octet to Quad Mode
DLP-537	Install New SONET Generic Program In-Service System Remote Network Element Download
DLP-538	Install New SONET Generic Program In-Service System Local Network Element Download
DLP-539	Convert a Conventional <i>SLC</i> -2000 FITL System (768 Lines) with HDOS to a DLC R4.5 or Later Enhanced FITL System (1,152 Lines)
DLP-540	Convert a Conventional <i>SLC</i> -2000 FITL System (768 Lines) with FiberReach NBS to a DLC R4.5 or Later Enhanced FITL System (1,152 Lines)
DLP-541	Condition and Connect Modems to Establish Communication From Remote CIT Location
Channel Unit Installation Tab Index	
Introduction	Introduction to Installing <i>SLC</i> ®-2000 Channel Units
Contents	Contents of This Tab
NTP-080	Install and Test <i>SLC</i> -2000 Channel Units for Metallic Distribution
NTP-081	Establish <i>SLC</i> -2000 for Fiber in the Loop (FITL) Distribution (DT Servers) — MSDT
NTP-082	Establish <i>SLC</i> -2000 for Fiber in the Loop (FITL) Distribution (DT Servers) — FiberReach NBS
DLP-600	Set Option Switches on AUA57, AUA41B, AUA45(), AUA56B, AUA75, <i>SPQ</i> ® 808, <i>SPQ</i> 809, AUA52B, AUA252(), AUA93, or <i>PGM</i> *-2000 Channel Units
DLP-601	Provision Channel Units
DLP-602	Test Single-Party or <i>SPOTS</i> ® Loop-Start/Ground-Start Channel
DLP-603	Test Coin Channel End-to-End on Universal <i>SLC</i> Carrier System
DLP-604	Test Multiparty (2-Party ANI) Channel on Integrated System (DCLU or IDCU to <i>SLC</i> -2000 RT)
* Trademark of Tollgrade Communications, Inc.	

Continued on next page

Table 4-5. Numerical List of TOP Procedures (Continued)

Element	Title
Channel Unit Installation Tab Index (Continued)	
DLP-605	Test Multiparty (2-Party ANI) Channel COT-to-RT on Universal <i>SLC</i> Carrier System
DLP-606	Test FSR Channel
DLP-607	Test DID Channel at <i>SLC</i> -2000 RT
DLP-608	Test AUA45() Manual Ringdown Channel at <i>SLC</i> -2000 RT
DLP-609	Test AUA75 Private Line Auto Ring (PLAR) Channel at <i>SLC</i> -2000 RT
DLP-610	Perform OCU and Channel Loopback Test at RT
DLP-611	Adjust Gain of 2-Wire Special Services Channel Unit
DLP-612	Adjust Gain of 4-Wire Special Services Channel Unit
DLP-613	Measure Signal Level End-to-End on Single-Party Channel (ALC Channel Unit Inserting Maximum Loss)
DLP-614	Measure Signal Level from Central Office to Network Interface (NIF) on Single-Party Channel (ALC Channel Unit Inserting Expected Loss)
DLP-615	Verify Voice-Frequency Special Service Channel Unit Settings
DLP-616	Provision and Install DT Server
DLP-617	Install AUA94 and/or <i>SPQ</i> 494 Channel Units in FiberReach NBS

Overall Task Index List

FIND YOUR JOB IN THE LIST BELOW THEN GO TO

Accept <i>SLC</i> [®] -2000 Access System	IXL-002
Turn Up <i>SLC</i> [®] -2000 Access System with Metallic Feeder	IXL-003
Turn Up <i>SLC</i> [®] -2000 Access System with Metallic Feeder Release 4.0 or Later	IXL-004
Turn Up <i>SLC</i> [®] -2000 Access System with SONET Feeder Release 3.1, 3.2, or 3.3.	IXL-005
Turn Up <i>SLC</i> [®] -2000 Access System with SONET Feeder Release 4.0 or Later	IXL-006
Perform Trouble-Clearing Procedures	IXL-007
Perform Circuit Order Tasks (in-service upgrades and deletions)	IXL-008
Install Channel Units.	IXL-009

Accept *SLC*®-2000 Access System

FIND YOUR JOB IN THE LIST BELOW . . . THEN GO TO

To accept the *SLC*-2000 Access System, perform the following procedures in the order shown. You can find each procedure behind the ***Acceptance*** tab.

1.	Accept <i>SLC</i> -2000 Access System	NTP-002
2.	Accept and Install ARM Shelf Fuses	NTP-003
3.	Accept and Install MDS Assembly Fuses	NTP-004
4.	<i>If your system uses an HDOS assembly,</i> Accept and Install HDOS Assembly Fuses	NTP-005

STOP. YOU HAVE COMPLETED THIS PROCEDURE.

Turn Up *SLC*[®]-2000 Access System with Metallic Feeder — Release 3.1, 3.2, or 3.3

FIND YOUR JOB IN THE LIST BELOW . . . THEN GO TO

To turn up a *SLC*-2000 Access System with metallic feeder using Software Release 3.1, 3.2, or 3.3, perform the following procedures in the order shown. You can find the procedures in either the ***ARM Shelf Turnup*** tab or the ***MDS Assembly Turnup*** tab.

⇒ **NOTE:**
Software Release 3.3 is applicable to the COT only.

1.	Install User Interface Panel Complex Support Circuit Packs (Release 3.1, 3.2, or 3.3)	NTP-010
2.	Establish <i>SLC</i> -2000 System with Metallic Feeders (Release 3.1, 3.2, or 3.3)	NTP-016
3.	Equip Bandwidth Management Complex Circuit Packs for <i>SLC</i> -2000 Systems Configured with Metallic Feeders (Release 3.2 and 3.3 only)	NTP-017
4.	If your system uses the Integral Test Head (ITH), equip the ITH Circuit Packs (Optional)	NTP-013
5.	Install Line Interface Unit (LIU) for Metallic Feeders (Release 3.1, 3.2, or 3.3)	NTP-018
6.	Install MDS Support Circuit Packs in ARM Shelf	NTP-040
7.	Equip an MDS Assembly	NTP-041

DO ITEMS BELOW IN ORDER LISTED FOR DETAILS, GO TO

-
8. Perform one of the following procedures according to your system configuration:

• Establish End-to-End DLC System with a <i>SLC</i> 96 COT or Integrated into a TR-08 or a TR-303 Digital Switch	NTP-042

• Establish End-to-End DLC System for a <i>SLC</i> -2000 COT with a <i>SLC</i> -2000 RT	NTP-043

• Establish End-to-End DLC System with an INA System	NTP-044

9. ***If your system uses the Integral Test Head (ITH)***, initialize the Integral Test Head (Optional) **NTP-027**

STOP. YOU HAVE COMPLETED THIS PROCEDURE.

Turn Up *SLC*[®]-2000 Access System with Metallic Feeder — Release 4.0 or Later

FIND YOUR JOB IN THE LIST BELOW . . . THEN GO TO

To turn up a *SLC*-2000 Access System with metallic feeder using Software Release 4.0 or later, perform the following procedures in the order shown. You can find the procedures in either the ***ARM Shelf Turnup*** tab or the ***MDS Assembly Turnup*** tab.

1.	Install User Interface Panel Complex Support Circuit Packs (Release 4.0 or Later)	NTP-019
2.	Establish <i>SLC</i> -2000 System with Metallic Feeders (Release 4.0 or Later)	NTP-024
3.	Equip Bandwidth Management Complex Circuit Packs for <i>SLC</i> -2000 Systems Configured with Metallic Feeders (Release 4.0 or Later)	NTP-025
4.	Install Line Interface Unit (LIU) for Metallic Feeders (Release 4.0 or Later)	NTP-026
5.	If your system uses the Integral Test Head (ITH), equip the ITH Circuit Packs (Optional)	NTP-013

DO ITEMS BELOW IN ORDER LISTED FOR DETAILS, GO TO

6.	Install MDS Support Circuit Packs in ARM Shelf	NTP-040
7.	Equip an MDS Assembly	NTP-041
8.	Perform one of the following procedures according to your system configuration:	
	• Establish End-to-End DLC System with a <i>SLC</i> 96 COT or Integrated into a TR-08 or a TR-303 Digital Switch	NTP-042
	• Establish End-to-End DLC System for a <i>SLC</i> -2000 COT with a <i>SLC</i> -2000 RT	NTP-043
	• Establish End-to-End DLC System with an INA System	NTP-044
9.	If your system uses the Integral Test Head (ITH) , initialize the ITH (Optional)	NTP-027

STOP. YOU HAVE COMPLETED THIS PROCEDURE.

Turn Up a *SLC*[®]-2000 Access System with SONET Feeder — Release 3.1, 3.2, or 3.3

FIND YOUR JOB IN THE LIST BELOW . . . THEN GO TO

To turn up a *SLC*-2000 Access System with SONET feeder using Software Release 3.1, 3.2, or 3.3, perform the following procedures in the order shown. You can find the procedures in either the ***ARM Shelf Turnup*** tab or the ***MDS Assembly Turnup*** tab.

⇒ **NOTE:**
Software Release 3.3 is applicable to the COT only.

1.	Install User Interface Panel Complex Support Circuit Packs (Release 3.1, 3.2, or 3.3)	NTP-010
2.	Equip SONET OC-3 Subsystem (Looped Back) (Release 3.1, 3.2, or 3.3)	NTP-011
3.	<i>If turning up a DLC system</i> , equip <i>SLC</i> -2000 Bandwidth Management Complex Circuit Packs (Release 3.1, 3.2, or 3.3)	NTP-012
4.	<i>If your system uses the Integral Test Head (ITH)</i> , equip ITH Circuit Packs (Optional)	NTP-013
5.	<i>If turning up a DLC system or DS-1 services</i> , perform Preservice ARM Shelf Turnup Tests (VTU/DS1 Unit Installation with System Looped Back) (Release 3.1, 3.2, or 3.3)	NTP-014
6.	<i>If turning up OC-3 optical spans</i> , establish End-to-End System <i>SLC</i> -2000 OC-3 Optical Fiber Spans (Release 3.1, 3.2, or 3.3)	NTP-015

DO ITEMS BELOW IN ORDER LISTED FOR DETAILS, GO TO

7.	Install MDS Support Circuit Packs in ARM Shelf	NTP-040
8.	Equip an MDS Assembly	NTP-041
9.	Perform one of the following procedures according to your system configuration:	
	• Establish End-to-End DLC System with a <i>SLC</i> 96 COT or Integrated into a TR-08 or a TR-303 Digital Switch	NTP-042
	• Establish End-to-End DLC System for a <i>SLC</i> -2000 COT with a <i>SLC</i> -2000 RT	NTP-043
	• Establish End-to-End DLC System with an INA System	NTP-044
10.	<i>If your system uses the Integral Test Head (ITH)</i> , initialize the Integral Test Head (Optional)	NTP-027

STOP. YOU HAVE COMPLETED THIS PROCEDURE.

Turn Up a *SLC*[®]-2000 Access System with SONET Feeder — Release 4.0 or Later

FIND YOUR JOB IN THE LIST BELOW . . . THEN GO TO

To turn up a *SLC*-2000 Access System with SONET feeder using Software Release 4.0 or later, perform the following procedures in the order shown. You can find the procedures in either the ***ARM Shelf Turnup*** tab or the ***MDS Assembly Turnup*** tab.

1.	Install User Interface Panel Complex Support Circuit Packs (Release 4.0 or Later)	NTP-019
2.	Equip SONET OC-3 Subsystem (Looped Back) (Release 4.0 or Later)	NTP-020
3.	<i>If turning up a DLC system</i> , equip <i>SLC</i> -2000 Bandwidth Management Complex Circuit Packs (Release 4.0 or Later)	NTP-021
4.	<i>If your system uses the Integral Test Head (ITH)</i> , equip ITH Circuit Packs (Optional)	NTP-013
5.	<i>If turning up a DLC system or DS1 services</i> , perform Preservice ARM Shelf Turnup Tests (VTU/DS1 Unit Installation with System Looped Back) (Release 4.0 or Later)	NTP-022
6.	<i>If turning up OC-3 optical spans</i> , establish End-to-End System <i>SLC</i> -2000 OC-3 Optical Fiber Spans (Release 4.0 or Later)	NTP-023
7.	Install or Verify Installation of MDS Support Circuit Packs in ARM Shelf	NTP-040

FIND YOUR JOB IN THE LIST BELOW . . . THEN GO TO

8. Equip an MDS Assembly	NTP-041

9. Perform one of the following procedures according to your system configuration:	

• Establish End-to-End DLC System with a <i>SLC</i> 96 COT or Integrated into a TR-08 or a TR-303 Digital Switch	NTP-042

• Establish End-to-End DLC System for a <i>SLC</i> -2000 COT with a <i>SLC</i> -2000 RT	NTP-043

• Establish End-to-End DLC System with an INA System	NTP-044

10. <i>If your system uses the Integral Test Head (ITH)</i> , initialize the Integral Test Head (Optional)	NTP-027

STOP. YOU HAVE COMPLETED THIS PROCEDURE.

Perform Trouble-Clearing Procedures

DO ITEMS BELOW IN ORDER LISTED FOR DETAILS, GO TO

These procedures allow you to clear troubles on the *SLC*[®]-2000 system. Except where noted, you can find these procedures behind the ***Trouble Clearing*** tab.

 **CAUTION:**
Take care to avoid damaging the LEDs that protrude through the openings in the faceplate of the circuit packs during handling or circuit pack installation.

 **CAUTION:**
When handling circuit packs, always wear an electrostatic discharge wrist strap connected to an ESD ground jack on the user interface panel (UIP) or fan assembly.

 **CAUTION:**
In dusty areas (for example, near construction sites), tent the RT cabinet to protect electronic equipment whenever cabinet doors are opened for extended periods.

Maintenance Philosophy	TAD-100
Isolate Trouble to COT or RT	TAP-101
Clear Alarms on a <i>SLC</i> [®] -2000 Access System	TAP-102
Clear OLIU or Fiber Trouble on a <i>SLC</i> [®] -2000 Access System	TAP-103
Use UIP or CIT to Isolate Trouble at a <i>SLC</i> [®] -2000 Access System	TAP-104
Clear Blown Fuse Trouble	TAP-105
Clear SONET Subsystem Trouble	TAP-106
Clear Customer Channel Failure Trouble Report at a <i>SLC</i> [®] -2000 Access System	TAP-107

DO ITEMS BELOW IN ORDER LISTED FOR DETAILS, GO TO

Clear Trouble During Program Upgrade	TAP-108
Isolate Fiber Distribution (FITL) Trouble at a <i>SLC</i> [®] -2000 Remote Terminal	TAP-109
Clear Data Link Related Trouble Reports at a <i>SLC</i> [®] -2000 Access System	TAP-110
Clear Trouble with the Tollgrade Digital DC Bypass Pair Channel Units . .	TAP-111
Clear Blown Fuse in the MDS or HDOS Assembly During Acceptance Testing	TAP-112
Clear Lighted DS1() VTU/LIU LED During MDS Assembly Turnup	TAP-113
Clear Powering Trouble	TAP-114
Clear FAULT LED Lighted But Not Flashing	TAP-115
Clear Flashing FAULT LED(s)	TAP-116
Clear Brownout Condition—Flashing Letter "L" in SYSCTL FE ID Display	TAP-117

The following procedures are located behind the ***Detailed Level Procedures*** tab.

Check 4A, 4B, or 4G Fan Unit Operation	DLP-514
Replace Core Circuit Packs	DLP-528
Replace VTU/LIU Circuit Packs	DLP-529

Perform Circuit Order Tasks

DO ITEMS BELOW IN ORDER LISTED FOR DETAILS, GO TO

These procedures allow you to upgrade or delete service on an in-service system. Except where noted, you can find these procedures behind the **Circuit Order** tab.

 **CAUTION:**
Take care to avoid damaging the LEDs that protrude through the openings in the faceplate of the circuit packs during handling and circuit pack installation.

 **CAUTION:**
When handling circuit packs, always wear an electrostatic discharge wrist strap connected to an ESD ground jack on the user interface panel (UIP) or fan assembly.

 **CAUTION:**
In dusty areas (for example, near construction sites), tent the RT cabinet to protect electronic equipment whenever cabinet doors are opened for extended periods.

 **NOTE:**
For SONET Taper and Ring Cross-Connect Philosophy, see **DLP-520**.

Prerequisite: Read the introduction section in the **Circuit Order** tab before proceeding.

Establish DS1 Services for SONET	NTP-060
Establish End-to-End System <i>SLC</i> [®] -2000 OC-3 Optical Fiber Span Extension STS-1 (Whole Function Group) Taper	NTP-061
Discontinue Service at a <i>SLC</i> [®] -2000 Remote Terminal for a TR-08 Universal System	NTP-062
Install and Test <i>SPQ</i> [®] 450 Channel Unit at RT for Analog to Integrated <i>SLC</i> [®] Precutover.	NTP-063

DO ITEMS BELOW IN ORDER LISTED FOR DETAILS, GO TO

Convert a Point-to-Point System to a Ring System	NTP-064
Add New <i>SLC</i> ®-2000 OC-3 Node (Shelf) to OC-3 VT1.5 Path Switched Ring	NTP-065
Convert (Upgrade) <i>SLC</i> ®-2000 Access System to DS1 Add/Drop System	NTP-067
Convert Service from Mode 1 to Mode 2 or from Mode 2 to Mode 1	NTP-068
Upgrade DLC Subsystem Software from Release 3.1 to Release 3.2 or Higher.	NTP-069
Convert Integrated TR-08 Service to TR-303 Service	NTP-071
Upgrade DLC Subsystem Software from Release 3.02.01 to Release 4.02.00 or Higher	NTP-073
Upgrade DLC Subsystem Software from Release 4.0X.0X to Release 4.02.00 or Higher	NTP-074
Upgrade DLC Subsystem Software from Release 3.2 to Release 3.3	NTP-075
Upgrade DLC Subsystem <i>SPQ</i> ®809 to <i>SPQ</i> 810	NTP-076
Upgrade SONET Subsystem OC-3 Ring Network to OC-12 Ring Network Using OC-3 Shelves In Service	NTP-077
Upgrade DLC Subsystem Software from Release 4.04.0X to Release 4.05.00.	NTP-078
Provision Individual DS0 Circuits for Service	NTP-079

DO ITEMS BELOW IN ORDER LISTED FOR DETAILS, GO TO

The following procedures are located behind the ***Detailed Level Procedures*** tab:

Change Site ID, Network Element Address, Target Identification (TID), or TBOS Display Number	DLP-517
Convert FiberReach NBS Quadrant from Quad to Octet Mode	DLP-535
Convert FiberReach NBS Quadrant from Octet to Quad Mode	DLP-536
Convert a Conventional <i>SLC</i> -2000 FITL System (768 Lines) with HDOS to a DLC R4.5 or Later Enhanced FITL System (1,152 Lines)	DLP-539
Convert a Conventional <i>SLC</i> -2000 FITL System (768 Lines) with FiberReach NBS to a DLC R4.5 or Later Enhanced FITL System (1,152 Lines)	DLP-540

The following procedures are located behind the ***Channel Unit Installation*** tab:

Install and Test <i>SLC</i> [®] -2000 Channel Units for Metallic Distribution	NTP-080
Establish <i>SLC</i> [®] -2000 for Fiber in the Loop (FITL) Distribution (DT Servers) — MSDT	NTP-081
Establish <i>SLC</i> [®] -2000 for Fiber in the Loop (FITL) Distribution (DT Servers) — FiberReach NBS	NTP-082

Install Channel Units

DO ITEMS BELOW IN ORDER LISTED FOR DETAILS, GO TO

These procedures give specific steps for provisioning, installing, and testing individual channel units in the MDS assembly. Except where noted, you can find these procedures behind the **Channel Unit Installation** tab.

 **CAUTION:**
Take care to avoid damaging the LEDs that protrude through the openings in the faceplate of the circuit packs during handling and circuit pack installation.

 **CAUTION:**
When handling circuit packs, always wear an electrostatic discharge wrist strap connected to an ESD ground jack on the user interface panel or fan assembly.

 **CAUTION:**
In dusty areas (for example, near construction sites), tent the RT cabinet to protect electronic equipment whenever cabinet doors are open for extended periods.

Install and Test SLC®-2000 Channel Units for Metallic Distribution	NTP-080
Establish SLC®-2000 for Fiber in the Loop (FITL) Distribution (DT Servers) — MSDT	NTP-081
Establish SLC®-2000 for Fiber in the Loop (FITL) Distribution (DT Servers) — FiberReach NBS	NTP-082
Set Option Switches on AUA57, AUA41B, AUA45(), AUA56B, AUA75, SPQ®808/809, AUA52B, AUA252(), AUA93, or PGM*-2000 Channel Units	DLP-600

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DO ITEMS BELOW IN ORDER LISTED FOR DETAILS, GO TO

Provision Channel Units	DLP-601
Test Single-Party, or <i>SPOTS</i> [®] Loop-Start/Ground-Start Channel (<i>SPOTS</i> [®] Channel Unit)	DLP-602
Test Coin Channel End-To-End.	DLP-603
Test Multiparty (2-Party ANI) Channel on Integrated System (DCLU to <i>SLC</i> [®] -2000 RT)	DLP-604
Test Multiparty (2-Party ANI) Channel COT-to-RT on Universal <i>SLC</i> [®] Carrier System	DLP-605
Test FSR Channel	DLP-606
Test DID Channel at <i>SLC</i> [®] -2000 RT.	DLP-607
Test AUA45() Manual Ringdown Channel at <i>SLC</i> [®] -2000 RT	DLP-608
Test AUA75 Private Line Auto Ring (PLAR) Channel at <i>SLC</i> [®] -2000 RT	DLP-609
Perform OCU and Channel Loopback	DLP-610
Adjust Gain of 2-Wire Special Services Channel Unit	DLP-611
Adjust Gain of 4-Wire Special Services Channel Unit	DLP-612
Measure Signal Level End-To-End on Single-Party Channel (ALC Channel Unit Inserting Maximum Loss)	DLP-613
Measure Signal Level from Central Office to Network Interface (NIF) on Single-Party Channel (ALC Channel Unit Inserting Expected Loss)	DLP-614
Verify Voice-Frequency Special Service Channel Unit Settings	DLP-615
Provision and Install DT Server	DLP-616

DO ITEMS BELOW IN ORDER LISTED FOR DETAILS, GO TO

Install AUA94 and/or *SPQ494* Channel Units in FiberReach NBS **DLP-617**

The following procedure can be found behind the ***Detailed Level Procedures*** tab.

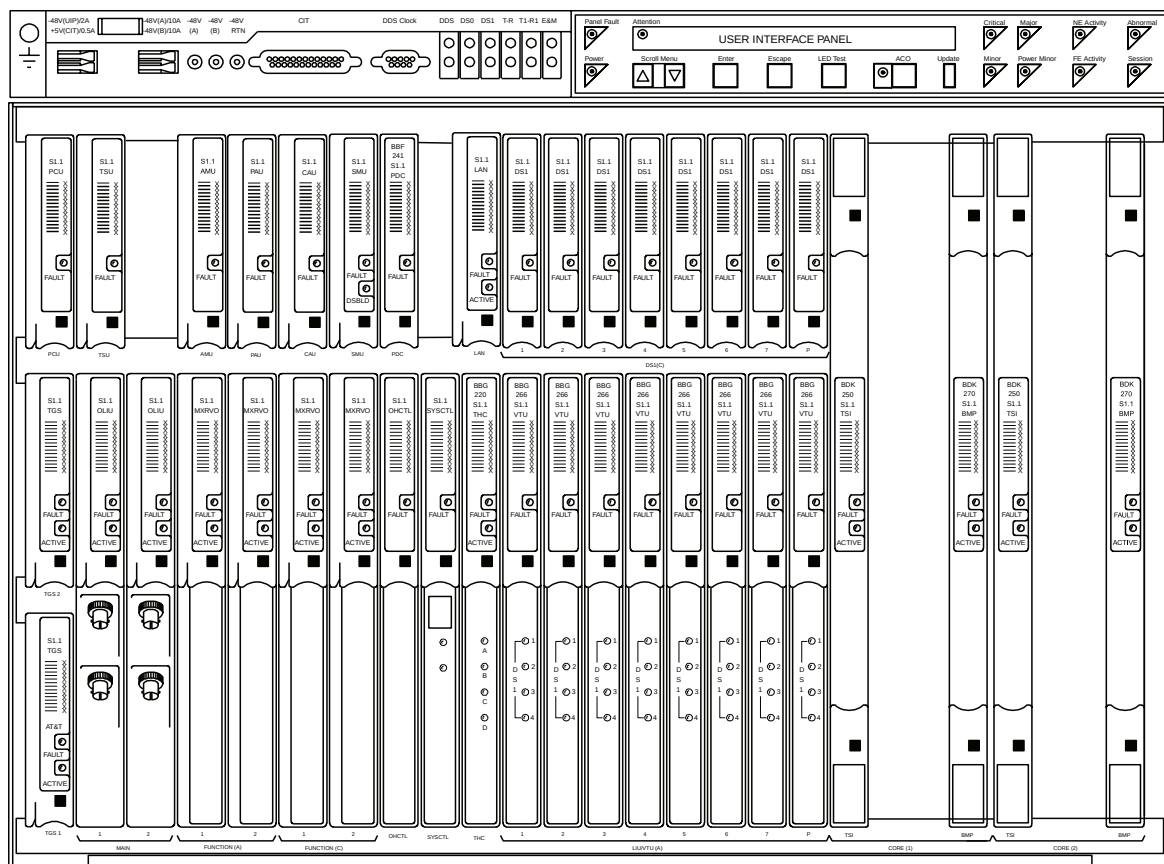
Connect CIT and Establish Session (Releases 3.1, 3.2, and 3.3) **DLP-521**

Connect CIT and Establish Session (Release 4.0 and Later) **DLP-525**

Condition and Connect Modems to Establish Communication From
Remote CIT Location **DLP-541**

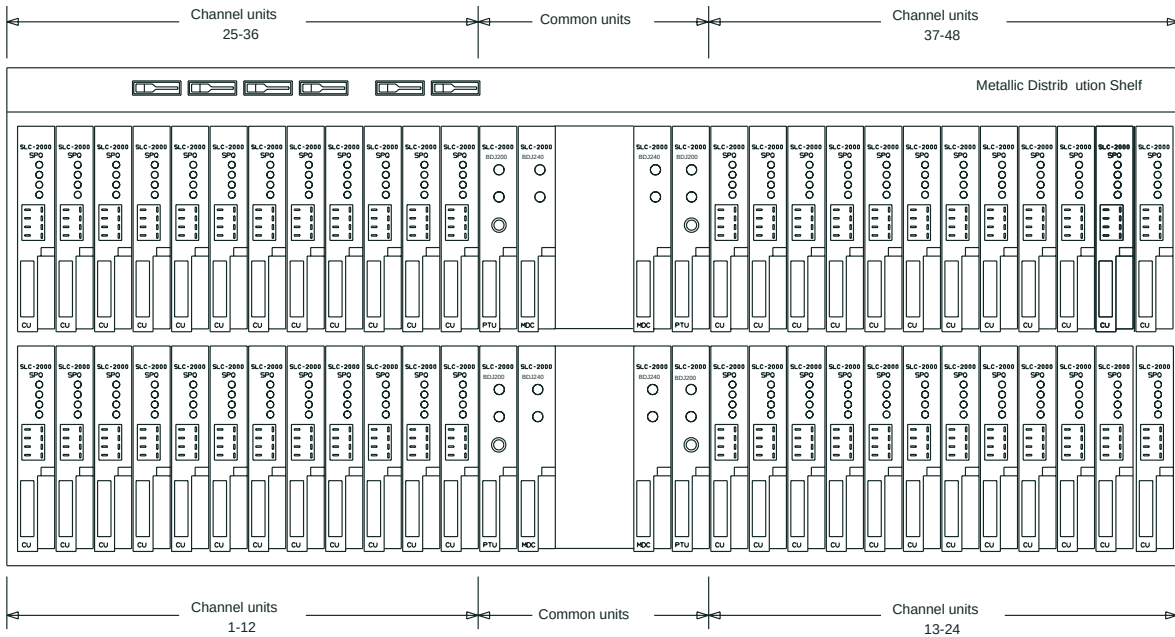
General

This tab provides procedures to accept the *SLC*[®]-2000 Access System digital loop carrier (DLC) access resource manager (ARM) shelf (see Figure 1), Metallic Distribution Shelf (MDS) assemblies (see Figures 2 through 5), and High Density Optics Shelf (HDOS) assemblies (see Figure 6). This is a visual and mechanical inspection. These procedures also verify that power is supplied to the ARM, MDS, and HDOS assemblies and that fuses can be installed.



Note: For Releases 3.1, 3.2, and 3.3, the circuit pack code for the PDC circuit pack is BBF240. For Release 4.0 and later, the circuit pack code for the PDC circuit pack is BBF241. The BMP circuit pack is used in Release 4.0 and later.

Figure 1 – Access Resource Manager Shelf



Note: The configuration shown is for Software Release 4.0 and later TR-303 interfaced SLC-2000 Access System RTs. Releases 3.1, 3.2, or 3.3 and Release 4.0 and later interfaced SLC-2000 Access RTs will include T8U circuit packs.

847801.eps

Figure 2 – Metallic Distribution Shelf Assembly

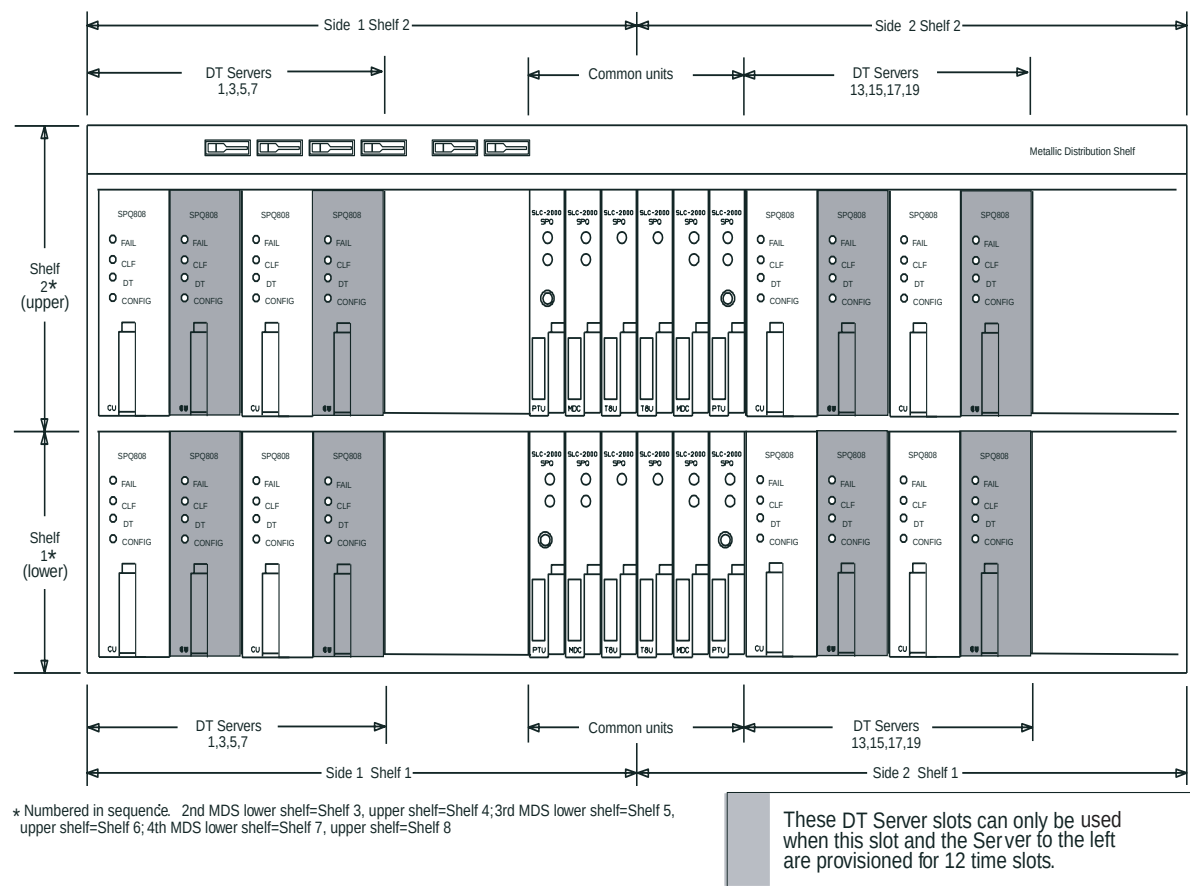
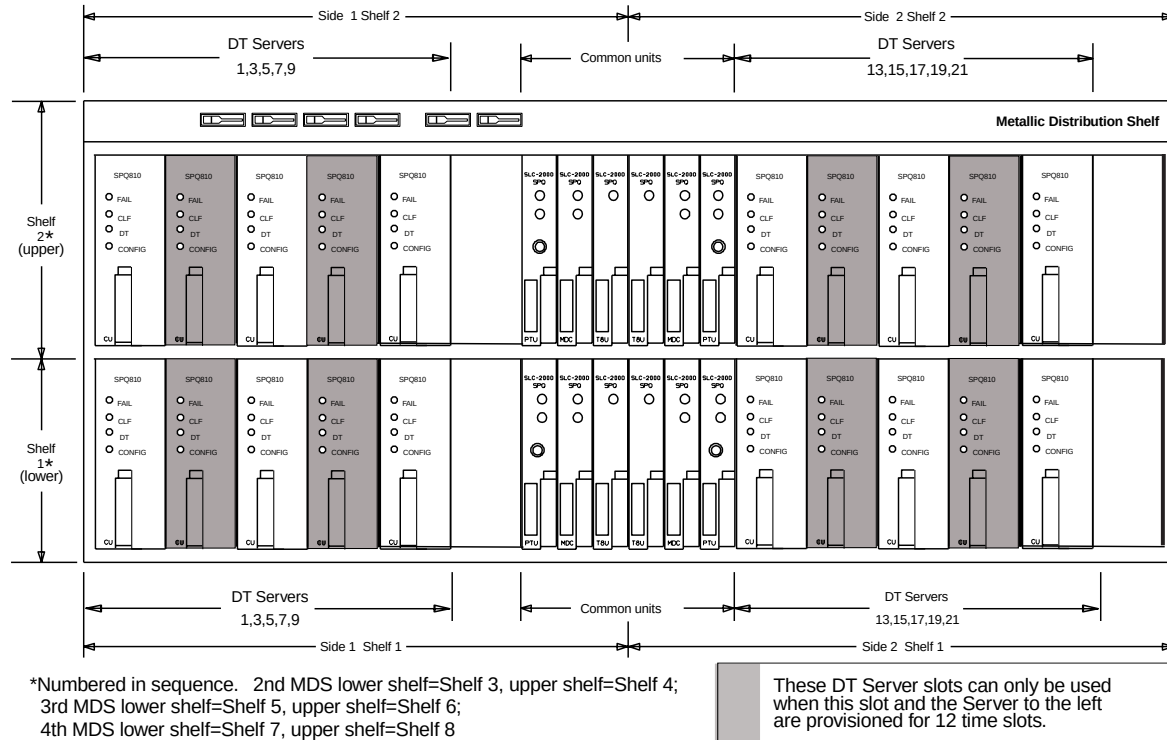


Figure 3 – Fiber Distribution (R4.0 to R4.4)



mdstt45.eps

Figure 4 – Fiber Distribution (R4.5 or Later With SPQ®810 Servers)



Figure 5 – Fiber Distribution (R4.5 or Later With SPQ®811 Servers)

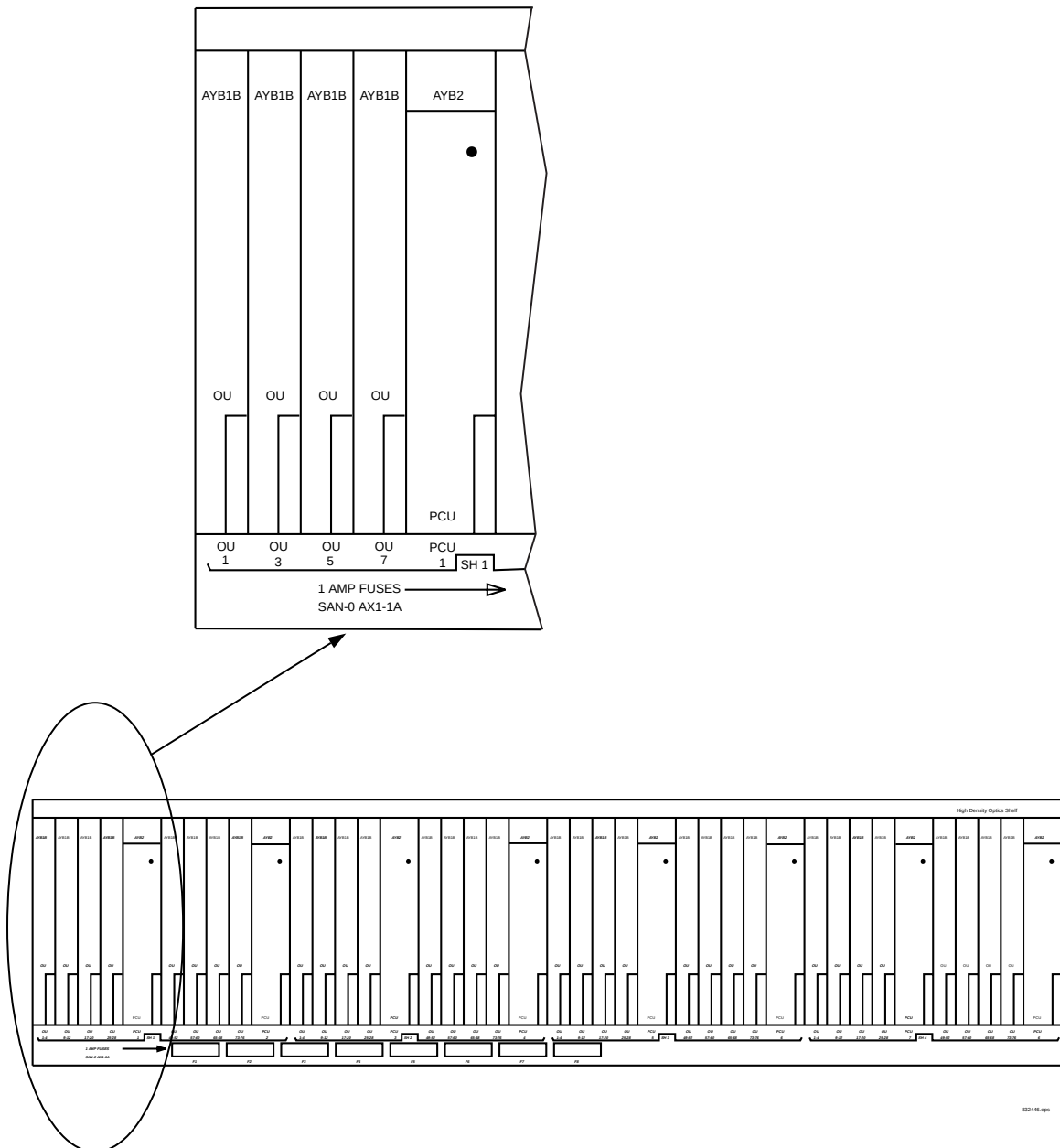


Figure 6 – High Density Optics Shelf (HDOS)

Contents of This Tab

-  **CAUTION:**
Take care to avoid damaging the LEDs that protrude through the openings in the faceplate of the circuit packs during handling and circuit pack installation.
-  **CAUTION:**
When handling circuit packs, always wear an electrostatic discharge wrist strap connected to an ESD ground jack on the user interface panel (UIP) or fan assembly.
-  **CAUTION:**
In dusty areas (for example, near construction sites), tent the RT cabinet to protect electronic equipment whenever cabinet doors are opened for extended periods.

Overall Acceptance Procedures

Accept SLC®-2000 Access System.....	NTP-002

Power and Fusing Acceptance Procedures

Accept and Install ARM Shelf Fuses	NTP-003
Accept and Install MDS Fuses	NTP-004
Accept and Install HDOS Fuses	NTP-005

Accept *SLC*®-2000 Access System

DO ITEMS BELOW IN ORDER LISTED FOR DETAILS, GO TO

1. Determine whether the system you are accepting is cabinet mounted or frame mounted.

If **Cabinet mounted**, continue with Step 2.

If **Frame mounted**, go to Step 8.

-
2. Determine whether the cabinet requires the special hex key and 216-type tool shown in Figure 1:

If cabinet ...	Then ...
Requires hex key and 216-type tool	a. Obtain the special hex key and the 216-type tool shown in Figure 1. b. Using the tools, open the cabinet door as shown in Figure 1. c. Continue with Step 3.
Does not require hex key and 216-type tool	Open the door and continue with Step 3.

DO ITEMS BELOW IN ORDER LISTED FOR DETAILS, GO TO

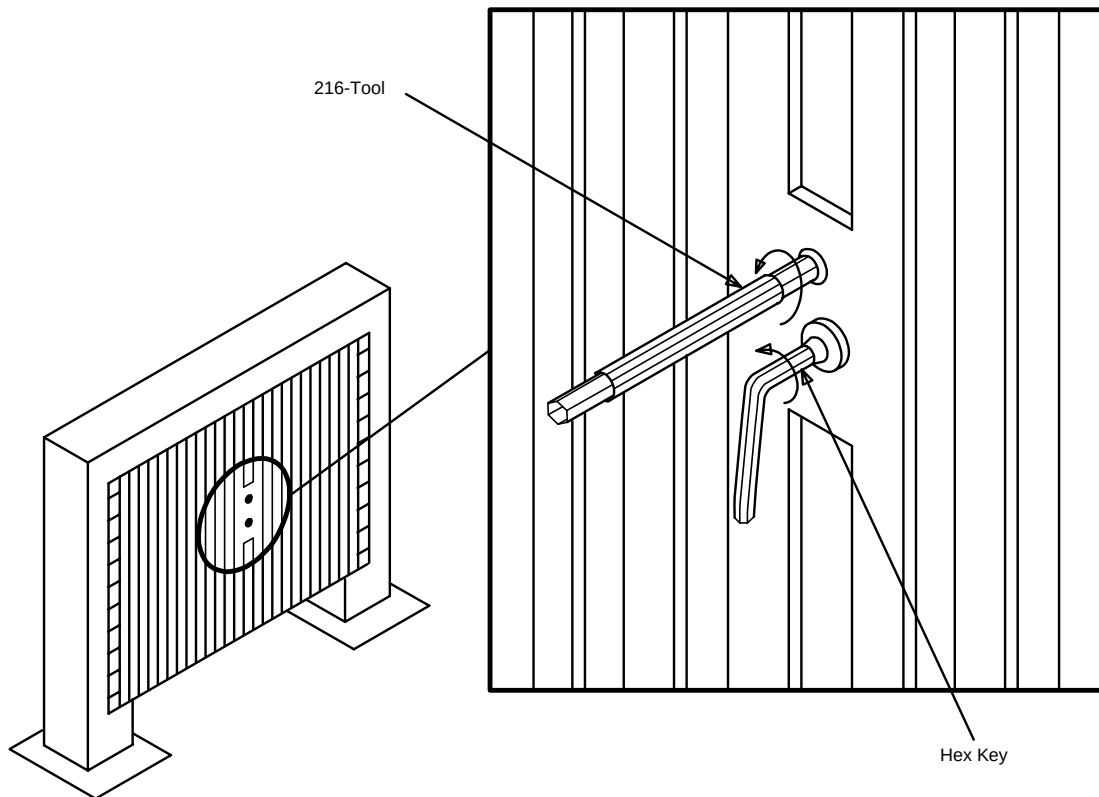


Figure 1 – Opening a Typical Cabinet with Hex Key and 216-Type Tool

3. On the inside of the side 1 left door, there is an AC wiring diagram with a table for circuit breaker code. On the inside of the side 1 right door, there is a label listing the cabinet ED number and the equipage groups. Find these items in the cabinet.
4. Set the **MAIN** circuit breaker in transfer/breaker panel to **ON** and verify that AC power is at convenience outlet(s). Is the proper AC voltage present?

If **YES**, then continue with Step 5.
If **NO**, then resolve problem using local procedures and continue with Step 5.

DO ITEMS BELOW IN ORDER LISTED FOR DETAILS, GO TO

5. Set the **MAIN** circuit breaker in the transfer/breaker panel to **OFF**.

6. With the **MAIN** circuit breaker off, determine that AC power into cabinet is correctly terminated on the **MAIN** circuit breaker by ensuring that AC voltage is not present on the AC convenience outlet(s) in the cabinet. Is AC voltage present at the outlets?

If **NO**, then continue with Step 7.

If **YES**, then resolve problem using local procedures and continue with Step 7.

7. Set the circuit breaker associated with this system to **ON**.

8. Determine if the UIP has been installed.

If **PRESENT**, continue with Step 9.

If **NOT PRESENT**, install UIP (**DLP-518**) and continue with Step 9.

9. Verify that the system providing power to the *SLC-2000* equipment has been turned up using the system's turnup procedures. This may include ensuring that equipment such as batteries, rectifiers, and ringing generators has been installed. It may also include verifying that –48 V DC and ringing voltages are present.



NOTE:

The *SLC-2000* RT does not have an integrated power system.

DO ITEMS BELOW IN ORDER LISTED FOR DETAILS, GO TO

10. Determine if plug-ins and fuses have been installed in the access resource manager (ARM) shelf, metallic distribution shelf (MDS) assemblies (if present), and high density optics shelf (HDOS) assemblies (if present).

If plug-ins or fuses are ...	Then ...
Installed	a. Remove and save any plug-ins installed in any shelf or assembly. b. Remove and save any fuses installed in any shelf or assembly. ⇒ NOTE: If needed, use the WP-90247 fuse extractor shown in Figure 2. c. Continue with Step 11.
Not installed	Continue with Step 11 .

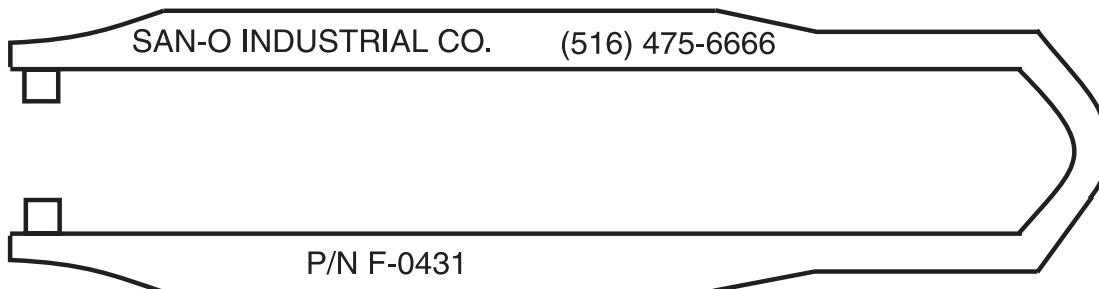


Figure 2 – WP-90247 Fuse Extractor Tool

-
11. Verify that the ARM, MDS (if present), and HDOS (if present) assemblies are tightly secured and not damaged. Resolve problems through local procedures.
-
12. Verify that all electrical connectors inside of shelves are properly secured and aligned with shelf slots. Resolve problems through local procedures.

DO ITEMS BELOW IN ORDER LISTED FOR DETAILS, GO TO

13. Verify that there are no broken, bent, or misaligned contacts on front of the connectors. Resolve problems through local procedures.

-
14. Determine if the shelves or assemblies are misaligned, bowed, bent, or twisted. DLP-530
-

15. Are there any misaligned, dented, bowed, or twisted shelves?

If **NO**, continue with Step **16**.

If **YES**, resolve problems through local procedures and continue with Step **16**.

-
16. Determine if you are accepting an RT or a COT.

If you are accepting an **RT**, continue with Step **17**.

If you are accepting a **COT**, go to Step **20**.



NOTE:

The COT is not supported in *SLC-2000* Software Release 4.0 or later.

-
17. Verify that 3-type protectors are installed in voice-frequency/digital pair protectors.
-

18. Check 4A, 4B, and 4G fan unit operations. DLP-514
-

19. Is access to the backplane of the MDS, ARM, and HDOS (if present) assemblies possible?

If **YES**, then continue with Step **20**.

If **NO**, then proceed to Step **21**.

-
20. Physically inspect the visible portion of the backplane and connectors for damage or loose connections. Resolve problems through local procedures.
-

21. Verify that there is 2 Ω or less resistance between electrostatic discharge (ESD) ground strap jacks on UIP and fan unit, if equipped, and frame ground point. Resolve problems through local procedures.

DO ITEMS BELOW IN ORDER LISTED FOR DETAILS, GO TO

22. Ensure that no circuit packs are installed in the ARM shelf, any MDS assemblies (if present), and HDOS (if present).



NOTE:

The ARM Shelf Turnup procedures in this document require all assemblies and shelves of the *SLC-2000* system to initially be empty. You will not see the correct alarm responses during turnup if there are extra circuit packs installed.

-
23. Determine if you are accepting an RT or a COT.

If accepting a ...	And the composite clock is ...	Then ...
RT	—	STOP. YOU HAVE COMPLETED THIS PROCEDURE.
COT	Used	a. Verify the composite clock is connected to the system through J184. b. STOP. YOU HAVE COMPLETED THIS PROCEDURE.
	Not used	a. Verify that the clock is disabled.  NOTE: Refer to document 363-208-003, <i>SLC-2000 Access System, Commands and Messages</i> (SET - SYNCN), or the appropriate CIT command. b. STOP. YOU HAVE COMPLETED THIS PROCEDURE.

Accept and Install ARM Shelf Fuses

DO ITEMS BELOW IN ORDER LISTED FOR DETAILS, GO TO

Summary: Before the access resource manager (ARM) shelf can be equipped with circuit packs, perform **Acceptance:NTP-002**, "Accept *SLC*[®]-2000 Access System," procedures to verify that the equipment is not damaged. The power equipment ***must be equipped*** to supply –48 V DC and ringing current (if required) to the ARM shelf and metallic distribution shelf (MDS) assemblies.

This acceptance procedure simply verifies that –48 V DC power is supplied to the ARM shelf and that the fuses can be installed in the user interface panel (UIP) without blowing.

1. At the UIP (Figure 1), verify that the proper voltages are present between the following jacks and the **–48V RTN** jack:
 - **–48V (A):** –42 to –56 V DC
 - **–48V (B):** –42 to –56 V DC.

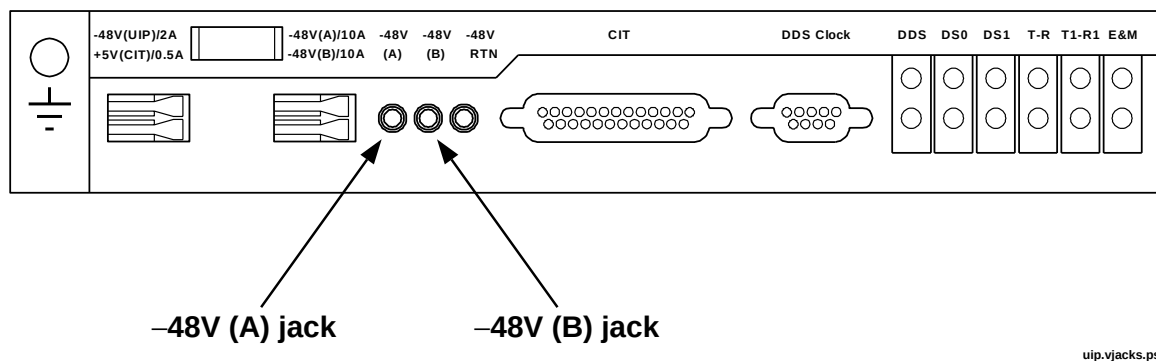


Figure 1 – Jack Locations

DO ITEMS BELOW IN ORDER LISTED FOR DETAILS, GO TO

2. Are the proper voltages present?

If **YES**, go to Step **3**.

If **NO**, do one of the following depending on your application:

If a ...	And ...	Then ...
COT	A frame application	a. Verify that power is wired to the terminal strip on the rear of the ARM shelf. b. Verify that the connectors between the terminal block and each shelf are connected. c. Check power equipment for abnormal voltage readings. d. Check to make sure power equipment circuit breakers are ON.
RT	A frame application	a. Verify that power is wired to the terminal strip on the right side (as viewed from front) of the ARM shelf. b. Check power equipment for abnormal voltage readings. c. Check to make sure power equipment circuit breakers are ON.
	Not a frame application	a. Check power equipment for abnormal voltage readings. b. Check to make sure power equipment circuit breakers are ON.

DO ITEMS BELOW IN ORDER LISTED FOR DETAILS, GO TO

3. Install a SAN-O 10-Amp fuse in **–48V(A)/10A** fuse holder (behind the cover) on the UIP.



NOTE:

The **Power** and **Panel Fault** LEDs light after the fuse is installed.

If the fuse ...	Then ...
Does not blow	Continue with Step 4.
Blows	Refer trouble to installation personnel or use schematic diagram to correct wiring trouble. (See "Cabling, Wiring, Assembling, and Application Schematic Diagrams" section in Tab 4 of this document.) Use WP-90247 fuse extractor tool if you cannot remove the fuse with your fingers.

-
4. Install a SAN-O 10-Amp fuse in **–48V(B)/10A** fuse holder on the UIP.

If the fuse ...	Then ...
Does not blow	Continue with Step 5.
Blows	Refer trouble to installation personnel or use schematic diagram to correct wiring trouble (check power equipment for abnormal voltages). (See "Cabling, Wiring, Assembling, and Application Schematic Diagrams" section in Tab 4 of this document.)

DO ITEMS BELOW IN ORDER LISTED FOR DETAILS, GO TO

5. Install a SAN-O 2-Amp fuse in **-48V/2A-UIP** fuse holder on the UIP.



NOTE:

The display will print ***SLC-2000 ACCESS SYSTEM*** for about 30 seconds and then print ***MN:NE:pdc unavailable***.

Minor and **NE Activity** LEDs will light.

The **Panel Fault** LED goes off.

The **Attention** LED lights and stays lighted any time there is an active fault or alarm in the system.

If the fuse ...	Then ...
Does <i>not</i> blow	Continue with Step 6.
Blows	Refer trouble to installation personnel or use schematic diagram to correct wiring trouble. (See "Cabling, Wiring, Assembling, and Application Schematic Diagrams" section in Tab 4 of this document.)

-
6. Install a SAN-O 1/2-Amp fuse in **+5V/.5A-CIT** fuse holder on the UIP.

If the fuse ...	Then ...
Does <i>not</i> blow	Continue with Step 7.
Blows	Refer trouble to installation personnel or use schematic diagram to correct wiring trouble. (See "Cabling, Wiring, Assembling, and Application Schematic Diagrams" section in Tab 4 of this document.)

DO ITEMS BELOW IN ORDER LISTED FOR DETAILS, GO TO

7. Press the **LED Test** push button and verify all alarm LEDs and display LEDs light.

If all alarm and display LEDs ...	Then ...
Light	STOP. YOU HAVE COMPLETED THIS PROCEDURE.
Do <i>not</i> light	a. Replace the UIP (DLP-518). b. Repeat Step 7.

Accept and Install MDS Assembly Fuses

DO ITEMS BELOW IN ORDER LISTED FOR DETAILS, GO TO

Summary: Before the metallic distribution shelf (MDS) assembly can be tested, perform **Acceptance:NTP-002**, "Accept *SLC*[®]-2000 Access System," procedures to verify that the equipment is not damaged. The power equipment ***must be equipped*** to supply –48 V DC and ringing current (if required) to the ARM shelf and metallic distribution shelf (MDS) assemblies.

Perform this acceptance procedure on all MDS assemblies. It simply verifies that fuses can be installed without blowing and that power is supplied to the MDS assembly.

1. Obtain the following circuit packs and fuses:
 - Four SAN-O 5-Amp fuses
 - Two SAN-O 1/2-Amp fuses (not required for fiber distribution)
 - One ***BDJ*[®]200 PTU**
 - One ***BDJ*240 MDC**
 - One ***SPQ*[®]**-type quad channel unit.

⇒ **NOTE:**
Ringing current power and fuses (–20Hz/0.5A and +20Hz/0.5A) are not required if the MDS assembly is to be configured for fiber-in-the-loop (FITL) distribution.

⇒ **NOTE:**
The positive ringing power and the fuse (+20Hz/0.5A) is only needed if channel units requiring positive ringing current (such as AUA55 multiparty) are to be installed.

DO ITEMS BELOW IN ORDER LISTED FOR DETAILS, GO TO

2. Measure the voltages at each of the following fuse holders by connecting one meter lead to the right fuse holder contact (at the back) and the other lead to **-48V RTN** jack on the user interface panel (UIP).

- **-48V/5A** fuse holder **PTU-(#)**
- **-20Hz/0.5A** fuse holder
- **+20Hz/0.5A** fuse holder.



NOTE:

There are two contacts at the back of the fuse holder. The contact on the right is the source of power (hot).

-
3. After measuring the voltage at each holder, verify that the proper voltages are present using Table A.



CAUTION:

When measuring AC voltages, ensure that you have conditioned your meter for AC measurements.



NOTE:

Voltages will be about the same as measured at the power and ringing supply equipment.

DO ITEMS BELOW IN ORDER LISTED FOR DETAILS, GO TO

If voltages are ...	Then ...
Within limits	Continue with Step 4.
Not within limits	a. Clear power shelf trouble or intershell wiring trouble using the appropriate schematic diagram. (See "Cabling, Wiring, Assembling, and Application Schematic Diagrams" section in Tab 4 of this document.) b. Return to Step 2.

Table A. Fuse Holder Voltage Range

Fuse Holder	Voltage Range
–48V/5A fuse holder PTU-(#)	–42 to –56 volts DC
–20Hz/0.5A fuse holder	–50 volts DC and 100 volts AC (±10 percent)
+20Hz/0.5A fuse holder	+50 volts DC and 100 volts AC (±10 percent) (if required)

-
4. Install the following fuses in the MDS assembly:
- **–48V/5A FUSES LOWER PTU-1:** 5-Amp fuses
 - **–48V/5A FUSES LOWER PTU-2:** 5-Amp fuses
 - **–48V/5A FUSES UPPER PTU-1:** 5-Amp fuses
 - **–48V/5A FUSES UPPER PTU-2:** 5-Amp fuses
 - **RING FUSES –20Hz/0.5A** (if required): 1/2-Amp fuse
 - **RING FUSES +20Hz/0.5A** (if required): 1/2-Amp fuse

⇒ **NOTE:**
–48V/5A fuse holders are located on the top front of the MDS.

DO ITEMS BELOW IN ORDER LISTED FOR DETAILS, GO TO

If ...	Then ...
The fuses do <i>not</i> blow	Continue with Step 5.
Any fuse blows	a. Check power and ringing generator equipment voltages or use schematic diagram to correct wiring. (See "Cabling, Wiring, Assembling, and Application Schematic Diagrams" section in Tab 4 of this document.) b. Refer trouble to installation personnel.

-
5. Select the lower-left section of the MDS assembly to begin testing (Figure 1). ***(You will be testing the MDS assembly sections one section at a time.)***

DO ITEMS BELOW IN ORDER LISTED FOR DETAILS, GO TO

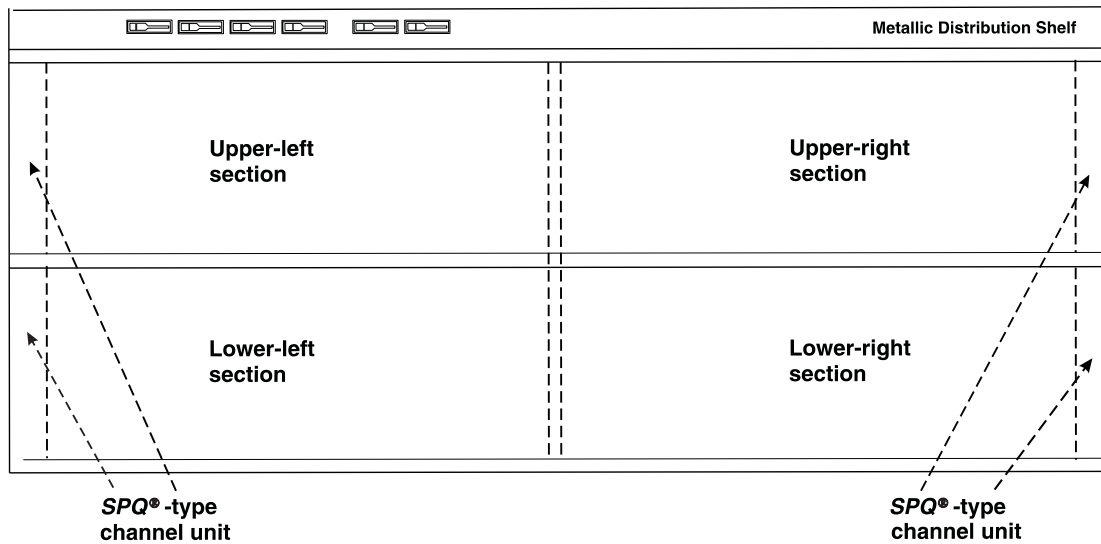


Figure 1 – MDS Assembly Sections

-
6. Install an *SPQ*-type quad channel unit in the slot farthest from the center of the MDS assembly in the section chosen.



CAUTION:

Ensure that you are wearing a wrist strap when installing and removing circuit packs.

-
7. Did an MDS assembly fuse blow?

If **NO**, continue with Step 8.

If **YES**, go to **TAP-112**.

-
8. Install the **PTU** in the **PTU-#** slot. Then install the **MDC** in the **MDC** slot next to the **PTU** and observe the MDS power-up alarm sequence.

Response: In the MDS section being tested, LEDs momentarily light on the **MDC** and the quad channel unit circuit pack.

DO ITEMS BELOW IN ORDER LISTED FOR DETAILS, GO TO



NOTE:

Ignore alarms caused by this test. All you want to do is verify that power is supplied to this shelf side of the MDS assembly.

If MDS circuit pack LEDs ...	Then ...
Light	Continue with Step 9.
Do <i>not</i> light	Check the following items: • Fuses: If blown, go to TAP-112. • Power Wiring Connector: Verify (or make) power wiring connector for the MDS assembly. (See "Cabling, Wiring, Assembling, and Application Schematic Diagrams" section in Tab 4 of this document.) • Power Equipment: Check power equipment for abnormal voltage readings. If trouble is not found, resolve using local procedures.

9. Remove the **MDC**, **PTU**, and channel unit just installed.

DO ITEMS BELOW IN ORDER LISTED FOR DETAILS, GO TO

10. Determine which section(s) of the MDS you have tested and choose the next section for testing (Figure 1).

If you've tested ...	Then ...
Lower-left only	Select the lower-right section and return to Step 6 .
Lower-left and Lower-right	Select the upper-left section and return to Step 6 .
Lower-left, Lower-right, and Upper-left	Select the upper-right section and return to Step 6 .
All sections	Continue with Step 11 .

-
11. Remove all circuit packs installed in any MDS assembly that are not in service.



NOTE:

The ARM Shelf Turnup procedures in this document require that the MDS assemblies are initially empty. You will not see the correct alarm conditions during ARM shelf turnup if there are circuit packs installed in the MDS assemblies.

STOP. YOU HAVE COMPLETED THIS PROCEDURE.

Accept and Install HDOS Assembly Fuses

DO ITEMS BELOW IN ORDER LISTED FOR DETAILS, GO TO

Summary: Before the high density optics shelf (HDOS) can be tested, **Acceptance:NTP-002**, "Accept SLC[®]-2000 Access System", procedures should be done to verify that the equipment is not damaged. The power equipment **must be equipped** to supply –48 V DC (ringing current is not required for the HDOS) to the access resource manager (ARM) shelf and MDS assemblies.

⇒ **NOTE:**
Refer to document 363-205-004, *SLC-2000 MSDT User Service Manual*, for more information on the HDOS and FITL distribution.

This acceptance procedure simply verifies that fuses can be installed without blowing and that power is supplied to the HDOS assembly. If you have an optical power meter, you can verify the fiber between the HDOS and fiber terminating shelf/panel.

1. Obtain the following circuit packs, fuses, and equipment:
 - Eight SAN-O AX1-1A fuses
 - One **AYB2 PCU**
 - One **OU (AYB1B, AYB1C, or AYB5)**
 - Optional — one optical power meter.
-
2. Measure the voltage at each fuse holder (**F1** through **F8**) by connecting one meter lead to the left fuse holder contact (at the back) and the other lead to **–48V RTN** jack on the user interface panel (UIP).

⇒ **NOTE:**
There are two contacts at the back of the fuse holder. The contact on the left is the source of power (hot).

DO ITEMS BELOW IN ORDER LISTED FOR DETAILS, GO TO

3. After measuring the voltage at each holder, verify that the proper voltage is present at each holder (–42 to –56 volts DC).



NOTE:

Voltages will be about the same as measured at the power and ringing supply equipment.

If voltages are ...	Then ...
Within limits	Continue with Step 4.
Not within limits	a. Clear power shelf trouble or intershell wiring trouble using the appropriate schematic diagram. (See "Cabling, Wiring, Assembling, and Application Schematic Diagrams" section in Tab 4 of this document.) b. Return to Step 2.

-
4. Install the SAN-O AX1-1A fuses in fuse holders labeled **F1** through **F8** on the HDOS.
-

5. Did any of the fuses blow when installed?

If **NO**, continue with Step 6.

If **YES**, refer trouble to installation personnel or use schematic diagram to correct wiring trouble. (See "Cabling, Wiring, Assembling, and Application Schematic Diagrams" section in Tab 4 of this document.) **Return to Step 4.**

6. Choose the plug-in slot group **SH 1** to begin testing (Figure 1).

DO ITEMS BELOW IN ORDER LISTED FOR DETAILS, GO TO

7. In the plug-in slot group chosen (Figure 1), choose plug-in slots **PCU-1** and **OU 1** to begin testing.

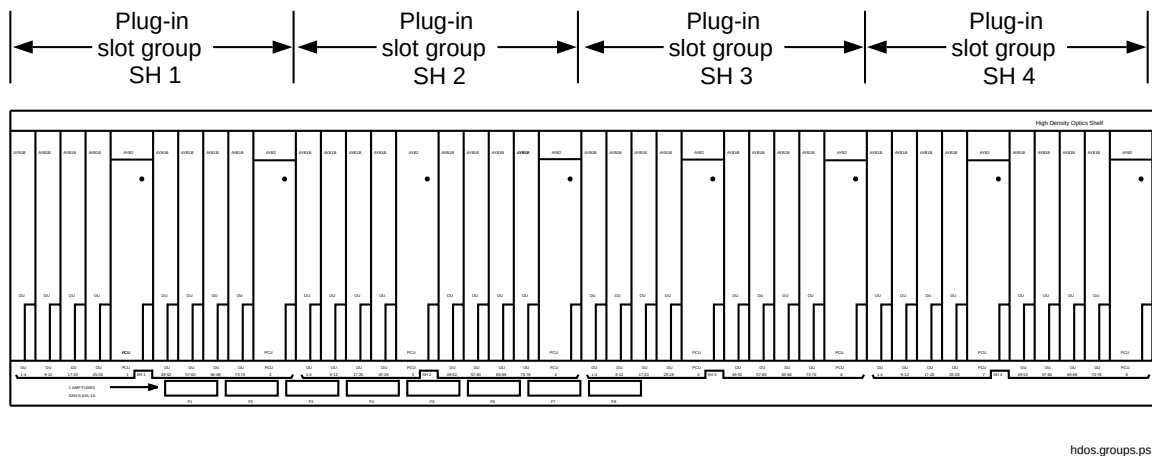


Figure 1 – HDOS Plug-In Slot Groups

8. Install an **AYB2 PCU** in the **PCU** slot and plug-in slot group chosen in the HDOS assembly.

Response: The fuse does not blow and the **PCU FAIL** LED lights momentarily then goes off.

-
9. Does the fuse blow when the PCU is installed?

If **NO**, continue with Step **10**.

If **YES**, go to **TAP-112**.

DO ITEMS BELOW IN ORDER LISTED FOR DETAILS, GO TO

10. Does the **FAIL** LED remain lighted after the **PCU** is installed?

If **NO**, continue with Step **11**.

If **YES**, replace the **PCU**.

11.



CAUTION:

*Remove optical protectors on **OU** and the HDOS backplane ST[®] connector before inserting the optical unit. Damage may occur to the optical unit and backplane if they are not removed.*

Install the **OU** in the chosen slot to the left of the **PCU**.



NOTE:

The **OU** can be either an **AYB1B**, **AYB1C**, or **AYB5**.

12. Does the fuse blow when the **OU** is installed?

If **NO**, continue with Step **13**.

If **YES**, go to **TAP-112**.

13. Does the **FAIL** LED on the **PCU** light after the **OU** is installed?

If **NO**, continue with Step **14**.

If **YES**, replace the **OU**, then the **PCU**.

14. Is an optical power meter available?

If **YES**, continue with Step **15**.

If **NO**, go to Step **17**.

15. Measure the transmit optical power at the fiber coming from the fiber jumper associated with the **OU** just installed (use a jumper fiber if necessary).

DO ITEMS BELOW IN ORDER LISTED FOR DETAILS, GO TO

16. Is the measured optical power between –21 and –26 dBm?

If **YES**, continue with Step **17**.

If **NO**, refer the problem to the installation group.

17. Determine which **PCU** and **OU** slots have been tested for the chosen plug-in slot group and choose the next slot(s) to be tested as follows:

If you've tested with the OU in slot(s) ...	And the PCU is in...	Then remove the OU from ...
1	PCU 1	Slot 1 and choose OU slot 3 for the next test. Return to Step 11 .
1 and 3	PCU 1	Slot 1 and choose OU slot 5 for the next test. Return to Step 11 .
1, 3, and 5	PCU 1	Slot 1 and choose OU slot 7 for the next test. Return to Step 11 .
1, 3, 5, and 7	PCU 1	Slot 7 and choose PCU slot 2 and OU slot 13 for the next test. Return to Step 8 .
1, 3, 5, 7, and 13	PCU 2	Slot 13 and choose OU slot 15 for the next test. Return to Step 11 .
1, 3, 5, 7, 13, and 15	PCU 2	Slot 17 and choose OU slot 19 for the next test. Return to Step 11 .
1, 3, 5, 7, 13, 15, 17, and 19	PCU 2	Slot 19 and choose OU slot PCU 2. Continue with Step 18 .

DO ITEMS BELOW IN ORDER LISTED FOR DETAILS, GO TO

18. Determine which plug-in slot groups have been tested and choose the next group as follows:

If you've tested ...	Then ...
SH 1	Choose SH 2 and return to Step 7.
SH 1 and SH 2	Choose SH 3 and return to Step 7.
SH 1, SH 2, and SH 3	Choose SH 4 and return to Step 7.
SH 1, SH 2, SH 3, and SH 4	Continue with Step 19.

-
19. When all slots have been tested, ensure all plug-ins are removed from the assembly.
-

20. Replace all optical protectors on optical units and HDOS backplane *ST* connectors that are not being put in service at this time.

STOP. YOU HAVE COMPLETED THIS PROCEDURE.

Introduction

General

This tab provides procedures to install circuit packs, perform preservice tests, and establish end-to-end feeder service subsystem at a *SLC*[®]-2000 Access System terminal. These procedures deal with the installation of circuit packs in the access resource manager (ARM) shelf. Either a SONET configuration or a direct metallic DS1 interface is provided as the carrier facility for the *SLC*-2000 Access System. Bulk carrier facilities make use of the SONET subsystem that is based on the DDM-2000 multiplexer.

SONET Subsystem

In a SONET configuration, the SONET subsystem in a *SLC*-2000 terminal terminates the SONET feeder. It provides all of the SONET and DS1 pipe functions in the *SLC*-2000 system. Unlike the DDM-2000, the *SLC*-2000 SONET subsystem has two physical function groups, designated A and C. The DDM-2000 OC-3 product supports three groups: A, B, and C.

In a point-to-point configuration (*SLC*-2000 RT interfacing to a *SLC*-2000 system or DDM-2000 in the CO), each function group (A and C) physically terminates one STS-1 signal from the SONET feeder. In the default time slot mode, STS-1 number 1 terminates on group A, and STS-1 number 3 terminates on group C. This default time slot mapping can be overridden using a CIT. For example, STS-1 number 2 can be cross-connected to either A or C function group.

In linear add/drop configurations, the default STS-1 time slot mappings can be used, or a CIT may be used to cross-connect any STS-1 channel on the SONET feeder to any function group. The C function group supports up to three STS-1 channels for add/drop networks. The A function group supports up to two STS-1 channels.

When establishing a point-to-point SONET network, all low-speed groups at both ends must have the same service capabilities (circuit packs for low-speed groups either installed or removed) for the system to come up with no alarms. If one end has circuit packs installed in a low-speed slot and the other does not, an alarm indication signal (AIS) will generate Minor alarms. To avoid this situation, turn up the SONET network with no low-speed slots equipped. Then equip the low-speed slots with circuit packs on a Circuit Order (as needed) basis at both ends.

When establishing a ring or linear drop network, first establish all optical spans, then make the necessary STS-1 or VT1 cross-connections before equipping the low-speed slots.

When turning up the SONET subsystem looped back, test each group by installing the appropriate circuit packs and performing local tests. Then, before connecting the system to the SONET network, have both ends verify that the low-speed slots are equipped compatibly.

System Configured with Metallic Feeders (LIUs)

In a direct metallic interface, the system is configured with metallic feeders (BBG267 LIUs) and a portion of the SONET subsystem. The OHCTL and SYSCTL circuit packs are required to support the metallic carrier facility. The TGS(1) circuit pack is also required to support the metallic carrier facility if the system is equipped with SONET Software Release 9.1.1.

Contents of This Tab

-  **CAUTION:**
Take care to avoid damaging the LEDs that protrude through the openings in the faceplate of the circuit packs during handling and circuit pack installation.
-  **CAUTION:**
When handling circuit packs, always wear an electrostatic discharge wrist strap connected to an ESD ground jack on the user interface panel (UIP).
-  **CAUTION:**
In dusty areas (for example, near construction sites), tent the RT cabinet to protect electronic equipment whenever cabinet doors are open for extended periods.

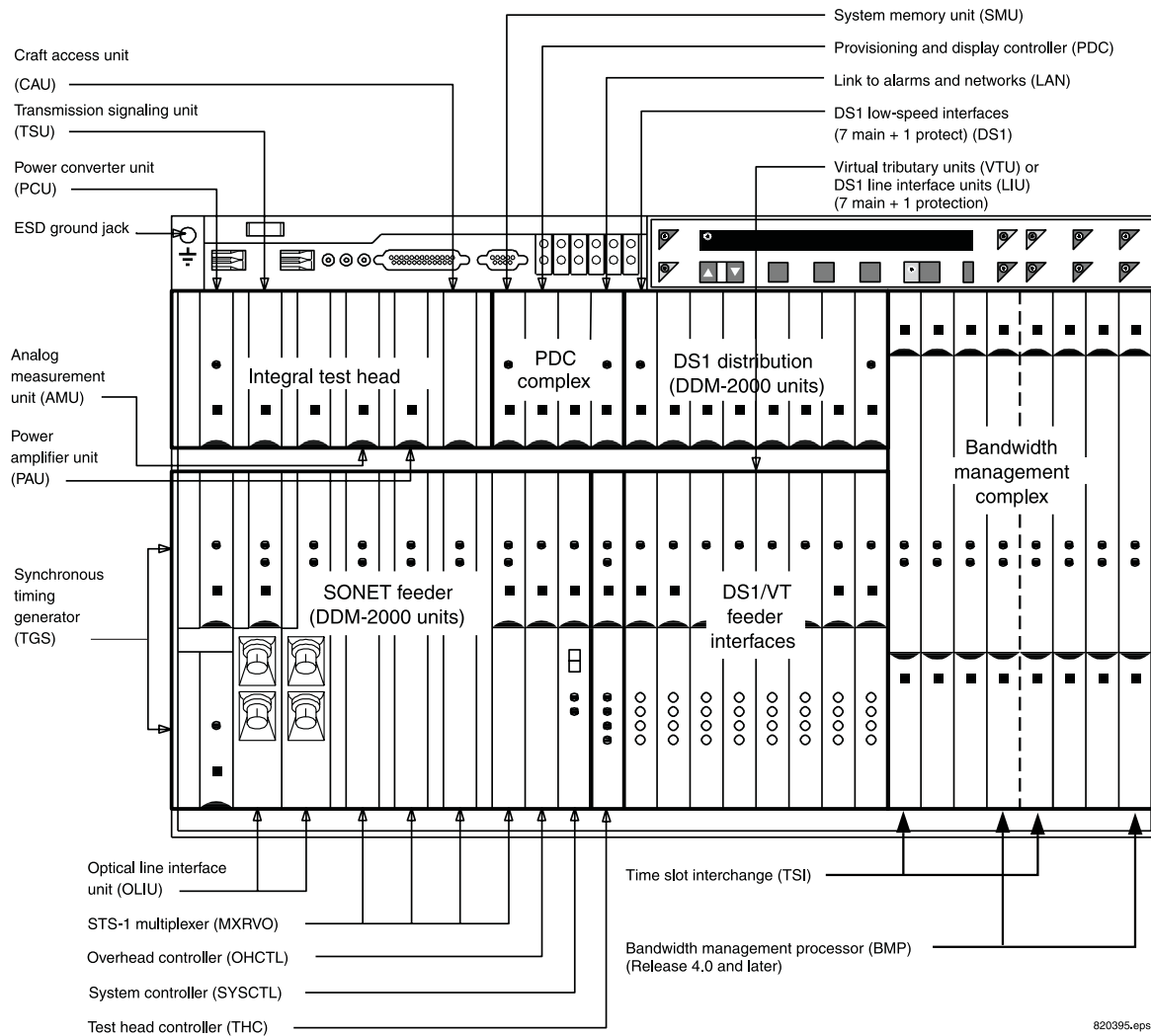
Prerequisite: Before performing these procedures, the *Acceptance Tab* procedures must be done to supply power to the access resource manager (ARM) assembly.

Install User Interface Panel Complex Support Circuit Packs (Release 3.1, 3.2, or 3.3)	NTP-010
Equip SONET OC-3 Subsystem (Looped Back) (Release 3.1, 3.2, or 3.3)	NTP-011
Equip <i>SLC</i> ®-2000 Bandwidth Management Complex Circuit Packs (Release 3.1, 3.2, or 3.3)	NTP-012
Equip Integral Test Head Circuit Packs (Optional)	NTP-013
Preservice ARM Shelf Turnup Tests (VTU/DS1 Unit Installation with System Looped Back) (Release 3.1, 3.2, or 3.3)	NTP-014
Establish End-to-End System — OC-3 Optical Fiber Spans (Release 3.1, 3.2, or 3.3)	NTP-015
Establish <i>SLC</i> ®-2000 System with Metallic Feeders Interfacing Through LIUs (Release 3.1, 3.2, or 3.3)	NTP-016
Equip Bandwidth Management Complex Circuit Packs for <i>SLC</i> ®-2000 Systems Configured with Metallic Feeders (Release 3.1, 3.2, or 3.3) ..	NTP-017

Install Line Interface Unit (LIU) for Metallic Feeders (Release 3.1, 3.2, or 3.3)	NTP-018
Install User Interface Panel Complex Support Circuit Packs (Release 4.0 or Later)	NTP-019
Equip SONET OC-3 Subsystem (Looped Back) (Release 4.0 or Later) . .	NTP-020
Equip <i>SLC</i> [®] -2000 Bandwidth Management Complex Circuit Packs (Release 4.0 or Later).	NTP-021
Preservice ARM Shelf Turnup Tests (VTU/DS1 Unit Installation with System Looped Back) (Release 4.0 or Later)	NTP-022
Establish End-to-End System — OC-3 Optical Fiber Spans (Release 4.0 or Later)	NTP-023
Establish <i>SLC</i> [®] -2000 System with Metallic Feeders Interfacing Through LIUs (Release 4.0 or Later)	NTP-024
Equip Bandwidth Management Complex Circuit Packs for <i>SLC</i> [®] -2000 Systems Configured with Metallic Feeders (Release 4.0 or Later)	NTP-025
Install Line Interface Unit (LIU) for Metallic Feeders (Release 4.0 or Later)	NTP-026
Initialize Integral Test Head Circuit Packs (Optional).....	NTP-027

The *SLC*[®]-2000 RT is divided into the access resource manager (ARM) shelf, metallic distribution shelf (MDS), and high density optics shelf (HDOS) assemblies. The *SLC*-2000 COT is divided into the ARM shelf, MDS, and alarm test unit (ATU) shelf assemblies. These procedures equip the ARM shelf subsystems [user interface panel support packs (PDC complex), SONET feeder, integral test head, and bandwidth management complex subsystem (see Figure 1)] so that service can be added at a later time using the *Circuit Order Tab* and *MDS Turnup Tab* procedures.

 **NOTE:**
The COT is not supported in *SLC*-2000 Software Release 4.0 or later.



820395.eps

Figure 1 – Access Resource Manager Shelf

Install User Interface Panel Complex Support Circuit Packs (Release 3.1, 3.2, or 3.3)

DO ITEMS BELOW IN ORDER LISTED FOR DETAILS, GO TO

Summary: Use this procedure to install the UIP complex circuit packs when the system will use Software Release 3.1, 3.2, or 3.3. You begin by installing the PDC circuit pack. Next, install the SMU and verify the software release it contains. Then enable the SMU using the UIP. After enabling the SMU, perform an LED test from the UIP. If needed, install the LAN circuit pack and repeat the LED test. Continue with the next turnup procedure depending on your system and type of service.

 **NOTE:**
Software Release 3.3 is applicable to the COT only.

 **CAUTION:**
When handling circuit packs, always wear an electrostatic discharge wrist strap connected to an ESD ground jack on the user interface panel (UIP).

 **CAUTION:**
Take care to avoid damaging the LEDs that protrude through the openings in the faceplate of the circuit packs during handling and circuit pack installation.

DO ITEMS BELOW IN ORDER LISTED FOR DETAILS, GO TO

1. Install the **BBF240 PDC** in the **PDC** slot in the ARM shelf. Verify that the **FAULT** LED lights then goes off within 1 minute. Proceed as follows:

If the PDC FAULT LED ...	Then ...
Lights, then goes off within 1 minute	Continue with Step 2.
Does <i>not</i> light	Check the –48V/2A-UIP fuse. <i>If the fuse is good</i> , replace the PDC and continue with Step 2. <i>If the fuse is bad</i> , replace the fuse and continue with Step 2.
Flashes or remains on	This indicates that the PDC needs software to be installed from the SMU. The LED will stop flashing or go off once the SMU is installed and enabled (Step 8). Continue with Step 2. Note: If the PDC FAULT LED remains on after the SMU is installed, the PDC circuit pack may be defective.

⇒ **NOTE:**
The **Major**, **NE Activity**, and **Abnormal** LEDs light within 4 minutes and remain lighted until the SONET subsystem is equipped. The **Attention** LED lights and remains lighted whenever there is an active alarm.

⇒ **NOTE:**
The **Abnormal** LED indicator lights because the SMU is not yet installed.

DO ITEMS BELOW IN ORDER LISTED FOR DETAILS, GO TO

2. Install the **BBF261 SMU** in the **SMU** slot in the ARM shelf. Verify that the **FAULT** LED goes off within 4 minutes.

⇒ **NOTE:**
The PDC **FAIL** LED turns on, then off.

⇒ **NOTE:**
The **DSBLD** LED will remain lighted if the software release on the SMU does not match the software release on the PDC. This condition will cause the **Abnormal** LED on the UIP to light. The **DSBLD** LED will go off once the **SMU** is enabled.

-
3. Does the SMU **FAULT** LED go off within 4 minutes?

If **NO**, continue with Step 4.
If **YES**, go to Step 5.

-
4. Replace the SMU. **Repeat from Step 3.**
-

5. At the UIP, press the **Scroll Menu** up or down arrow push button until **RETRIEVE-PROG-VRSN <ent>** is displayed. Then press **Enter**. Press the **Scroll Menu** down arrow push button until **SYS: DLC version** is displayed. Verify that the *version* is **3.01.00** or later. A typical readout will look something like this:
Sys: DLC R3.01.00.

Reference: Refer to **DLP-500** for more information on how to use the UIP commands.

-
6. Does the SMU contain the correct software version?

If **YES**, go to Step 8.
If **NO**, continue with Step 7.

-
7. Replace the **SMU** with one that has the correct version, or download the correct version into the **SMU** from a PC after installing the OHCTL and SYSCTL circuit packs in a later procedure.

⚠ **CAUTION:**
Downloading cannot be accomplished until the OHCTL and SYSCTL are installed.

DO ITEMS BELOW IN ORDER LISTED FOR DETAILS, GO TO

Reference: Refer to **Circuit Order: NTP-069** for upgrading SMU software.

8. At the UIP, press **Escape** then the **Scroll Menu** up or down arrow push button until **SET-STATE-SMU <ent>** is displayed. Then press **Enter**. Press the **Scroll Menu** up or down arrow push button until **SET-SMU: ENABLED <ent>** is displayed. Then press **Enter**. When **CONFIRM? Y<ent> N<esc>** is displayed, press **Enter**. Continue the procedure as follows:

If the UIP displays ...	Then the SMU ...	Then ...
SET-STATE-SMU: ENBLD done	Does not need to load software to the PDC.	Continue with Step 9.
NE:pdcc SW Installing MN:NE:pdcc unavailable. Note: The PDC FAULT LED will flash while the SMU is loading software.	Needs to load software on the PDC.	a. Wait several minutes for the software to load and the PDC FAULT LED to stop flashing. At the end of the software download, the SMU will be enabled. The UIP Abnormal and SMU DSBLD LEDs go off. b. Wait 2 minutes after the software download completes to continue with Step 9.

⇒ **NOTE:**
If the SMU version matches the PDC version, the SMU will be enabled.

⇒ **NOTE:**
The **Attention**, **Major**, and **NE Activity** alarms will remain lighted until the SONET subsystem circuit packs are installed.

DO ITEMS BELOW IN ORDER LISTED FOR DETAILS, GO TO

9. Press the **LED Test** UIP push button. Verify that the following LEDs light:
- All UIP LEDs and display segments
 - The **PDC FAULT** LED
 - The **SMU FAULT** and **DSBLD** LEDs.

Proceed with this procedure as follows:

If all LEDs ...	And the PDC has ...	Then ...
Do <i>not</i> light	<i>Not</i> been replaced	Replace the SMU or PDC and <i>repeat this step</i> .
	Been replaced	Check the wiring using schematic diagrams, check the fuses, or replace the UIP display [DLP-518]. Continue with Step 10 after correcting the problem.
Light	—	Continue with Step 10.

-
10. Determine if the LAN circuit pack is to be installed.

⇒ **NOTE:**
The LAN card is required at the COT and is optional at the RT. The LAN card is required at the RT if connection of a CIT to the rear CIT port by means of a null modem is made or if special service testing [remote measurement unit/remote test unit (RMU/RTU)] is desired.

-
11. Do you need to install the LAN circuit pack?

If **YES**, continue with Step 12.
If **NO**, **STOP. YOU HAVE COMPLETED THIS PROCEDURE.**

DO ITEMS BELOW IN ORDER LISTED FOR DETAILS, GO TO

12. Install a BBF250 LAN circuit pack in the LAN slot.

⇒ **NOTE:**
The **FAULT** LED on the LAN circuit pack lights and then goes off within 1 minute. Ignore transient alarms.

⇒ **NOTE:**
The PDC **FAULT** LED and the SMU **FAULT** and **DSBLD** LEDs light, then clear.

-
13. Press the **LED Test** UIP push button. Verify that all LEDs on the following circuit packs light:

- **SMU**
- **PDC**
- **LAN.**

-
14. Do all LEDs on the SMU, PDC, and LAN circuit pack light when the **LED Test** button is pushed?

If **YES**, **STOP. YOU HAVE COMPLETED THIS PROCEDURE.**

If **NO**, continue with Step **15**.

-
15. Replace circuit pack that has an LED that does not light.
-

16. If needed, return the UIP display to the Main Menu by pressing the **Escape** button.

STOP. YOU HAVE COMPLETED THIS PROCEDURE.

Equip **SLC®-2000 SONET OC-3 Subsystem (Looped Back) (Release 3.1, 3.2, or 3.3)**

DO ITEMS BELOW IN ORDER LISTED FOR DETAILS, GO TO

Summary: This procedure gives the steps for installing the SONET subsystem circuit packs. You begin by verifying that you've installed fuses in the ARM shelf and that you've performed **NTP-010** to install the UIP complex support circuit packs. Then install the OHCTL and SYSCTL and ensure that all alarms have cleared. Next, install the TGS and OLIU plug-ins and install the OLIU optical loops. Log in to the SONET subsystem and disable the DCC channel. Then install the MXRV0s depending on the type of service. Finally, perform an LED test and check the protection switching function.

Prerequisites:

- Before starting this procedure, you must know the TBOS display number, the Site ID number, and the Power Minor alarm options (selectable options on the **SYSCTL**). You must also know the Network Element number (selectable options on the **OHCTL**).
- Circuit packs must not be installed in any MDS assembly. This may cause Major or Critical alarms. Remove any circuit packs installed in the MDS assemblies before beginning this procedure.
- This procedure assumes that all hardwired installation and testing of the unequipped **SLC-2000** Access Resource Manager (ARM) shelf has been done. It also assumes that power is applied to the shelf (**Power** LED lighted on user interface panel).



CAUTION:

Unterminated optical connectors may emit invisible laser radiation. Eye damage may occur if beam is viewed directly or with improper optical instruments. Avoid direct exposure to the beam.



CAUTION:

When handling circuit packs, always wear an electrostatic discharge wrist strap connected to an ESD ground jack on the user interface panel (UIP).

DO ITEMS BELOW IN ORDER LISTED FOR DETAILS, GO TO

 **CAUTION:**
Take care to avoid damaging the LEDs that protrude through the openings in the faceplate of the circuit packs during handling and circuit pack installation.

 **NOTE:**
Many of the plug-ins (SYSCTL, OHCTL, DS1) have numerous option switches that must be set before they are installed.

1. Verify that the fuses have been installed in the ARM shelf.

-
2. Verify that the procedure to install user interface panel complex support circuit packs (**ARM Shelf Turnup:NTP-010**) has been performed.

 **NOTE:**
The **PDC** circuit pack must be installed for the SONET subsystem to activate UIP alarms.

 **NOTE:**
When the **PDC** and **SMU** are installed, there may be **Attention**, **Major**, and **NE Activity** alarms until the **SYSCTL** circuit pack is installed.

-
3. Set options and install the **OHCTL** plug-in. DLP-501

 **NOTE:**
FAULT LED stays lighted.

 **NOTE:**
See your local company documentation for specific option settings. In some cases, special arrangements have been made with specific companies to include their option settings as an appendix to this document.

-
4. Is **BBG5** or **BBG8 SYSCTL** plug-in being installed in ARM shelf?

If **BBG5**, then continue with Step 5.

If **BBG8**, go to Step 6.

DO ITEMS BELOW IN ORDER LISTED FOR DETAILS, GO TO

5. Set options and install the **BBG5 SYSCTL** plug-in. DLP-502

⇒ **NOTE:**
It may take up to 1 minute for SYSCTL to start initialization.

⇒ **NOTE:**
See your local company documentation for specific option settings. In some cases, special arrangements have been made with specific companies to include their option settings as an appendix to this document.

Proceed to Step 7.

-
6. Set options and install the **BBG8 SYSCTL** plug-in. DLP-534

⇒ **NOTE:**
It may take up to 1 minute for SYSCTL to start initialization.

⇒ **NOTE:**
See your local company documentation for specific option settings. In some cases, special arrangements have been made with specific companies to include their option settings as an appendix to this document.

-
7. Do all alarms clear after **SYSCTL** plug-in is installed and initialized?

If **NO**, then go to **TAP-104**.

If **YES**, go to Step 8.

⇒ **NOTE:**
The AGNE alarm will always be active and the DSNE and FECOM alarms may be active unless this node is designated as the DSNE.

⇒ **NOTE:**
Circuit packs must not be installed in any MDS assembly. This may cause Major or Critical alarms. Remove any circuit packs installed in the MDS assemblies.

-
8. (See Notes.) Option (select *free running* option) and install **TGS** timing plug-ins. DLP-503

⇒ **NOTE:**
To avoid timing alarms before the end-to-end OC-3 system has been established, the **TGS** option switches must be *temporarily* set to *free running*.

DO ITEMS BELOW IN ORDER LISTED FOR DETAILS, GO TO

9. Install **OLIUs** in **MAIN 1** and **MAIN 2**. DLP-504

⇒ **NOTE:**
22F/22F-U/22F2-U OLIUs are required for DS1 taper/drop (partial function group VT1 cross-connections) and ring configurations. For other configurations (point-to-point or STS-1 taper/drop cross-connections) either **22F/22F-U/22F2-U** or **21G/21G-U/21G2-U OLIUs** can be used. If **21G/21G-U/21G2-U OLIUs** are used, the **HIGH/LOW POWER** switch is set to **LOW** for shelf loopback.

⇒ **NOTE:**
After installing the OLIUs, both **ACTIVE** LEDs are lighted and both **FAULT** LEDs flash on the **OLIUs**.

For Point-to-Point or Taper configurations (SONET 6.2.1 or later), the Critical and NE Activity alarms are activated.

For Ring configurations (SONET 7.01.## or later), Minor or Critical and NE Activity alarms may be activated.

-
10. Install **OLIU** optical loops. DLP-505

⇒ **NOTE:**
FAULT LEDs on **OLIU** stop flashing.

-
11. Is the CIT located locally or at a remote location?

If **locally**, then continue with Step **12**.

If **remote location**, then proceed to Step **13**.

-
12. Using a CIT, log in to the SONET subsystem as a privileged user. DLP-521

⇒ **NOTE:**
The default login is **LUC01**, **LUC02**, or **LUC03** and the default password is **SLC-2000**.

Proceed to Step **14**.

-
13. Using the CIT at the remote location, log in to the SONET subsystem as a privileged user. DLP-541

⇒ **NOTE:**
The default login is **LUC01**, **LUC02**, or **LUC03** and the default password is **SLC-2000**.

DO ITEMS BELOW IN ORDER LISTED FOR DETAILS, GO TO

14. Disable the DCC channel from the CIT using the following procedure:

While accessing the SONET subsystem, enter:

set-fecom:dcc-all and press the Enter key

At the **Communications [CurrentValues]** = prompt, enter: **?** and select **2 (disabled)**

At the **NS/US** = prompt, press the Enter key

At the **Execute?** prompt, enter: **Y**

Response: The CIT displays:

```
set-fecom:dcc-all COMPLD
*/
dcc-a slot not equipped properly -- provisioning unchanged
dcc-b slot not equipped properly -- provisioning unchanged
dcc-c slot not equipped properly -- provisioning unchanged
/*
```

⇒ **NOTE:**
Critical and **NE Activity** LEDs remain lighted. For ring applications, **MN** and **NE Activity** LEDs remain lighted.

-
15. Will the ARM shelf be used for DS1 services (Function group C) **only?**

If **NO**, continue with Step **16**.

If **YES**, go to Step **18**.

-
16. Install **BBG2 MXRVO** plug-ins in Function group A **FUNCTION(A) 1** then **FUNCTION(A) 2** slots.

⇒ **NOTE:**
For **FUNCTION(A) 1** slot, the **MXRVO FAULT** lights for less than 30 seconds and then goes off. The **ACTIVE** LED lights.
For **FUNCTION(A) 2** slot, the **MXRVO FAULT** lights for less than 30 seconds and then goes off.

DO ITEMS BELOW IN ORDER LISTED FOR DETAILS, GO TO

17. Will the ARM shelf be used for DS1 (Function group C) services?

If **YES**, continue with Step **18**.

If **NO**, go to Step **19**.

18. Install **BGG2 MXRVO** plug-ins in Function group C **FUNCTION(C)**
1 then **FUNCTION(C) 2** slots.



NOTE:

For **FUNCTION(C) 1** slot, the **MXRVO FAULT** lights for less than 30 seconds and then goes off. The **ACTIVE** LED lights.

For **FUNCTION(C) 2** slot, the **MXRVO FAULT** lights for less than 30 seconds and then goes off.

19. Perform an LED test and verify that all LEDs on all circuit packs light.	DLP-507

20. Test protection switching function.	DLP-509

STOP. YOU HAVE COMPLETED THIS PROCEDURE.

Equip **SLC[®]-2000** Bandwidth Management Complex Circuit Packs (Release 3.1, 3.2, or 3.3)

DO ITEMS BELOW IN ORDER LISTED FOR DETAILS, GO TO

Summary: In this procedure it is assumed that the system is being equipped for TR-08* operation (Release 3.1 or later). It will be revised when other system configurations are available. This procedure requires that the SONET subsystem (**NTP-011**) be equipped before any bandwidth management circuit packs are installed.

 **NOTE:**
Software Release 3.3 is applicable to the COT only.

 **CAUTION:**
When handling circuit packs, always wear an electrostatic discharge wrist strap connected to an ESD ground jack on the user interface panel (UIP).

 **CAUTION:**
Take care to avoid damaging the LEDs that protrude through the openings in the faceplate of the circuit packs during handling and circuit pack installation.

1. Obtain two **BDK[®]250 TSI** circuit packs to install in the bandwidth management complex of the ARM shelf.
2. On each **TSI**, verify that the daughter board is properly seated.
3. Install a **BDK 250 TSI** in **CORE (1) STU/TSI** slot and verify that the **FAULT** LED lights and then goes off and the **ACTIVE** LED lights.

* Bellcore Technical Reference TR-TSY-000008, Issue 2, August 1987, *Digital Interface Between the SLC 96 Digital Loop Carrier System and a Local Digital Switch.*

DO ITEMS BELOW IN ORDER LISTED FOR DETAILS, GO TO

⇒ **NOTE:**
If the **TSI FAULT** LED is flashing (indicating software is being installed from the SMU), you will not see the proper responses until after the software is installed and the **FAULT** LED stops flashing.

⇒ **NOTE:**
After 1 minute, user interface panel (UIP) **Minor** or **Critical**, **Attention**, and **NE Activity** LEDs light. Ignore transient alarms.

-
4. Did the **FAULT** LED light and then go off and the **ACTIVE** LED light?

If **NO**, continue with Step 5.

If **YES**, go to Step 6.

-
5. Obtain a new **BDK250 TSI** and ensure that the daughter board is properly seated. **Return to Step 3.**

-
6. Wait **5 minutes** for data transfer and perform the LED test. DLP-507

-
7. Install a **BDK250 TSI** in **CORE (2) STU/TSI** slot and verify that the **FAULT** LED lights and then goes off.

⇒ **NOTE:**
If the **TSI FAULT** LED is flashing (indicating software is being installed from the SMU), you will not see the proper responses until after the software is installed and the **FAULT** LED stops flashing.

⇒ **NOTE:**
After installing the second TSI, one of the following may happen:

- All alarms clear (continue with the next step)
- The **Minor** or **Critical**, **Attention**, and **NE Activity** LEDs are lighted and the fault list contains **system data memory fault** message indicating the system needs to be initialized. This will clear when the system is initialized in Step 11 (continue with the next step).

DO ITEMS BELOW IN ORDER LISTED FOR DETAILS, GO TO

8. Did the **FAULT** LED light and then go off?

If **NO**, continue with Step 9.

If **YES**, go to Step 10.

-
9. Obtain a new **BDK250 TSI** and ensure that the daughter board is properly seated. **Return to Step 7.**
-

10. Wait **5 minutes** for data transfer and perform the LED test. DLP-507
-

11. Initialize the system as follows:

At the UIP, press **Escape** then the **Scroll Menu** up or down arrow push button until **INITIALIZE-SYSTEM <ent>** is displayed. Then press **Enter**. When **CONFIRM? Y<ent> N<esc>** is displayed, press **Enter**.



CAUTION:

*The **INITIALIZE-SYSTEM** UIP command must be executed after the **PDC**, **SMU**, and **TSIs** have been installed and before any **VTU** or **MDC** circuit packs are installed. This UIP command will be denied if any **VTU** or **MDC** packs are installed.*



NOTE:

INITIALIZE-SYSTEM done is displayed after about 5 seconds. The **FAULT** LED on the OHCTL and the **Major** and **NE Activity** UIP LEDs are lighted. The **Abnormal** LED may briefly light, then clear. To clear all alarms, log in to the CIT as a privileged user and enter the CIT SONET subsystem **set - fecom** command to disable the DCC channel and then use the **set - ne** command to set the DSNE and AGNE to yes (Y).



NOTE:

The **Minor**, **Attention**, and **NE Activity** LEDs remain lighted if the SONET cross-connections have been changed from the default settings.

-
12. Wait **2 minutes** after all transient alarms clear and then press the **LED Test** UIP push button. Verify that all LEDs light on both **TSIs**.

DO ITEMS BELOW IN ORDER LISTED FOR DETAILS, GO TO

13. Do all LEDs light on both TSI circuit packs?

If **NO**, continue with Step **14**.

If **YES**, go to Step **15**.

-
14. Replace the TSI that contains an LED that is not lighted.

Continue with Step 15.

15. Make **CORE (2)** the active core as follows:

At the UIP, press **Escape** then the **Scroll Menu** up or down arrow push button until **SWITCH-CORE <ent>** is displayed. Then press **Enter**. Press the **Scroll Menu** up or down arrow push button until **SWITCH-CORE: FORCE->2 <ent>** is displayed. Then press **Enter**. When **CONFIRM? Y<ent> N<esc>** is displayed, press **Enter**.



NOTE:

TSI ACTIVE LED lights in **CORE (2)**. The **Major** or **Minor**, **Abnormal**, and **NE Activity** LEDs light and the **SW-CORE: FORCE->2** done is displayed.

-
16. Use the **SWITCH-CORE** command and select the **RESET** option to reset the bandwidth management core protection switching state as follows:

Press **Escape** then the **Scroll Menu** up or down arrow push button until **SWITCH-CORE <ent>** is displayed. Then press **Enter**. Press the **Scroll Menu** up or down arrow push button until **SWITCH-CORE: RESET <ent>** is displayed. Then press **Enter**. When **CONFIRM? Y<ent> N<esc>** is displayed, press **Enter**.



NOTE:

The reset causes the system to work on CORE 2 and a switch to CORE 1 will not occur unless trouble is detected.



NOTE:

All alarms clear and **SW-CORE: RESET done** is displayed.

DO ITEMS BELOW IN ORDER LISTED FOR DETAILS, GO TO

17. Wait **2 minutes** for the system to stabilize, then make **CORE (1)** the active core as follows:

At the UIP, press **Escape** then the **Scroll Menu** up or down arrow push button until **SWITCH-CORE <ent>** is displayed. Then press **Enter**. Press the **Scroll Menu** up or down arrow push button until **SWITCH-CORE: FORCE->1 <ent>** is displayed. Then press **Enter**. When **CONFIRM? Y<ent> N<esc>** is displayed, press **Enter**.

⇒ **NOTE:**
TSI ACTIVE LED lights in **CORE (1)**. The **MN, Abnormal, Attention**, and **NE Activity** LEDs light and the **SW-CORE: FORCE->1 done** is displayed.

-
18. Use the **SWITCH-CORE** command and select the **RESET** option to reset the bandwidth management core protection switching state as follows:

Press **Escape** then the **Scroll Menu** up or down arrow push button until **SWITCH-CORE <ent>** is displayed. Then press **Enter**. Press the **Scroll Menu** up or down arrow push button until **SWITCH-CORE: RESET <ent>** is displayed. Then press **Enter**. When **CONFIRM? Y<ent> N<esc>** is displayed, press **Enter**.

⇒ **NOTE:**
The reset causes the system to work on CORE 1 and a switch to CORE 2 will not occur unless trouble is detected.

⇒ **NOTE:**
All alarms clear and **SW-CORE: RESET done** is displayed.

-
19. Wait **2 minutes** for the system to stabilize.

-
20. Determine if your system is an RT or COT and set the system as follows:

At the UIP, press **Escape** then the **Scroll Menu** up or down arrow push button until **SET-NE <ent>** is displayed. Then press **Enter**. Press the **Scroll Menu** up or down arrow push button until one of the following commands is displayed depending on your system type:

- For COT: **SET-NE: COT <ent>**
- For RT: **SET-NE: RT <ent>**

DO ITEMS BELOW IN ORDER LISTED FOR DETAILS, GO TO

Then press **Enter**. When **CONFIRM? Y<ent> N<esc>** is displayed, press **Enter**.

21. Do any alarms exist on the system?

If **YES**, continue with Step **22**.

If **NO**, go to Step **23**.

22. Clear alarms using **TAP-102** or local procedures. After alarms are cleared, **continue with Step 23**.

23. Is system equipped with SONET Software Release 6.0, 7.0, 7.1, or 7.2 and higher?

If **6.0, 7.0, or 7.1**, continue with Step **24**.

If **7.2 and higher**, go to Step **25**.

24. Using the CIT and while accessing the SONET subsystem, execute the command **set -ne** and proceed as follows:

For ...	When the system displays ...	Then enter ...
All systems	TID [Site#NE#] =	RETURN.
	GNE [no] =	One of the following: • yes — for nodes connected to surveillance center • no — for all other nodes Then press RETURN .
Ring systems only	DCCMode [distinct] =	Press RETURN .

➡ **NOTE:**
The system will reset and within 3 minutes all alarms clear.

STOP. YOU HAVE COMPLETED THIS PROCEDURE.

DO ITEMS BELOW IN ORDER LISTED FOR DETAILS, GO TO

25. Using the CIT and while accessing the SONET subsystem,
execute the command **set -ne** and proceed as follows:

When the system displays ...	Then enter ...
TID [default] =	Refer to office records and enter correct value followed by RETURN .
DSNE [No] =	
AlarmGroup [1-255] =	
AGNE [No] =	
SITE [1-64] =	
NE [1-5] =	
IdleChannelSignal [ais] =	
SHELF [1-8] =	
CO/RT [rt] =	
TBOS Addr [1-8] =	
TBOS Link [noTBOS] =	
TBOS Remote [disable] =	
Execute?	Y and press RETURN .

⇒ **NOTE:**
The system will reset and within 3 minutes all alarms clear.

⇒ **NOTE:**
Refer to **DLP-521** or **DLP-541** to establish a CIT connection.

STOP. YOU HAVE COMPLETED THIS PROCEDURE.

Equip **SLC[®]-2000** Integral Test Head Circuit Packs (Optional)

DO ITEMS BELOW IN ORDER LISTED FOR DETAILS, GO TO

Summary: In this procedure it is assumed that the system is being equipped with the circuit packs in the integral test head (ITH) subsystem. If a DC test pair or remote measurement unit (RMU) is used, the TSU, AMU, and PAU circuit packs are not installed. The local test access feature requires the THC, PCU, and CAU circuit packs to be installed.

To properly initialize the integral test head circuit packs, the **THC (BBG220)** must be installed last. The **THC** will run diagnostic tests and do calibration on the ITH circuit packs (may take up to 10 minutes). Any circuit pack that fails diagnostics or cannot calibrate will have the **FAULT** LED lighted.

After properly installing the ITH circuit packs, you must install the VTUs or the LIUs. The **THC** will take channels 23 and 24 (both voice frequency) in digroup A of the digital loop carrier (DLC) system 1 in the metallic distribution shelf (MDS) assembly 1 to allow dial-up access to the integral test head. Before channel testing is possible, the associated central office equipment, the feeder subsystem (SONET system or metallic feeder), and DLC system 1 in MDS assembly 1 must be turned up and connected end to end.



CAUTION:

When handling circuit packs, always wear an electrostatic discharge wrist strap connected to an ESD ground jack on the user interface panel (UIP) or fan assembly.



CAUTION:

Take care to avoid damaging the LEDs that protrude through the openings in the faceplate of the circuit packs during handling and circuit pack installation.

DO ITEMS BELOW IN ORDER LISTED FOR DETAILS, GO TO

1. Do you want to install ITH circuit packs or perform ITH initialization testing (see Note)?

If **installing ITH circuit packs**, continue with Step 2.

If **performing ITH initialization testing**, go to **NTP-027**.



NOTE:

If circuit packs have not been installed in the ITH, choose *installing ITH circuit packs*. If circuit packs have been installed and you are returning to this procedure for final ITH initialization testing after installing VTUs or LIUs, choose *performing ITH initialization testing*.

-
2. Using the work order, is local test access required (access from the UIP jack)?

If **YES**, continue with Step 3.

If **NO**, go to Step 4.

-
3. Ensure that all external test equipment is disconnected from the local test access jacks on the UIP.
-

4. Using the work order, determine which ITH circuit packs you need to install. (See Table A for specific applications.)

DO ITEMS BELOW IN ORDER LISTED FOR DETAILS, GO TO

Table A. Required ITH Circuit Packs by Application (TR-08)

ITH Circuit Pack	MLT-2	Local Test Access*	SARTS	Routine Testing
THC (BBG220) (contains software for the ITH subsystem)	X	X	X	X
PCU (BBF220)	X	X	X	X
AMU (BBF221)	X		X	X
PAU (BBF222)	X		X	X
TSU (BBF223)	X			X
CAU (BBF225) [†]		X		

* UIP jack access.

† If the ITH is equipped for local test access (with the CAU), SARTS and external remote test unit access will be blocked. However, installing dummy bantam plugs in the UIP jacks T/R - CHAN and DROP, T1R1 - CHAN and DROP, and E/M - CHAN (five plugs total) will enable external remote testing. When local test access is needed, the plugs may be removed temporarily to use the jacks but must be replaced as soon as local testing is completed to restore external remote test access. (Refer to the circuit maintenance description in Chapter 3, "Operations Interfaces," for more details.)

DO ITEMS BELOW IN ORDER LISTED FOR DETAILS, GO TO

5. Install the needed ITH circuit packs in the following order (see Caution):



CAUTION:

*For the system to properly initialize, you must install the **THC** circuit pack last.*

If installing ...	Then install circuit pack in the slot labeled ...
BBF220 PCU	PCU
BBF223 TSU	TSU
BBF221 AMU	AMU
BBF222 PAU	PAU
BBF225 CAU	CAU (local test access only)
BBG220 THC	THC



NOTE:

After installing the **THC**, all other circuit pack **FAULT** LEDs will extinguish within 1 minute.



NOTE:

After about 10 minutes from the time the **THC** is installed, the **GREEN** LED on the **THC** will stop flashing. At this time no **FAULT** LEDs should be lighted on any of the **ITH** circuit packs.



NOTE:

The **THC** signaling LEDs should all be off if the **CAU** circuit pack is not installed. Ignore these LEDs at this time if the **BBF225 CAU** is installed.

DO ITEMS BELOW IN ORDER LISTED FOR DETAILS, GO TO

6. After installing the **THC**, check the LEDs on the ITH circuit packs and proceed as follows:

If the ...	FAULT LED(s) ...	Then do the following ...
PCU	Does not go off within a few seconds	Replace the PCU.
AMU and PAU	Light simultaneously after about 2 minutes	Check measurement ground to the ITH as follows: Verify that the measurement ground is connected by measuring the voltage between the –48 V (A) jack on the UIP and pin 13 (gray wire) of Jack J303. The voltage should be –48 V. <i>If the measurement ground is not connected,</i> connect the measurement ground (see the appropriate <i>SLC-2000 Customer Assembly Manual</i>).
TSU, PAU, and AMU	Light simultaneously	1. Check measurement ground to the ITH as outlined above. 2. <i>If the measurement ground was properly connected,</i> replace the circuit packs in the following order to find the defective pack: BBF223 (TSU) BBF222 PAU) BBF221 (AMU).
CAU	Lights	Ensure that all external test equipment is disconnected from the local test access jacks on the UIP.
ITH circuit packs	Behave normally	<i>Continue with Step 7.</i>

DO ITEMS BELOW IN ORDER LISTED FOR DETAILS, GO TO

7. After performing Step 6, are any **FAULT** LEDs lighted on any ITH circuit packs?

If **YES**, continue with **Step 8**.

If **NO**, **STOP. YOU HAVE COMPLETED THIS PROCEDURE.**

8. Replace any circuit packs with **FAULT** LEDs lighted.



NOTE:

The **THC** green LED will begin to flash when a circuit pack is removed or inserted to indicate that the **THC** is recalibrating.

Preservice ARM Shelf Turnup Tests (VTU/DS1 Unit Installation with System Looped Back) (Release 3.1, 3.2, or 3.3)

DO ITEMS BELOW IN ORDER LISTED FOR DETAILS, GO TO

Summary: This procedure gives the steps for installing the VTU and DS1 circuit packs. Follow the procedure as written to ensure proper operation.

 **CAUTION:**
When handling circuit packs, always wear an electrostatic discharge wrist strap connected to an ESD ground jack on the user interface panel (UIP).

 **CAUTION:**
Take care to avoid damaging the LEDs that protrude through the openings in the faceplate of the circuit packs during handling and circuit pack installation.

1. From the work order, determine the type of services your system will require:

If **digital loop carrier (DLC) services** (pipes) are required, continue with **Step 2**.

If **DS1 services only** are required, go to **Step 14**.

If **neither DLC nor DS1 services** are required, establish an end-to-end SONET network using **ARM Shelf**

Turnup:NTP-015, "Establish End-to-End System *SLC*®-2000 OC-3 Optical Fiber Spans."

-
2. Have **BBG2 MXRVO** plug-ins been installed in Function Group A?

If **NO**, continue with **Step 3**.

If **YES**, go to **Step 4**.

DO ITEMS BELOW IN ORDER LISTED FOR DETAILS, GO TO

3. Install **BBG2 MXRVO** plug-ins in Function Group A
FUNCTION(A) 1 then **FUNCTION(A) 2** slots.



NOTE:

For **FUNCTION(A) 1** slot, the **MXRVO FAULT** lights for less than 30 seconds and then goes off. The **ACTIVE** LED lights.

For **FUNCTION(A) 2** slot, the **MXRVO FAULT** lights for less than 30 seconds and then goes off.

-
4. Have **BDK®250 TSI** circuit packs been installed in the bandwidth management complex?

If **NO**, continue with **Step 5**.

If **YES**, go to **Step 6**.

-
5. Install the **BDK250 TSI** circuit packs in bandwidth management complex by performing **ARM Shelf Turnup: NTP-012**.



NOTE:

The bandwidth management complex circuit packs (**BDK250 TSI**) must be installed before the MDS support packs will function properly.



NOTE:

No alarms are present on the system.

-
6. Using the work order, choose the first **LIU/VTU(A)** slot for VTU installation.



NOTE:

The procedures for installing an LIU circuit pack are contained in **NTP-018**.

-
7. Install a **BBG266 VTU** circuit pack in the slot chosen and wait for alarms to clear.

Response: The **FAULT** LEDs on the **VTU** light for less than 3 minutes (per pack) when installed. (The display on the UIP fault menu may indicate that the VTU software is installing.) Then all alarms clear (ignore transient alarms).



NOTE:

The **Major** or **Minor, Attention**, and **NE Activity** alarms (if on) will clear after the first **VTU** is installed (installing additional **VTUs** may cause transient alarms).

DO ITEMS BELOW IN ORDER LISTED FOR DETAILS, GO TO

8. Does the **FAULT** LED remain lighted and the **UIP RETRIEVE-FAULTS** command indicate no software is installing?

If **YES**, continue with Step **9**.

If **NO**, go to Step **10**.

-
9. Remove the bad VTU and obtain a new VTU. ***Return to Step 7.***
-

10. Have you installed VTUs in all slots shown on the work order [including the protection slot (**P**)]?

If **NO**, continue with Step **11**.

If **YES**, go to Step **12**.

-
11. Using the work order, choose the next **LIU/VTU(A)** slot to install a VTU. ***Return to Step 7.***
-

12. Perform an LED test.

DLP-507

-
13. Do you want to install DS1 services?

If **YES**, continue with Step **14**.

If **NO**, **STOP. YOU HAVE COMPLETED THIS PROCEDURE.**

-
14. Have **BBG2 MXRVO** plug-ins been installed in Function Group C?

If **NO**, continue with Step **15**.

If **YES**, go to Step **17**.

-
15. Install **BBG2 MXRVO** plug-ins in Function Group C **FUNCTION(C) 1** then **FUNCTION(C) 2** slots.



NOTE:

For **FUNCTION(C) 1** slot, the **MXRVO FAULT** lights for less than 30 seconds and then goes off. The **ACTIVE** LED lights.

For **FUNCTION(C) 2** slot, the **MXRVO FAULT** lights for less than 30 seconds and then goes off.

-
16. Test **MXVRO** protection switching function (if required).

DLP-509

DO ITEMS BELOW IN ORDER LISTED FOR DETAILS, GO TO

17. Install **DS1/DS1PM** circuit packs in **DS1(LS-C)** slots **1** through **P** as required. Install **177A** retainer cards in all unequipped **DS1(C)** slots not equipped with **DS1/DS1PM** circuit packs. If a **DS1PM** circuit pack is installed in any service slot (**1** through **8**), then a **DS1PM** circuit pack must be installed in slot **P** if protection is required. DLP-510



NOTE:

The SONET subsystem command set - feat must be entered at the CIT to activate the enhanced performance monitoring features of the **DS1PM** pack.

-
18. Test individual DS1 channels. DLP-531

-
19. Perform an LED test. DLP-507

STOP. YOU HAVE COMPLETED THIS PROCEDURE.

Establish End-to-End System *SLC*[®]-2000 OC-3 Optical Fiber Spans (Release 3.1, 3.2, or 3.3)

DO ITEMS BELOW IN ORDER LISTED FOR DETAILS, GO TO



CAUTION:

When handling circuit packs, always wear an electrostatic discharge wrist strap connected to an ESD ground jack on the user interface panel (UIP).



CAUTION:

Take care to avoid damaging the LEDs that protrude through the openings in the faceplate of the circuit packs during handling and circuit pack installation.



NOTE:

When connecting the point-to-point or taper/drop *SLC*-2000 SONET subsystem to a central office DDM-2000 or *SLC*-2000 Access System, a **Minor** alarm will be generated if the Function Groups (A and C) are not equipped the same [for example a **VTU** in Function Group A slot 1 needs a **DS1** pack installed at the central office end DDM-2000 or *SLC*-2000 shelf Function Group A slot (or appropriate cross-connected slot), to avoid **Minor**, **Attention**, and **NE Activity** alarms]. It is recommended that the Function Groups at both ends be equipped the same (empty slots, or equipped DS1 slots) when establishing the OC-3 network.



NOTE:

This procedure assumes the far end DDM-2000 or *SLC*-2000 terminal has been turned up and tested (looped back).

DO ITEMS BELOW IN ORDER LISTED FOR DETAILS, GO TO

1. Verify that the *SLC-2000* RT or COT is looped back and that all MDS assemblies are unequipped before continuing.
-

2. Determine the optical loss of each optical span from office records or by making the required measurements.



CAUTION:

Open optical connectors may emit invisible laser radiation. Avoid direct exposure to the beam. Do not view beam with optical instruments. Procedures other than those specified herein may result in hazardous laser radiation exposure.

3. Does the system meet the required measurements?

If **YES**, then continue with Step 4.
If **NO**, then proceed to **TAP-102**.

4. Is your system used for *linear* configurations or *ring* configurations?

If **linear**, then continue with Step 5.
If **ring**, then proceed to Step 21.

5. At the CO equipment (either *SLC-2000* system or *DDM-2000*) and RT, remove the optical loops from the **OLIUs** in the optical span being established.



NOTE:

This will cause the **Critical** and **NE Activity** alarms to light.

6. Does your system use **21G** OLIUs?

If **YES**, then continue with Step 7.
If **NO**, then proceed to Step 10.

7. Set the option switches on the **21G OLIUs** to agree with the loss of the optical facility.

DLP-504

8. Did you have to change any option switch settings?

If **YES**, then continue with Step 9.
If **NO**, then proceed to Step 10.

DO ITEMS BELOW IN ORDER LISTED FOR DETAILS, GO TO

9. After changing the option settings and installing the OLIU, press the **Update** button on the UIP.

-
10. Connect the optical span being established to the multiplexer **OLIUs** at each end. DLP-511

Comment: All alarms clear. The SONET subsystem will display **Minor, NE Activity, and FE Activity** alarms if the function groups (A and C) are not equipped for the same service capabilities at both ends. To clear this alarm condition, install or remove the appropriate circuit packs in function group A or C at the *SLC-2000 RT* or far end *DDM-2000*.

-
11. Is the CIT located locally or at a remote location?

If **locally**, then continue with Step **12**.

If **remote location**, then proceed to Step **13**.

-
12. Using a CIT at both the COT and RT, log in to the SONET subsystem as a privileged user. DLP-521

Proceed to Step **14**.

-
13. Using the CIT at the remote location, log in to the SONET subsystem as a privileged user at the COT and perform Step **14**. DLP-541
Log in to the SONET subsystem as a privileged user at the RT and repeat Step **14**.

-
14. Using the CIT at both the COT and RT, enter the following message:

set-fecom:dcc-all and press the Enter key

At the **Communications =** prompt, enter: **enable**

At the **NS/US =** prompt, press the Enter key

At the **Execute?** prompt, enter: **Y**

DO ITEMS BELOW IN ORDER LISTED FOR DETAILS, GO TO

⇒ **NOTE:**
After enabling communications at one end only, the **FAULT** LED on the **OHCTL** flashes. If it does not flash, use the **rtrv-fecom** command to ensure that communications are enabled. Ignore other alarms.

⇒ **NOTE:**
Within 1 minute after both ends are enabled, all alarms should clear.

-
15. Do you have a **Major** alarm and a **FAULT** LED lighted on the **SYSCTL** and/or **OHCTL**?

If **YES**, then continue with Step 16.

If **NO**, then proceed to Step 17.

⇒ **NOTE:**
When the *SLC-2000* COT and RT are connected to the network, you may have the alarms indicated above that are caused by a duplicated site/ne address, TBOS display, or TID.

-
16. At the CIT, enter the **rtrv-alm** command to look for a problem caused by a duplicated site/ne address, TBOS display, or TID. Go to **DLP-517** to clear this trouble by changing the appropriate setting.

-
17. At both the CO and RT, remove both **TGS** circuit packs and determine if the timing mode is set as indicated by the work order.

⇒ **NOTE:**
The **TGS** option switches are probably set for *free running*. Before the end-to-end services are established, the specified timing mode (loop timing at the RT) must be set on the **TGS** packs.

-
18. Are the timing mode options set as indicated by the work order?

If **NO**, then continue with Step 19.

If **YES**, then proceed to Step 20.

DO ITEMS BELOW IN ORDER LISTED FOR DETAILS, GO TO

19. Set the timing mode as indicated by the work order. Reinstall the circuit packs and press the **SYSC TL UPD/INIT** button. DLP-503

Go to Step 36.



NOTE:

If the option switch setting is changed, an update must be done by momentarily depressing the **SYSC TL UPD/INIT** button after the **TGS** packs are reinstalled.



NOTE:

After pressing the **SYSC TL UPD/INIT** button, it may take up to 2 minutes for transient alarms to clear.



NOTE:

See your local company documentation for specific option settings. In some cases, special arrangements have been made with specific companies to include their option settings as an appendix to this document.

-
20. After determining that timing mode options do **not** need to be changed, reinstall the circuit pack. **Go to Step 40.**
-

21. Choose the first optical span to establish.



NOTE:

A ring configuration requires that the **MAIN 1 OLIU** at one shelf (node) connects to the **MAIN 2 OLIU** at an adjacent shelf (node). See Figure 1. The procedure to establish the ring configuration starts from one node and continues to an adjacent node, then continues to the next node until the final connection is made from the last node back to the first node. This procedure is used at a *SLC-2000* ring node.

-
22. At the near end, remove the optical loop from *ONE OLIU* (for example, **MAIN 2**) associated with the optical span being established. At the other end, remove the optical loop from the associated **OLIU** (for example, **MAIN 1**) in the optical span being established.



NOTE:

This will cause the **Minor**, **Attention**, and **NE Activity** alarms to light and the **OLIU FAULT** LED to start flashing.

DO ITEMS BELOW IN ORDER LISTED FOR DETAILS, GO TO

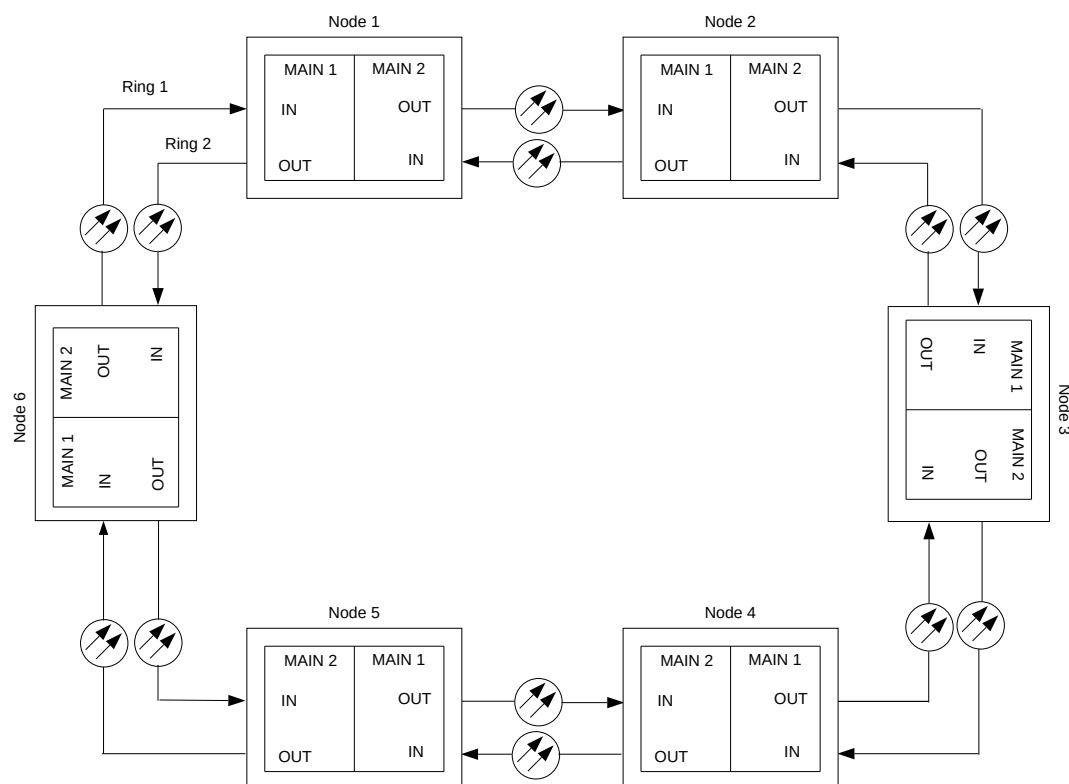


Figure 1 – Example Ring Configuration Connections

23. Connect the optical fibers and verify the integrity of the optical span being established. DLP-519

24. When the *SLC-2000* system is connected to the network, do you have a **Major** alarm and a **FAULT** LED lighted on the **SYSCTL** and/or **OHCTL**?

If **YES**, then continue with Step 25.

If **NO**, then proceed to Step 26.



NOTE:

When the *SLC-2000* system is connected to the network, you may have the alarms indicated above that are caused by a duplicated site/ne address, TBOS display, or TID.

DO ITEMS BELOW IN ORDER LISTED FOR DETAILS, GO TO

25. At the CIT, enter the **rtrv-alm** command to look for a problem caused by a duplicated site/ne address, TBOS display, or TID. Go to **DLP-517** to clear this trouble by changing the appropriate setting.

-
26. Remove both **TGS** circuit packs and determine if the timing mode is set as indicated by the work order.

⇒ **NOTE:**
The **TGS** option switches are probably set for *free running*. Before the end-to-end services are established, the specified timing mode (loop timing at the RT) must be set on the **TGS** packs.

-
27. Are the timing mode options set as indicated by the work order?

If **NO**, then continue with Step **28**.

If **YES**, then proceed to Step **29**.

-
28. Set the timing mode as indicated by the work order. Reinstall the circuit packs and press the **SYSCTL UPD/INIT** button. DLP-503
Go to Step 30.

⇒ **NOTE:**
If the option switch setting is changed, an update must be done by momentarily depressing the **SYSCTL UPD/INIT** button after the **TGS** packs are reinstalled.

⇒ **NOTE:**
After pressing the **SYSCTL UPD/INIT** button, it may take up to 2 minutes for transient alarms to clear.

⇒ **NOTE:**
See your local company documentation for specific option settings. In some cases, special arrangements have been made with specific companies to include their option settings as an appendix to this document.

DO ITEMS BELOW IN ORDER LISTED FOR DETAILS, GO TO

29. After determining that timing mode options do **not** need to be changed, reinstall the circuit pack.

30. Is the CIT located locally or at a remote location?

If **locally**, then continue with Step **31**.

If **remote location**, then proceed to Step **32**.

31. Using a CIT at both the COT and RT, log in to the SONET subsystem as a privileged user.

DLP-521

Proceed to Step **33**.

32. Using the CIT at the remote location, log in to the SONET subsystem as a privileged user at the COT and perform Step **33**. Log in to the SONET subsystem as a privileged user at the RT and repeat Step **33**.

DLP-541

DO ITEMS BELOW IN ORDER LISTED FOR DETAILS, GO TO

33. Do one of the following depending on the OLIU:

If span being connected at this time is on an ...	Then do the following ...
M1 OLIU	Using the CIT, enter the following message: set - fecom: dcc - m1 At the Communications = prompt, enter: enable At the NS/US = prompt, enter: NS or US , as appropriate At the Execute? prompt, enter: Y
M2 OLIU	Using the CIT, enter the following message: set - fecom: dcc - m2 At the Communications = prompt, enter: enable At the NS/US = prompt, enter: NS or US , as appropriate At the Execute? prompt, enter: Y

34. While accessing the SONET subsystem, execute the command **set - ne** and proceed as follows:

- At the **TID [Site#NE#]** = prompt, enter the TID from the work order if different from the default TID and press **Return**.
- At the **GNE []** = prompt, press **Y Return** for node connected to surveillance center, or press **Return** for all other nodes.
- At the **DCCMode [identical]** = prompt, enter **distinct** and then press **Return**.



NOTE:

The system will reset and within 3 minutes all alarms clear.

DO ITEMS BELOW IN ORDER LISTED FOR DETAILS, GO TO

35. Have you established both optical spans connected to the SLC-2000 RT (the span for the other adjacent SONET terminal)?

If **NO**, then continue with Step **36**.

If **YES**, then proceed to Step **37**.

-
36. Choose the other optical span to be established and **return to Step 22**.
-

37. Using the CIT, enter **rtrv-sync** to ensure that all SONET nodes in a ring configuration are connected before services are established and all *LineTimed* SONET ring nodes are using the default synchronization (source=main-1, modeswitch=revertive).
-

38. Are SONET nodes correctly set?

If **NO**, then continue with Step **39**.

If **YES**, then proceed to Step **40**.

-
39. Set the nodes using the **set-sync** commands.



NOTE:

Use document 363-208-003, *SLC-2000 Access System, Commands and Messages*, for the correct command format.

40. Install STS-1 or VT1.5 cross-connections per work order.



NOTE:

DLP-520 provides cross-connect philosophies for ring applications.

41. (See Caution.) At the RT, test the power minor alarm by turning AC circuit breaker(s) off. It may take 5 minutes (or longer) for the **Power Minor** alarm to activate.

Response: The **Power Minor** and **NE Activity** LEDs light. The central office DDM-2000 reports a power minor (or major if provisioned for major) RT alarm.



CAUTION:

This step should only be performed if the RT is equipped with backup battery. Turning off AC power will interrupt service if battery backup is not available.

DO ITEMS BELOW IN ORDER LISTED FOR DETAILS, GO TO

42. Was the response met?

If **NO**, then continue with Step **43**.

If **YES**, then proceed to Step **44**.

43. Clear the trouble using local procedures.

44. Restore AC power.

45. Do you need to set user provisionable options on your system (for example, performance monitoring options)?

If **YES**, then continue with Step **46**.

If **NO**, then proceed to Step **47**.

46. See Note. Set user provisionable options on your system.



NOTE:

See your local company documentation for specific option settings. In some cases, special arrangements have been made with specific companies to include their option settings as an appendix to this document.

47. Refer to *MDS Turnup* and *Circuit Order Tabs* when required. The system is now ready for initial metallic distribution shelf turnup and/or DS1 service to be established.

STOP. YOU HAVE COMPLETED THIS PROCEDURE.

Establish *SLC*[®]-2000 System with Metallic Feeders Interfacing Through LIUs (Release 3.1, 3.2, or 3.3)

DO ITEMS BELOW IN ORDER LISTED FOR DETAILS, GO TO

Summary: The following SONET subsystem circuit packs are required for metallic feeder operation:

- SYSCTL
- OHCTL.

This procedure allows the *SLC*-2000 system to be equipped with metallic feeders. You must first install the OHCTL and SYSCTL circuit packs then verify that the software in the SMU is the correct version.

Prerequisite: Before starting this procedure, you must have the following information:

- **SYSCTL Selectable Options:**
 - TBOS display number
 - Site ID number
 - Power Minor alarm options.
- **OHCTL Selectable Options:**
 - Network Element number.

Also, the SMU and PDC installation must be complete before performing this procedure. If the SMU and PDC installations have ***not*** been performed, go to **ARM Shelf Turnup: NTP-010**, "Install User Interface Panel Complex Support Circuit Packs (Release 3.1, 3.2, or 3.3)."

Circuit packs should not be installed in any MDS shelf. Remove any circuit packs from the MDS assemblies.

 **CAUTION:**
When handling circuit packs, always wear an electrostatic discharge wrist strap connected to an ESD ground jack on the user interface panel (UIP).

DO ITEMS BELOW IN ORDER LISTED FOR DETAILS, GO TO

 **CAUTION:**
Take care to avoid damaging the LEDs that protrude through the openings in the faceplate of the circuit packs during handling and circuit pack installation.

 **NOTE:**
The SYSCTL and OHCTL circuit packs each have option switches that must be set before circuit pack installation. Option switch settings are listed in the "Detailed Level Procedures (DLPs)" tab of this document. (See references in the procedure.)

1. Set option switches and install the **BBG7 OHCTL** circuit pack in the ARM shelf. DLP-501

 **NOTE:**
OHCTL **FAULT** LED is lighted.

 **NOTE:**
See your local company documentation for specific option settings. In some cases, special arrangements have been made with specific companies to include their option settings as an appendix to this document.

-
2. Set option switches and install the **BBG5 SYSCTL** circuit pack in the ARM shelf. DLP-502

 **NOTE:**
SYSCTL **FAULT** LED is off. OHCTL **FAULT** LED cycles on and off. **Major**, **NE Activity**, and **Attention** LEDs on the UIP are lighted.

 **NOTE:**
See your local company documentation for specific option settings. In some cases, special arrangements have been made with specific companies to include their option settings as an appendix to this document.

DO ITEMS BELOW IN ORDER LISTED FOR DETAILS, GO TO

3. At the UIP, press the Scroll Menu up or down arrow button until **RETRIEVE-PROG-VRSN<ent>** is displayed and press **ENTER**. Press the Scroll Menu down arrow button until SMU:DLC version is displayed. Verify that the version is 3.01.00 or later. A typical readout will look something like this:

Sys:DLC R3.01.00



NOTE:

Refer to **DLP-500** for more information on how to use the UIP commands.

-
4. Does the SMU contain the correct version of software?
If **NO**, continue with Step 5.
If **YES**, **STOP. YOU HAVE COMPLETED THIS PROCEDURE.**
-

5. Perform one of the following items:
 - Replace the SMU with an SMU circuit pack that contains the correct software version.
 - Using a PC, download the correct software version into the SMU. Refer to **DLP-524** for information on upgrading SMU software.

Equip Bandwidth Management Complex Circuit Packs for *SLC*[®]-2000 Systems Configured with Metallic Feeders (Release 3.2 or 3.3)

DO ITEMS BELOW IN ORDER LISTED FOR DETAILS, GO TO

Summary: Equipping the bandwidth management complex consists of installing the time slot interchange (TSI) circuit packs.

 **CAUTION:**
When handling circuit packs, always wear an electrostatic discharge wrist strap connected to an ESD ground jack on the user interface panel (UIP).

 **CAUTION:**
Take care to avoid damaging the LEDs that protrude through the openings in the faceplate of the circuit packs during handling and circuit pack installation.

1. Obtain two **BDK[®]250 TSI** circuit packs to install in the bandwidth management complex of the ARM shelf.

-
2. On each **TSI**, verify that the daughter board is properly seated.
-

3. Install a **BDK250 TSI** in **CORE (1) STU/TSI** slot and verify that the **FAULT** LED lights and then goes off and the **ACTIVE** LED lights.

 **NOTE:**
If the **TSI FAULT** LED is flashing (indicating software is being installed from the SMU), you will not see the proper responses until after the software is installed and the **FAULT** LED stops flashing.

 **NOTE:**
After 1 minute, **Minor**, **Attention**, and **NE Activity** LEDs light on the user interface panel (UIP). Ignore transient alarms.

DO ITEMS BELOW IN ORDER LISTED FOR DETAILS, GO TO

4. Did the **FAULT** LED light and then go off and the **ACTIVE** LED light?

If **NO**, continue with Step 5.

If **YES**, go to Step 6.

-
5. Obtain a new **BDK250 TSI** and ensure that the daughter board is properly seated. **Return to Step 3.**
-

6. Wait 5 minutes for data transfer and perform the LED test. DLP-507
-

7. Install a **BDK250 TSI** in **CORE (2) STU/TSI** slot and verify that the **FAULT** LED lights and then goes off.



NOTE:

If the **TSI FAULT** LED is flashing (indicating software is being installed from the SMU), you will not see the proper responses until after the software is installed and the **FAULT** LED stops flashing.



NOTE:

After installing the second TSI, one of the following may happen:

- All alarms clear (continue with the next step).
- The **Critical**, **Attention**, and **NE Activity** LEDs are lighted and the fault list contains system data memory fault message indicating the system needs to be initialized. This will clear when the system is initialized in Step **11** (continue with the next step).

-
8. Did the **FAULT** LED light and then go off?

If **NO**, continue with Step 9.

If **YES**, go to Step 10.

-
9. Obtain a new **BDK250 TSI** and ensure that the daughter board is properly seated. **Return to Step 7.**
-

10. Wait 5 minutes for data transfer and perform the LED test. DLP-507

DO ITEMS BELOW IN ORDER LISTED FOR DETAILS, GO TO

11. Initialize the system as follows:

At the UIP, press **Escape** then the **Scroll Menu** up or down arrow push button until **INITIALIZE-SYSTEM <ent>** is displayed. Then press **Enter**. When **CONFIRM? Y<ent> N<esc>** is displayed, press **Enter**.



CAUTION:

*The **INITIALIZE-SYSTEM** UIP command must be executed after the **PDC**, **SMU**, and **TSIs** have been installed and before any **LIU** or **MDC** circuit packs are installed. This UIP command will be denied if any **LIU** or **MDC** packs are installed.*



NOTE:

INITIALIZE-SYSTEM done is displayed after about 5 seconds and all alarms clear.



NOTE:

The **Minor**, **Attention**, and **NE Activity** LEDs remain lighted if the SONET cross-connections have been changed from the default settings.

-
12. Wait 2 minutes after all transient alarms clear and then press the **LED Test** UIP push button. Verify that all LEDs light on both **TSIs**.
-

13. Do all LEDs light on both TSI circuit packs?

If **NO**, continue with **Step 14**.

If **YES**, go to **Step 15**.

-
14. Replace the TSI that contains an LED that is not lighted.
Continue with Step 15.
-

15. Make **CORE (2)** the active core as follows:

At the UIP, press **Escape** then the **Scroll Menu** up or down arrow push button until **SWITCH-CORE <ent>** is displayed. Then press **Enter**. Press the **Scroll Menu** up or down arrow push button until **SWITCH-CORE: FORCE->2 <ent>** is displayed. Then press **Enter**. When **CONFIRM? Y<ent> N<esc>** is displayed, press **Enter**.

DO ITEMS BELOW IN ORDER LISTED FOR DETAILS, GO TO

⇒ **NOTE:**
TSI ACTIVE LED lights in **CORE (2)**. The **MN, Abnormal,**
and **NE Activity** LEDs light and the **SW-CORE: FORCE->2**
done is displayed.

16. Use the **SWITCH-CORE** command and select the **RESET** option to reset the bandwidth management core protection switching state as follows:

Press **Escape** then the **Scroll Menu** up or down arrow push button until **SWITCH-CORE <ent>** is displayed. Then press **Enter**. Press the **Scroll Menu** up or down arrow push button until **SWITCH-CORE: RESET <ent>** is displayed. Then press **Enter**. When **CONFIRM? Y<ent> N<esc>** is displayed, press **Enter**.

⇒ **NOTE:**
The reset causes the system to work on CORE 2 and a switch to CORE 1 will not occur unless trouble is detected.

⇒ **NOTE:**
All alarms clear and **SW-CORE: RESET done** is displayed.

17. Wait 2 minutes for the system to stabilize, then make **CORE (1)** the active core as follows:

At the UIP, press **Escape** then the **Scroll Menu** up or down arrow push button until **SWITCH-CORE <ent>** is displayed. Then press **Enter**. Press the **Scroll Menu** up or down arrow push button until **SWITCH-CORE: FORCE->1 <ent>** is displayed. Then press **Enter**. When **CONFIRM? Y<ent> N<esc>** is displayed, press **Enter**.

⇒ **NOTE:**
TSI ACTIVE LED lights in **CORE (1)**. The **MN, Abnormal,**
and **NE Activity** LEDs light and the **SW-CORE: FORCE->1**
done is displayed.

DO ITEMS BELOW IN ORDER LISTED FOR DETAILS, GO TO

18. Use the **SWITCH-CORE** command and select the **RESET** option to reset the bandwidth management core protection switching state as follows:

Press **Escape** then the **Scroll Menu** up or down arrow push button until **SWITCH-CORE <ent>** is displayed. Then press **Enter**. Press the **Scroll Menu** up or down arrow push button until **SWITCH-CORE: RESET <ent>** is displayed. Then press **Enter**. When **CONFIRM? Y<ent> N<esc>** is displayed, press **Enter**.

⇒ **NOTE:**
The reset causes the system to work on CORE 2 and a switch to CORE 1 will not occur unless trouble is detected.

⇒ **NOTE:**
All alarms clear and **SW-CORE: RESET done** is displayed.

-
19. Wait 2 minutes for the system to stabilize.

-
20. Determine if your system is an RT or COT and set the system as follows:

At the UIP, press **Escape** then the **Scroll Menu** up or down arrow push button until **SET-NE <ent>** is displayed. Then press **Enter**. Press the **Scroll Menu** up or down arrow push button until one of the following commands is displayed depending on your system type:

- For COT: **SET-NE: COT <ent>**
- For RT: **SET-NE: RT <ent>**

Then press **Enter**. When **CONFIRM? Y<ent> N<esc>** is displayed, press **Enter**.

-
21. Do any alarms exist on the system?

If **YES**, continue with Step 22.
If **NO**, go to Step 23.

-
22. Clear alarms using **TAP-102** or local procedures. After alarms are cleared, **continue with Step 23**.

DO ITEMS BELOW IN ORDER LISTED FOR DETAILS, GO TO

23. Wait 5 minutes for data transfer and perform the LED test. DLP-507

24. Using the CIT and while accessing the SONET subsystem, execute the command **set -ne** and proceed as follows:

- At the **TID [Site#NE#]** = prompt, press **Return**.
- At the **GNE [no]** = prompt, enter **yes** for node connected to surveillance center, or enter **no** for all other nodes, and then press **Return**.
- *For Linear configuration*, at the **CrsMode [default]** = prompt, press **Return**.
- *For Ring configuration*, at the **DCC Mode [distinct]=** prompt, press **Return** or select **[identical]** and press **Return**.
- At the **Execute? . . .** prompt, type **y** for yes and press **Return**.

 **NOTE:**
The system will reset and within 3 minutes all alarms clear.

STOP. YOU HAVE COMPLETED THIS PROCEDURE.

Install Line Interface Unit (LIU) for Metallic Feeders (Release 3.1, 3.2, or 3.3)

DO ITEMS BELOW IN ORDER LISTED FOR DETAILS, GO TO

Summary: This procedure gives the steps for installing the LIUs for metallic feeders in the ARM shelf.



CAUTION:

When handling circuit packs, always wear an electrostatic discharge wrist strap connected to an ESD ground jack on the user interface panel (UIP).



CAUTION:

Take care to avoid damaging the LEDs that protrude through the openings in the faceplate of the circuit packs during handling and circuit pack installation.

1. Verify that the procedures to equip the bandwidth management complex **ARM Shelf Turnup: NTP-017** have been done.
-
2. On the UIP, press **Escape** then the **Scroll Menu** up or down arrow button until **SET FEEDER <ent>** is displayed, then press **Enter**. Press the **Scroll Menu** up or down arrow button until **LIU <ent>** is displayed, then press **Enter**.

When **CONFIRM? Y<ent> N<esc>** is displayed, press **Enter**.



NOTE:

SET-FEEDER:LIU done is displayed.

-
3. Using the work order, choose the first **VTU/LIU** slot (slots **1** through **P**) in which to install an LIU.
-
4. Install the LIU in the **VTU/LIU** slot chosen.



NOTE:

The **FAULT** LED on the **LIU** flashes for less than 2 minutes (per pack) when installed.

DO ITEMS BELOW IN ORDER LISTED FOR DETAILS, GO TO

5. After 2 minutes, does the LIU's **FAULT** LED remain lighted?

If **YES**, continue with Step 6.

If **NO**, go to Step 7.

-
6. Remove the LIU with the lighted **FAULT** LED and obtain a new LIU. **Return to Step 4.**
-

7. Using the work order, have all LIUs been installed?

If **NO**, continue with Step 8.

If **YES**, go to Step 9.

-
8. Using the work order, choose the next **VTU/LIU** slot in which to install an LIU. **Return to Step 4.**
-

9. Are there empty **VTU/LIU** slots?

If **YES**, continue with Step 10.

If **NO**, go to Step 11.

-
10. Install BBG268 retainer card in any empty **VTU/LIU** slot.



NOTE:

BBG268 retainer cards must be installed in all unused **VTU/LIU** slots for LIU protection switching to operate properly. If the retainer cards are not used, transmission may be corrupted.

-
11. Are there DS1 alarms on the system?

If **YES**, continue with Step 12.

If **NO**, go to Step 13.

-
12. At the UIP, press the **Update** key. **Wait for transient alarms to clear.**



NOTE:

The **Minor**, **Attention**, and **NE Activity** alarms will clear after all the **LIUs** are connected end to end. On the UIP, **MN: Is-a-x rcvd bad clock** will be displayed for each LIU that is not connected.

DO ITEMS BELOW IN ORDER LISTED FOR DETAILS, GO TO

13. Perform an LED test.

DLP-507



NOTE:

The system is now ready for initial Metallic Distribution Shelf turnup.

STOP. YOU HAVE COMPLETED THIS PROCEDURE.

Install User Interface Panel Complex Support Circuit Packs (Release 4.0 or Later)

Summary: Use this procedure to install the UIP complex circuit packs when the system uses Software Release 4.0 or later. First, install the PDC circuit pack. Next, install the SMU and verify that the software release of the SMU matches the software release of the PDC. Then disable the SMU using the UIP. After disabling the SMU, perform an LED test from the UIP. If needed, install the LAN circuit pack and perform the LED test again. Continue with the next turnup procedure depending on your system and type of service.



CAUTION:

When handling circuit packs, always wear an electrostatic discharge wrist strap connected to an ESD ground jack on the user interface panel (UIP).



CAUTION:

Take care to avoid damaging the LEDs that protrude through the openings in the faceplate of the circuit packs during handling and circuit pack installation.

DO ITEMS BELOW IN ORDER LISTED FOR DETAILS, GO TO

1. Install the **BBF241 PDC** in the **PDC** slot in the ARM shelf. Verify that the **FAULT** LED lights then goes off within 5 minutes. Proceed as follows:

If the PDC FAULT LED ...	Then ...
Lights then goes off	Continue with Step 2 .
Does <i>not</i> light	Check the -48V/2A-UIP fuse. <i>If the fuse is good</i> , replace the PDC and continue with Step 2 . <i>If the fuse is bad</i> , replace the fuse and continue with Step 2 .
Flashes or remains on	This indicates the PDC needs software to be installed from the SMU. It will stop flashing or go off once the SMU is installed and enabled. Continue with Step 2 .



NOTE:

The **Major**, **NE Activity**, and **Abnormal** LEDs light within 5 minutes and remain lighted until the SONET or metallic feeder subsystem is equipped. The **Attention** LED lights and remains lighted whenever there is an active alarm.

DO ITEMS BELOW IN ORDER LISTED FOR DETAILS, GO TO

2. Install the **BBF261 SMU** in the **SMU** slot in the ARM shelf. Verify the following:
 - **FAULT** and **DSBLD** LEDs of the **SMU** light, then go off within 5 minutes.
 - **FAULT** LED of the **PDC** lights, then goes off within 5 minutes.
 - UIP panel LEDs light, then go off within 2 minutes.

⇒ **NOTE:**
The **DSBLD** LED will remain lighted if the software release on the SMU does not match the software release on the PDC. This condition will cause the **Abnormal** LED on the UIP to light. The **DSBLD** LED will go off once the **SMU** is enabled or if the **SMU** software load matches the **PDC** software load.

-
3. Does the SMU **FAULT** LED remain lighted?

If **YES**, continue with Step 4.
If **NO**, go to Step 5.

-
4. Replace the SMU. ***Repeat from Step 3.***
-

5. Does the PDC **FAULT** LED flash slowly?

If **YES**, continue with Step 6.
If **NO**, go to Step 7.

⇒ **NOTE:**
If the PDC light flashes slowly, there could be an incompatibility between the software load on the SMU and the type of PDC installed (that is, a BBF240 or a BBF241), and there is no software load on the PDC.

-
6. Replace the PDC. ***Repeat from Step 5.***
-

7. After the SMU and PDC have powered up and reset or loaded, is the **DSBLD** LED on the SMU off?

If **YES**, go to Step 9.
If **NO**, continue with Step 8.

DO ITEMS BELOW IN ORDER LISTED FOR DETAILS, GO TO

8. At the UIP, press **Escape** then the **Scroll Menu** up or down arrow push button until **SET-STATE-SMU <ent>** is displayed. Then press **Enter**. Press the **Scroll Menu** up or down arrow push button until **SET-SMU: DISABLED <ent>** is displayed. Then press **Enter**. When **CONFIRM? Y<ent> N<esc>** is displayed, press **Enter**.

Response: **SMU DSBLD** LED goes off and **PDC FAULT** LED flashes. The UIP displays **PDC awaiting SW** for approximately 5 minutes and then displays **MN:NE:pdv unavail**. The **PDC FAULT** LED goes off when the software is finished loading and the UIP **Major** and **NE Activity** LEDs are lighted.

9. At the UIP, press the **LED Test** push button. Verify that the following light:
 - All UIP LEDs and display segments
 - **PDC FAULT** LED
 - **SMU FAULT** and **DSBLD** LEDs.

Proceed with this procedure as follows:

If all LEDs ...	And the PDC has ...	Then ...
Do <i>not</i> light	Not been replaced	Replace the PDC and repeat this step .
	Been replaced	Check the wiring using schematic diagrams, check the fuses, or replace the UIP display [DLP-518]. Continue with Step 10 after correcting the problem.
Light	—	Continue with Step 10 .

DO ITEMS BELOW IN ORDER LISTED FOR DETAILS, GO TO

10. Do you need to install the LAN circuit pack?

If **YES**, continue with Step **11**.

If **NO**, go to Step **15**.

11. Install a BBF250 LAN circuit pack in the LAN slot.



NOTE:

The **FAULT** LED and, in some situations, the **ACTIVE** LED on the LAN circuit pack light and then go off within 5 minutes. Ignore transient alarms.



NOTE:

The PDC **FAULT** LED and SMU **FAULT** and **DSBLD** LEDs light, then clear within 5 minutes.

12. At the UIP, press the **LED Test** push button. Verify that all LEDs on the following circuit packs light:

- **SMU**
- **PDC**
- **LAN.**

13. Do all LEDs on the SMU, PDC, and LAN circuit packs light when the **LED Test** button is pushed?

If **YES**, go to Step **15**.

If **NO**, continue with Step **14**.

14. Replace a circuit pack if any LEDs (on the pack) do not light.

15. If needed, return the UIP display to the Main Menu by pressing the **Escape** button.

STOP. YOU HAVE COMPLETED THIS PROCEDURE.

Equip *SLC*[®]-2000 SONET OC-3 Subsystem (Looped Back) (Release 4.0 or Later)

DO ITEMS BELOW IN ORDER LISTED FOR DETAILS, GO TO

Summary: Use this procedure to install the SONET subsystem circuit packs. First, begin by verifying that the fuses are installed in the ARM shelf and that **NTP-019** has been performed to install the UIP complex support circuit packs. Then, install the OHCTL and SYCTL and ensure that all alarms have cleared. Next, install the TGS and OLIU plug-ins. Log in to the SONET subsystem and disable the DCC channel and install the OLIU optical loops. Then install the MXRVOs depending on the type of service used. Perform an LED test and check the protection switching function. Verify that the SMU contains the correct version of software. And finally, confirm that the SMU is enabled.

Prerequisites:

- For Software Release 4.0 or 4.1, before starting this procedure, you must know the TBOS display number/TBOS address, the Site ID number, and the Power Minor alarm options (selectable options on the **BBG5 SYCTL**). You must also know the Network Element number (selectable options on the **BBG7 OHCTL**).
- In this procedure it is assumed that all hardwired installation and testing of the unequipped *SLC*-2000 access resource manager (ARM) shelf has been done. It is also assumed that power is applied to the shelf (**Power** LED lighted on user interface panel).



CAUTION:

Unterminated optical connectors may emit invisible laser radiation. Eye damage may occur if beam is viewed directly or with improper optical instruments. Avoid direct exposure to the beam.



CAUTION:

When handling circuit packs, always wear an electrostatic discharge wrist strap connected to an ESD ground jack on the user interface panel (UIP).



CAUTION:

Take care to avoid damaging the LEDs that protrude through the openings in the faceplate of the circuit packs during handling and circuit pack installation.

DO ITEMS BELOW IN ORDER LISTED FOR DETAILS, GO TO

⇒ **NOTE:**
Many of the plug-ins (SYSCTL, BBG7 OHCTL, DS1) have numerous option switches that must be set before they are installed.

1. Verify that the fuses have been installed in the ARM shelf.

-
2. Verify that the procedure to install user interface panel complex support circuit packs (**ARM Shelf Turn-Up:NTP-019**) has been performed.

⇒ **NOTE:**
The **PDC** circuit pack must be installed for the SONET subsystem to activate UIP alarms.

⇒ **NOTE:**
When the **PDC** and **SMU** are installed, there may be **Attention, Major, and NE Activity** alarms until the **SYSCTL** circuit pack is installed.

-
3. DLP-501

⇒ **NOTE:**
The **BBG9 OHCTL** is required for SONET Software Releases 9.0 (R9.0) and later; whereas, the **BBG7 OHCTL** is required for SONET Releases prior to R9.0.

Set options, if necessary, and install the **OHCTL** plug-in.

⇒ **NOTE:**
FAULT LED stays lighted.

⇒ **NOTE:**
See your local company documentation for specific option settings. In some cases, special arrangements have been made with specific companies to include their option settings as an appendix to this document.

-
4. Is system to be equipped with SONET Software Release 9.0 or later?

If **NO**, then continue with Step 5.
If **YES**, then proceed to Step 6.

DO ITEMS BELOW IN ORDER LISTED FOR DETAILS, GO TO

5. Set options and install the **BBG5 SYSCTL** plug-in. DLP-502



NOTE:

See your local company documentation for specific option settings. In some cases, special arrangements have been made with specific companies to include their option settings as an appendix to this document.

Proceed to Step 7.

-
6. Set options and install the **BBG8 SYSCTL** plug-in. DLP-534



NOTE:

See your local company documentation for specific option settings. In some cases, special arrangements have been made with specific companies to include their option settings as an appendix to this document.

-
7. Do all alarms clear after **SYSCTL** plug-in is installed and initialized?

If **NO**, then continue with Step 8.

If **YES**, then proceed to Step 9.

-
8. Load the software using procedures found in document 363-208-023, *SLC-2000 Access System Software Release Description*. This document also contains information on compatible software releases.

-
9. (See Notes.) Option (select *free running* option) and install **TGS** timing plug-ins. DLP-503



NOTE:

To avoid timing alarms before the end-to-end OC-3 system has been established, the **TGS** option switches must be *temporarily* set to *free running*.

DO ITEMS BELOW IN ORDER LISTED FOR DETAILS, GO TO

10. Install **OLIUs**.

⇒ **NOTE:**
22F OLIUs are required for DS1 taper/drop (partial function group VT1 cross-connections) and ring configurations. For other configurations [point-to-point or STS-1 (whole function group) taper/drop cross-connections] either **22F** or **21G OLIUs** can be used. If **21G OLIUs** are used, the **HIGH/LOW POWER** switch is set to **LOW** for shelf loopback.

⇒ **NOTE:**
After installing the OLIUs, both **ACTIVE** LEDs are lighted and both **FAULT** LEDs flash on the **OLIUs**.

For Point-to-Point or Taper configurations (SONET 6.2.2 or later), the **Critical** and **NE Activity** alarms are activated.

For Ring configurations (SONET 7.1.2 or later), **Major** or **Minor** and **NE Activity** alarms may be activated.

-
11. Install **OLIU** optical loops. DLP-505

⇒ **NOTE:**
FAULT LEDs on **OLIU** stop flashing.

-
12. Is the CIT located locally or at a remote location?

If **locally**, then continue with Step **13**.

If **remote location**, then go to Step **14**.

-
13. Using a CIT, log in to the SONET subsystem as a privileged user. DLP-525

⇒ **NOTE:**
The default login is **LUC01**, **LUC02**, or **LUC03** and the default password is **SLC-2000**.

Proceed to Step **15**.

-
14. Using the CIT at the remote location, log in to the SONET subsystem as a privileged user. DLP-541

⇒ **NOTE:**
The default login is **LUC01**, **LUC02**, or **LUC03** and the default password is **SLC-2000**.

DO ITEMS BELOW IN ORDER LISTED FOR DETAILS, GO TO

15. At the CIT, disable the DCC channel by doing the following:

While accessing the SONET subsystem, enter:

set-fecom:dcc-all

At the **Communications [CurrentValues]** = prompt, enter:

disable

At the **NS/US [CurrentValues]** = prompt, press **RETURN**.

At the **Execute?** prompt, enter: **Y**

Response: The CIT displays:

```
set-fecom:dcc-all COMPLD
*/
dcc-a slot not equipped properly -- provisioning unchanged
dcc-b slot not equipped properly -- provisioning unchanged
dcc-c slot not equipped properly -- provisioning unchanged
/*
```

⇒ **NOTE:**
Critical and **NE Activity** remain lighted. For ring applications, **Major** or **Minor** and **NE Activity** LEDs remain lighted.

Reference: Refer to **DLP-525** or **DLP-541** for more information on establishing a CIT session.

-
16. Will the ARM shelf be used for DS1 services (Function Group C) **only?**

If **NO**, then continue with Step 17.

If **YES**, then proceed to Step 19.

-
17. Install **BBG2 MXRVO** plug-ins in Function Group A **FUNCTION(A) 1** then **FUNCTION(A) 2** slots.

⇒ **NOTE:**
For **FUNCTION(A) 1** slot, the **MXRVO FAULT** lights for less than 30 seconds and then goes off. The **ACTIVE** LED lights.
For **FUNCTION(A) 2** slot, the **MXRVO FAULT** lights for less than 30 seconds and then goes off.

DO ITEMS BELOW IN ORDER LISTED FOR DETAILS, GO TO

18. Will the ARM shelf be used for DS1 services (Function Group C)
(refer to office records)?

If **YES**, then continue with Step **19**.

If **NO**, then proceed to Step **20**.

-
19. Install **BBG2 MXRVO** plug-ins in Function Group C
FUNCTION(C) 1 then **FUNCTION(C) 2** slots.



NOTE:

For **FUNCTION(C) 1** slot, the **MXRVO FAULT** lights for less than 30 seconds and then goes off. The **ACTIVE** LED lights.

For **FUNCTION(C) 2** slot, the **MXRVO FAULT** lights for less than 30 seconds and then goes off.

-
20. Perform an LED test and verify that all LEDs on all circuit packs light.	DLP-507
-

21. Test protection switching function.	DLP-509
-

22. At the UIP, press the **Scroll Menu** up or down arrow push button until **RETRIEVE-PROG-VRSN~<ent>** is displayed. Then press **Enter**. Press the **Scroll Menu** up or down arrow push button until **Sys:DLC** version is displayed. Verify that the version is **4.00.02** or later.



NOTE:

A typical readout will look something like this:

Sys:DLC R4.00.02.

The following is a list of the software release versions and the UIP readout for each one:

Release Version	UIP Readout
R4.0	Sys:DLC R4.00.02
R4.1	Sys:DLC R4.01.00
R4.2	Sys:DLC R4.02.00
R4.3	Sys:DLC R4.03.00
R4.4	Sys:DLC R4.04.00
R4.5	Sys:DLC R4.05.00
R4.6	Sys:DLC R4.06.00

DO ITEMS BELOW IN ORDER LISTED FOR DETAILS, GO TO

23. Does the **SMU** contain the correct version of software?

If **YES**, then proceed to Step **25**.
If **NO**, then continue with Step **24**.

-
24. Replace the **SMU** with one that has the correct version of software, or download the correct version of software into the **SMU** from a PC.

⇒ **NOTE:**
After the **SMU** has been downloaded, the **DISABLE** LED will light.

Refer to **DLP-524** for upgrading SMU software.

-
25. Enable the **SMU**, if necessary.

⇒ **NOTE:**
If the **PDC** contains the same software load as the **SMU**, the **SMU** will default to enabled and no further action is required.

⇒ **NOTE:**
The **PDC** will install the new software. Wait 2 minutes after the installation is completed for the system to stabilize.

Reference: Refer to **DLP-500** for more information on how to use the UIP commands.

STOP. YOU HAVE COMPLETED THIS PROCEDURE.

Equip **SLC[®]-2000** Bandwidth Management Complex Circuit Packs (Release 4.0 or Later)

DO ITEMS BELOW IN ORDER LISTED FOR DETAILS, GO TO

Summary: This procedure assumes that the system is being equipped for TR-08* or TR-303† operation (Release 4.0 or later). This procedure requires that the SONET subsystem [NTP-020] be equipped before any bandwidth management circuit packs are installed.



CAUTION:

When handling circuit packs, always wear an electrostatic discharge wrist strap connected to an ESD ground jack on the user interface panel (UIP).



CAUTION:

Take care to avoid damaging the LEDs that protrude through the openings in the faceplate of the circuit packs during handling and circuit pack installation.

1. Obtain two **BDK[®]250 TSI** circuit packs and two **BDK270 BMP** circuit packs to install in the bandwidth management complex of the ARM shelf.
2. On each **TSI**, verify that the daughter board is properly seated.
3. Install a **BDK250 TSI** in **CORE (1) TSI** slot and verify that the **FAULT** LED lights and then goes off twice within 3 minutes and the **ACTIVE** LED lights.

* Bellcore Technical Reference TR-TSY-000008, Issue 2, August 1987, *Digital Interface Between the SLC 96 Digital Loop Carrier System and a Local Digital Switch*.

† Bellcore Technical Reference TR-NWT-000303, Issue 2, December 1992, *Integrated Digital Loop Carrier System Generic Requirements, Objectives, and Interface*.

DO ITEMS BELOW IN ORDER LISTED FOR DETAILS, GO TO

4. After the **ACTIVE** LED lights on the **BDK250 TSI**, install the **BDK270 BMP** circuit pack in the **CORE(1)** slot marked **BMP**.

⇒ **NOTE:**
If the **BMP FAULT** LED is flashing fast (indicating software is being installed from the SMU), you will not see the proper responses until after the software is installed and the **FAULT** LED stops flashing.

⇒ **NOTE:**
The **Major** or **Minor**, **Attention**, and **NE Activity** LEDs light on the user interface panel (UIP). The **FAULT** LEDs on the **TSI** and **BMP** circuit packs flash slowly then fast when the software load is installing in the respective unit. The LED will remain on during the pack initialization process. The **ACTIVE** LED lights on both the **BMP** and **TSI** circuit packs. Ignore transient alarms.

-
5. Wait 5 minutes for data transfer and perform the LED test. DLP-507
-

6. Install a **BDK250 TSI** in **CORE (2) TSI** slot.
-

7. After the **TSI** software loading process is finished, install the **BDK270 BMP** circuit pack in the **CORE(2)** slot marked **BMP**.

⇒ **NOTE:**
If the **BMP FAULT** LED is flashing fast (indicating software is being installed from the SMU), you will not see the proper responses until after the software is installed and the **FAULT** LED stops flashing.

⇒ **NOTE:**
The **Major** or **Minor**, **Attention**, and **NE Activity** LEDs light on the user interface panel (UIP). The **FAULT** LEDs on the **TSI** and **BMP** circuit packs flash slowly then fast when the software is installing in the respective unit. The LED will remain on during the pack initialization process. The **ACTIVE** LED does *not* light on either the **BMP** or the **TSI** circuit pack because side 2 is on standby. Ignore transient alarms.

-
8. Wait 5 minutes for data transfer and perform the LED test. DLP-507
-

DO ITEMS BELOW IN ORDER LISTED FOR DETAILS, GO TO

9. Initialize the system as follows:

At the UIP, press **Escape** then the **Scroll Menu** up or down arrow push button until **INITIALIZE-SYSTEM <ent>** is displayed. Then press **Enter**. When **CONFIRM? Y<ent> N<esc>** is displayed, press **Enter**.



CAUTION:

*The **INITIALIZE-SYSTEM UIP** command must be executed after the **PDC**, **SMU**, and **TSI/BMPs** have been installed and before any **VTU** or **MDC** circuit packs are installed. This UIP command will be denied if any **VTU** or **MDC** packs are installed.*



NOTE:

INITIALIZE-SYSTEM done is displayed within 1 minute. The **FAULT** LED on the **OHCTL** and the **Major** and **NE Activity** UIP LEDs are lighted. The **Abnormal** LED may briefly light, then clear. To clear all alarms, log in to the CIT as a privileged user and enter the CIT SONET subsystem **set - fecom** command to disable the DCC channel and then use the **set - ne** command to set the DSNE and AGNE to yes (Y).



NOTE:

The **Major** or **Minor**, **Attention**, and **NE Activity** LEDs remain lighted.

-
10. Wait 15 minutes after all transient alarms clear and then press the **LED Test** UIP push button. Verify that all LEDs light on both **TSI/BMPs**.
-

11. Do all LEDs light on both TSI/BMP circuit packs?

If **NO**, continue with Step **12**.

If **YES**, go to Step **13**.

-
12. Replace the TSI/BMP that contains an LED that is not lighted.
Continue with Step 13.

DO ITEMS BELOW IN ORDER LISTED FOR DETAILS, GO TO

13. Make **CORE (2)** the active core as follows:

At the UIP, press **Escape** then the **Scroll Menu** up or down arrow push button until **SWITCH-CORE <ent>** is displayed. Then press **Enter**. Press the **Scroll Menu** up or down arrow push button until **SWITCH-CORE: FORCE->2 <ent>** is displayed. Then press **Enter**. When **CONFIRM? Y<ent> N<esc>** is displayed, press **Enter**.

⇒ **NOTE:**
TSI/BMP ACTIVE LED lights in **CORE (2)** and goes off in **CORE(1)**. The **Major** or **Minor**, **Abnormal**, and **NE Activity** LEDs light and the **SW-CORE: FORCE->2 done** is displayed.

-
14. Use the **SWITCH-CORE** command and select the **RESET** option to reset the bandwidth management core protection switching state as follows:

Press **Escape** then the **Scroll Menu** up or down arrow push button until **SWITCH-CORE <ent>** is displayed.

Then press **Enter**. Press the **Scroll Menu** up or down arrow push button until **SWITCH-CORE: RESET <ent>** is displayed. Then press **Enter**. When **CONFIRM? Y<ent> N<esc>** is displayed, press **Enter**.

⇒ **NOTE:**
The reset causes the system to work on CORE 2 and a switch to CORE 1 will not occur unless trouble is detected.

⇒ **NOTE:**
All alarms clear and **SW-CORE: RESET done** is displayed.

-
15. Wait 2 minutes for the system to stabilize, then make **CORE (1)** the active core as follows:

At the UIP, press **Escape** then the **Scroll Menu** up or down arrow push button until **SWITCH-CORE <ent>** is displayed. Then press **Enter**. Press the **Scroll Menu** up or down arrow push button until **SWITCH-CORE: FORCE->1 <ent>** is displayed. Then press **Enter**. When **CONFIRM? Y<ent> N<esc>** is displayed, press **Enter**.

DO ITEMS BELOW IN ORDER LISTED FOR DETAILS, GO TO

⇒ **NOTE:**
TSI/BMP ACTIVE LED lights in **CORE (1)**. The **Major** or **Minor, Abnormal**, and **NE Activity** LEDs light and the **SW-CORE: FORCE->1** done is displayed.

16. Use the **SWITCH-CORE** command and select the **RESET** option to reset the bandwidth management core protection switching state as follows:

Press **Escape** then the **Scroll Menu** up or down arrow push button until **SWITCH-CORE <ent>** is displayed. Then press **Enter**. Press the **Scroll Menu** up or down arrow push button until **SWITCH-CORE: RESET <ent>** is displayed. Then press **Enter**. When **CONFIRM? Y<ent> N<esc>** is displayed, press **Enter**.

⇒ **NOTE:**
The reset causes the system to work on CORE 1 and a switch to CORE 2 will not occur unless trouble is detected.

⇒ **NOTE:**
All alarms clear and **SW-CORE: RESET done** is displayed.

17. Wait 2 minutes for the system to stabilize.
-

18. At the UIP, press **Escape** then the **Scroll Menu** up or down arrow push button until **SET-NE <ent>** is displayed. Then press **Enter**. Press the **Scroll Menu** up or down arrow push button until **SET-NE: [RT] <ent>** is displayed. Then press **ENTER**. When **CONFIRM? Y<ent> N<esc>** is displayed, press **Enter**.
-

19. Do any alarms exist on the system?

If **YES**, continue with Step 20.

If **NO**, go to Step 21.

20. Clear alarms using **TAP-102** or local procedures. After alarms are cleared, **continue with Step 21**.
-

21. Is system equipped with SONET Software Release 6.0, 7.0, 7.1, or 7.2 and higher?

If **6.0, 7.0, or 7.1**, continue with Step 22.

If **7.2 and higher**, go to Step 24.

DO ITEMS BELOW IN ORDER LISTED FOR DETAILS, GO TO

22. Using the CIT and while accessing the SONET subsystem,
execute the command **set -ne** and proceed as follows:

For ...	When the system displays ...	Then enter ...
All systems	TID [Site#NE#] =	RETURN.
	GNE [no] =	One of the following: • yes — for nodes connected to surveillance center • no — for all other nodes Then press RETURN.
Ring systems only	DCCMode [distinct] =	Press RETURN.

23. Using the CIT and while accessing the SONET subsystem, execute the command **set - fecom** and proceed as follows:

When the system displays ...	Then enter ...
COM [enabled] =	One of the following: • enabled — communication over a specified DCC is enabled • disabled — communication over a specified DCC is disabled Then press RETURN .
NSUS [ns/us] =	One of the following: • ns — when this end of the DCC is defined as a network site • us — when this end of the DCC is defined as a user site ⇒ NOTE: If neither one is selected (RETURN pressed without an entry), M1 is assigned to us and M2 is assigned to ns by default. Then press RETURN .

⇒ **NOTE:**
The system will reset and within 3 minutes all alarms clear.

STOP. YOU HAVE COMPLETED THIS PROCEDURE.

DO ITEMS BELOW IN ORDER LISTED FOR DETAILS, GO TO

24. Using the CIT and while accessing the SONET subsystem,
execute the command **set -ne** and proceed as follows:

When the system displays ...	Then enter ...
TID [default] =	Refer to office records and enter correct value followed by RETURN .
DSNE [No] =	
AlarmGroup [1-255] =	
AGNE [No] =	
SITE [1-64] =	
NE [1-5] =	
IdleChannelSignal [ais] =	
SHELF [1-8] =	
CO/RT [rt] =	
TBOS Addr [1-8] =	
TBOS Link [noTBOS] =	
TBOS Remote [disable] =	
Execute?	Y and press RETURN .

⇒ **NOTE:**
The SYSCTL will perform an initialization that will take
approximately three minutes.

DO ITEMS BELOW IN ORDER LISTED FOR DETAILS, GO TO

25. Using the CIT and while accessing the SONET subsystem, execute the command **set - fecom** and proceed as follows:

When the system displays ...	Then enter ...
ADDRESS =	The AID of the data communications channel (DCC) Then press RETURN .
COM [enabled] =	One of the following: • enabled — communication over a specified DCC is enabled • disabled — communication over a specified DCC is disabled Then press RETURN .
NSUS [ns/us] =	One of the following: • ns — when this end of the DCC is defined as a network site • us — when this end of the DCC is defined as a user site ⇒ NOTE: If neither one is selected (RETURN pressed without an entry), M1 is assigned to us and M2 is assigned to ns by default. Then press RETURN .

⇒ **NOTE:**
The system will reset and within 3 minutes all alarms clear.

STOP. YOU HAVE COMPLETED THIS PROCEDURE.

Preservice ARM Shelf Turnup Tests (VTU/DS1 Unit Installation with System Looped Back) (Release 4.0 or Later)

DO ITEMS BELOW IN ORDER LISTED FOR DETAILS, GO TO

Summary: This procedure gives the steps for installing the VTU and DS1 circuit packs. Follow the procedure as written to ensure proper operation.

 **CAUTION:**
When handling circuit packs, always wear an electrostatic discharge wrist strap connected to an ESD ground jack on the user interface panel (UIP).

 **CAUTION:**
Take care to avoid damaging the LEDs that protrude through the openings in the faceplate of the circuit packs during handling and circuit pack installation.

1. Verify that the procedure to turn up the SONET subsystem found in **ARM Shelf Turnup:NTP-020**, "Equip *SLC*[®]-2000 SONET OC-3 Subsystem (Looped Back)," has been performed.

-
2. Are the ***BDK*[®]250 TSI** and ***BDK*270 BMP** circuit packs installed in **CORE(1)** and **CORE(2)** STU/TSI and BMP slots?

If **YES**, continue with **Step 3**.

If **NO**, perform **ARM Shelf Turnup:NTP-021**, "Equip *SLC*[®]-2000 Bandwidth Management Complex Circuit Packs," procedure before continuing with **Step 3**.

 **NOTE:**
The bandwidth management complex circuit packs must be installed before the MDS support packs will function properly.

DO ITEMS BELOW IN ORDER LISTED FOR DETAILS, GO TO

⇒ **NOTE:**
No alarms are present on the system.

3. Using the work order, choose the first **LIU/VTU(A)** slot for VTU installation.

⇒ **NOTE:**
The procedures for installing an LIU circuit pack are contained in **NTP-018**.

4. Install a **BBG266 VTU** circuit pack in the slot chosen and wait for alarms to clear.

Response: The **FAULT** LEDs on the **VTU** light for less than 3 minutes (per pack) when installed. (The display on the UIP fault menu will indicate that the VTU software is installing.) Then all alarms clear (ignore transient alarms).

⇒ **NOTE:**
The **Major** or **Minor**, **Attention**, and **NE Activity** LEDs will be lighted.

5. Does the **FAULT** LED remain lighted and the **UIP RETRIEVE-FAULTS** command indicate no software is installing?

If **YES**, continue with Step 6.
If **NO**, go to Step 7.

6. Remove the bad VTU and obtain a new VTU. ***Return to Step 4.***
-

7. Have you installed VTUs in all slots shown on the work order [including the protection slot (**P**)]?

If **NO**, continue with Step 8.
If **YES**, go to Step 9.

8. Using the work order, choose the next **LIU/VTU(A)** slot to install a VTU. ***Return to Step 4.***
-

9. Perform an LED test.

DLP-507

DO ITEMS BELOW IN ORDER LISTED FOR DETAILS, GO TO

10. Do you want to install DS1 services?

If **YES**, continue with Step **11**.

If **NO**, **STOP. YOU HAVE COMPLETED THIS PROCEDURE.**

11. Install DS1/DS1PM circuit packs in DS1(LS-C) slots 1 through P as required. Install 177A retainer cards in all unequipped DS1(C) slots not equipped with DS1/DS1PM circuit packs. If a DS1PM circuit pack is installed in any service slot (1 through 8), then a DS1PM circuit pack must be installed in slot P if protection is required.	DLP-510

12. Test individual DS1 channels.	DLP-531

13. Perform an LED test.	DLP-507

STOP. YOU HAVE COMPLETED THIS PROCEDURE.

Establish End-to-End System *SLC*[®]-2000 OC-3 Optical Fiber Spans (Release 4.0 or Later)

DO ITEMS BELOW IN ORDER LISTED FOR DETAILS, GO TO



CAUTION:

When handling circuit packs, always wear an electrostatic discharge wrist strap connected to an ESD ground jack on the user interface panel (UIP).



CAUTION:

Take care to avoid damaging the LEDs that protrude through the openings in the faceplate of the circuit packs during handling and circuit pack installation.



NOTE:

When connecting the point-to-point or taper/drop *SLC*-2000 SONET subsystem to a central office DDM-2000 or *SLC*-2000 Access System, a **Minor** alarm will be generated if the Function Groups (A and C) are not equipped the same [for example a **VTU** in Function Group A slot 1 needs a **DS1** pack installed at the central office end DDM-2000 or *SLC*-2000 shelf Function Group A slot (or appropriate cross-connected slot), to avoid **Minor**, **Attention**, and **NE Activity** alarms]. It is recommended that the Function Groups at both ends be equipped the same (empty slots, or equipped DS1 slots) when establishing the OC-3 network.



NOTE:

In this procedure it is assumed that the far-end DDM-2000 or *SLC*-2000 terminal has been turned up and tested (looped back).

1. Verify that the *SLC*-2000 RT is looped back and that all MDS assemblies are unequipped before continuing.

DO ITEMS BELOW IN ORDER LISTED FOR DETAILS, GO TO

2. Determine the optical loss of each optical span from office records or by making the required measurements at the output of both OLIUs using an optical meter.



CAUTION:

Open optical connectors may emit invisible laser radiation. Avoid direct exposure to the beam. Do not view beam with optical instruments. Procedures other than those specified herein may result in hazardous laser radiation exposure.

-
3. Does the system meet the required measurements?

If **YES**, then continue with Step 4.
If **NO**, then proceed to **TAP-102**.

-
4. Is your system used for *linear* configurations or *ring* configurations?

If **linear**, then continue with Step 5.
If **ring**, then proceed to Step 19.

-
5. At the CO equipment (either *SLC-2000* system or *DDM-2000*) and RT, remove the optical loops from the **OLIUs** in the optical span being established.



NOTE:

This will cause the **Critical** and **NE Activity** alarms to light.

-
6. Does your system use **21G** OLIUs?

If **YES**, then continue with Step 7.
If **NO**, then proceed to Step 10.

-
7. Set the option switches on the **21G OLIUs** to agree with the loss of the optical facility. DLP-504

-
8. Did you have to change any option switch settings?

If **YES**, then continue with Step 9
If **NO**, then proceed to Step 10.

DO ITEMS BELOW IN ORDER LISTED FOR DETAILS, GO TO

9. After changing the option settings and installing the OLIU, press the **Update** button on the UIP.

-
10. Connect the optical span being established to the multiplexer OLIUs at each end.	DLP-511

Comment: The SONET subsystem will display **Major, NE Activity**, and **FE Activity** alarms if the Function Groups (A and C) are not equipped for the same service capabilities at both ends. To clear this alarm condition, install or remove the appropriate circuit packs in Function Group A or C at the *SLC-2000* RT or far-end *DDM-2000*.

-
11. Is the CIT located locally or at a remote location?

If **locally**, then continue with Step **12**.

If **remote location**, then proceed to Step **13**.

Proceed to Step **14**.

-
12. Using a CIT at the RT, log in to the SONET subsystem as a privileged user.	DLP-521

-
13. Using the CIT at the remote location, log in to the SONET subsystem as a privileged user.	DLP-541

-
14. Using the CIT at the RT, enter the following message:

set - fecom: dcc -m

At the **Communications =** prompt, enter:

enable

At the **Execute?** prompt, enter:

Y



NOTE:

After enabling communications at one end only, the **FAULT** LED on the **OHCTL** flashes. If it does not flash, use the **rtrv-fecom** command to ensure that communications are enabled. Ignore other alarms.

DO ITEMS BELOW IN ORDER LISTED FOR DETAILS, GO TO

15. Do you have a **Major** alarm and a **FAULT** LED lighted on the **SYSCTL** and/or **OHCTL**?

If **YES**, then continue with Step **16**.

If **NO**, then proceed to Step **17**.



NOTE:

When the *SLC-2000* RT is connected to the network, you may have the alarms indicated above that are caused by a duplicated site/ne address, TBOS display, or TID.

-
16. At the CIT, enter the **rtrv-alm** command to look for a problem caused by a duplicated site/ne address, TBOS display, or TID. Go to **DLP-517** to clear this trouble by changing the appropriate setting.
-

17. At both the CO and RT, remove both **TGS** circuit packs and determine if the timing mode is set as indicated by the work order.



NOTE:

The **TGS** option switches are probably set for *free running*. Before the end-to-end services are established, the specified timing mode (loop timing at the RT) must be set on the **TGS** packs.

-
18. Are the timing mode options set as indicated by the work order?

If **NO**, then continue with Step **19**.

If **YES**, then proceed to Step **20**.

-
19. Set the timing mode as indicated by the work order. Reinstall the circuit packs and press the **SYSCTL UPD/INIT** button. DLP-503
Go to Step 40.



NOTE:

If the option switch setting is changed, an update must be done by momentarily depressing the **SYSCTL UPD/INIT** button after the **TGS** packs are reinstalled.



NOTE:

After pressing the **SYSCTL UPD/INIT** button, it may take up to 2 minutes for transient alarms to clear.

DO ITEMS BELOW IN ORDER LISTED FOR DETAILS, GO TO

⇒ **NOTE:**
See your local company documentation for specific option settings. In some cases, special arrangements have been made with specific companies to include their option settings as an appendix to this document.

-
20. After determining that timing mode options do *not* need to be changed, reinstall the circuit pack. ***Go to Step 40.***
-

21. Choose the first optical span to establish.

⇒ **NOTE:**
A ring configuration requires that the **MAIN 1 OLIU** at one shelf (node) connects to the **MAIN 2 OLIU** at an adjacent shelf (node). See Figure 1. The procedure to establish the ring configuration starts from one node and continues to an adjacent node, then continues to the next node until the final connection is made from the last node back to the first node. This procedure is used at a *SLC-2000* ring node.

-
22. At the near end, remove the optical loop from *ONE OLIU* (for example, **MAIN 2**) associated with the optical span being established. At the other end, remove the optical loop from the associated **OLIU** (for example, **MAIN 1**) in the optical span being established.

⇒ **NOTE:**
This will cause the **Minor, Attention, and NE Activity** alarms to light and the **OLIU FAULT** LED to start flashing.

DO ITEMS BELOW IN ORDER LISTED FOR DETAILS, GO TO

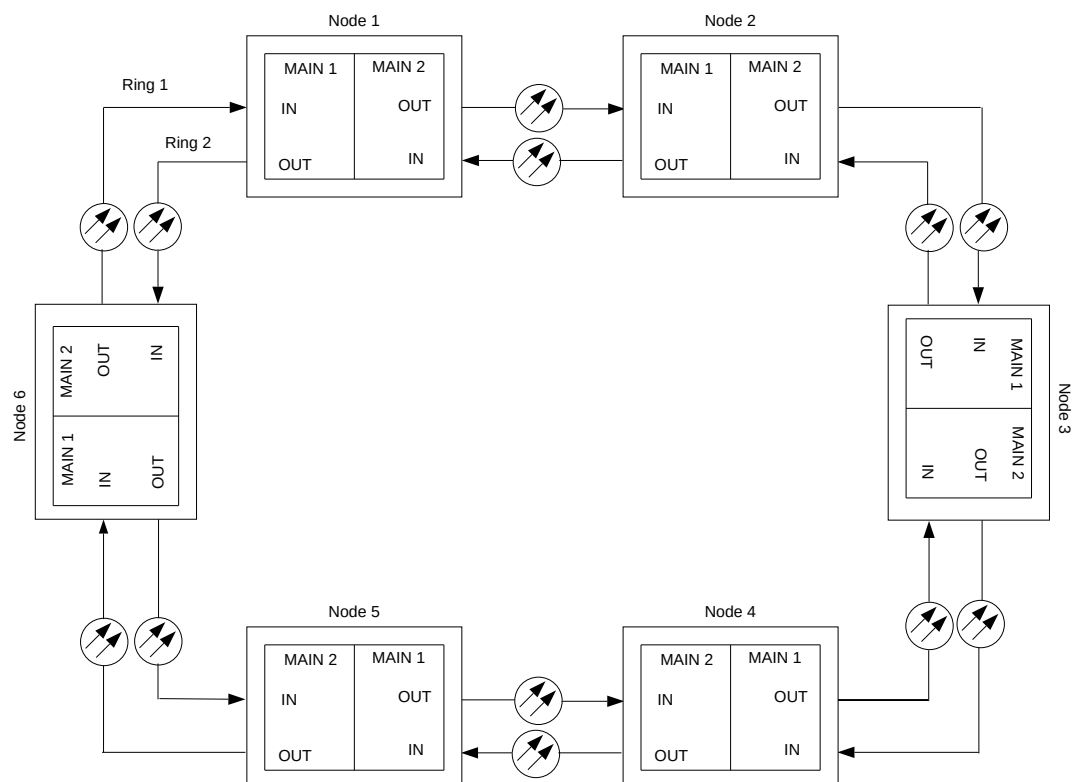


Figure 1 – Example Ring Configuration Connections

23. Connect the optical fibers and verify the integrity of the optical span being established. DLP-519

24. When the *SLC-2000* system is connected to the network, do you have a **Major** alarm and a **FAULT** LED lighted on the **SYCTL** and/or **OHCTL**?

If **YES**, then continue with Step 25.
If **NO**, then proceed to Step 26.

DO ITEMS BELOW IN ORDER LISTED FOR DETAILS, GO TO

⇒ **NOTE:**
When the *SLC-2000* system is connected to the network,
you may have the alarms indicated above that are caused by
a duplicated site/ne address, TBOS display, or TID.

25. At the CIT, enter the **rtrv-alm** command to look for a problem
caused by a duplicated site/ne address, TBOS display, or TID. Go
to **DLP-517** to clear this trouble by changing the appropriate
setting.
-

26. Remove both **TGS** circuit packs and determine if the timing mode DLP-503
is set as indicated by the work order.

⇒ **NOTE:**
The **TGS** option switches are probably set for *free running*.
Before the end-to-end services are established, the specified
timing mode (loop timing at the RT) must be set on the **TGS**
packs.

27. Are the timing mode options set as indicated by the work order?

If **NO**, continue with Step **28**.
If **YES**, go to Step **29**.

28. Set the timing mode as indicated by the work order. Reinstall the DLP-503
circuit packs and press the **SYSCTL UPD/INIT** button.
Go to Step 30.

⇒ **NOTE:**
If the option switch setting is changed, an update must be
done by momentarily depressing the **SYSCTL UPD/INIT**
button after the **TGS** packs are reinstalled.

⇒ **NOTE:**
After pressing the **SYSCTL UPD/INIT** button, it may take up
to 2 minutes for transient alarms to clear.

⇒ **NOTE:**
See your local company documentation for specific option
settings. In some cases, special arrangements have been
made with specific companies to include their option settings
as an appendix to this document.

DO ITEMS BELOW IN ORDER LISTED FOR DETAILS, GO TO

29. After determining that timing mode options do **not** need to be changed, reinstall the circuit pack.

30. Is the CIT located locally or at a remote location?

If **locally**, then continue with Step **31**.
If **remote location**, then go to Step **32**.

31. Using a CIT at the RT, log in to the SONET subsystem as a privileged user.	DLP-521

Proceed to Step **33**.

32. Using the CIT at the remote location, log in to the SONET subsystem as a privileged user.	DLP-541

33. Do one of the following depending on the OLIU:

If span being connected at this time is on an ...	Then do the following ...
M1 OLIU	Using the CIT, enter the following message: set - fecom: dcc - m1 At the Communications = prompt, enter: enable At the NS/US = prompt, enter: NS or US, as appropriate At the Execute? prompt, enter: Y
M2 OLIU	Using the CIT, enter the following message: set - fecom: dcc - m2 At the Communications = prompt, enter: enable At the NS/US = prompt, enter: NS or US, as appropriate At the Execute? prompt, enter: Y

DO ITEMS BELOW IN ORDER LISTED FOR DETAILS, GO TO

34. Is system equipped with SONET Software Release 6.0, 7.0, or 7.1?

If **YES**, then continue with Step **35**.

If **NO**, then proceed to Step **36**.

35. While accessing the SONET subsystem, execute the command **set -ne** and proceed as follows:

- At the **TID [Site#NE#]** = prompt, press **Return**.



NOTE:

GNE should be set to "yes" during turnup procedures at all nodes to extinguish the "communication failure" alarm.

- At the **GNE [no]** = prompt, press **Y** followed by **Return** for node connected to surveillance center, or press **Return** for all other nodes.



NOTE:

The system will reset and within 3 minutes all alarms clear.

Go to Step 38.

DO ITEMS BELOW IN ORDER LISTED FOR DETAILS, GO TO

36.



NOTE:

AGNE should be set to "yes" during turnup procedures at all nodes to extinguish the "communication failure" alarm.

While accessing the SONET subsystem, execute the command **set -ne** and proceed as follows (refer to office records):

When the system displays ...	Then enter ...
TID [default] =	Refer to office records and enter correct value followed by RETURN .
DSNE [No] =	
AlarmGroup [1-255] =	
AGNE [No] =	
SITE [1-64] =	
NE [1-5] =	
IdleChannelSignal [ais] =	
SHELF [1-8] =	
CO/RT [rt] =	
TBOS Addr [1-8] =	
TBOS Link [noTBOS] =	
TBOS Remote [disable] =	
Execute?	Y and press RETURN .

DO ITEMS BELOW IN ORDER LISTED FOR DETAILS, GO TO

37. If a specific DCC between two nodes is to be disabled, execute the **set - fecom** command and proceed as follows:
- At the **COM [enabled] =** prompt, enter **disabled** and then press **Return** if communication over a specified DCC is to be disabled, or press **Return** if communication is to be enabled.
 - At the **NSUS [ns/us] =** prompt, enter **ns** and then press **Return** if this end of the DCC is defined as a network site, or enter **us** and press **Return** if this end of the DCC is defined as a user site.

⇒ **NOTE:**
The system will reset and within 3 minutes all alarms clear.

-
38. Have you established both optical spans connected to the SLC-2000 RT (the span for the other adjacent SONET terminal)?

If **NO**, then continue with Step **39**.
If **YES**, then proceed to Step **40**.

-
39. Choose the other optical span to be established and **return to Step 22**.
-

40. Using the CIT, enter **rtrv -sync** to ensure that all SONET nodes in a ring configuration are connected before services are established and all *LineTimed* SONET ring nodes are using the default synchronization (source=main-1, modeswitch=revertive).
-

41. Are SONET nodes correctly set?

If **NO**, then continue with Step **42**.
If **YES**, then proceed to Step **43**.

-
42. Set the nodes using the **set -sync** commands.

⇒ **NOTE:**
The SyncAutoreconfiguration and SyncMessaging options can also be set at this time (check office records for correct settings).

⇒ **NOTE:**
Use document 363-208-003, *SLC-2000 Access System, Commands and Messages*, for the correct command format.

DO ITEMS BELOW IN ORDER LISTED FOR DETAILS, GO TO

43. Install STS-1 or VT1.5 cross-connections per work order. DLP-520



NOTE:

DLP-520 provides cross-connect philosophies for ring applications.

-
44. (See Caution.) At the RT, test the power minor alarm by turning AC circuit breaker(s) off. It may take 5 minutes (or longer) for the **Power Minor** alarm to activate.

Response: The **Power Minor** and **NE Activity** LEDs light. The central office DDM-2000 reports a power minor (or major if provisioned for major) RT alarm.



CAUTION:

This step should only be performed if the RT is equipped with backup battery. Turning off AC power will interrupt service if battery backup is not available.

-
45. Was the response met?

If **NO**, then continue with Step 46.

If **YES**, then proceed to Step 47.

-
46. Clear the trouble using local procedures.

-
47. Restore AC power.

-
48. Do you need to set user provisionable options on your system (for example, performance monitoring options)?

If **YES**, then continue with Step 49.

If **NO**, then proceed to Step 50.

-
49. See Note. Set user provisionable options on your system.



NOTE:

See your local company documentation for specific option settings. In some cases, special arrangements have been made with specific companies to include their option settings as an appendix to this document.

DO ITEMS BELOW IN ORDER LISTED FOR DETAILS, GO TO

50. Refer to *MDS Turnup* and *Circuit Order Tabs* when required. The system is now ready for initial metallic distribution shelf turnup and/or DS1 service to be established.

Establish *SLC*®-2000 System with Metallic Feeders Interfacing Through LIUs (Release 4.0 or Later)

DO ITEMS BELOW IN ORDER LISTED FOR DETAILS, GO TO

Summary: The following SONET subsystem circuit packs are required for metallic feeder operation:

- SYSCTL
- OHCTL
- TGS (required for systems equipped with SONET Software Release 9.1.1).

This procedure allows the *SLC*-2000 system to be equipped with metallic feeders. You must first install the OHCTL, SYSCTL, and TGS (if required) circuit packs then verify that the software in the SMU is the correct version.

Prerequisite: Before starting this procedure, you must have the following information:

- ***SYSCTL Selectable Options:***
 - TBOS display number/TBOS address
 - Site ID number
 - Power Minor alarm options.
- ***OHCTL Selectable Options:***
 - Network Element number.

Also, the SMU and PDC installation must be complete before performing this procedure. If the SMU and PDC installations have not been performed, go to **ARM Shelf Turnup: NTP-019**, "Install User Interface Panel Complex Support Circuit Packs (Release 4.0 or Later)."

Circuit packs should not be installed in any MDS shelf. Remove any circuit packs from the MDS assemblies.



CAUTION:

When handling circuit packs, always wear an electrostatic discharge wrist strap connected to an ESD ground jack on the user interface panel (UIP).

DO ITEMS BELOW IN ORDER LISTED FOR DETAILS, GO TO

 **CAUTION:**
Take care to avoid damaging the LEDs that protrude through the openings in the faceplate of the circuit packs during handling and circuit pack installation.

 **NOTE:**
The SYSCTL and BBG7 OHCTL circuit packs each have option switches that must be set before circuit pack installation. Option switch settings are listed in the "Detailed Level Procedures (DLPs)" tab of this document. (See references in the procedure.)

1. Set option switches, if necessary, and install the **OHCTL** circuit pack in the ARM shelf. DLP-501

 **NOTE:**
OHCTL **FAULT** LED is lighted.

 **NOTE:**
See your local company documentation for specific option settings. In some cases, special arrangements have been made with specific companies to include their option settings as an appendix to this document.

-
2. Is system equipped with Software Release 4.2 or later?

If **NO**, continue with Step 3.

If **YES**, go to Step 4.

-
3. Set option switches and install the **BBG5 SYSCTL** circuit pack in the ARM shelf. DLP-502

 **NOTE:**
SYSCTL **FAULT** LED is off. OHCTL **FAULT** LED cycles on and off. **MAJOR**, **NE ACTIVITY**, and **ATTENTION** LEDs on the UIP are lighted. ***SYSCTL EXTND INITZN done*** message is displayed on the UIP approximately 2 minutes following SYSCTL installation. All UIP LED indicators are off.

 **NOTE:**
See your local company documentation for specific option settings. In some cases, special arrangements have been made with specific companies to include their option settings as an appendix to this document.

Proceed to Step 5.

DO ITEMS BELOW IN ORDER LISTED FOR DETAILS, GO TO

4. Set option switches and install the **BBG8 SYSCTL** circuit pack in the ARM shelf. DLP-534

⇒ **NOTE:**
SYSCTL **FAULT** LED is off. OHCTL **FAULT** LED cycles on and off. **MAJOR**, **NE ACTIVITY**, and **ATTENTION** LEDs on the UIP are lighted. ***SYSCTL EXTND INITZN done*** message is displayed on the UIP approximately 2 minutes following SYSCTL installation. All other UIP LED indicators are off.

⇒ **NOTE:**
See your local company documentation for specific option settings. In some cases, special arrangements have been made with specific companies to include their option settings as an appendix to this document.

-
5. If the system is equipped with SONET Software Release 9.1.1, set option switches and install **TGS** circuit pack in slot **TGS(1)** of the ARM shelf. Otherwise, ***continue with Step 6.*** DLP-503

Response: TGS **ACTIVE** LED is lighted. All UIP LED indicators are off.

⇒ **NOTE:**
See your local company documentation for specific option settings. In some cases, special arrangements have been made with specific companies to include their option settings as an appendix to this document.

DO ITEMS BELOW IN ORDER LISTED FOR DETAILS, GO TO

6. At the UIP, press the Scroll Menu up or down arrow button until **RETRIEVE-PROG-VRSN<ent>** is displayed and press **ENTER**. Press the Scroll Menu down arrow button until SMU:DLC version is displayed. Verify that the version is 4.00.02 or later. A typical readout will look something like this:

Sys:DLC R4.00.02

The following is a list of the software release versions and the UIP readout for each one:

Release Version	UIP Readout
R4.0	Sys:DLC R4.00.02
R4.1	Sys:DLC R4.01.00
R4.2	Sys:DLC R4.02.00
R4.4	Sys:DLC R4.04.00
R4.5	Sys:DLC R4.05.00
R4.6	Sys:DLC R4.06.00



NOTE:
Refer to **DLP-500** for more information on how to use the UIP commands.

-
7. Does the SMU contain the correct version of software?

If **NO**, continue with Step 8.

If **YES**, **STOP. YOU HAVE COMPLETED THIS PROCEDURE.**

-
8. Perform one of the following items:

- Replace the SMU with an SMU circuit pack that contains the correct software version.
- Using a PC, download the correct software version into the SMU. Refer to **DLP-524** for information on upgrading SMU software.

DO ITEMS BELOW IN ORDER LISTED FOR DETAILS, GO TO

9. Enable the SMU as follows:

At the UIP, press **Escape** then the **Scroll Menu** up or down arrow push button until **SET-STATE-SMU~<ent>** is displayed. Then press **Enter**.

Press the **Scroll Menu** up or down arrow push button until **SET-SMU:~ENABLED~<ent> is displayed**. Then press **Enter**.

When **CONFIRM?~Y<ent>~N<esc>** is displayed, press **Enter**.

⇒ **NOTE:**
If the PDC contains the same software load as the SMU, the SMU will default to "enabled" and no further action is required.

⇒ **NOTE:**
The PDC will install the new software. Wait 2 minutes after installation is completed for the system to stabilize.

STOP. YOU HAVE COMPLETED THIS PROCEDURE.

Equip Bandwidth Management Complex Circuit Packs for *SLC*®-2000 Systems Configured with Metallic Feeders (Release 4.0 or Later)

DO ITEMS BELOW IN ORDER LISTED FOR DETAILS, GO TO

Summary: Equipping the bandwidth management complex consists of installing the time slot interchange (TSI) circuit packs. You must install the SYSCTL and OHCTL circuit packs before installing any bandwidth management complex circuit pack. If the SYSCTL and OHCTL circuit packs have not been installed, go to **ARM Shelf Turnup: NTP-024**, "Establish *SLC*-2000 System with Metallic Feeders (LIUs) (Release 4.0 and Later)."

 **CAUTION:**
When handling circuit packs, always wear an electrostatic discharge wrist strap connected to an ESD ground jack on the user interface panel (UIP).

 **CAUTION:**
Take care to avoid damaging the LEDs that protrude through the openings in the faceplate of the circuit packs during handling and circuit pack installation.

1. Obtain two ***BDK*®250 TSI** circuit packs and two ***BDK270 BMP*** circuit packs to install in the bandwidth management complex of the ARM shelf.
2. On each **TSI**, verify that the daughter board is properly seated.
3. Install a ***BDK250 TSI*** in **CORE (1) TSI** slot and verify that the **ACTIVE** LED lights.

DO ITEMS BELOW IN ORDER LISTED FOR DETAILS, GO TO

4. After the **ACTIVE** LED lights on the **BDK250 TSI**, install the **BDK270 BMP** circuit pack in the **CORE(1)** slot marked **BMP**.

⇒ **NOTE:**
If the **TSI FAULT** LED and the **BMP FAULT** LED are flashing fast (indicating software is being installed from the SMU), you will not see the proper responses until after the software is installed and the **FAULT** LED stops flashing.

⇒ **NOTE:**
The **Major** or **Minor**, **Attention**, and **NE Activity** LEDs light on the user interface panel (UIP). The **FAULT** LEDs on the **TSI** and **BMP** circuit packs flash slowly then fast when installing the software load. The LED will remain on during the pack initialization process. The **ACTIVE** LED lights on both the **BMP** and **TSI** circuit packs. Ignore transient alarms.

-
5. Wait 5 minutes for data transfer and perform the LED test. DLP-507
-

6. Install a **BDK250 TSI** in **CORE (2) TSI** slot.
-

7. After the **TSI** software loading process is finished, install the **BDK270 BMP** circuit pack in the **CORE(2)** slot marked **BMP**.

⇒ **NOTE:**
If the **TSI FAULT** LED and the **BMP FAULT** LED are flashing fast (indicating software is being installed from the SMU), you will not see the proper responses until after the software is installed and the **FAULT** LED stops flashing.

⇒ **NOTE:**
The **Major** or **Minor**, **Attention**, and **NE Activity** LEDs light on the user interface panel (UIP). The **FAULT** LEDs on the **TSI** and **BMP** circuit packs flash slowly then fast when installing the software load. The LED will remain on during the pack initialization process. The **ACTIVE** LED does not light on either the **BMP** or the **TSI** circuit pack because side 2 is on standby. Ignore transient alarms.

-
8. Wait 5 minutes for data transfer and perform the LED test. DLP-507
-

DO ITEMS BELOW IN ORDER LISTED FOR DETAILS, GO TO

9. Initialize the system as follows:

At the UIP, press **Escape** then the **Scroll Menu** up or down arrow push button until **INITIALIZE-SYSTEM <ent>** is displayed. Then press **Enter**. When **CONFIRM? Y<ent> N<esc>** is displayed, press **Enter**.



CAUTION:

*The **INITIALIZE-SYSTEM UIP** command must be executed after the **PDC**, **SMU**, and **TSI/BMPs** have been installed and before any **LIU** or **MDC** circuit packs are installed. This UIP command will be denied if any **LIU** or **MDC** packs are installed.*



NOTE:

INITIALIZE-SYSTEM done is displayed within 1 minute and all alarms clear. But, while the system initialization is in progress, all DLC circuit packs will reset causing the **FAULT** LED to cycle on and off.



NOTE:

The **Minor**, **Attention**, and **NE Activity** LEDs remain lighted.

-
10. Wait 15 minutes after all transient alarms clear and then press the **LED Test** UIP push button. Verify that all LEDs light on both TSI/BMPs.
-

11. Do all LEDs light on both TSI/BMP circuit packs?

If **NO**, continue with Step **12**.

If **YES**, go to Step **13**.

-
12. Replace the TSI/BMP that contains an LED that is not lighted.
Continue with Step 13.
-

13. Make **CORE (2)** the active core as follows:

At the UIP, press **Escape** then the **Scroll Menu** up or down arrow push button until **SWITCH-CORE <ent>** is displayed. Then press **Enter**. Press the **Scroll Menu** up or down arrow push button until **SWITCH-CORE: FORCE->2 <ent>** is displayed. Then press **Enter**. When **CONFIRM? Y<ent> N<esc>** is displayed, press **Enter**.

DO ITEMS BELOW IN ORDER LISTED FOR DETAILS, GO TO

⇒ **NOTE:**
TSI/BMP ACTIVE LED lights in **CORE (2)** and goes off in **CORE(1)**. The **Major** or **Minor**, **Abnormal**, and **NE Activity** LEDs light and the **SW-CORE: FORCE->2 done** is displayed.

14. Use the **SWITCH-CORE** command, and select the **RESET** option to reset the bandwidth management core protection switching state as follows:

Press **Escape** then the **Scroll Menu** up or down arrow push button until **SWITCH-CORE <ent>** is displayed. Then press **Enter**. Press the **Scroll Menu** up or down arrow push button until **SWITCH-CORE: RESET <ent>** is displayed. Then press **Enter**. When **CONFIRM? Y<ent> N<esc>** is displayed, press **Enter**.

⇒ **NOTE:**
The reset causes the system to work on CORE 2 and a switch to CORE 1 will not occur unless trouble is detected.

⇒ **NOTE:**
All alarms clear and **SW-CORE: RESET done** is displayed.

15. Wait 2 minutes for the system to stabilize, then make **CORE (1)** the active core as follows:

At the UIP, press **Escape** then the **Scroll Menu** up or down arrow push button until **SWITCH-CORE <ent>** is displayed. Then press **Enter**. Press the **Scroll Menu** up or down arrow push button until **SWITCH-CORE: FORCE->1 <ent>** is displayed. Then press **Enter**. When **CONFIRM? Y<ent> N<esc>** is displayed, press **Enter**.

⇒ **NOTE:**
TSI/BMP ACTIVE LED lights in **CORE (1)**. The **Major** or **Minor**, **Abnormal**, and **NE Activity** LEDs light and the **SW-CORE: FORCE->1 done** is displayed.

DO ITEMS BELOW IN ORDER LISTED FOR DETAILS, GO TO

16. Use the **SWITCH-CORE** command and select the **RESET** option to reset the bandwidth management core protection switching state as follows:

Press **Escape** then the **Scroll Menu** up or down arrow push button until **SWITCH-CORE <ent>** is displayed. Then press **Enter**. Press the **Scroll Menu** up or down arrow push button until **SWITCH-CORE: RESET <ent>** is displayed. Then press **Enter**. When **CONFIRM? Y<ent> N<esc>** is displayed, press **Enter**.

⇒ **NOTE:**
The reset causes the system to work on CORE 2 and a switch to CORE 1 will not occur unless trouble is detected.

⇒ **NOTE:**
All alarms clear and **SW-CORE: RESET done** is displayed.

-
17. Wait 2 minutes for the system to stabilize.
-

18. Use the **SET-NE** command to configure the DLC subsystem for a remote terminal as follows:

At the UIP, press **Escape** then the **Scroll Menu** up or down arrow push button until **SET-NE <ent>** is displayed. Then press **Enter**. Press the **Scroll Menu** up or down arrow push button until **SET-NE: RT <ent>** is displayed. Then press **ENTER**. When **CONFIRM? Y<ent> N<esc>** is displayed, press **Enter**.

-
19. Do any alarms exist on the system?

If **YES**, continue with Step 20.
If **NO**, go to Step 21.

20. Clear alarms using **TAP-102** or local procedures. After alarms are cleared, **continue with Step 21**.

DO ITEMS BELOW IN ORDER LISTED FOR DETAILS, GO TO

21. Using the CIT and while accessing the SONET subsystem, execute the command **set -ne** and proceed as follows (refer to office records):

When the system displays ...	Then enter ...
TID [default] =	Refer to office records and enter correct value followed by RETURN .
DSNE [No] =	
AlarmGroup [1-255] =	
AGNE [No] =	
SITE [1-64] =	
NE [1-5] =	
IdleChannelSignal [ais] =	
SHELF [1-8] =	
CO/RT [rt] =	
TBOS Addr [1-8] =	
TBOS Link [noTBOS] =	
TBOS Remote [disable] =	
Execute?	Y and press RETURN .

 **NOTE:**
The system will reset and within 3 minutes all alarms clear.

STOP. YOU HAVE COMPLETED THIS PROCEDURE.

Install Line Interface Unit (LIU) for Metallic Feeders (Release 4.0 or Later)

DO ITEMS BELOW IN ORDER LISTED FOR DETAILS, GO TO

Summary: This procedure gives the steps for installing the LIUs for metallic feeders in the ARM shelf. Installation of the bandwidth management complex circuit packs (TSI/BMP) must be performed prior to the installation of any LIU circuit pack.

 **CAUTION:**
When handling circuit packs, always wear an electrostatic discharge wrist strap connected to an ESD ground jack on the user interface panel (UIP).

 **CAUTION:**
Take care to avoid damaging the LEDs that protrude through the openings in the faceplate of the circuit packs during handling and circuit pack installation.

1. Verify that the procedures to equip the bandwidth management complex, **ARM Shelf Turnup: NTP-025**, have been done.

-
2. Set the feeder type as follows:

At the UIP, press **Escape** then the **Scroll Menu** up or down arrow button until **SET-FEEDER <ent>** is displayed, then press **Enter**.
Press the **Scroll Menu** up or down arrow button until **SET-FEEDER: LIU <ent>** is displayed, then press **Enter**.

When **CONFIRM? Y<ent> N<esc>** is displayed, press **Enter**.

 **NOTE:**
SET-FEEDER:LIU done is displayed.

-
3. Using the work order, choose the first **VTU/LIU** slot (slots **1** through **P**) in which to install an LIU.

DO ITEMS BELOW IN ORDER LISTED FOR DETAILS, GO TO

4. Install the **BBG267 LIU** in the **VTU/LIU** slot chosen.



NOTE:

The **FAULT** LED on the **LIU** flashes fast when installing the software load and remains on throughout the pack initialization process. Wait 3 minutes after installation for the LIU circuit pack to stabilize.

-
5. After 3 minutes, does the LIU **FAULT** LED remain lighted?

If **YES**, continue with Step 6.

If **NO**, go to Step 7.

-
6. Remove the LIU with the lighted **FAULT** LED and obtain a new LIU. **Return to Step 4.**
-

7. Using the work order, have all LIUs been installed?

If **NO**, continue with Step 8.

If **YES**, go to Step 9.

-
8. Using the work order, choose the next **VTU/LIU** slot in which to install an LIU. **Return to Step 4.**
-

9. Are there empty **VTU/LIU** slots?

If **YES**, continue with Step 10.

If **NO**, go to Step 11.

-
10. Install **BBG268** retainer card in any empty **VTU/LIU** slot.



NOTE:

BBG268 retainer cards must be installed in all unused **VTU/LIU** slots for LIU protection switching to operate properly. If the retainer cards are not used, transmission may be corrupted.

-
11. Are there DS1 alarms on the system?

If **YES**, continue with Step 12.

If **NO**, go to Step 13.

DO ITEMS BELOW IN ORDER LISTED FOR DETAILS, GO TO

12. At the UIP, press the **Update** key. *Wait for transient alarms to clear.*

-
13. At the CIT, enter **dlc** at the command prompt to toggle to the DLC subsystem command operations.
-

14. At the CIT, per the work order, set the synchronization/timing parameter for the DLC subsystem CORE using the **SET-SYNCN** command.

Reference: Refer to document 363-208-003, *SLC[®]-2000 Access System, Commands and Messages*, for additional information on the **SET-SYNCN** command.

-
15. Perform an LED test.

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STOP. YOU HAVE COMPLETED THIS PROCEDURE.

Initialize **SLC[®]-2000** Integral Test Head Circuit Packs (Optional)

DO ITEMS BELOW IN ORDER LISTED FOR DETAILS, GO TO

Summary: The test head controller (**THC**) will take channels 23 and 24 (both voice frequency) in digroup A of the digital loop carrier (DLC) system 1 in the metallic distribution shelf (MDS) assembly 1 to allow dial-up access to the Integral Test Head (ITH). Before channel testing is possible, the associated central office equipment, the feeder subsystem (SONET system or metallic feeder), and DLC system 1 in MDS assembly 1 must be turned up and connected end to end.

1. Ensure that MDS shelf 1 is turned up and connected to CO equipment and channels 23 and 24 are equipped and are assigned to the ITH.
2. Ensure that the CO switch and the *SLC-2000* system is provisioned with the ITH telephone number.
3. Using a terminal and modem, log in to the ITH as an administrator using the ITH dial-up link.



NOTE:

Refer to document 363-208-015, *The Human Interface to the SLC[®]-2000 Integral Test Head*, for login procedures.

4. Once you are logged in to the ITH, verify that the ITH status indicates that diagnostics have **PASSED**.
5. Does the ITH status indicate that diagnostics have **PASSED**?

If **NO**, continue with Step 6.

If **YES**, go to Step 8.

6. Retrieve the detailed diagnostic results using the **RTRV-DIAG** menu selection.

DO ITEMS BELOW IN ORDER LISTED FOR DETAILS, GO TO

7. Replace the circuit pack associated with the failure.
8. Use the **RTRV-STAT** menu selection to verify the ITH equipage.
The equipage should reflect the circuit packs installed in the ITH subsystem.
9. Log off from the ITH.



NOTE:

The ITH is now ready to receive test commands from MLT.

STOP. YOU HAVE COMPLETED THIS PROCEDURE.

Introduction

General

This tab provides procedures to establish end-to-end digital loop carrier (DLC) systems by installing support circuit packs in the access resource manager (ARM) shelf (see Figure 1) and the metallic distribution shelf (MDS) assemblies (see Figures 2 through 5) at a *SLC*[®]-2000 Access System remote terminal (RT).

The digital loop carrier (DLC) subsystem is comprised of a bandwidth management core in the ARM shelf, **VTU or LIU** circuit packs in the ARM shelf, and the MDS assemblies. The optional integral test head (ITH) subsystem in the ARM shelf provides a loop testing interface.

The turnup of an MDS includes the selection of the distribution mode, metallic [copper drops via the feeder distribution interface (FDI)] or fiber in the loop (FITL) [fiber distribution to *SLC*-2000 DTs or DDM-2000 FiberReach narrowband shelves (NBS)]. It is assumed that the distribution mode (metallic or FITL) is known before equipping the MDS.

SONET Subsystem

In a SONET configuration, the SONET subsystem must be turned up and connected end to end using *ARM Shelf Turnup* tab procedures before DLC systems can be established.

When installing the DLC support packs in the ARM shelf, Function Group A must have the same service capabilities at both ends for the system to come up without any Minor SONET alarms.

System Configured with Metallic Feeders (LIUs)

For systems configured with metallic feeders (LIUs), the metallic subsystem must be turned up using the **SYCTL** and **OHCTL** circuit packs and connected end to end using the *ARM Shelf Turnup* tab procedures before DLC systems can be established.

System Capability

Up to 28 DS1s can be interfaced, supporting up to 8 metallic distribution shelves [768 DS0s (R4.4 and earlier) or 1,152 DS0s (R4.5 and later)]. The limitation of 28 physical feeder DS1s permits the following configurations:

- Maximum of seven TR-08 Mode 1 VRTs (and no INA DS1s)
- Maximum of eight TR-08 Mode 2 VRTs (with 12 physical DS1s available for INA DS1s or TR-303 VRT)
- Maximum of two TR-303 VRTs (variable concentration allows remaining DS1s for INA DS1s or TR-08 VRTs)
- Maximum of 28 INA DS1s (no VRTs if 28 DS1s are used).

If the TR-303 VRT is configured, two feeder DS1s are required to support the embedded operations channel (EOC) and time slot management channel (TMC) interfaces to the switch.

Turnup Philosophy

Because of the wide variety of applications, it is impractical to document every possible system configuration. Circuit packs may be installed in the SONET subsystem before service is required; thus, the ARM Turnup procedures in this chapter equip function groups and perform tests with the system looped back.

When performing MDS Turnup procedures, the SONET subsystem function groups may have circuit packs already installed. The MDS Turnup procedures say "*If required, install... circuit packs*" (such as MXRVO). These packs are needed to establish the service, but they may have been already installed during ARM Turnup. If the circuit pack is not installed, then install it. If the circuit pack is already installed, proceed to the next step.

The DLC support circuit packs (**VTU/LIU**s and **TSI/BMP**s) have an interdependency that causes a **VTU/LIU** to fail when installed if all **TSI/BMP**s are failed or not installed. Also, a **TSI** may declare a *free running Minor* alarm if no **VTU/LIU** circuit packs are installed.

The DLC system circuit packs (**MDC**, **PTU**, and **T8U**) will cause alarms when installed in the metallic distribution shelf (assuming the SONET subsystem and bandwidth management CORE support packs have been installed) *if the associated equipment is not connected*. These circuit packs should not be installed until establishing an end-to-end carrier system.

Note: For Releases 3.1, 3.2, and 3.3, the circuit pack code for the PDC circuit pack is BBF240. For Release 4.0 and later, the circuit pack code for the PDC circuit pack is BBF241. The BMP circuit pack is used in Release 4.0 and later.

Figure 1 – Access Resource Manager Shelf



Figure 2 – First Metallic Distribution Shelf Assembly, Metallic Distribution

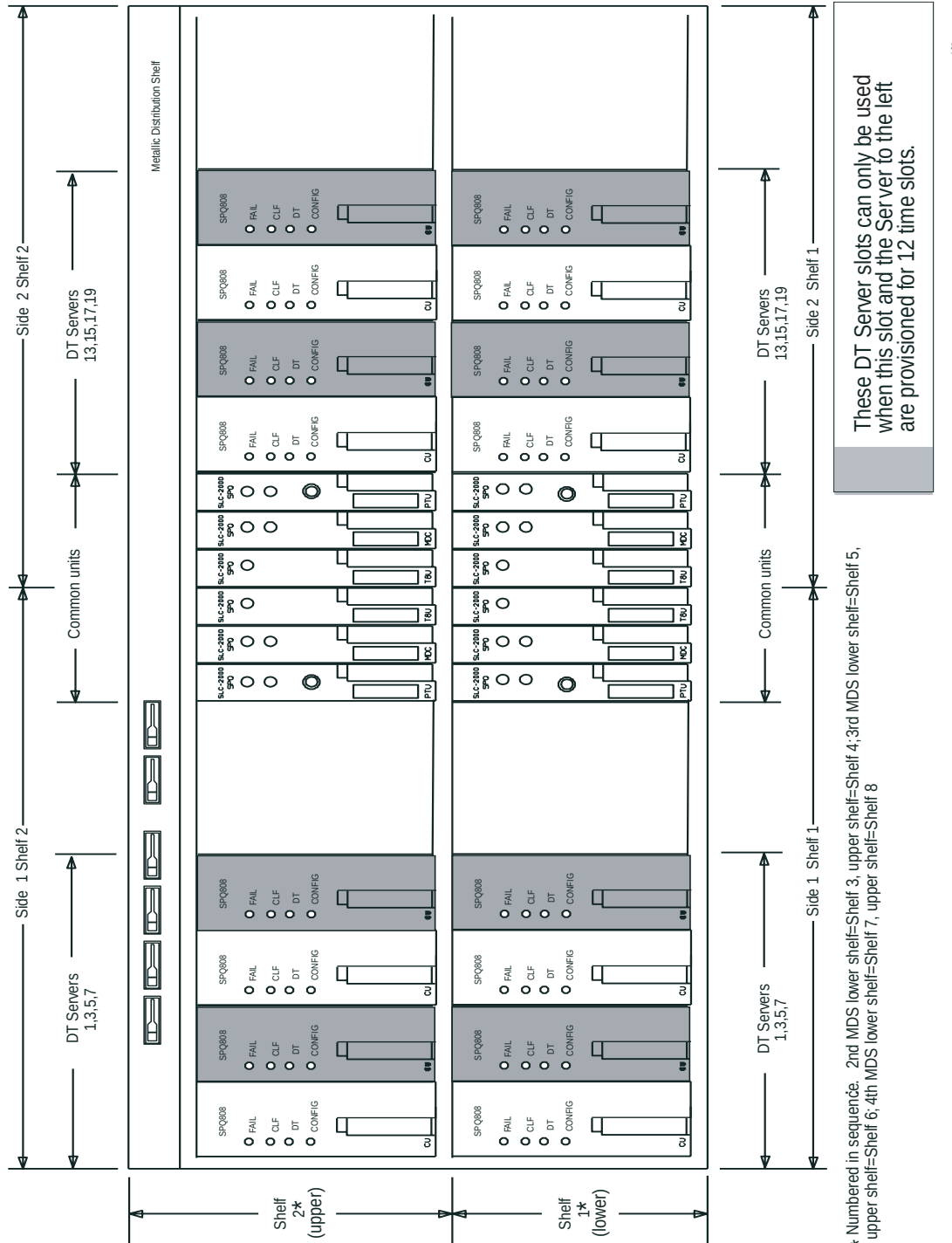
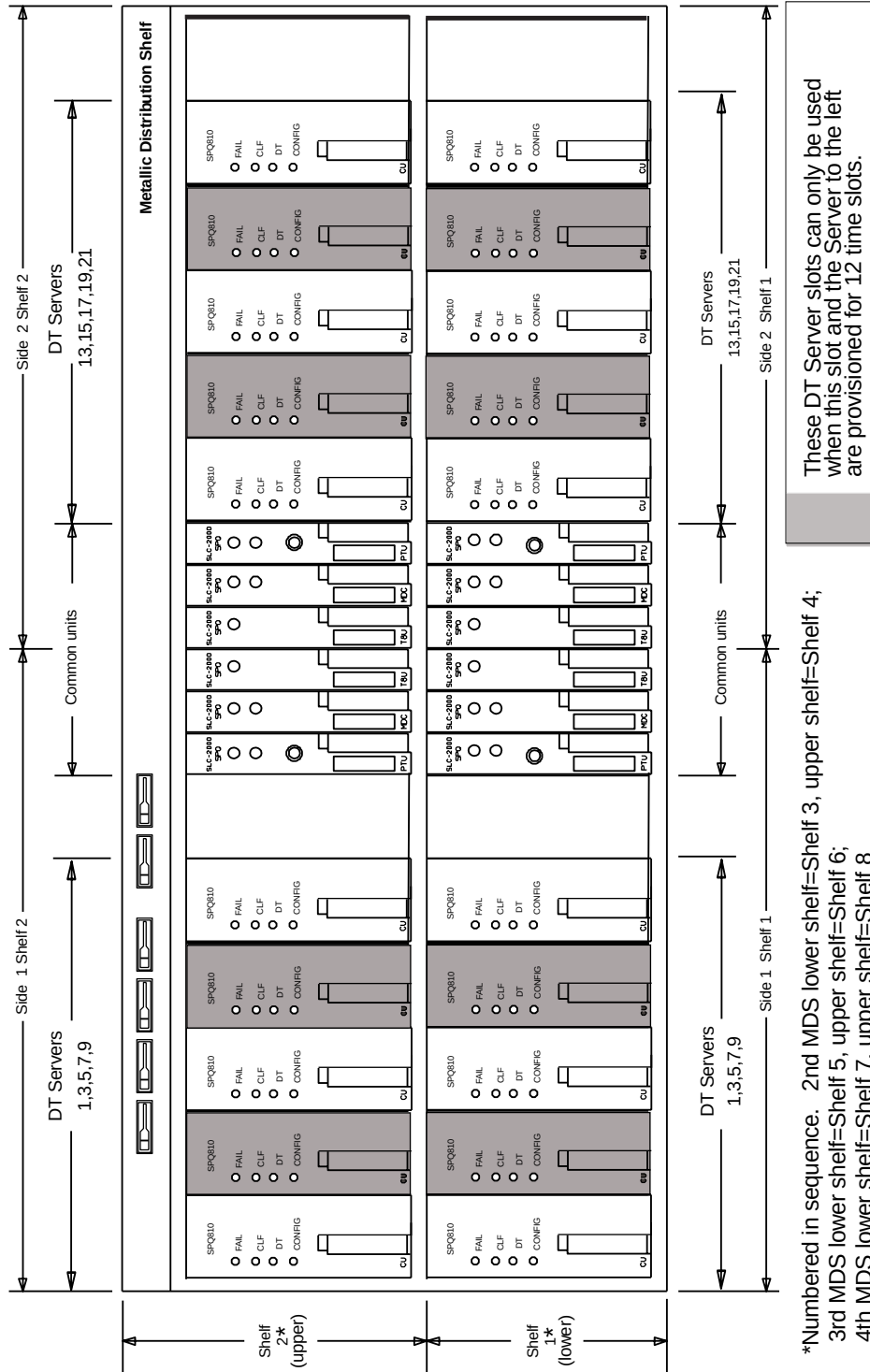
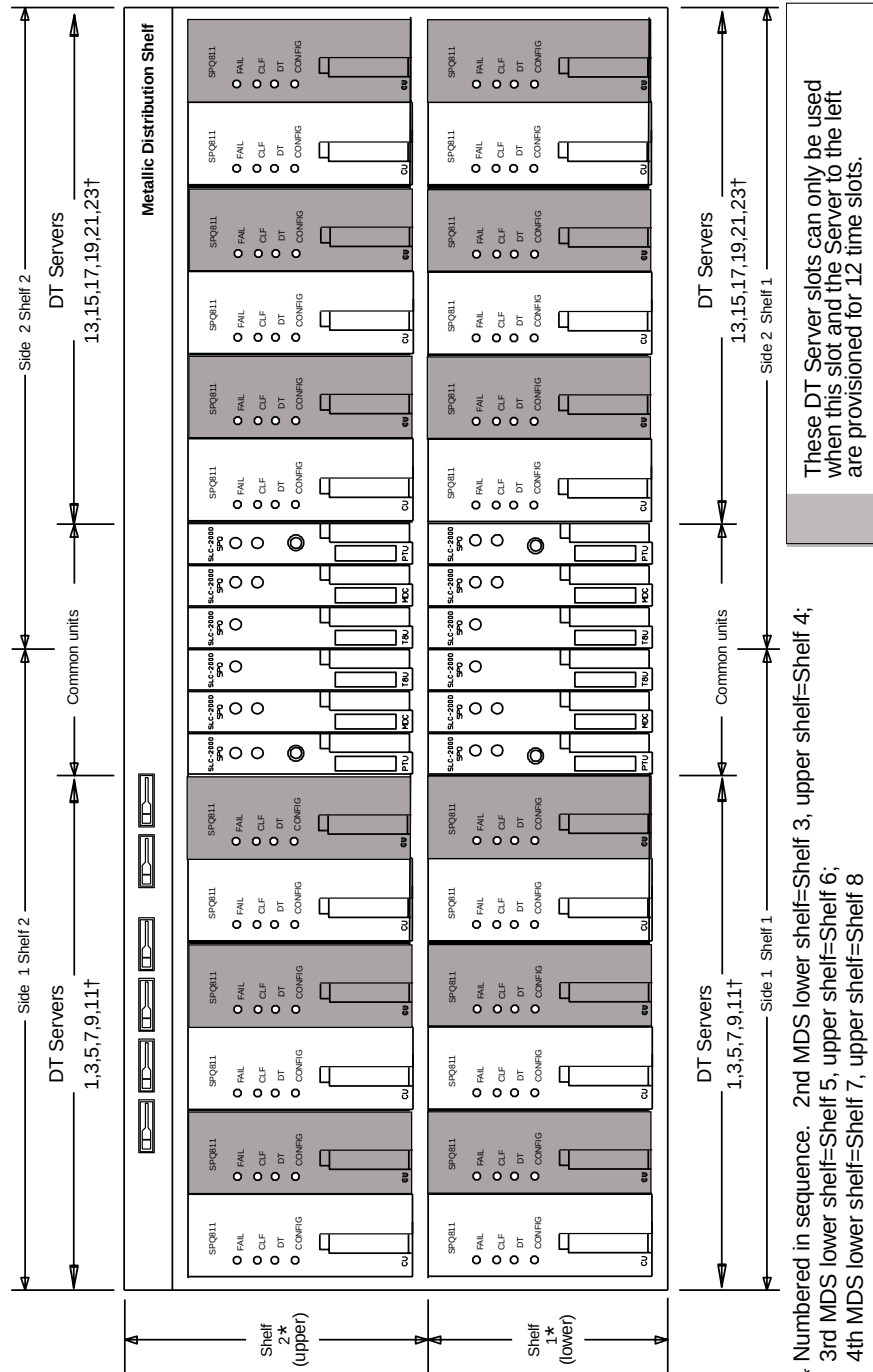


Figure 3 – First MDS Assembly, Fiber Distribution (R4.0 to R4.4)



mdstf145.eps

Figure 4 – First MDS Assembly, Fiber Distribution (R4.5 or Later With SPQ®810 Servers)



mdst146.eps

Figure 5 – First MDS Assembly, Fiber Distribution (R4.5 or Later With SPQ®811 Servers)

Contents of This Tab

-  **CAUTION:**
Take care to avoid damaging the LEDs that protrude through the openings in the faceplate of the circuit packs during handling and circuit pack installation.
-  **CAUTION:**
When handling circuit packs, always wear an electrostatic discharge wrist strap connected to an ESD ground jack on the user interface panel (UIP) or fan assembly.
-  **CAUTION:**
In dusty areas (for example, near construction sites), tent the RT cabinet to protect electronic equipment whenever cabinet doors are opened for extended periods.
-  **NOTE:**
For the SONET Ring or Taper Cross-Connect Philosophy, see **DLP-520**.

Acceptance: NTP-004, "Acceptance and MDS Fuse Installation," must be done to supply power to the metallic distribution shelf (MDS) assembly.

Install or Verify Installation of Metallic Distribution Shelf (MDS) Support Circuit Packs in ARM Shelf.	NTP-040
Equip an MDS Assembly	NTP-041
Establish End-to-End DLC System with a <i>SLC</i> [®] 96 COT or Integrated into a TR-08 or a TR-303 Digital Switch	NTP-042
Establish End-to-End DLC System for a <i>SLC</i> -2000 COT with a <i>SLC</i> -2000 RT	NTP-043
Establish End-to-End DLC System with an Integrated Network Access (INA) System.	NTP-044

If the metallic distribution shelf is to be configured for fiber-in-the-loop (FITL) distribution, the installation and turnup of the respective distant terminal (DT) [SLC®-2000 multi-services distant terminal (MSDT) or DDM-2000 FiberReach multiplexer narrowband shelf (NBS)], the installation of the outside plant fiber, and the installation of the high density optics shelf (HDOS) must have been completed prior to the installation of the DT server circuit packs in the MDS. To establish FITL distribution at the DT prior to installation of DT servers, refer to **Channel Unit Installation: NTP-081** or **NTP-082**.

For procedures to turn up the SLC-2000 MSDT, see document 363-205-004, *SLC-2000 Multi-Services Distant Terminal (MSDT) Feature, User/Service and Ordering Manual*. For procedures to turn up the DDM-2000 FiberReach multiplexer NBS, see document 363-206-301, *DDM-2000 FiberReach Multiplexer, Wideband/Narrowband Shelf, User/Service Manual*.

Install or Verify Installation of Metallic Distribution Shelf (MDS) Support Circuit Packs in ARM Shelf

DO ITEMS BELOW IN ORDER LISTED FOR DETAILS, GO TO

Summary: This procedure ensures that the ARM shelf is properly equipped to support MDS assembly turnup. For SONET subsystems, you first verify that you have performed either **NTP-015** or **NTP-023** to establish end-to-end fiber optic spans. For ring and taper systems, you next verify the proper SONET cross-connections. Then, verify that the ARM shelf bandwidth management complex is properly equipped. Next ensure that LIUs or VTUs are properly installed. Finally, perform an LED test and verify that all LEDs light.



CAUTION:

When handling circuit packs, always wear an electrostatic discharge wrist strap connected to an ESD ground jack on the user interface panel (UIP).



CAUTION:

Take care to avoid damaging the LEDs that protrude through the openings in the faceplate of the circuit packs during handling and circuit pack installation.

1. What type of feeder will this MDS use?

If **SONET**, continue with Step 2.
If **Metallic**, go to Step 5.

-
2. Verify that the procedure to establish the SONET subsystem (**ARM Shelf Turnup: NTP-015** or **NTP-023**, "Establish End-to-End System *SLC*[®]-2000 OC-3 Optical Fiber Spans") has been performed.
-

3. Do you have a *ring* or *taper* configuration?

If **YES**, continue with Step 4.
If **NO**, go to Step 5.

DO ITEMS BELOW IN ORDER LISTED FOR DETAILS, GO TO

4. Verify that proper SONET cross-connections have been made per DLP-520 system records or work order.
-

5. Are you turning up a TR-08 mode 1 system or a TR-303 system?

If **TR-08**, continue with Step 6.

If **TR-303**, go to Step 7.



NOTE:

TR-303 systems are only compatible with Software Release 4.0 and later.

6. Verify that you have performed **NTP-012** or **NTP-017** and that **BDK®250 TSI** circuit packs have been installed in the ARM shelf.
Go to Step 8.



NOTE:

BDK250 TSI circuit packs must be installed before the metallic distribution shelf support packs will function properly.

7. Verify that you have performed **NTP-021** or **NTP-025** and that **BDK250 TSI** and **BDK270 BMP** circuit packs have been installed in the ARM shelf. **Go to Step 8.**



NOTE:

BDK250 TSI and **BDK270 BMP** circuit packs must be installed before the metallic distribution shelf support packs will function properly.

8. Using the work order, are VTUs or LIUs required?

If **YES**, continue with Step 9

If **NO**, go to Step 16.

9. Have VTUs or LIUs already been installed?

If **NO**, continue with Step 10.

If **YES**, go to Step 16.

DO ITEMS BELOW IN ORDER LISTED FOR DETAILS, GO TO

10. Are you turning up a TR-08 system or a TR-303 system?

If **TR-08**, continue with Step **11**

If **TR-303**, go to Step **12**.

11. Using the work order, install VTUs or LIUs as required.

Go to Step 14.

12. Using the work order, determine the following:

- Circuit pack requirements and the line size for the TR-303 VRT
- DS1 equipment required for concentration ratios engineered for the TR-303 VRT per the work order.



NOTE:

VRT1 must be established before VRT2 is established.

13. Install the VTU/LIU packs as required.



NOTE:

Note that there are four DS1 ports per VTU or LIU circuit pack. In a TR-303 system, there is no physical relationship between the VTU/LIU slots and shelves. Logical-to-physical mapping can be assigned as needed using any unequipped slot. If unequipped slots are present after installing LIU circuit packs, insert retainer packs in these slots.

14. Did you install VTUs or LIUs?

If **LIUs**, continue with Step **15**.

If **VTUs**, go to Step **16**.

15. Install **BBG268** retainer cards in any unequipped LIU slots.

16. Perform an LED test and verify that all LEDs light.

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STOP. YOU HAVE COMPLETED THIS PROCEDURE.

Equip an MDS Assembly

DO ITEMS BELOW IN ORDER LISTED FOR DETAILS, GO TO

Summary:

- **For TR-08 Systems:** At the Metallic Distribution Shelf (MDS) assembly, install the PTU, MDC, and T8U circuit packs (two of each, one on each side) in the shelf being turned up (upper or lower shelf in the MDS assembly). Execute the TEST-SHELF command and verify that all LEDs on the shelf light.
- **For TR-303 Systems:** Using the CIT DLC "ED-MODE-T8U" command, set the T8U option to "NO" for all shelves that will not be used as a TR-08 VRT. At the MDS assembly, install the PTU and MDC circuit packs (two of each, one on each side) in the shelf being turned up (upper or lower shelf in the MDS assembly). Execute the TEST-SHELF command and verify that all LEDs on the shelf light.



CAUTION:

When handling circuit packs, always wear an electrostatic discharge wrist strap connected to an ESD ground jack on the user interface panel (UIP).



CAUTION:

Take care to avoid damaging the LEDs that protrude through the openings in the faceplate of the circuit packs during handling and circuit pack installation.

1. Verify that you have performed the procedure to install circuit packs to support the metallic distribution shelf (**MDS Assembly Turnup: NTP-040**, "Install Metallic Distribution Shelf Support Circuit Packs in ARM Shelf").

-
2. Using the work order, determine the type of distribution for this assembly (metallic or fiber in the loop).



NOTE:

The default for distribution mode is metallic (MET).

DO ITEMS BELOW IN ORDER LISTED FOR DETAILS, GO TO

3. Set the distribution for each shelf in the assembly as follows:



NOTE:

If **MDCs** are installed in the shelf, they must be removed before the **SET-DISTRIBUTION** UIP command is executed. You cannot change the distribution mode from the UIP if either **MDC** pack is installed in the shelf. The **MDC** circuit packs may be present if the CIT is used to set distribution.

If you are using a ...	Then ...
UIP	a. Press Escape. b. Press the Scroll Menu up or down arrow button until the system displays SET-DISTRIBUTION <ent> and press Enter. c. Press the Scroll Menu up or down arrow button until the appropriate shelf number (SET-DISTN:SHELF 1 through 8) is displayed in the command string and press Enter. d. Use the down arrow button until the system displays the appropriate distribution mode in the command string and press Enter (FITL for fiber in the loop; MET for metallic drop). This selects the appropriate distribution mode on a shelf. A SET-DISTN:#:mode done message will print.
CIT	Enter the ED-DISTN command and select the appropriate shelf and distribution mode. See document 363-208-003, <i>SLC-2000 Access System, Commands and Messages</i> , for more information.

DO ITEMS BELOW IN ORDER LISTED FOR DETAILS, GO TO

4. Are you establishing a TR-08 or a TR-303 MDS assembly
(Refer to office records)?

If **TR-08**, continue with Step 5.

If **TR-303**, go to Step 15.

-
5. Using the work order, determine the TR-08 mode for the assembly
(mode 1 or mode 2).

⇒ **NOTE:**
The default TR-08 mode is Mode 1.

⇒ **NOTE:**
Both VRTs in an MDS assembly must be set to the same
mode.

-
6. Set the TR-08 mode as follows:

On the UIP, press **Escape**, then the **Scroll Menu** up or down
arrow button until the system displays **SET-MODE-TR8 <ent>**,
then press **Enter**. Press the **Scroll Menu** up or down arrow button
until the appropriate VRT numbers are displayed in the command
string (for example, **SET-MODE:VRT1&2 <ent>**) and press **Enter**.
Press the **Scroll Menu** up or down arrow button until the correct
mode (1 or 2) is displayed in the command string and press **Enter**.
Press **ENTER** at the **CONFIRM? Y<ent> N<esc>** prompt.

⇒ **NOTE:**
A **SET-MODE:VRT#&# [#] done** message will print.

DO ITEMS BELOW IN ORDER LISTED FOR DETAILS, GO TO

7. Choose either the upper or lower shelf of the MDS assembly to begin installing common circuit packs (Figure 1).
-

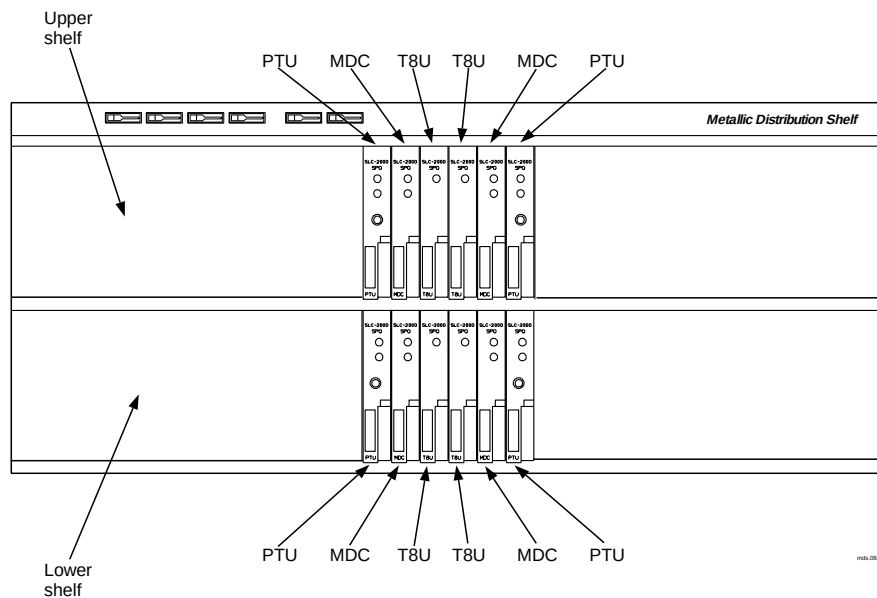


Figure 1 – Common Circuit Pack Locations (TR-08)

8. Install two **BDJ®200 PTUs** in **PTU** slots of the appropriate shelf (ignore alarms).
 9. Install two **BDJ205 T8Us** in **T8U** slots of the appropriate shelf (ignore alarms).
 10. Install two **BDJ240 MDCs** in **MDC** slots of the appropriate shelf (ignore transient alarms).
-

➡ **NOTE:**
The **MDC FAULT** LED will flash when the **MDC** circuit pack is initially installed and during software upgrade. **Wait for the LED to stop flashing before continuing.**

DO ITEMS BELOW IN ORDER LISTED FOR DETAILS, GO TO

11. After the powerup alarm sequence is observed (momentarily lighting LEDs on these circuit packs) and transient alarms settle (about 2 minutes after software loads and the LED stops flashing), are there **FAULT** LEDs lighted on any of the circuit packs installed?

If **YES**, continue with Step **12**.

If **NO**, go to Step **13**.

-
12. Replace any **PTU**, **T8U**, or **MDC** with a lighted **FAULT** LED.
-

13. Have you installed the common circuit packs for both the upper and lower shelf in the MDS assembly?

If **NO**, continue with Step **14**.

If **YES**, go to Step **28**.

-
14. Select the unequipped shelf (upper or lower) of the MDS assembly for common circuit pack installation. **Return to Step 8**.
-

15. Choose any shelf of either MDS assembly for TR-303 turnup.
-

16. Is the CIT located locally or at a remote location?

If **locally**, then continue with Step **17**.

If **remote location**, then go to Step **18**.

-
17. Establish a CIT connection with the RT.

DLP-525

Proceed to Step **19**.

-
18. Use the CIT at the remote location to establish a connection with the RT.

DLP-541

-
19. Toggle to the DLC subsystem by entering: **DLC**.
-

DO ITEMS BELOW IN ORDER LISTED FOR DETAILS, GO TO

20. Set the T8U value to **NO** by entering the following command:

ED-MODE-T8U::shelf-#::::T8UMODE=N;

Where **shelf-#** is the number of the shelf you wish to mark as not needing the T8U circuit pack (check office records). (See document 363-208-003, *SLC-2000 Access System, Commands and Messages*, for more information on this command.)



NOTE:

Any shelf equipped without a T8U eliminates its use as a TR-08 VRT. However, any subscriber line on that shelf can be cross-connected to a shelf configured as a TR-08 VRT equipped with a T8U.

-
21. Install two **BDJ200 PTUs** in **PTU** slots of the appropriate shelf (ignore alarms) (Figure 2).

-
22. Install two **BDJ240 MDCs** in **MDC** slots of the appropriate shelf (ignore transient alarms).



NOTE:

The **MDC FAULT** LED will flash when the **MDC** circuit pack is initially installed and during software upgrade. ***Wait for the LED to stop flashing before continuing.***

DO ITEMS BELOW IN ORDER LISTED FOR DETAILS, GO TO

23. After the powerup alarm sequence is observed (momentarily lighting LEDs on these circuit packs), wait several minutes (about 2 minutes after software loads) for transient alarms to settle.
-

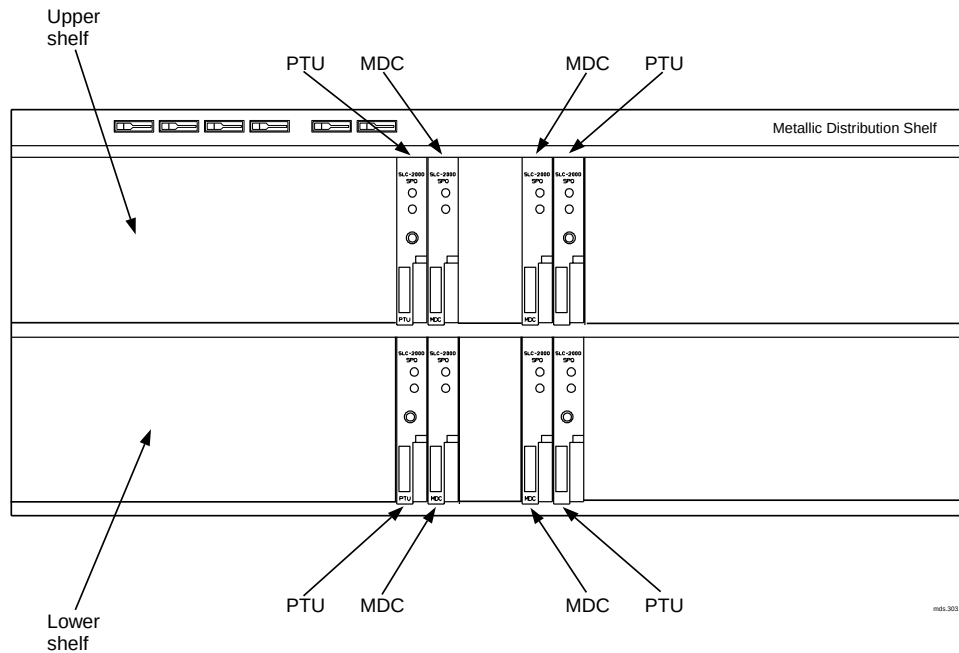


Figure 2 – Common Circuit Pack Locations (TR-303)

24. Is the **FAULT** LED lighted on the **PTU** or **MDC**?

If **YES**, continue with Step **25**.

If **NO**, go to Step **26**.

-
25. Replace the **PTU** or **MDC** circuit pack with the lighted **FAULT** LED.
-

26. Have you installed common circuit packs in both the upper and lower shelves in this MDS assembly?

If **NO**, continue with Step **27**.

If **YES**, go to Step **28**.

DO ITEMS BELOW IN ORDER LISTED FOR DETAILS, GO TO

27. Select the lower shelf for TR-303 turnup. ***Return to Step 18.***

28. On the UIP, press the **LED Test** button on the MDS assembly and verify that all LEDs on the **MDC** and **PTU** circuit packs light. DLP-507

29. Do all LEDs light on the **MDC** and **PTU** circuit packs?

If **NO**, continue with **Step 30**.

If **YES**, go to **Step 31**.

30. Replace the **PTU** or **MDC** circuit pack with the LEDs that do not light.

31. Test both shelves of the MDS assembly by doing the following for each shelf:

On the UIP, press **Escape** then the **Scroll Menu** up or down arrow button until **TEST-SHELF<ent>** is displayed. Then press **Enter**. Press the **Scroll Menu** up or down arrow button until the appropriate shelf numbers appear (**TEST-SHELF:1,2 <ent>**) in the command string. Press **Enter** and verify that the LEDs on the circuit packs on the correct shelves light.

32. Did the LEDs on the circuit packs on the correct shelves light?

If **NO**, continue with **Step 33**.

If **YES**, go to **Step 34**.

33. Correct ARM to MDS cabling (J500-X to P500).

34. Do you want to turn up another MDS assembly?

If **NO**, **STOP. YOU HAVE COMPLETED THIS PROCEDURE.**

If **YES**, return to **Step 2**.

Establish End-to-End DLC System with a *SLC*[®] 96 COT or Integrated into a TR-08 or TR-303 Digital Switch

DO ITEMS BELOW IN ORDER LISTED FOR DETAILS, GO TO

Summary: Verify that the data base and connections have been installed on the local digital switch (LDS) or the *SLC* 96 system. If needed, install standard cross-connections. If connecting to a *SLC* 96 system, have the far end connect each digroup. For all other systems, test the alarms. For metallic systems, perform single party channel tests and update records. For FITL systems, test the order-wire feature (if needed) and install DT Servers.

 **CAUTION:**
When handling circuit packs, always wear an electrostatic discharge wrist strap connected to an ESD ground jack on the user interface panel (UIP).

 **CAUTION:**
Take care to avoid damaging the LEDs that protrude through the openings in the faceplate of the circuit packs during handling and circuit pack installation.

1. Verify that the procedure to equip an MDS assembly (**MDS Assembly Turnup: NTP-041**, "Equip an MDS Assembly") has been performed.

-
2. Verify that the data base and connections have been installed at the *SLC* 96 system or the local digital switch (LDS) that connects to the *SLC*-2000 RT.

 **NOTE:**
Ensure that the local digital switch is properly configured to support the large line size TR-303 VRT. Refer to the "Software Release Compatibility" section in Chapter 2 of this document for supported interfaces.

DO ITEMS BELOW IN ORDER LISTED FOR DETAILS, GO TO

3. Are you installing standard T0 cross-connections at this time?

If **YES**, continue with Step 4.

If **NO**, go to Step 5.

-
4. (See Note.) Install T0 cross-connections as follows:

DLP-523

If connecting to a ...	Then ...
TR-08 digital switch or a TR-08 COT (such as a <i>SLC</i> 96 COT)	Install standard T0 cross-connections with the UIP INITIALIZE-CRS command.
TR-303 digital switch	Install standard T0 cross-connections with the CIT INIT - CRS - T0 command.



NOTE:

If nonstandard cross-connections are used, first set up standard cross-connections and continue these procedures. After completing the procedures in this NTP, delete the original cross-connections and reconfigure the T0 cross-connections per the work order and using local procedures.

-
5. Install the T1 standard cross-connections at the RT as follows:

DLP-522

If connecting to a ...	Then ...
TR-08 digital switch or a TR-08 COT (such as a <i>SLC</i> 96 COT)	Install standard T1 cross-connections with the UIP INITIALIZE-CRS command.
TR-303 digital switch	Install standard T1 cross-connections with the CIT ENT - CRS - T1 command. (Refer to the following example.)

DO ITEMS BELOW IN ORDER LISTED FOR DETAILS, GO TO

⇒ **NOTE:**
If T1 cross-connections other than the standard cross-connections are used, refer to the work order and install the T1 cross-connections using a CIT and local procedures.

⇒ **NOTE:**
If the digital switch is not ready, the EOC and TMC data link failed alarms will be present.

Example of standard T1 cross-connections and 5ESS switch DS1 assignments:

The following tables provide a typical example of standard T1 cross-connections made at the CIT and 5ESS switch DS1 assignments. These cross-connections and switch assignments place the two communications channels, EOC and TMC, to the LDS across the same quad DS1 circuit pack.

T1 Cross-Connections

Address 1 (Physical)	Address 2 (Logical)
a-1-1	v3fdr-1-1*
a-1-2	v3fdr-1-2*
a-1-3	v3fdr-1-3
a-1-4	v3fdr-1-4
a-2-1	v3fdr-1-5

* TR303 EOC and TMC communications channels.

5ESS Switch DS1 Assignments

IFAC (Physical)	RT FAC (Logical)
ifac 0 (eli 0)	1*
ifac 1 (eli 0)	2*
ifac 2 (eli 0)	3
ifac 3 (eli 0)	4
ifac 4 (eli 0)	5

* TR303 EOC and TMC communications channels.

DO ITEMS BELOW IN ORDER LISTED FOR DETAILS, GO TO

Example of recommended T1 cross-connections and 5ESS switch DS1 assignments:

The following tables provide a typical example of recommended T1 cross-connections made at the CIT and 5ESS switch DS1 assignments. These cross-connections are recommended over the standard cross-connections since they place the two EOC and TMC communications channels to the LDS across two separate quad DS1 circuit packs. This arrangement helps reduce the possibility of service outages at the RT due to DS1 circuit pack failure.

T1 Cross-Connections

Address 1 (Physical)	Address 2 (Logical)
a-1-1	v3fdr-1-1*
a-2-1	v3fdr-1-2*
a-1-2	v3fdr-1-3
a-2-2	v3fdr-1-4
a-1-3	v3fdr-1-5

* TR303 EOC and TMC communications channels.

5ESS Switch DS1 Assignments

IFAC (Physical)	RT FAC (Logical)
ifac 0 (eli 0)	1*
ifac 20 (eli 1)	2*
ifac 1 (eli 0)	3
ifac 21 (eli 1)	4
ifac 2 (eli 0)	5

* TR303 EOC and TMC communications channels

DO ITEMS BELOW IN ORDER LISTED FOR DETAILS, GO TO

Before turning the system up in-service, verify that the logical DS1s are lined up (refer to the following example). If the logical DS1s are not lined up, there will be "no dial tone" problems on some of the lines. The physical assignments (IFACS on the 5ESS switch and LS card on DLC) are optional.

IFAC (Physical)	RT FAC (Logical)
5ESS Switch (Logical)	DLC (Logical)
rt fac #1	v3fdr-1-1 *
rt fac #2	v3fdr-1-2 *
rt fac #3	v3fdr-1-3
rt fac #4	v3fdr-1-4
rt fac #5	v3fdr-1-5

* TR303 EOC and TMC communications channels.

-
6. Establish communications with the far end.

DO ITEMS BELOW IN ORDER LISTED FOR DETAILS, GO TO

7. At the RT, determine which **VTU/LIU** LEDs correspond to the system being established.
 - **For TR-08 connections**, determine which LEDs correspond to which digroup as follows:

If the VTU/LIU indicator shows ...	And you're configured for ...	Then the corresponding digroup is ...
DS1(1)	Mode 1	Digroup A (lower or upper shelf in the MDS assembly).
	Mode 2	Digroup AB (for the lower shelf in the MDS assembly).
DS1(2)	Mode 1	Digroup B (lower or upper shelf in the MDS assembly).
	Mode 2	Digroup CD (for the lower shelf in the MDS assembly).
DS1(3)	Mode 1	Digroup C (lower or upper shelf in the MDS assembly).
	Mode 2	Digroup AB indicator (for the upper shelf in the MDS assembly).
DS1(4)	Mode 1	Digroup D (lower or upper shelf in the MDS assembly).
	Mode 2	Digroup CD (for the upper shelf in the MDS assembly).

- **For the TR-303 connections**, logical DS1 number 1 must be cross-connected to establish communications with the local digital switch. Logical DS1 number 2 should be cross-connected to the local digital switch to prevent an alarm condition at the RT.

DO ITEMS BELOW IN ORDER LISTED FOR DETAILS, GO TO

8. Are you connecting to a TR-08 COT (such as a *SLC* 96 COT) or a TR-08 digital switch?

If **YES**, continue with Step **9**.

If **NO**, go to Step **16**.

-
9. Have CO craftsperson put the TR-08 system in service (remove system loopbacks, if necessary).

-
10. Have the CO craftsperson connect digroup A (or AB for Mode 2) of the TR-08 system being established to the correct CO SONET port or T1 line and ensure that the **VTU/LIU DS1()** LED associated with the system digroup A (or AB for Mode 2) goes off.

-
11. Does the LED associated with digroup A (or AB — Mode 2) go off?

If **NO**, go to **TAP-113**.

If **YES**, continue with Step **12**.

-
12. Have the CO craftsperson connect one of the following digroups (depending on the mode) of the TR-08 system to the CO DDM-2000 port or T1 line:

- **Mode 1** — Digroup B
- **Mode 2** — Digroup CD

-
13. Does the appropriate **VTU/LIU DS1()** LED go off?

If **NO**, go to **TAP-113**.

If **YES**, continue with Step **14**.

DO ITEMS BELOW IN ORDER LISTED FOR DETAILS, GO TO

14. Determine the next digroup for the CO craftsperson to connect from the TR-08 system to the DDM-2000 or T1 line and proceed as follows:

If configured for ...	And the CO craftsperson has already connected ...	Then have the CO craftsperson connect ...	And ...
Mode 1	Digroup B	Digroup C	<i>Return to Step 13.</i>
	Digroup B Digroup C	Digroup D	<i>Return to Step 13.</i>
	Digroup B Digroup C Digroup D	—	<i>Continue with Step 15.</i>
Mode 2	—	—	<i>Continue with Step 15.</i>

⇒ **NOTE:**
After digroup D (or digroup CD for Mode 2) is connected, all alarms clear.

-
15. At the UIP, use the **TEST-VRT-ALARM** command to verify that each alarm shown in Table A will activate. Test all active (or in-service) VRTs. DLP-532

⇒ **NOTE:**
The **TEST-VRT-ALARM** command will send an alarm (Major, Minor, Digroup A, B, C, or D) for 30 seconds in the selected system and then automatically clear the alarm. If remoted alarm closures are to be tested, a craftsperson at the remote alarm center must verify that the alarm is received within the 30 seconds that the alarm is activated.

DO ITEMS BELOW IN ORDER LISTED FOR DETAILS, GO TO

Table A – TEST-VRT-ALARM Alarm Summary

Alarm Selected	SLC®-2000 Alarms	Central Office DLC Alarms	Remote Alarms
MAJOR Alarm	Major, NE Activity, Abnormal	FE, MJ	IDX, MJ, FE
MINOR Alarm	Minor, NE Activity, Abnormal	FE, MN	IDX, MN, FE
Digroup A [B,C,D] Alm	NE Activity, Abnormal	A [B,C,D]	IDX, A [B,C,D]

16. Is the MDS assembly configured for *metallic* or *FITL*?

If **metallic**, continue with Step 17.

If **FITL**, go to Step 20.

17. Perform single party channel tests in slots **6, 12, 18, and 24** and verify you can dial, talk, ring, and trip-ring on channels 21, 45, 69, and 93 of each slot. Also, perform MLT testing, if available. DLP-515

18. Update system records to reflect that the MDS assembly has been turned up for metallic service.

19. **You have completed this procedure.** Turn to the "Channel Unit Installation" tab and install channel units as required (**Channel Unit Installation: NTP-080**, "Install and Test SLC®-2000 Channel Units for Metallic Distribution").

20. Do you want to test the optional FITL order-wire feature?

If **YES**, continue with Step 21.

If **NO**, go to Step 25.



NOTE:

The FITL order wire is an optional feature and need not be tested on all DLC systems at the SLC-2000 RT.

DO ITEMS BELOW IN ORDER LISTED FOR DETAILS, GO TO

21. Set the options on an **AUA57 FSR** channel unit (use **D** or **S** option for 20 Hz). DLP-600
-

22. Are any optical units installed in the high density optics shelf (HDOS) slots associated with the DT Server slot to be tested?

If **YES**, continue with Step **23**.

If **NO**, go to Step **24**.



NOTE:

Optical units can include the **AYB1B**, **AYB1C**, **AYB5**.

23. Remove any optical units installed in the HDOS slots associated with the DT Server slot to be tested.
-

24. Perform channel tests using an **AUA57** channel unit in slots 1 and 5. DLP-533
-

25. Use **DLP-616** (*Channel Unit Installation* tab; "Provision and Install DT Server") and install DT Server units as required.



NOTE:

For procedures to turn up the *SLC-2000 MSDT*, see document 363-205-004, *SLC-2000 MSDT User/Service Manual*. For procedures to turn up the *DDM-2000 FiberReach multiplexer narrowband shelf (NBS)*, see document 363-206-301, *DDM-2000 FiberReach Multiplexer, Wideband/Narrowband Shelf, User/Service Manual*.

26. Update system records to reflect that the MDS assembly has been turned up for FITL service.

STOP. YOU HAVE COMPLETED THIS PROCEDURE.

Establish End-to-End DLC System for *SLC*[®]-2000 COT with a *SLC*-2000 RT

DO ITEMS BELOW IN ORDER LISTED FOR DETAILS, GO TO

Summary: If needed, install T1 and T0 cross-connections. Then, using the UIP, test the system to ensure that it can send alarms to the CO equipment. If you are turning up an RT, perform channel test and update records.

 **CAUTION:**
When handling circuit packs, always wear an electrostatic discharge wrist strap connected to an ESD ground jack on the user interface panel (UIP).

 **CAUTION:**
Take care to avoid damaging the LEDs that protrude through the openings in the faceplate of the circuit packs during handling and circuit pack installation.

 **NOTE:**
Refer to Chapter 1, "System Overview," for information on the software compatibility for universal configurations.

1. Verify that the procedure to equip an MDS assembly (**MDS Assembly Turnup: NTP-041**, "Equip an MDS Assembly") has been performed at both the COT and the RT.

-
2. At the COT and RT, install the standard T1 cross-connections using the UIP. DLP-522

 **NOTE:**
For TR-08 operation only.

 **NOTE:**
If T1 cross-connections other than the default cross-connections are used, refer to the work order and install the T1 cross-connections using a CIT.

DO ITEMS BELOW IN ORDER LISTED FOR DETAILS, GO TO

3. Are you installing standard TR-08 T0 cross-connections at this time?

If **YES**, continue with Step 4.

If **NO**, go to Step 5.

-
4. At the COT and RT, install the default T0 cross-connections using the UIP. DLP-523



NOTE:

If T0 cross-connections other than the default cross-connections are used, refer to the work order and install the T0 cross-connections using a CIT.

-
5. Establish communications with the far end.

DO ITEMS BELOW IN ORDER LISTED FOR DETAILS, GO TO

6. Determine which **VTU/LIU** LEDs correspond to the system being established as follows:

If the VTU/LIU indicator shows ...	And you're configured for ...	Then the corresponding digroup is ...
DS1(1)	Mode 1	Digroup A (lower or upper shelf in the MDS assembly).
	Mode 2 [*]	Digroup AB (for the lower shelf in the MDS assembly).
DS1(2)	Mode 1	Digroup B (lower or upper shelf in the MDS assembly).
	Mode 2 [*]	Digroup CD (for the lower shelf in the MDS assembly).
DS1(3)	Mode 1	Digroup C (lower or upper shelf in the MDS assembly).
	Mode 2 [*]	Digroup AB indicator (for the upper shelf in the MDS assembly).
DS1(4)	Mode 1	Digroup D (lower or upper shelf in the MDS assembly).
	Mode 2 [*]	Digroup CD (for the upper shelf in the MDS assembly).

* The SLC-2000 COT does not support Mode 2 operation.

-
7. At the RT, use the **TEST-VRT-ALARM** UIP command to verify that each alarm shown in Table A will activate. Also, verify that the alarm activates at the COT. DLP-532



NOTE:

The **TEST-VRT-ALARM** command will send an alarm (Major, Minor, Digroup A, B, C, or D) for 30 seconds in the selected system and then automatically clear the alarm. If remoted alarm closures are to be tested, a craftsperson at the remote alarm center must verify that the alarm is received within the 30 seconds that the alarm is activated.

DO ITEMS BELOW IN ORDER LISTED FOR DETAILS, GO TO

Table A – TEST-VRT-ALARM Alarm Summary

Alarm Selected	SLC[®]-2000 Alarms	Central Office DLC Alarms	Remote Alarms
MAJOR Alarm	Major, NE Activity, Abnormal	FE, MJ	IDX, MJ, FE
MINOR Alarm	Minor, NE Activity, Abnormal	FE, MN	IDX, MN, FE
Digroup A [B,C,D] Alm	NE Activity, Abnormal	A [B,C,D]	IDX, A [B,C,D]

8. Are you turning up a COT?

If **NO**, continue with Step **9**.

If **YES**, go to Step **12**.

9. Is the MDS assembly configured for *FITL* or *metallic* distribution?

If **metallic**, continue with Step **10**.

If **FITL**, go to Step **13**.

10. Perform single party channel tests in slots **21-24**, **45-48**, **69-72**, and **93-96**. Verify that you can dial, talk, ring, and trip-ring on the first channel (for example, channel 21) of each slot. DLP-515

11. Update system records to reflect that the MDS assembly has been turned up for metallic service.

12. Go to the *Channel Unit Installation* tab and install channel units as required (**NTP-080**, "Install and Test SLC-2000 Channel Units for Metallic Distribution").

STOP. YOU HAVE COMPLETED THIS PROCEDURE.

DO ITEMS BELOW IN ORDER LISTED FOR DETAILS, GO TO

13. Do you want to test the optional FITL order-wire feature?

If **YES**, continue with Step **14**.

If **NO**, go to Step **18**.



NOTE:

The FITL order-wire is an optional feature and need not be tested on all DLC systems at the *SLC-2000 RT*.

-
14. Set the options on an **AUA57 FSR** channel unit (use **D** or **S** option for 20 Hz). DLP-600
-

15. Are any optical units installed in the high density optics shelf (HDOS) slots associated with the DT Server slot to be tested?

If **YES**, continue with Step **16**.

If **NO**, go to Step **17**.



NOTE:

Optical units can include the **AYB1B**, **AYB1C**, **AYB5**.

-
16. Remove any optical units installed in the HDOS slots associated with the DT Server slot to be tested.
-

17. Perform channel tests using an **AUA57** channel unit in slots 1 and 5. DLP-533
-

18. Use **DLP-616** (*Channel Unit Installation* tab, "Provision and Install DT Server") and install DT Server units as required.



NOTE:

For procedures to turn up the *SLC-2000 MSDT*, see document 363-205-004, *SLC-2000 MSDT User/Service Manual*. For procedures to turn up the DDM-2000 FiberReach multiplexer narrowband shelf (NBS), see document 363-206-301, *DDM-2000 FiberReach Multiplexer, Wideband/Narrowband Shelf, User/Service Manual*.

19. Update system records to reflect that the MDS assembly has been turned up for FITL service.

STOP. YOU HAVE COMPLETED THIS PROCEDURE.

Establish End-to-End DLC System with an Integrated Network Access (INA) System

DO ITEMS BELOW IN ORDER LISTED FOR DETAILS, GO TO

Summary: This procedure is used to establish an end-to-end *SLC*®-2000 Access System with an INA system (for example, a D4 channel bank). At the RT, services from this system can be configured for metallic or FITL distribution.

Prerequisites: Prior to performing this procedure, verify the following:

- The procedure to equip the MDS assembly (**MDS Assembly Turnup: NTP-041**, "Equip an MDS Assembly") has been performed.
- The INA system is looped back to itself at the central office (CO) DSX-1 jacks with no alarms.
- The *SLC*-2000 INA DS1 is looped back to itself at the CO DSX-1 panel with no alarming.
- T1 cross-connections between the INA system and the *SLC*-2000 INA DS1s have been established at the CO's DSX-1 panel.
- The low-speed interface or the T1 line for the INA system was established at the CO and the line code and framing format is consistent with the work order.
- The INA circuits have been established using the work order.
- The TR-08 and/or TR-303 systems are equipped with the VRTs for the *SLC*-2000 system per office records. (Use **MDS Assembly Turnup: NTP-042** to establish TR-08 and/or TR-303 VRTs if not previously installed. First, establish the TR-08 circuit, then the TR-303 circuit.)



CAUTION:

When handling circuit packs, always wear an electrostatic discharge wrist strap connected to an ESD ground jack on the user interface panel (UIP).



CAUTION:

Take care to avoid damaging the LEDs that protrude through the openings in the faceplate of the circuit packs during handling and circuit pack installation.

DO ITEMS BELOW IN ORDER LISTED FOR DETAILS, GO TO

1. Establish the INA T1 cross-connections at the RT using the **ENT - CRS - T1** CIT command. DLP-526
-

2. Do you want to establish T0 cross-connections at this time?

If **YES**, continue with Step 3.

If **NO**, go to Step 4.

3. Establish the T0 cross-connections using the **ENT - CRS - T0** CIT command. (Refer to the work order and install the T0 cross-connections using a CIT.) DLP-527
-

4. Using the work order, set the INA line code and frame format required to interface with the INA system.



NOTE:

Use the **ED - T1** or **ED - INA** CIT command. Refer to document 363-208-003, *SLC-2000 Access System, Commands and Messages*.

5. Establish communications with the far end.
-

6. At the RT, determine which **VTU/LIU** LEDs correspond to the INA system being established. Table A shows this relationship.

Table A – VTU/LIU and Corresponding INA System

DS1/INA Feeder	VTU/LIU Slot	DS1 LED	Physical DS1 Port
1 through 4	1	1 through 4	a-1-1 through 4
5 through 8	2	1 through 4	a-2-1 through 4
9 through 12	3	1 through 4	a-3-1 through 4
13 through 16	4	1 through 4	a-4-1 through 4
17 through 20	5	1 through 4	a-5-1 through 4
21 through 24	6	1 through 4	a-6-1 through 4
25 through 28	7	1 through 4	a-7-1 through 4

DO ITEMS BELOW IN ORDER LISTED FOR DETAILS, GO TO

7. Select the first DS1 of the INA system for the CO craftsperson to connect.

-
8. Have the CO craftsperson connect the selected DS1 of the INA system being established to the correct SONET CO port or T1 line for the RT.

Response: The **DS1() VTU/LIU** LED associated with the system goes off.

-
9. Does the **VTU/LIU DS1()** LED associated with the system go off?

If **NO**, go to **TAP-113**.

If **YES**, continue with Step **10**.

-
10. Have all DS1 INAs been connected?

If **YES**, go to Step **12**.

If **NO**, continue with Step **11**.

-
11. Select the next DS1 INA for the CO craftsperson to connect.
Return to Step 8.

-
12. Is the MDS assembly configured for *metallic* or *FITL*?

If **metallic**, continue with Step **13**.

If **FITL**, go to Step **16**.

-
13. Go to the *Channel Unit Installation* tab and install channel units as required (**Channel Unit Installation: NTP-080**, "Install and Test SLC-2000 Channel Units for Metallic Distribution").

-
14. For INA established lines, perform channel tests. Refer to the channel unit installation test for the specific special service or other type of channel unit.

DLP-515

-
15. Update system records to reflect that the MDS assembly has been turned up for metallic service.

STOP. YOU HAVE COMPLETED THIS PROCEDURE.

DO ITEMS BELOW IN ORDER LISTED FOR DETAILS, GO TO

16. Set the options on an **AUA57 FSR** channel unit (use **D** or **S** option for 20 Hz). DLP-600
-

17. Are any optical units installed in the high density optics shelf (HDOS) slots associated with the DT Server slot to be tested?

If **YES**, continue with Step **18**.

If **NO**, go to Step **19**.



NOTE:

Optical units can include the **AYB1B**, **AYB1C**, **AYB5**.

18. Remove any optical units installed in the HDOS slots associated with the DT Server slot to be tested.
-

19. Perform channel tests using an **AUA57** channel unit in slots 1 and 5. DLP-533
-

20. Use **DLP-616** (*Channel Unit Installation* tab, "Provision and Install DT Server") and install DT server units as required.



NOTE:

For procedures to turn up the *SLC-2000 MSDT*, see document 363-205-004, *SLC-2000 Multi-Services Distant Terminal (MSDT) Feature, User/Service and Ordering Manual*. For procedures to turn up the *DDM-2000 FiberReach multiplexer narrowband shelf (NBS)*, see document 363-206-301, *DDM-2000 FiberReach Multiplexer, Wideband/Narrowband Shelf, User/Service Manual*.

21. Update system records to reflect that the MDS assembly has been turned up for FITL service.

STOP. YOU HAVE COMPLETED THIS PROCEDURE.

Introduction

General

This tab provides procedures to add, change, or remove service in a *SLC*[®]-2000 Access System.

When adding DS1 services, in this procedure it is assumed that the SONET or metallic feeder subsystem is turned up and connected end to end. The digital loop carrier (DLC) systems in the metallic distribution shelves must be established end to end using the *MDS Turnup Tab* procedures before channel units can be installed.

When adding DS0 (individual circuit) services, the specific DS0 circuits must be provisioned for the service, the appropriate channel unit(s) must be installed, and the necessary DS0 and DS1 cross-connections must be provisioned (at each end of the transmission facility if the configuration includes a COT). Refer to **NTP-079** for details.

Contents of This Tab

-  **CAUTION:**
Take care to avoid damaging the LEDs that protrude through the openings in the faceplate of the circuit packs during handling and circuit pack installation.
-  **CAUTION:**
When handling circuit packs, always wear an electrostatic discharge wrist strap connected to an ESD ground jack on the user interface panel (UIP) or fan assembly.
-  **CAUTION:**
In dusty areas (for example, near construction sites), tent the RT cabinet to protect electronic equipment whenever cabinet doors are opened for extended periods.

-  **NOTE:**
For SONET taper and ring cross-connect philosophy, see **DLP-520**.

Prerequisite: Read the introduction section of this tab before proceeding.

Establish DS1 Services for SONET	NTP-060
Establish End-to-End System <i>SLC</i> [®] -2000 OC-3 Optical Fiber Span Extension STS-1 (Whole Function Group) Taper	NTP-061
Discontinue Service at a <i>SLC</i> [®] -2000 Remote Terminal (RT) for a TR-08 Universal System	NTP-062
Install and Test <i>SPQ</i> [®] 450 Channel Unit at RT for Analog to Integrated <i>SLC</i> [®] Precutover	NTP-063
Convert a Point-to-Point System to Ring System.	NTP-064
Add New <i>SLC</i> -2000 OC-3 Node (Shelf) to OC-3 VT1.5 Path Switched Ring.	NTP-065
Convert (Upgrade) <i>SLC</i> [®] -2000 Access System to DS1 Add/Drop System	NTP-067
Convert Service from Mode 1 to Mode 2 or from Mode 2 to Mode 1	NTP-068

Upgrade DLC Subsystem Software from Release 3.1 to Release 3.2 or Higher	NTP-069
Convert Integrated TR-08 Service to TR-303 Service at the <i>SLC-2000</i> Remote Terminal (RT)	NTP-071
Upgrade DLC Subsystem Software (Release 3.02.01 to Release 4.02.00 or Higher)	NTP-073
Upgrade DLC Subsystem Software (Release 4.0X.0X to Release 4.02.00 or Higher)	NTP-074
Upgrade DLC Subsystem Software (Release 3.2 to Release 3.3)	NTP-075
Upgrade DLC Subsystem <i>SPQ</i> ®809 to <i>SPQ</i> 810	NTP-076
Upgrade SONET Subsystem OC-3 Ring Network to OC-12 Ring Network Using OC-3 Shelves In Service	NTP-077
Add DS1 Service to an In-Service <i>SLC-2000</i> TR-303 System	NTP-078
Provision Individual DS0 Circuits for Service.	NTP-079

Establish DS1 Services for SONET

DO ITEMS BELOW IN ORDER LISTED FOR DETAILS, GO TO

1.



CAUTION:

When handling circuit packs, always wear an electrostatic discharge wrist strap connected to an ESD ground jack on the user interface panel (UIP) or fan assembly.



CAUTION:

Take care to avoid damaging the LEDs that protrude through the openings in the faceplate of the circuit packs during handling and circuit pack installation.

Verify that the procedure to establish the SONET subsystem (**ARM Shelf Turnup: NTP-015** or **NTP-023**, "Establish End-to-End System *SLC*®-2000 OC-3 Optical Fiber Spans") has been done.

-
2. For *ring* or *taper* system configurations, verify proper SONET cross-connections have been made per system records or work order.

Reference: DLP-520

-
3. If required, install **BBG2 MXRVO** plug-ins in Function Group C **FUNCTION(C) 1** then **FUNCTION(C) 2** slots.

Response: For **FUNCTION(C) 1** slot, the **MXRVO FAULT** lights for less than 30 seconds and then goes off. The **ACTIVE** LED lights.

For **FUNCTION(C) 2** slot, the **MXRVO FAULT** lights for less than 30 seconds and then goes off.

DO ITEMS BELOW IN ORDER LISTED FOR DETAILS, GO TO

4. Test **MXRVO** protection switching function by momentarily removing the **MXRVO** (for at least 15 seconds) that has its **ACTIVE** LED lighted. Verify that the **ACTIVE** LED on the other **MXRVO** circuit pack lights.

-
5. Perform an LED test. Verify that all LEDs light.
-

DLP-507

- 6.



NOTE:

Standard DS1 transmitter sources are designed to terminate in a nominal 100-ohm impedance. This termination is usually provided by the receiving equipment. When not connected to receiving equipment (that is, idle or unterminated), DS1 transmitter equipment should be terminated in a 100-ohm load. When connecting through DSX equipment, this can be accomplished with terminating plugs available from the DSX manufacturer. Any alternative method may be used resulting in 100 ohms across the TIP and RING of the DS1 circuit output while in an idle state. Failure to terminate DS1 outputs may result in violation of FCC Part 15 emission requirements and possibly interfere with other electronic equipment. Also, AIS should be turned off (using the **set - t1: address: ais=no** command) on any DS1 circuit that is not in service.

Option and install required service **DS1/DS1PM** plug-ins. Install protection **DS1/DS1PM** plug-in and **177A** Retainer Cards, if required.

DLP-510

Comment: **NE** or **FE Activity** alarms will clear when both the CO and RT are equipped with the same DS1 port service capabilities.

DO ITEMS BELOW IN ORDER LISTED FOR DETAILS, GO TO

7.



NOTE:

DS1 cross-connections must be made on the SONET subsystem as VT1.5 cross-connections.

Make required DS1 cross-connection(s) for circuit(s) being added.

8. Assist central office craftsperson to perform DS1 transmission tests if required (such as installing a DS1 loopback patch cord).

9. Perform an LED test. Verify that all LEDs light.

DLP-507

Establish End-to-End System *SLC*[®]-2000 OC-3 Optical Fiber Span Extension STS-1 (Whole Function Group) Taper

DO ITEMS BELOW IN ORDER LISTED FOR DETAILS, GO TO

General: This procedure is used to equip Function Group **C** with **OLI** circuit packs to add an access point node to the SONET network. Function Group **C** must not have any DS1 services circuit packs (**MXRVO** or **DS1** circuit packs) installed. Remove DS1 services from Service Group **C** before doing this procedure, if required (**Circuit Order: NTP-062**, "Discontinue Service at a *SLC*-2000 Remote Terminal").

This procedure is used to drop STS-1 A to the local *SLC*-2000 DLC subsystem and pass STS-1 B and STS-1 C to another *SLC*-2000 RT. The optical span from Function Group **C** should be connected to **MAIN** of the second *SLC*-2000 RT, and Service Group B should be cross-connected to muldem A of this second *SLC*-2000 RT. Function Group C can be passed to a third *SLC*-2000 System, if desired, after the second RT is turned up.

1.



CAUTION:

Unterminated optical connectors may emit invisible laser radiation. Eye damage may occur if beam is viewed directly or with improper optical instruments. Avoid direct exposure to the beam.



CAUTION:

When handling circuit packs, always wear an electrostatic discharge wrist strap connected to an ESD ground jack on the user interface panel (UIP) or fan assembly.

DO ITEMS BELOW IN ORDER LISTED FOR DETAILS, GO TO



CAUTION:

Take care to avoid damaging the LEDs that protrude through the openings in the faceplate of the circuit packs during handling and circuit pack installation.



NOTE:

This procedure assumes that the *SLC-2000 Access Resource Manager (ARM)* shelf has been turned up and is in service end-to-end. It also assumes that Function Group **C** is unequipped.

Install **OLIU** plug-ins in **FUNCTION (C) 1** and **2(P)** slots. If **21G OLIUs** are used, set **HIGH/LOW POWER** switch to **LOW**. DLP-504

2. Install **OLIU** optical loops. DLP-505

3. Perform an LED test. DLP-507

4. When ready to establish the new OC-3 optical span, remove optical loops from **OLIUs** in the optical span for Function Group **C**.

Comment: This will cause the **Critical** alarm to light.

5. If **21G OLIUs** are used, set the option switches on the **21G OLIUs** to agree with the loss of the optical facility. DLP-504

6.



NOTE:

If the option switch setting is changed, an update must be done by momentarily depressing the **UPD/INIT** button on the **SYSCTL** after the **OLIU** is installed.

Reinstall **OLIUs** (if removed), press the **UPD/INIT** button on the **SYSCTL**, and connect the new optical span being established to the multiplexer **OLIUs** at each end. Start with the local **FUNCTION C 1 OLIU** to far-end **MAIN 1 OLIU** and then **FUNCTION C 2(P)** to **MAIN 2(P)**. DLP-511

Comment: This assumes the far-end *SLC-2000 RT* has been turned up and passed loopback tests using this document.

DO ITEMS BELOW IN ORDER LISTED FOR DETAILS, GO TO

7. When the *SLC-2000* RT is connected to the network, you may have a **Major** alarm and a **FAULT** LED lighted on the **SYSTL** and/or **OHCTL** caused by a duplicated site/ne address, TBOS display, or TID. Use the craft interface terminal **rtrv-alm** command to look for this type of trouble. DLP-517 can be used to clear this trouble by changing the appropriate setting.

-
8. Test protection switching function, if required. DLP-509
-

9.



NOTE:

The **rlgn** command can be used to provision the SONET subsystem in the central office.

Use the **rtrv-crs** command at this RT to see if the proper cross-connections have been made to a new RT. If required, use the **ent-crs-sts1()** command at this RT to make cross-connections.

DLP-520

The **set-ne:TID=x;crs>manual** may need to be done before cross-connections can be made. You may have to delete standard cross-connections before making new cross-connections using the **dlt-crs-sts1** command (for example, **dlt-crs-sts1:m-1,a-1** is used to delete STS-1 to Function Group A standard cross-connection). To cross-connect STS-1 B to STS-1 A of a second RT, use the **ent-crs-sts1:m-2,c-1** command in the second RT SONET subsystem. To cross-connect STS-1 C to STS-1 A of a third RT, use the **ent-crs-sts1:m-3,a-1** command in the third RT SONET subsystem.

-
10. Update office records.

Discontinue Service at a *SLC*[®]-2000 Remote Terminal (RT) for a TR-08 Universal System

DO ITEMS BELOW IN ORDER LISTED FOR DETAILS, GO TO

General: This procedure is used to remove service for either the SONET subsystem (DS1 services) or the digital loop carrier (DLC) subsystem (carrier system services). Before doing this procedure, verify that all customer service has been discontinued or rerouted. ***Have the central office DDM-2000 discontinue service at the same time the RT services are removed.*** To discontinue service, remove the input signal, press the **Update** or **UPD/INT** button, then remove the proper plug-in circuit pack and press **Update** or **UPD/INT** again. Press **Update** or **UPD/INT** every time a circuit pack is removed. Protection circuit packs should be removed last.

This NTP provides procedures to remove DLC, DS1, Function Group, and OC-3 span services.

⇒ **NOTE:**
When removing circuit packs in the SONET subsystem, a **Minor** alarm will be generated if the Function Groups (A and C) are not equipped the same at both ends (for example, to remove a **VTU** in Function Group A slot 1, you must also remove a **DS1** pack installed at the DDM-2000 Function Group A slot 1 not to generate a **Minor** alarm). These ***alarms will not clear until the Function Groups at both ends are equipped to support the same services.***

1.

⚠ **CAUTION:**
When handling circuit packs, always wear an electrostatic discharge wrist strap connected to an ESD ground jack on the user interface panel (UIP) or fan assembly.

⚠ **CAUTION:**
Take care to avoid damaging the LEDs that protrude through the openings in the faceplate of the circuit packs during handling and circuit pack installation.

DO ITEMS BELOW IN ORDER LISTED FOR DETAILS, GO TO

Verify that all customer service associated with the service being removed has been discontinued or rerouted at the central office.

What type of service do you want to remove?

If **DLC** services, then continue with Step 2.

If **DS1** services, then proceed to Step 15

If **function group** services, then proceed to Step 21.

If **OLIUC-3** services, then proceed to Step 27.

Remove DLC System

2. At both the RT and COT, ensure that a VTU is installed in the protection slot.
-

3. At the COT, use the **DLT-CRS-T1** command to delete all four T1 cross-connections on the VRT associated with the VTU to be removed.

Response: This sends AIS to the RT and changes all four ports on the VTU at the RT to the **OOS-MT** state. Service should switch to the protection VTU (Minor and FE LEDs will light).

4. Remote log in to the RT site. Using the **DLT-CRS-T1** command, delete all four T1 cross-connections on the RT VRT associated with the VTU to be removed.

Response: This sends AIS to the COT and changes all four ports on the VTU at the COT to the **OOS-MT** state.

5. Have central office personnel turn down the carrier system equipment.

Response: The yellow **DS1() VTU** LEDs associated with the system will light. **Major** and **FE Activity** LEDs light.

DO ITEMS BELOW IN ORDER LISTED FOR DETAILS, GO TO

6. At the RT, remove the **MDC** packs associated with the DLC system.

Response: **Major** alarm clears. (All alarms will clear after the CO DDM-2000 or *SLC*-2000 system is updated.)

-
7. At the RT, remove the **PTU** packs, **T8U** packs, and all channel units associated with the DLC system.

-
8. At the COT, perform an UPDATE.

Response: Each port on the VTU changes to the **OOS-MTAuto** state.

-
9. If needed, remote log in to the RT. Update the DLC subsystem using the **upd** command.

Response: Each port on the VTU changes to the **OOS-MTAuto** state.

10.



CAUTION:

Before removing any VTU, ensure that the protection VTU is equipped. If the protection VTU is not equipped, the UPDATE will fail.



NOTE:

A **VTU** supports two Mode 2 DLC systems. It is not necessary to remove the **VTU** packs unless you plan to remove the **MXRVO** circuit packs in Function Group A. The system will have FE Activity alarms when VTU packs are removed until the corresponding DS1 packs are removed at the CO DDM-2000 and that system is updated.



NOTE:

If you plan to remove the **MXRVO** circuit packs, remove the protection **VTU** pack last.

If needed, remove the VTU at the COT and update the COT again.

Response: The VTU changes from the equipped state to the **OOS-MTUEQAuto** (unequipped) state.

DO ITEMS BELOW IN ORDER LISTED FOR DETAILS, GO TO

11. If the VTU was removed at the COT (above), remove the VTU at the RT and update the RT again.

Response: The VTU changes from the equipped state to the **OOS-MTUEQAuto** (unequipped) state.

-
12. If needed, delete the T0 cross-connections made in the VRT associated with the VTU at the RT (and the COT if it is a SLC-2000 system). (Use a remote login to the RT.)
-

13. Update system records.
-

14. If you want to remove other services from the system, repeat from Step 1. Otherwise,

STOP. YOU HAVE COMPLETED THIS PROCEDURE.

Remove DS1 Services

15. Remove digital line signals from the **DS1** circuit pack.

Response: The **FAULT** LED flashes on the **DS1** pack. **Major** or **Minor** and **NE Activity** LEDs light.

-
16. Press the **UPD/INT SYSCTL** button.

Response: The **FAULT** LED on the **DS1** pack goes off.

17. If the system was established with VT1.5 cross-connections, use the **dlt-crs** command to delete cross-connections, as required, associated with the VTU that is to be removed.
-

18. Remove the **DS1** pack after all DS1 service has been discontinued.

Comment: A **DS1** pack supports four DS1 channels. It is not necessary to remove the **DS1** packs unless you plan to remove the **MXRVO** circuit packs in Function Group C. The system will have FE Activity alarms when DS1 packs are removed until the corresponding DS1 packs are removed at the other end and that system is updated.

If you plan to remove the **MXRVO** circuit packs, remove the protection **DS1** pack last.

DO ITEMS BELOW IN ORDER LISTED FOR DETAILS, GO TO

19. Update system records.

20. If you want to remove other services from the system, repeat from Step 1. Otherwise,

STOP. YOU HAVE COMPLETED THIS PROCEDURE.

Remove Function Group A or C Services

21. Remove DS1 services or DLC services using the appropriate steps in this NTP.

22. Remove one of the **MXRVO** packs in the function group. Then press the **UPD/INT SYSCTL** button.

Response: **Minor** and **NE Activity** LEDs light and go off after pressing the **UPD/INT** button.

23. Remove the other **MXRVO** pack in the function group. Then press the **UPD/INT SYSCTL** button.

Response: **Major** and **NE Activity** LEDs light and go off after pressing the **UPD/INT** button.

24. Remove the corresponding **MXRVO** packs in the other end and update the system.

25. Update system records.

26. If you want to remove other services from the system, repeat from Step 1. Otherwise,

STOP. YOU HAVE COMPLETED THIS PROCEDURE.

Remove OC-3 MAIN, A, or C Span

27. To remove the MAIN function group OC-3 span, first remove DS1, DLC, and Function Group C and A services using the previous steps.

28. Remove one of the **OLIU** packs in the function group. Then press the **UPD/INT SYSCTL** button.

Response: **Minor** and **NE Activity** LEDs light and go off after pressing the **UPD/INT** button.

DO ITEMS BELOW IN ORDER LISTED FOR DETAILS, GO TO

29. Remove the other **OLI**U pack in the function group. Then press the **UPD/INT SYSCTL** button.

Response: **Critical** and **NE Activity** LEDs light and go off after pressing the **UPD/INT** button.

-
30. Update system records.
-

31. If you want to remove other services from the system, repeat from Step **1**. Otherwise,

STOP. YOU HAVE COMPLETED THIS PROCEDURE.

Install and Test *SPQ*[®]450 Channel Unit at RT for Analog to Integrated *SLC*[®] Precutover

DO ITEMS BELOW IN ORDER LISTED FOR DETAILS, GO TO

Summary: This procedure is used to install and test the *SPQ*450 channel unit prior to cutting service over to an integrated *SLC*-2000 Access System.

Figure 1 shows the ALIC5 cutover arrangement.

 **NOTE:**
The ALIC5 function is only supported in TR-08 virtual remote terminals (VRTs).

1. Obtain test equipment necessary to test an *SPQ*450 type channel unit, as follows:
 - A telephone set, equipped with a bridged ringer
 - A volt-ohm-meter (VOM)
 - A Return Loss Measurement Set - HP4937A or equivalent.

Comment: If bridge lifters are required, use Model 1574D (or equivalent) sold by:
Coil Sales & Manufacturing Company
Charles Center, 5600 Apollo Drive
Rolling Meadows, Illinois 60008
Telephone: (708) 806-6300

DO ITEMS BELOW IN ORDER LISTED FOR DETAILS, GO TO

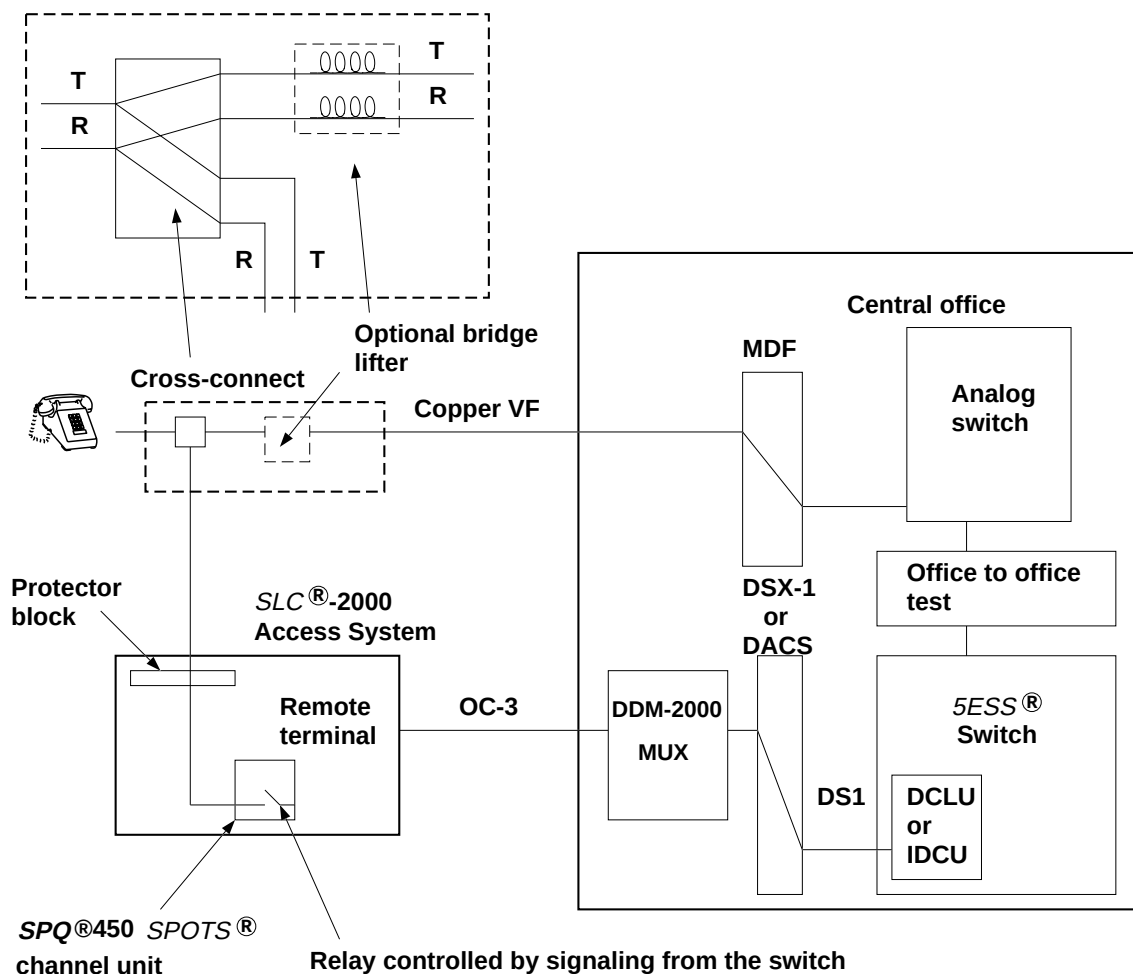


Figure 1 – ALIC5 Cutover Arrangement

DO ITEMS BELOW IN ORDER LISTED FOR DETAILS, GO TO

2.



CAUTION:

This procedure is not to be started unless it has been verified that the tip and ring leads of the remote terminal drop are not connected to an in-service circuit (removing the protector is an easy method to disconnect the leads).



NOTE:

Switching personnel must provision the channel for loop or ground start according to the type of service before beginning this procedure. Provisioning the switch to comply with the service order is done via a Recent Change/Verify procedure.



NOTE:

The *SPQ450* has no option settings; however, the active and inactive states of the channel unit are controlled by the digital switch.

Active = Postcutover

Inactive = Precutover

Request the switching craftsperson to provision the *SPQ450* channel unit for the postcutover (active) state using Sections 6 and 7 of document 235-105-200, *5ESS® Switch Precutover and Cutover Procedures*, Issue 7.

3.	At the RT, for the circuit being installed, verify correct operation for loop or ground start operation.	DLP-602

4.	If desired (optional), check automatic loss compensation channel unit function.	DLP-613

5. At the bridging location (RT), verify that the *SPQ450* tip/ring leads are not reversed by terminating with a test telephone and measuring voltage polarity. Get a VOM and condition to measure DC volts. Attach RED (+) lead to tip and BLACK (–) meter lead to ring. If voltage is between +4 and +15 V DC when the test telephone is off-hook, polarity is correct.

DO ITEMS BELOW IN ORDER LISTED FOR DETAILS, GO TO

6. Request the switching craftsperson to provision the *SPQ450* channel unit for the precutover (inactive) state.
-

7. Measure the voltage across ring to ground. Attach RED (+) lead to ground and BLACK (–) meter lead to ring.
-

8. Is result less than 2 volts?

If **YES**, then continue with Step 9.

If **NO**, then proceed to Step 11.

9. Condition the VOM to measure resistance. Measure resistance across tip to ground and ring to ground.
-

10. Are both results greater than 200 kohms?

If **YES**, then proceed to Step 13.

If **NO**, then continue with Step 11.

11. At RT, check the connection to the channel unit. Correct wiring trouble, if any, and verify the correct channel unit slot number and circuit are used.
-

12. Verify that the correct circuit and *SLC-2000* system have been entered into the switch data base and that the circuit has been provisioned for the precutover (inactive) state.

Repeat from Step 7.

13. With *SPQ450* CU operating properly, verify that the switch person is ready for the *ALIC5* circuit to be bridged to the working circuit (in other words, verify that the switch will not activate the channel unit until the RT craftsperson verifies that the circuit is idle).

DO ITEMS BELOW IN ORDER LISTED FOR DETAILS, GO TO

14. Is bridge lifter to be used at connection point?

If **YES**, then continue with Step **15**.

If **NO**, then proceed to Step **16**.

15. At the proposed point of connection to the working circuit, verify that the circuit is idle and then connect the saturable-inductor bridge lifter in series with tip and ring on the leg from the connection point to the analog switch.
-

16. At the proposed bridging location to the working circuit, verify that the circuit is idle and then bridge the cable pair from the *SPQ450* channel unit to the working circuit. From the *SPQ450* faceplate, verify the connection by using a telephone set (or butt set) to dial a test line in the analog switch.

Comment: If the circuit is ground start, you must momentarily ground the ring lead to obtain dial tone.

17. Is the bridged circuit to be evaluated for transmission quality from the customer's location?

If **YES**, then continue with Step **18**.

If **NO**, then proceed to Step **24**.

18. At the customer location, verify that the circuit is idle, request the switch person at the analog switch to disconnect this circuit, and request the digital switch person to place the *ALIC5* channel unit in the active state. Attach a transmission measuring set, dial up a 105-type test line in the integrated switch, and measure the signal level at 0.4, 1.0, and 2.8 kHz, and measure noise.

DLP-614

Comment: The Trunk and Line Work Station at the *5ESS* switch can be used to send and measure tones.

DO ITEMS BELOW IN ORDER LISTED FOR DETAILS, GO TO

19. Is signal level at 1.0 kHz greater than -8.5 dBm? (For example, -8 dBm is greater than -8.5 dBm.)

If **YES**, then continue with Step **20**.

If **NO**, continue with Step **20**, but note that the circuit has too much loss and record the result. You may be required to install bridge lifters for acceptable service.

-
20. Record signal levels at 0.4 kHz, 1.0 kHz, and 2.8 kHz for later report to responsible engineering center.
-

21. Is noise less than 20 dBmC?

If **YES**, then continue with Step **22**.

If **NO**, continue with Step **22**, but note that the circuit is too noisy and record the result. "You may be required to install bridge lifters for acceptable service."

-
22. Report to responsible engineering center the transmission results measured above and continue with Step **23**.
-

23. For a business circuit, first terminate line with a telephone set, then attach a TMS (using its RECEIVE jack and with impedance set to $600\ \Omega$, refer to DLP-614, Steps 2 through 5) to make necessary connection for return loss test. At the switch, command the ALIC5 circuit to be connected to a four-wire test port, if available; otherwise, to a two-wire test port. Disconnect the telephone set. At the CO, condition an HP-4937A (or equivalent) measuring set to measure return loss on a four-wire or two-wire basis as required. Measure return loss at the switch test port. Echo return loss (ERL) should be greater than 8 dB, singing return loss (SRL)-Low should be greater than 4 dB, and SRL-High should be greater than 4 dB. Record and report the results to the responsible engineering center.
-

24. Request switching craftsperson to provision the *SPQ450* channel unit for precutover (inactive) state.
-

STOP. YOU HAVE COMPLETED THIS PROCEDURE.

Convert a Point-to-Point System to a Ring System

DO ITEMS BELOW IN ORDER LISTED FOR DETAILS, GO TO

Summary: This procedure, changing a point-to-point system to a ring system, requires cooperation between the central office (CO) and the remote terminal (RT). Both ends must be equipped with **22F OLIUs** in the **MAIN 1** and **2** slots. All cross-connections must be converted from *default* to *manual VT1.5* cross-connections. The fibers must be switched between **MAIN 1 and MAIN 2 OLIUs** as shown in Figure 1. This can be done *in service* or *out of service*. After the fibers are switched, the ring SONET generic (Release 7.#.#) must be loaded at both ends. If the DLC is being upgraded to Release 4.x or higher, the SONET software must be Release 7.1.02 or higher.

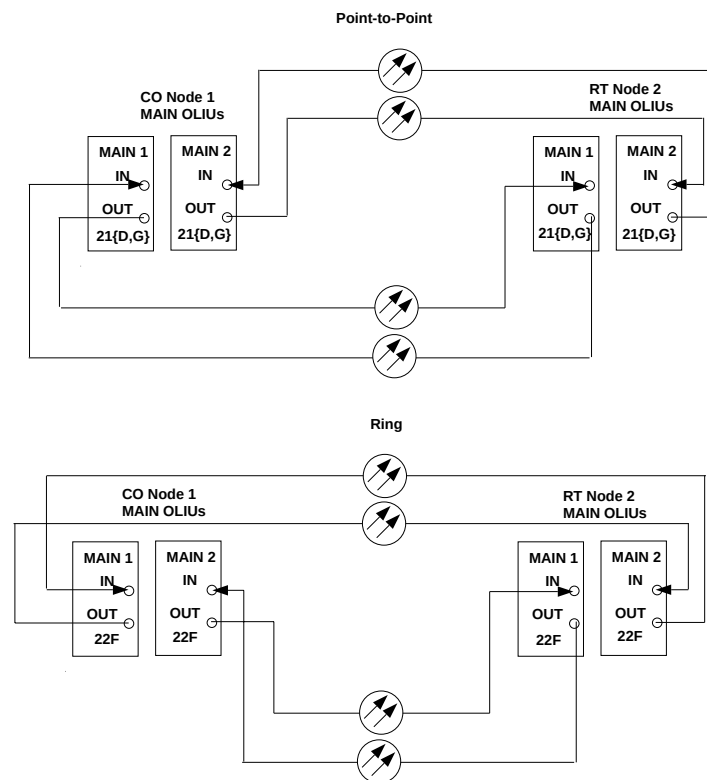


Figure 1 – OC-3 Point-to-Point and Ring OLIU Fiber Connections

DO ITEMS BELOW IN ORDER LISTED FOR DETAILS, GO TO



CAUTION:

*This procedure requires **22F OLIU** circuit packs in all shelves. **22F OLIU** circuit packs will not support span lengths as long as **21G OLIU** circuit packs will support. If existing **OLIUs** will be replaced in this procedure, you must determine if the **22F OLIUs** will support the existing span length. Optical line power measurements and/or office records must be used to verify that the existing span length can be supported.*



CAUTION:

When handling circuit packs, always wear an electrostatic discharge wrist strap connected to an ESD ground jack on the user interface panel (UIP) or fan assembly.



NOTE:

All nodes in the same network must have the same software release.



NOTE:

You may also contact Lucent Technologies to provide an in-service upgrade. Experienced Lucent Technologies installers will help you plan and execute the network upgrade. For more information, contact your Lucent Technologies Account Representative.

DO ITEMS BELOW IN ORDER LISTED FOR DETAILS, GO TO

1. Is the CIT located locally or at a remote location? DLP-521

If **locally**, then continue with Step 2.
If **remote location**, then go to Step 3.

-
2. Connect a craft interface terminal to the user interface panel and log in to the SONET subsystem. Note the node's *TID*=target identifier.

Proceed to Step 3.

-
3. Using the CIT at the remote location, log in to the SONET subsystem. Note the node's *TID*=target identifier. DLP-541

-
4. Use the **rtrv-alm:** command to verify that no alarms, locks, loops, or switches are present.

-
5. Establish communications with craftsperson at the CO end. DLP-504

-
6. Replace **OLIUs** in **MAIN 1** and **MAIN 2** slots with **22F OLIUs**, if not already done. (Protection **OLIUs** are required.)

-
7. At **both** the CO and RT ends, use **set-ne:TID:crs>manual** command to set cross-connect mode to manual.

-
8. Use the CIT commands

cnvt-crs:a1,m-1
cnvt-crs:b1,m-2
cnvt-crs:c1,m-3

to convert all default STS-1 cross-connections to corresponding VT1.5 cross-connections at **both** shelves.

-
9. Use the **set-fecom:dcc-m:com=disabled** command to disable far-end communications (fecom) at the near-end shelf.

DO ITEMS BELOW IN ORDER LISTED FOR DETAILS, GO TO

10.



CAUTION:

*Transmission configuration information for in-service systems is stored on the **TGS** circuit pack in **TGS** slot **1**. In some instances (for example, during system tests or while performing this upgrade), if the version of software being installed is not compatible with the current transmission configuration, it may be necessary to remove the **TGS** circuit pack in **TGS** slot **1** in order to force the system to run the software you are trying to download. If both **TGS** circuit packs are not installed, removal of the only **TGS** circuit pack would cause service interruption.*

Ensure both **TGS** circuit packs are installed. Then, use the **switch-sync:s=circuitpack,pri>manual** command to switch to the protection **TGS 2** circuit pack. Verify **ACTIVE** is lighted on the **TGS** pack in slot **2**, then remove **TGS** pack in slot **1** (so the new SONET generic will be forced to run).

11.



CAUTION:

*This step may interrupt service until the optical lines have been properly reconnected. Notify maintenance center and other required personnel that service may be interrupted. Then, use the **switch-sync:s=circuitpack,pri=inhibit** command.*



NOTE:

In the ring configuration, optical fibers from **MAIN 1** at one node is connected to **MAIN 2** at the adjacent node.

At this point the CO must frog the fibers at node 1 for rings as shown in Figure 1.

If this is to be done without interrupting service, use the **switch-line:main:pri>manual** command.

12. Upgrade both nodes (shelves) with rings software. (Software upgrades must be made locally at each shelf.)

DLP-513

DO ITEMS BELOW IN ORDER LISTED FOR DETAILS, GO TO

13. Reinstall **TGS** circuit pack in TGS slot **1**. Then, use the
switch-sync:s=circuitpack,pri=reset command.
14. Use **set-fecom:dcc-all:com=enabled** command at both
ends to enable far-end communications (fecom).
15. The ring configuration is now complete, and new nodes may be
added as required [**Circuit Order: NTP-065**].

Add New *SLC*[®]-2000 OC-3 Node (Shelf) to OC-3 VT1.5 Path Switched Ring

DO ITEMS BELOW IN ORDER LISTED FOR DETAILS, GO TO

1.



CAUTION:

When handling circuit packs, always wear an electrostatic discharge wrist strap connected to an ESD ground jack on the user interface panel (UIP) or fan assembly.



NOTE:

In this procedure it is assumed that all existing nodes are in service and a new RT site (shelf) is being added to the VT1.5 path switched ring configuration. Release 5 or later software is required. (See Figure 1.)



NOTE:

It is assumed that optical loops are installed on the new shelf, that the new shelf has been tested in a looped back configuration, and that the proper release of software (Release 5) has been loaded [**ARM Shelf Turnup: NTP-014** or **NTP-022**].



NOTE:

All shelves in the same network must have the same or compatible software releases.



NOTE:

This procedure requires information from other sites in the network, either through remote modem connection or by having a technician at the neighboring site.



NOTE:

If the *SLC*-2000 system fails to respond in the indicated manner, refer to **Trouble Clearing: IXL-007**.

Is the CIT located locally or at a remote location?

If **locally**, then continue with Step 2.

If **remote location**, then go to Step 3.

DO ITEMS BELOW IN ORDER LISTED FOR DETAILS, GO TO

2. Connect a craft interface terminal (CIT) to the user interface panel (UIP) to log in to the SONET subsystem and use the **rtrv-alm** command to verify that no alarms, locks, loops, or switches are present. DLP-521

Proceed to Step 4.

3. Using the CIT at the remote location, log in to the SONET subsystem and use the **rtrv-alm** command to verify that no alarms, locks, loops, or switches are present. DLP-541

4. Notify maintenance center that alarms will be generated.
-

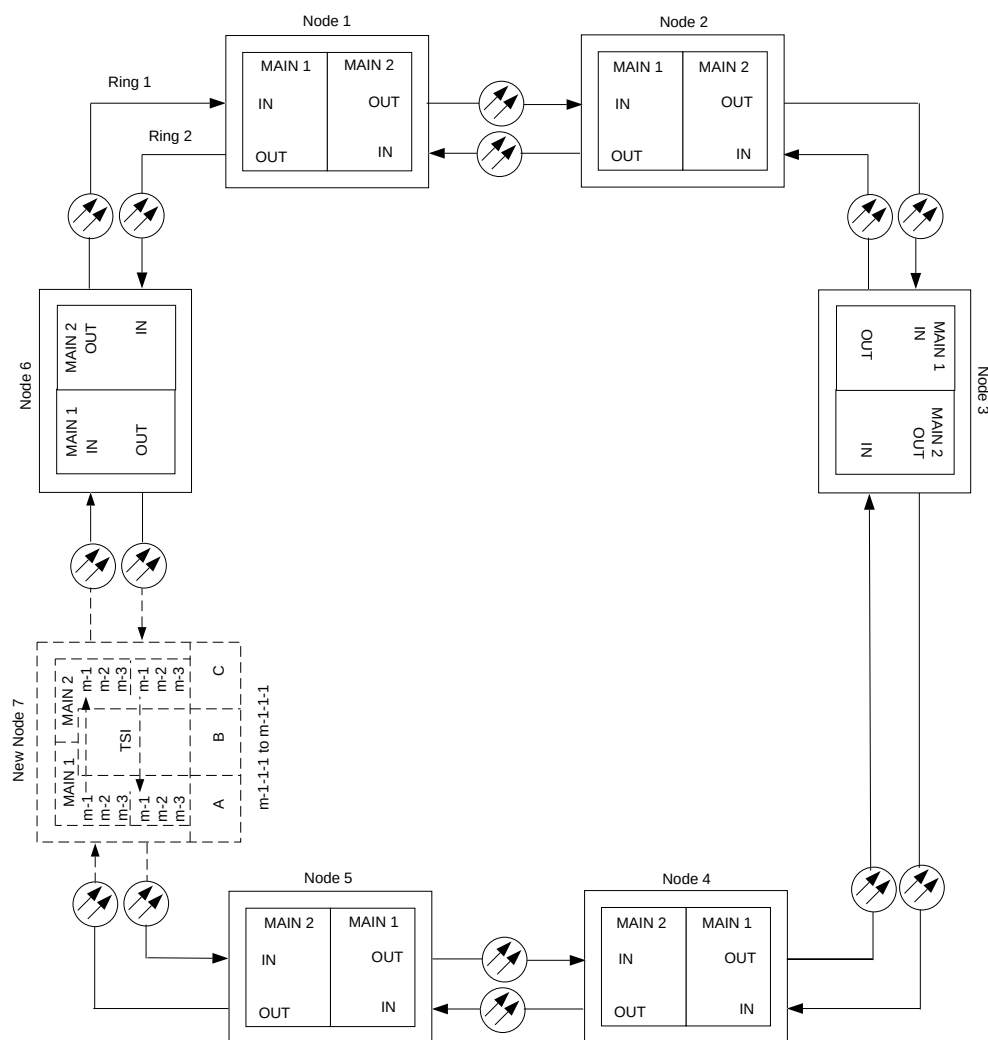


Figure 1 – Adding an RT (Node) to an Existing Ring Network

DO ITEMS BELOW IN ORDER LISTED FOR DETAILS, GO TO

5.



NOTE:

It may be helpful to make a sketch of the network to visualize the cross-connections required.

Use **rtrv-nmap:** command to determine systems (sites) in the network and how they are connected to each other. Use the **rtrv-ne** command at each site to verify that the new shelf TID, SITE/NE, or TBOS display number is not duplicated at any other site.

Comment: All existing cross-connections for any node must be made as a pass-through cross-connection at the new node (for example, report showing

a-1-1 m-1-1-1

at any node must be cross-connected as a pass-through cross-connection at the new node using

ent-crs-vt1:m-1-1-1,m-1-1-1

command).

-
6. From office records or by using the **rtrv-crs-vt1:all** command at any site, determine the existing cross-connections.
-

7.



CAUTION:

Critical or major alarms will be generated if pass-through cross-connections are not made in the new node before connecting it into the network.



NOTE:

Up to 84 DS1s may be terminated in a ring network. Once a DS1 is terminated, that time slot must be reserved in both directions around the ring to the far end. Therefore, if a DS1 is terminated (cross-connected) to a function group on a near-end and far-end terminating shelf, it must also be cross-connected as a pass-through in every node in the network. See "Cross-Connection Provisioning" in the "Administration and Provisioning" section of this manual for more information on cross-connections.

DO ITEMS BELOW IN ORDER LISTED FOR DETAILS, GO TO

Use the **ent-crs-vt1:** command at the new shelf to make all required *pass-through* cross-connections (for example, **ent-crs-vt1:m-1-1-1,m-1-1-1**). Pass-through cross-connections must be made at the new node to correspond to each terminating cross-connection present in every node in the ring network. (See Figure 1.)

8.



CAUTION:

Unterminated optical connectors may emit invisible laser radiation. Eye damage may occur if the beam is viewed directly or with improper optical instruments. Avoid direct exposure to the beam.



CAUTION:

An automatic protection switch service hit may occur when the correct optical fibers are cut. Cutting the wrong fiber lines will cause a service interruption.

At the point where the new SLC-2000 shelf will be added, use local procedures to cut the two fiber lines connecting existing shelves and condition the fiber for connection to the new shelf.

9. Verify that only **minor nsa OC-3 LOS** and **nsa inc. VT AIS** alarms are present at each end of the fiber cut.

DO ITEMS BELOW IN ORDER LISTED FOR DETAILS, GO TO

10.

⇒ **NOTE:**
The new shelf **TGS** option switches are probably set for *free running*. Before the end-to-end system is established, the specified (*looped timing*) timing mode must be set on the **TGS** circuit pack.

⇒ **NOTE:**
If the option switch setting is changed, an update must be done by momentarily depressing the **UPD/INIT** button on the **SYSCTL** after the **TGS** circuit packs are reinstalled.

Set timing mode on new shelf **TGS** to the timing mode specified in work order or office records. DLP-503

11. At new shelf, remove **OLIU** optical loops.

12. Determine the optical loss of the optical facility from office records or by making the required measurements.

13. Connect one pair of optical fibers from an adjacent shelf (site) to new shelf **MAIN 1 OLIU**. Ensure that the correct fibers are connected to the proper **OLIU [MAIN 2(P)]** in one node to **MAIN 1** in an adjacent node]. DLP-519

14.

⇒ **NOTE:**
If the report in this step indicates wrong fiber connections or no connection, verify that *fecom* is ON (**rtrv-fecom:**) and check fiber integrity.

Use **rtrv-nmap:** command to verify proper fiber connections have been made to the adjacent node.

15. Connect optical fibers from the other adjacent shelf (site) to new shelf **MAIN 2(P) OLIU**. Ensure that the correct fibers are connected to the proper **OLIU [MAIN 2(P)]** in one node to **MAIN 1** in an adjacent node]. DLP-519

DO ITEMS BELOW IN ORDER LISTED FOR DETAILS, GO TO

16.



NOTE:

If the report in this step indicates wrong fiber connections or no connection, verify that *fecom* is ON (**rtrv-fecom:**) and check fiber integrity.

Use **rtrv-nmap:** command to verify proper fiber connections have been made to the adjacent node.

-
17. Verify that all alarm and status conditions clear. If **nsa inc. VT AIS** alarm is present and no **inc. OC-3 LOS** alarm, check that all pass-through cross-connections have been properly made using the **rtrv-crs-vt1:** command.
-

18. The system is ready for DLC (*MDS Assembly Turnup* tab) or DS1 (*Circuit Order* tab) services to be established.

Convert (Upgrade) *SLC*[®]-2000 Access System to DS1 Add/Drop System

DO ITEMS BELOW IN ORDER LISTED FOR DETAILS, GO TO

Summary: This procedure is used to convert/upgrade a *SLC*-2000 SONET to a DS1 add/drop shelf. It may require replacing all **OLI****U** circuit packs in a shelf with **22-type OLI****U** circuit packs, which requires SONET Release 3 or later software. If Release 3 or later software is not installed, a software upgrade must be done before the **OLI****U**s are installed. After the software and **OLI****U**s are installed, the **set-ne: TID:crs>manual** command sets the shelf cross-connect mode to manual to allow cross-connections to be entered manually. The shelf is now an STS-1 add/drop shelf. In order to convert it to a DS1 add/drop shelf, the **cnvt-crs:** command is used to convert an existing STS-1 cross-connection to up to 28 individual VT1.5 (DS1) cross-connections.



CAUTION:

SLC-2000 circuit packs contain static sensitive components that can be damaged by electrostatic discharge. A static ground wrist strap must be worn when handling the circuit packs.

1. Use **rtrv-alm** command to verify that no alarms, locks, loops, or switches are present.
2. Notify maintenance center that alarms will be generated.
3. Install SONET program Release 3 or later, if not already installed.
4. Replace existing **OLI****U**s with **22-type OLI****U**s, if not already performed.
5. Use the **set-ne: TID:crs>manual** command to set shelf cross-connect mode to manual.

DO ITEMS BELOW IN ORDER LISTED FOR DETAILS, GO TO

6. Use the **cnvt-crs:address1, address2** command to convert the required STS-1 cross-connections to DS1 cross-connections.



CAUTION:

*Execution of the **cnvt-crs** command for existing STS-1 cross-connections that are supporting DS3 or other non-DS1 services will interrupt those services. This command should only be executed when existing STS-1 cross-connections are supporting either no service or DS1 service.*



NOTE:

No inverse capability is available with this command to convert from 28 DS1 cross-connections back to a single STS-1 cross-connection. In order to do this, you must delete each of the 28 DS1 cross-connections using the **dlt-crs-vt1** command and then enter the STS-1 cross-connection using the **ent-crs-sts1** command.



NOTE:

The shelf is now a DS1 add/drop shelf. Individual DS1 cross-connections may now be made using the **ent-crs-vt1** command.



NOTE:

See **System Turnup/Circuit Order: IXL-001** for procedures to add DS1 service.

Convert Service from Mode 1 to Mode 2 or from Mode 2 to Mode 1

DO ITEMS BELOW IN ORDER LISTED FOR DETAILS, GO TO



CAUTION:

Active calls will be dropped during mode conversions. This procedure will affect service.

1. Delete all DS1 cross-connections between logical feeder DS1s and physical feeder DS1s of the two VRTs.

-
2. Change the mode by using one of the following commands:

- **UIP: SET-MODE-TR8**
- **CIT: ED-MODE-TR8**



NOTE:

Per work order or office records, have the central office personnel make the appropriate 5ESS® switch changes to the data base for the mode conversion.

-
3. Reestablish the appropriate DS1 cross-connections.

-
4. If the SLC®-2000 RT is connected to a SLC 96 system, reconfigure the SLC 96 COT with TAUs for mode 2 or LIUs for mode 1. See document 363-202-400, *SLC 96 Carrier System, Central Office Terminal Acceptance and Installation*.

-
5. Ensure that all alarms clear.

Upgrade DLC Subsystem Software from Release 3.1 to Release 3.2 or Higher

DO ITEMS BELOW IN ORDER LISTED FOR DETAILS, GO TO



CAUTION:

Read through this procedure prior to starting — the steps can only be done one time. Follow this procedure in the exact order listed or the conversion will fail. If the sys data memory fault message is displayed during the conversion, the conversion has failed and all provisioning data has been lost. If done properly, the conversion does not interrupt any calls.

General: This procedure can be used to upgrade a SLC[®]-2000 access system from Release 3.01 DLC version software to Release 3.02 or higher (during this upgrade, all of the other nodes on the same network should be updated simultaneously to minimize service interruption).

1. Connect COM1 port of a personal computer to the CIT port. DLP-524
Ensure that the baud rates match between the PC and the CIT port.

2.



NOTE:

Depending on the format of the release diskettes, you may have to download the release software onto the PC hard drive before you install it in the system. In this procedure it is assumed that it will be provided on 3-1/2 inch double-sided double-density (2HD) diskettes.

Insert disk 1 of Release 3.02.01 or later of the DLC software into the floppy disk drive of the PC and enter **A:** Return

DO ITEMS BELOW IN ORDER LISTED FOR DETAILS, GO TO

3. If you have two or fewer diskettes for the release, enter **checkpgm** and follow the directions to verify that the floppy disks for the upgrade are error free. After completion of *checkpgm*, reinsert disk 1 of the release.

-
4. Enter **term**. After starting the terminal emulator, disregard the message **Can't find script <init>**.

Response: A brief message is displayed, and you are instructed to **Press any key to continue . . .** After you press any key, the ctrm emulator is loaded and the terminal responds with **CTRM ready (Enter Alt-h for help) Communications established**.

-
5. Press . The PC begins communicating with the system. The shelf responds with: **Enter a "1" to proceed.**
Subsystem =

-
6. Press and . The system responds with the following: **login <**

Enter **ATT01** (default login) and press .

The PC responds with: **password <**

Enter **SLC-2000** (default password) and press .
Lucent Technologies copyright information is displayed.
Press to continue.

 **NOTE:**
Record the TID information (**site1ne1**), which is displayed immediately following the . For example, the header format is displayed as follows:

**site1ne1 94-07-28 13:21:02 system SLC-2000
SONET (R6.2.1)**

DO ITEMS BELOW IN ORDER LISTED FOR DETAILS, GO TO

Response: A detailed SONET subsystem status and alarm message will be displayed on the screen. A detailed DLC subsystem status and alarm message will be displayed on the screen in response to a **Y** . If no DLC status and alarm messages are required, press **N** .

-
7. Enter **ins-prog** to begin downloading the software.

Response: The PC will respond with **TID #:**

-
8. Enter the target identifier (TID); for example, **site1ne1** .
The PC will respond with the following message:

```
Testing for program installation
/* Caution! Execution of this command will erase the
current generic n.n.n at system name and replace it with
generic m.m.m. If this fails prior to completion, the
control system will likely become inoperable until another
install program attempt is successful. This command will
terminate any other active CIT sessions. This command will
take about nn minutes to install the new program.
*/
Execute? (y/n) or CAnCel/DELeTe to quit =
```

If this message says **...replace it with generic 3.02.01** (or later generic), continue with Step 9.

Otherwise, press or , get the correct release software, and start again from Step 2.

Comment: You may want to record the estimate of how long it will take to install the new program.

DO ITEMS BELOW IN ORDER LISTED FOR DETAILS, GO TO

9. When you have verified the software being downloaded is R3.02.01 or later, press and . The new software is being loaded when the PC responds with: **In progress**

Response: When the download from disk 1 is completed, you will be prompted to insert the next diskette. Remove disk 1, insert disk 2, and press . Continue until all release diskettes have been downloaded.

-
10. Press the **Scroll Menu** up or down arrow button until **RETRIEVE-PROG-VRSN <ent>** is displayed and press **Enter**. Press the **Scroll Menu** down arrow button until **SMU: DLC version** is displayed. Verify that the *version* is 3.02.01 or later (**SMU: DLC vrsn 3.02.##**).

DLP-500

DO ITEMS BELOW IN ORDER LISTED FOR DETAILS, GO TO

11.

DLP-500



CAUTION:

*To avoid interrupting service, make sure no manual conditions (manual/force/lockout) exist before enabling the SMU with the **SET-STATE-SMU** or **ED-STATE-SMU** command.*

On the UIP, press , then press the **Scroll Menu** up or down arrow button until **SET-STATE-SMU <ent>** is displayed and press . Press the **Scroll Menu** up or down arrow button until **SET-SMU: ENABLED <ent>** is displayed and press . When **CONFIRM? Y<ent> N<esc>** is displayed, press .

Response: The **SMU** loads software in the **PDC**, the UIP displays **NE:pdv SW Installing** then **MN:NE:pdv unavailable**, and the **PDC FAULT** LED flashes. The software is then installed in the **TSIs**, then **MDCs**, then **VTUs**.

Comment: Ignore alarms. The retrieve faults UIP command (while the software is installing) will display **dlcsys SW installing**.

STOP. YOU HAVE COMPLETED THIS PROCEDURE.

Convert Integrated TR-08 Service to TR-303 Service at the *SLC*[®]-2000 Remote Terminal (RT)

DO ITEMS BELOW IN ORDER LISTED FOR DETAILS, GO TO

General: This procedure details the changes required at the *SLC*-2000 Remote Terminal (RT) to change from an integrated TR-08 to an integrated TR-303 service providing environment. This procedure makes several references to changes required at the local digital switch (LDS). If the LDS is a *5ESS*[®] switch, refer to document 235-105-210, *5ESS Switch, 5ESS-2000 Switch Routine Operations and Maintenance Procedures*, for the processes required to delete the TR-08 service from the LDS and the processes required to grow the TR-303 service.

This procedure also includes references where appropriate actions should be taken at the LDS. Before performing this procedure, read and understand all steps well in advance. Where coordination is required (such as changing line coding on all network elements), it is highly recommended that you inform and prepare all personnel in advance.

⇒ **NOTE:**
Ensure that the RT is running SLC-2000 Software Release 4.00.02 or later before starting this procedure. Lucent Technologies does **not** recommend converting the RT software from Release 3.0X.0X to Release 4.00.02 or later concurrent with this operation.

⇒ **NOTE:**
Converting TR-08 services to TR-303 services is a complex operation requiring a high level of interaction between the LDS activities and the RT activities. This conversion will cause a loss of subscriber service which depends on the LDS conversion method used and the corresponding RT method of changing cross-connect information.

DO ITEMS BELOW IN ORDER LISTED FOR DETAILS, GO TO

⇒ **NOTE:**
Note that DS1 feeders in TR-303 require B8ZS line coding whereas TR-08 normally requires AMI line coding. Before starting this process, ensure that all points requiring line coding changes have been identified (such as LDS, DDM nodes, DACS systems, RT).

⇒ **NOTE:**
If DS1s currently providing service to an RT will be reused for other applications, ensure that the existing and future network mapping is well defined for all elements involved.

⇒ **NOTE:**
With a TR-303 VRT supporting more than 99 lines, an update may be required in both the LDS and the supporting operations systems to permit the larger line number range.

⇒ **NOTE:**
In this procedure it is assumed that all necessary software, hardware, and engineering updates have been performed at the LDS before starting. Also, before beginning this procedure, ensure that all traffic engineering from the RT and LDS perspective has been completed.

-
1. Identify the TR-08 VRT on which this procedure is to be performed. Refer to the work order for specifics on the VRT and shelf location.
-
2. Verify that the VRT is fully functional with no alarms. At the RT CIT, enter the **RTRV-VRT : : X** command where *X* is the VRT number of the VRT being converted.

DO ITEMS BELOW IN ORDER LISTED FOR DETAILS, GO TO

3. Retrieve all existing T1 cross-connection information in this VRT entering the CIT command **RTRV-CRS-T1::vrtfdr-X-all** where *X* is the VRT number of the shelf being converted. Make note of the physical T1 locations if it is to be reused later in the TR-303 VRT. Verify that the data retrieved from the RT corresponds with data in the work order. If the data conflicts, **DO NOT PROCEED**. Resolve all discrepancies before continuing this procedure.

-
4. Retrieve all existing T0 cross-connection information in this VRT entering the CIT command **RTRV-CRS-T0::vrtdp-X-all** where *X* is the VRT number of the shelf being converted. Make note of the physical drops for later use in building the TR-303 VRT. Verify that the data retrieved from the RT corresponds with data in the work order. If the data conflicts, **DO NOT PROCEED**. Resolve all discrepancies before continuing this procedure.

-
5. Verify the current system configuration by entering **RTRV-NE** to check the T8U equipage and entering **RTRV-DISTN** to verify if the affected shelf or shelves are set for metallic or fiber distribution.

-
6. Enter the **RTRV-HSTY** CIT command. Review the recent history of commands entered and the actions performed at the RT. If any unusual activity has taken place, ensure that a proper resolution has occurred.

-
7. Does this RT have the TR-303 VRT already built and operational?

If **NO**, then continue with Step **8**.

If **YES**, then determine if the procedure starting at Step **22** offers a reasonable alternative to Steps **8** through **21** for your application.

-
8. Inform the LDS personnel that the RT is ready to start the conversion procedure. The LDS personnel must inform the RT personnel when the DS1 facilities have been removed from service.



NOTE:

If the TR-303 VRT was not previously built in this RT, ensure that the LDS personnel performing the conversion are aware that the secondary (or backup) EOC/TMC channels **MUST** be assigned on the second logical DS1 (RTFAC2 for the 5ESS Switch) serving the TR-303 VRT.

DO ITEMS BELOW IN ORDER LISTED FOR DETAILS, GO TO

9. Wait until the LDS personnel removes the DS1s from service before proceeding with the next steps (verified by the yellow LEDs being lighted on the VTU/LIU providing service to the VRT you are converting). You can perform the following steps concurrently with the LDS conversion activities. Inform the LDS personnel that the RT conversion is in process.

-
10. Referring to the work order, delete the T0 cross-connections from the VRT being converted by entering the CIT command
DLT-CRS-T0::vrtdp-X-all::drop-x-all where *X* is the VRT number of the VRT being converted.

Verify that all cross-connections were removed by entering the CIT command **RTRV-CRS-T0::vrtdp-X-all**.

-
11. As specified in the work order, delete the T1 feeder cross-connections entering the CIT command
DLT-CRS-T1::a-X-Y::vrtfdr-X-DG where *X* is the VTU/LIU card, *Y* is the DS1 on that card, and *DG* is the digroup indicator **a-d** for the TR-08 digroup.

-
12. Verify that all DS1s (T1) are removed by entering the CIT command **RTRV-CRS-T1::vrtfdr-X-all**.

-
13. Disable the T8U circuit packs on the shelf under the following conditions:

If ...	Then ...
The VRT being converted is contained in one distribution shelf and No TR-08 T0 cross-connections are left in this shelf and No future TR-08 cross-connections will be made into this shelf	Disable the T8U circuit packs on the shelf entering the following command: ED-MODE-T8U::shelf-S where <i>S</i> is the shelf from which the T8Us will be removed. Enter the no option when prompted.

DO ITEMS BELOW IN ORDER LISTED FOR DETAILS, GO TO



CAUTION:

*The **ED - MODE - T8U** command will cause the shelf to perform an initialization. Wait until the initialization is complete before proceeding.*

Remove the T8U circuit packs from the shelf.



NOTE:

If two TR-303 VRTs are required to be built after conversion, VRT-1 should be built first. This requires that **ENT - CRS - T1** be performed for VRT-1 first followed by VRT-2.

14. Reestablish the T0 cross-connections as follows:

If the work order indicates that ...	Then ...
All 96 cross-connections are on one metallic distribution shelf and The drops are sequential	Enter the following CIT command: ENT - CRS - T0 :: v3dp-1- YY&&ZZ :: drop-X-all where: YY is the first TR-303 channel number ZZ is the last TR-303 channel number as detailed in the work order X is the shelf being modified.
The drops are not to be sequentially assigned	Use the detailed information obtained in Step 2 or refer to the work order in reestablishing the T0 cross-connections. Refer to the ENT - CRS - T0 command in document 363-208-003, <i>SLC-2000 Access System, Commands and Messages</i> , for assistance in addressing within the TR-303 VRT.

DO ITEMS BELOW IN ORDER LISTED FOR DETAILS, GO TO

15. Using the work order, establish the T1 (DS1) cross-connections with the following command:

ENT-CRS-T1::a-VV-DD::v3fdr-1-XX

where:

VV is the VTU/LIU pack

DD is the DS1 on that pack

XX is the logical feeder number.



CAUTION:

*It is critical to ensure that the logical feeder in the RT is physically connected to the same logical feeder number in the LDS. When connected to a 5ESS switch, this means the facility indicated as **RTFAC 1** is connected to **v3fdr-1-1**, **RTFAC 2** is connected to **v3fdr-1-2**, and so on. Service will be severely impaired if this does not happen.*

-
16. At the RT, enter the command **RTRV-T1::all** to verify that the line coding and frame format for all DS1s providing service to the TR-303 VRT are set to B8ZS and ESF, respectively.

Ensure that the line coding at all network elements (such as DDM-2000, DACS, LDS, etc.) involved in transporting the TR-303 DS1s from the LDS to the RT is set to B8ZS. Frame formatting for these DS1s should also be set to ESF through all elements.



NOTE:

If any changes in DS1 assignments are made concurrent with the conversion of the VRT to TR-303, changes may also be required in the transport systems cross-connections. Refer to the work order for any changes required in the network level cross-connections. Verify that all changes are complete and accurate.

-
17. Ensure all DS1 cross-connections are accurate by entering the **RTRV-CRS-T1::v3fdr-1-all** or **RTRV-CRS-T1::v3fdr-2-all** command and verifying the results.

DO ITEMS BELOW IN ORDER LISTED FOR DETAILS, GO TO

18. Ensure all DS0 cross-connections are accurate by entering the **RTRV-CRS-T0::v3dp-1-all** or **RTRV-CRS-T0::v3dp-2-all** command and verifying the results.
-

19. Inform the LDS personnel that all changes are complete in the RT for the TR-303 VRT. All DS1s should go into service at the RT as soon as the LDS puts the same in the operational state.

Verify that the TR-303 VRT is in-service by entering the **RTRV-VRT::v303-1** or **RTRV-VRT::v303-2** command to check the status of the VRT.

20. Verify the DS1s are in-service by entering the **RTRV-T1::all** command to verify status of all DS1s.

If the DS1s do not indicate an in-service state, verify the physical cross-connections, line coding, and frame formatting from the LDS to the RT. Verify that the LDS has attempted to place the DS1s in-service.

21. All POTS and ISDN line provisioning is performed by the LDS. When the LDS personnel indicates that lines are in service, verify the service on the lines in the new TR-303 environment. If establishing special services in this VRT, refer to the "Channel Unit Installation" tab of this manual.

STOP. YOU HAVE COMPLETED THIS PROCEDURE.

22. Determine whether or not the TR-303 exists in the physical RT.

If the TR-303 VRT exists in this physical RT, these next steps offer an alternative method of checkerboarding the lines from the TR-08 VRT into the TR-303 VRT one line at a time. This method includes minimal service interruption to the subscriber.

23. Inform LDS personnel that the RT is ready to start the conversion procedure.

DO ITEMS BELOW IN ORDER LISTED FOR DETAILS, GO TO

24. Have LDS personnel identify an individual circuit in which the service will be moved from the TR-08 VRT to the TR-303 VRT.

-
25. Once the circuit has been removed from the TR-08 VRT and added to the TR-303 in the LDS, enter the following command to delete the TR-08 cross-connection:

DLT-CRS-T0::vrtdp-X-YY:::drop-S-CU-CKT

where:

X is TR-008 VRT number

YY is the TR-008 circuit number

S is the shelf

CU is the channel unit number

CKT is the individual circuit on the channel unit.

-
26. Cross-connect the same circuit to the TR-303 VRT by entering one of the following commands:

ENT-CRS-T0::v3dp-1-YY:::drop-S-CU-CKT

or

ENT-CRS-T0::v3dp-2-YY:::drop-S-CU-CKT

where:

YY is the TR-303 logical circuit number (or call reference value) from the work order

S is the shelf

CU is the channel unit number

CKT is the individual circuit on the channel unit.



NOTE:

The TR-303 logical line number (or call reference value) must be the same value at the LDS and at the RT to provide service.

-
27. Have the LDS personnel restore the line to an in-service state.

-
28. Check for service on the line by going off-hook and checking for dial tone. Call the line to verify ringing.

DO ITEMS BELOW IN ORDER LISTED FOR DETAILS, GO TO

29. Repeat Steps **24** through **28** for all lines in the TR-08 VRT.
-
30. Once all lines are removed from the TR-08 VRT, verify that all cross-connections were removed by entering the command
RTRV-CRS-T0::vrt dp-X-all.
-
31. Disable the T8U circuit packs on the shelf under the following conditions:

If ...	Then ...
The VRT being converted is contained in one distribution shelf and No TR-08 T0 cross-connections are left in this shelf and No future TR-08 cross-connections will be made into this shelf	Disable the T8U circuit packs on the shelf entering the following command: ED-MODE-T8U::shelf-S where <i>S</i> is the shelf from which the T8Us will be removed. Enter the no option when prompted.

 **CAUTION:**
*The **ED-MODE-T8U** command will cause the shelf to perform an initialization. Wait until the initialization is complete before proceeding.*

Remove the T8U circuit packs from the shelf.

-
32. Refer to the work order to determine the feeders for the now unused TR-08 VRT for the physical location and number of DS1s equipped. Delete the T1 feeder cross-connections serving the TR-08 VRT with the **DLT-CRS-T1::a-X-Y::vrt fdr-X-DG** where *X* is the VTU/LIU card, *Y* is the DS1 on that card, and *DG* is the digroup indicator (a-d) for the TR-008 digroup.

DO ITEMS BELOW IN ORDER LISTED FOR DETAILS, GO TO

33. Verify that all DS1s (T1) are removed by entering the command
rtrv-crs-t1::vrtfdr-X-all.

-
34. If any of the feeders are to be reassigned to provide TR-303 feeder capacity, continue with Step **35**. If not, then go to Step **39**.
-

35. Using the work order, establish the T1 (DS1) cross-connections by entering the following command:

ENT-CRS-T1::a-VV-DD::v3fdr-1-XX

where:

VV is the VTU/LIU pack

DD is the DS1 on that pack

XX is the logical feeder number.



CAUTION:

*It is critical to ensure that the logical feeder in the RT is physically connected to the same logical feeder number in the LDS. When connected to a 5ESS switch, this means the facility indicated as **RTFAC 1** is connected to **v3fdr-1-1**, **RTFAC 2** is connected to **v3fdr-1-2**, and so on. Service will be severely impaired if this does not happen.*

-
36. At the RT, enter the **RTRV-T1-all** command to verify that the line coding and frame format for all DS1s providing service to the TR-303 VRT are set to B8ZS and ESF, respectively.

Ensure the line coding at all network elements (such as DDM-2000, DACS, LDS, etc.) involved in transporting the TR-303 DS1s from the LDS to the RT is set to B8ZS. All elements must also be set for ESF frame format.



NOTE:

If any changes in DS1 assignments are made concurrent with the conversion of the VRT to TR-303, changes may be required in the transport systems cross-connections. Refer to the work order for any changes required in the network level cross-connections. Verify all changes are complete and accurate.

DO ITEMS BELOW IN ORDER LISTED FOR DETAILS, GO TO

37. Ensure that all DS1 cross-connections are accurate by entering the **RTRV-CRS-T1::v3fdr-1-all** or **RTRV-CRS-T1::v3fdr-2-all** command and verifying the results.
-

38. Are all DS1s previously used in the TR-08 VRT reassigned to the TR-303 VRT?

If **NO**, then continue with Step **39**.

If **YES**, then **STOP. YOU HAVE COMPLETED THIS PROCEDURE.**

39. Update the network level cross-connections to reroute the now unused DS1s according to service requirements. Refer to the work order for any changes required in the network level cross-connections. Verify that all changes are complete and accurate.

STOP. YOU HAVE COMPLETED THIS PROCEDURE.

Upgrade DLC Subsystem Software (Release 3.02.01 or 3.22.01 to Release 4.02.00 or Higher)

DO ITEMS BELOW IN ORDER LISTED FOR DETAILS, GO TO



CAUTION:

Read through this procedure prior to starting — the steps can only be done one time. Follow this procedure in the exact order listed or the conversion may fail.

General: This procedure can be used to upgrade a SLC[®]-2000 remote terminal from Release 3.02.01 or 3.22.01 DLC version software to Release 4.02.00 or higher (during this upgrade, all of the other nodes on the same network should be updated as soon as possible to minimize possible service interruption).



CAUTION:

To avoid extended interruption of service, make sure no manual conditions (manual/force/lockout) exist and no alarms are present before installation of the BBF241 PDC.



NOTE:

At some point during the system conversion to Release 4.02.00 or higher, it may be necessary to revert back to the previous Release 3.02.01 or 3.22.01. To enable a rapid return to Release 3.02.01 or 3.22.01, one of the time slot interchange (TSI) circuit packs should be preserved. If a return to Release 3.02.01 or 3.22.01 is anticipated, replace the standby **TSI** pack with a spare. Ensure that the removed **TSI** pack is readily available until such time as no return to Release 3.02.01 or 3.22.01 is evident.



NOTE:

To ensure that the TSI circuit packs are fully functional before the conversion begins, force a core copy switch and let the system run on the other TSI circuit pack for 15 minutes. Clear the force in effect.

DO ITEMS BELOW IN ORDER LISTED FOR DETAILS, GO TO

Response: Verify that no alarms are raised and the system functions without incident on the other copy of the TSI circuit pack before starting this conversion.



NOTE:

Verify that the SONET subsystem is operating on Software Release 6.2.2 or higher for linear applications or Software Release 7.1.2 or higher for ring applications for all nodes in the network. The Release 4.2 and later DLC software is compatible only with these DDM-2000 SONET releases.

1. Is the CIT located locally or at a remote location?

If **locally**, then continue with Step 2.

If **remote location**, then Proceed to Step 3.

-
2. Use the CIT at the user interface panel (UIP) CIT port to log on to the <i>SLC-2000</i> system.	DLP-525

Proceed to Step 4.

-
3. Using the CIT at the remote location, log on to the <i>SLC-2000</i> system.	DLP-541
-

4. At the CIT, enter "DLC" to toggle to the DLC side menus.

Response: Verify that the currently running version on the system is R3.02.01 or R3.22.01. Header information will provide the DLC software version currently running on the system.



CAUTION:

*The conversion will only work if the system being converted is currently running R3.02.01 or R3.22.01. If the system is not presently running R3.02.01 or R3.22.01, then this procedure should be stopped and the system converted to R3.02.01 or R3.22.01 before proceeding (see **NTP-069** for more information on upgrading the system to R3.02.01 or R3.22.01).*

DO ITEMS BELOW IN ORDER LISTED FOR DETAILS, GO TO

5. From the DLC prompt enter: **RTRV-EQPT : :SMU**.

Response: The system displays the currently stored version of software on the SMU. The program version must be R4.02.00 or higher. If the program version is not correct, refer to **DLP-524** to download the correct version of software into the SMU.

-
6. Install two **BDK® 270** BMP circuit packs — one in **Core (1)**, and the other in **Core (2)**. Wait approximately 5 minutes for the system to stabilize before continuing.

Response: **The BMP in the active TSI side** will have its **ACTIVE** LED lighted and the red LED flashing slowly.
The BMP in the standby TSI side will have all LEDs off.

-
- 7.



CAUTION:

Do not install the BBF241 PDC until it is time to initiate the load installation of R4.02.00 or higher into all system circuit packs. If the PDC contains the same R4.02.00 or higher load stored on the SMU, the SMU will automatically enable itself and all circuit packs in the system will initiate an installation of the R4.02.00 or higher load.

Replace the BBF240 PDC, used with Release 3.22.01 and earlier, with a BBF241 PDC, used with Release 4.00.0X and later.



NOTE:

After the PDC is installed, the UIP will report a SYS MEMORY data fault error. This is normal during the load conversion procedure and does not affect the system. This error indication will clear after both cores have completed software loading.



NOTE:

It is recommended that RT site personnel remain on site through the **CORE (1)** and **CORE (2)** installation of the R4.02.00 or higher load.

Retain the BBF240 PDC at the site.

DO ITEMS BELOW IN ORDER LISTED FOR DETAILS, GO TO

Response: The PDC and the SMU will reset. Wait 5 minutes after the reset to allow the system to return to a stable state.

If the SMU automatically enables itself because the PDC contains the same software load as the SMU, **go to Step 9. Otherwise, continue with Step 8.**

8. Do one of the following from either the UIP or the CIT: DLP-500

- **From the UIP.** Press **Escape**, then the **Scroll Menu** up or down arrow button until **SET-STATE-SMU <ent>** is displayed and press **Enter**. Press the **Scroll Menu** up or down arrow button until **SET-SMU: ENABLED <ent>** is displayed and press **Enter**. When **CONFIRM? Y<ent> N<esc>** is displayed, press **Enter**.
- **From the CIT,** logged on and connected to the DLC menu prompt, enter: **ED-STATE-SMU: :enable**.

Response: The SMU loads software in the PDC, the UIP displays **NE:pdcc SW Installing** then **MN:NE:pdcc unavailable**, and the PDC **FAULT** LED will flash. During the software installation of the common circuit packs, it is normal for packs to switch from **ACTIVE** or to protection, and for the **FAULT** LED to light or flash. Your CIT connection will drop as the PDC resets and installs the load. Remotely or locally reestablish the CIT connection and DLC prompt after the PDC has installed the load and reset itself (see **DLP-525** or **DLP-541** for more information on CIT connection).

DO ITEMS BELOW IN ORDER LISTED FOR DETAILS, GO TO

9. While monitoring the installation of the new software load in the PDC or the automatic enabling of the SMU, verify that the installation process continues in the following order:



NOTE:

Ignore all transient fault messages and alarms while the circuit packs are installing their software load.

- A. TSI (standby).



NOTE:

It is normal for the SLC-2000 System to issue a "CRITICAL MEMORY MISMATCH" alarm while the standby TSI is performing its software download. This alarm may remain present until the standby CORE processor complex finishes loading and initialization.

- B. Core switch.

- C. TSI (new standby).

- D. BMP (new standby).

- E. Core switch.

Comment: If the BMP (old standby) already has the correct software load installed, the system will *not* perform this core switch.

- F. BMP (old standby).

DO ITEMS BELOW IN ORDER LISTED FOR DETAILS, GO TO

G. MDC 1-1 through MDC 8-2.

Comment: As each MDC completes its installation, any circuit pack in that shelf that is associated with ONUs equipped with download supporting circuit packs (*SPQ*[®]809 S2:2 and MC97793A1 BIU, *SPQ*810 and FHB2 DSXBIU, or *SPQ*811 and FHB2 DSXBIU) will start to install the new BIU/DSXBIU software load [refer to document 363-205-004, *SLC-2000 Multi-Services Distant Terminal (MSDT) Feature, User/Service Manual*, or document 363-206-301, *DDM-2000 FiberReach Multiplexer, Wideband/Narrowband Shelf, User/Service Manual*]. Verify that the **DT** LED on the DT Server flashes and the BIU LEDs at the MSDT or the DSXBIU LEDs at the DDM-2000 FiberReach narrowband shelf (NBS) location flash within 5 minutes. This will verify that the software installation is in progress. The software installation and download will take approximately 4 hours.

⇒ **NOTE:**
Any provisioning change made (that is, **ed-dt**) for an MSDT or FiberReach NBS will cause the supporting MDC and DT Server(s) to reset. This will interrupt any BIU/DSXBIU software installation and download then in progress (approximately a 4-hour procedure). The download will then have to restart from the beginning after the reset has completed. **Provisioning changes should not be done at this point in the procedure.**

DO ITEMS BELOW IN ORDER LISTED FOR DETAILS, GO TO

H. If this is an upgrade to Software Release 4.04.0X and SPQ809 DT Servers will be upgraded to SPQ810 DT Servers, then refer to **NTP-076**. Otherwise, continue with the next step in this procedure.

I. VTU/LIU 8 (protection).

J. VTU/LIU 1 through VTU/LIU 7.

Comment: Verify the CIT or UIP alarm/fault messages during the above installation. The messages should match the appropriate installation procedure. A fast flashing red LED indicates an installation is in progress except on the VTU circuit packs. The VTU red LEDs will remain on during an installation process. The red LEDs on the BMP circuit packs may also remain on for part of the installation of the circuit packs. After the last circuit pack software load installation is complete, wait 5 minutes for the system to stabilize and clear alarms. Verify that the CIT or UIP alarm/fault message **DLC SYSTEM SW INSTALLING** is no longer displayed.

⇒ **NOTE:**
It is possible that under certain conditions the installation process may skip a particular circuit pack (that is, the circuit pack is already loaded with the correct software or the attempted load installation was aborted). If the software load installation was aborted, the system will try to load it again at the end of the system installation process. If all of the alarms clear when the new software is loaded, the upgrade can be considered successful. Refer to the "Trouble Clearing" tab of this document for information on clearing alarms, etc. If problems are present and it has been determined that the conversion will not proceed forward, contact your technical representative.

Comment: All alarms will clear when the new software is loaded, and the central office DLC configuration matches the RT.

DO ITEMS BELOW IN ORDER LISTED FOR DETAILS, GO TO



NOTE:

Call processing on the MDC (48 lines) will be interrupted for about 30 seconds when that MDC is reset after it is upgraded with the new load. Established calls (both parties in communication) will not be affected during the installation except for FITL configurations. For FITL configurations, call processing will be interrupted and established calls will be dropped after the BIU/DSXBIU has installed the software load and is resetting to run on the new software load.

10. Do one of the following from either the UIP or the CIT: DLP-500

- **From the UIP.** Enter the **RETRIEVE-PROG-VRSN** command. Verify that the SMU version displayed on the UIP is **4.02.00** or higher and the DLC version displayed on the UIP is the same as the one displayed on the SMU.
- **From the CIT.** In the DLC subsystem, enter **RTRV-EQ : SMU**. Verify that the DLC prompt header information display (software currently running on the system) is 4.02.00 or higher and the SMU version is the same as displayed in the header.

11. From the UIP or CIT, force **CORE (1)** to be active. Clear the force in effect.

12. Use the CIT to ensure that all provisioning for specials and FITL versus metallic has been transferred. If FITL is being used, check that the number of lines for each server has been correctly provisioned. Refer to document 363-208-003, *SLC-2000 Access System, Commands and Messages*, for the RTRV-T0, RTRV-NBS, and RTRV-DT command pages.



NOTE:

If provisioning information is lost, reprovision circuits again per original work order or call your local representative for technical assistance.

STOP. YOU HAVE COMPLETED THIS PROCEDURE.

Upgrade DLC Subsystem Software (Release 4.0X.0X to Release 4.02.00 or Higher)

DO ITEMS BELOW IN ORDER LISTED FOR DETAILS, GO TO



CAUTION:

Read through this procedure prior to starting — the steps can only be done one time. Follow this procedure in the exact order listed or the conversion may fail.

General: This procedure can be used to upgrade a SLC[®]-2000 remote terminal from Release 4.0X.0X DLC version software to Release 4.02.00 or higher. All nodes on the same network should be updated at the same time to minimize possible service interruption.



CAUTION:

To avoid extended interruption of service, make sure no manual conditions (manual/force/lockout) exist and no alarms are present before enabling the SMU.



NOTE:

To ensure that the TSI/BMP circuit packs are fully functional before the conversion begins, force a core copy switch and let the system run on the other TSI/BMP circuit packs for 15 minutes. Clear the force in effect.

Response: Verify that no alarms are raised and the system functions without incident on the other copy of the TSI/BMP circuit packs before starting this conversion.

DO ITEMS BELOW IN ORDER LISTED FOR DETAILS, GO TO



NOTE:

While conversion from R4.00.01 to R4.02.00 or higher is supported, notice that when the core does a side switch to load the other core, calls in progress will be dropped. Within 1 minute, call processing will be reestablished. This does not occur when converting from R4.00.02.

1. Verify that the SONET subsystem is operating on Software Release 6.2.2 or higher for linear applications or Release 7.1.2 or higher for ring applications for all nodes in the network. The Release 4.0 or higher DLC software is compatible only with these DDM releases.	DLP-513

-
2. Is the CIT located locally or at a remote location?

If **locally**, then continue with Step 3.

If **remote location**, then Proceed to Step 4.

-
3. Use the CIT at the user interface panel (UIP) CIT port to log on to the <i>SLC-2000</i> system.	DLP-525

Proceed to Step 5.

-
4. Using the CIT at the remote location, log on to the <i>SLC-2000</i> system.	DLP-541

-
5. Enter "DLC" to toggle to the DLC-side menus.

Response: Verify that the currently running version on the system is R4.00.0X or higher. Header information will provide the DLC software version currently running on the system.



CAUTION:

This conversion will only work if the system being converted is currently running R4.00.0X or higher. If this is not the case, then this procedure should be stopped and the system should be converted to R4.00.0X or higher using the applicable procedure in this tab or in the appropriate software release description.

DO ITEMS BELOW IN ORDER LISTED FOR DETAILS, GO TO

6. From the DLC prompt enter: **RTRV-EQ: :SMU**.

Response: The system displays the currently stored version of software on the SMU. The program version must be R4.00.0X or higher. If the program version is not correct, refer to **DLP-524** to download the correct version of software into the SMU.

-
7. Do one of the following from either the UIP or the CIT: DLP-500

- **From the UIP**, press **Escape**, then the **Scroll Menu** up or down arrow button until **SET-STATE-SMU <ent>** is displayed and press **Enter**. Press the **Scroll Menu** up or down arrow button until **SET-SMU: ENABLED <ent>** is displayed and press **Enter**. When **CONFIRM? Y<ent> N<esc>** is displayed, press **Enter**.
- **From the CIT**, logged on and connected to the DLC menu prompt, enter: **ED-STATE-SMU: :enable**.

Response: The **SMU** loads software in the **PDC**, the UIP prints **NE:pdc SW Installing** then **MN:NE:pdc unavailable**, and the **PDC FAULT** LED will flash. During the software installation of the common circuit packs, it is normal for packs to switch from **ACTIVE** or to protection, and for the **FAULT** LED to light or flash. The CIT connection will drop as the PDC resets and installs the load. Remotely or locally reestablish the CIT connection and DLC prompt after the PDC has installed the load and reset itself (see **DLP-525** for more information on CIT connection).

-
8. While monitoring the installation of the new software load in the PDC, verify that the installation process continues in the following order:

 **NOTE:**
Ignore all transient fault messages and alarms while the circuit packs are installing their software load.

1. TSI (standby).
2. BMP (standby).
3. Core switch.

DO ITEMS BELOW IN ORDER LISTED FOR DETAILS, GO TO

4. TSI (new standby).
5. BMP (new standby).
6. MDC 1-1 through MDC 8-2.

Comment: As each MDC completes its installation, any circuit pack in that shelf that is associated with DTs equipped with download supporting circuit packs (*SPQ*[®]809 S2:2 and MC97793A1 BIU, *SPQ*810 and FHB2 DSXBIU, or *SPQ*811 and FHB2 DSXBIU) will start to install the new BIU/DSXBIU software load [refer to document 363-205-004, *SLC-2000 Multi-Services Distant Terminal (MSDT) Feature, User/Service Manual*, or document 363-206-301, *DDM-2000 FiberReach Multiplexer, Wideband/Narrowband Shelf, User/Service Manual*]. Verify that the following occurs within 5 minutes:

- The DT Server **DT** LED flashes
- At the MSDT, all BIU LEDs flash and the BIU faceplate display indicates the percentage of download completed (for example, **1** = 10%, **2** = 20%)
- At the FiberReach narrowband shelf (NBS), all DSXBIU LEDs flash.

This will verify that the software installation is in progress. The software installation and download will take approximately 4 hours.



NOTE:

Any provisioning change made (that is, **ed-dt**) for an MSDT or DDM-2000 FiberReach NBS will cause the supporting MDC and DT Server(s) to reset. This will interrupt any BIU/DSXBIU software installation and download then in progress (approximately a 4-hour procedure). The download will then have to restart from the beginning after the reset has completed. **Provisioning changes should not be done at this point in the procedure.**

DO ITEMS BELOW IN ORDER LISTED FOR DETAILS, GO TO

7. If this is an upgrade to Software Release 4.04.0X and *SPQ809* DT Servers will be upgraded to *SPQ810* DT Servers, then refer to **NTP-076**. Otherwise, continue with the next step in this procedure.
8. VTU/LIU 8 (protection).
9. VTU/LIU 1 through VTU/LIU 7.

Comment: Verify the CIT or UIP alarm/fault messages during the above installation. The messages should match the appropriate installation procedure. A fast flashing red LED indicates an installation is in progress except on the VTU circuit packs. The VTU red LEDs will remain on during an installation process. The red LEDs on the BMP circuit packs may also remain on for part of the installation of the circuit packs. After the last circuit pack software load installation is complete, wait 5 minutes for the system to stabilize and clear alarms. Verify that the CIT or UIP alarm/fault message ***DLC SYSTEM SW INSTALLING*** is no longer displayed.

 **NOTE:**
It is possible that under certain conditions the installation process may skip a particular circuit pack (that is, the circuit pack may already be loaded with the correct software or the attempted load installation was aborted). If the software load installation was aborted, the system will try to load it again at the end of the system installation process. If all of the alarms clear when the new software is loaded, the upgrade can be considered successful. Refer to the "Trouble Clearing" tab of this document for information on clearing alarms, etc. If problems are present and it has been determined that the conversion will not proceed forward, contact your technical representative.

Comment: All alarms will clear when the new software is loaded, and the central office DLC configuration matches the RT.

DO ITEMS BELOW IN ORDER LISTED FOR DETAILS, GO TO



NOTE:

Call processing on the MDC (48 lines) will be interrupted for about 30 seconds when the MDC resets after it is upgraded with the new load. Established calls (both parties in communication) will not be affected during the installation except for FITL configurations. For FITL configurations, call processing will be interrupted and established calls will be dropped after the BIU/DSXBIU has installed the software load and is resetting to run on the new software load.

-
9. Do one of the following from either the UIP or the CIT:	DLP-500

- **From the UIP.** Enter the **RETRIEVE-PROG-VRSN** command. Verify that the SMU version displayed on the UIP is **4.02.00** or higher and the DLC version displayed on the UIP is the same as the one displayed on the SMU.
- **From the CIT.** In the DLC subsystem, enter **RTRV-EQ : SMU**. Verify that the DLC prompt header information display (software currently running on the system) is 4.02.00 or higher and the SMU version is the same as displayed in the header.

-
10. From the UIP or CIT, force **CORE (1)** to be active. Clear the force in effect.
-

11. Use the CIT to ensure that all provisioning for specials and FITL versus metallic has been transferred. If FITL is being used, check that the number of lines for each server has been correctly provisioned. Refer to document 363-208-003, *SLC-2000 Access System, Commands and Messages*, for the RTRV-T0, RTRV-NBS, and RTRV-DT command pages.



NOTE:

If provisioning information is lost, reprovision circuits again per original work order or call your local representative for technical assistance.

STOP. YOU HAVE COMPLETED THIS PROCEDURE.

Upgrade DLC Subsystem Software from Release 3.02 or 3.22 to Release 3.03 or Higher

DO ITEMS BELOW IN ORDER LISTED FOR DETAILS, GO TO



CAUTION:

Read through this procedure prior to starting — the steps can only be done one time. Follow this procedure in the exact order listed or the conversion will fail. If the sys data memory fault message is displayed during the conversion, the conversion has failed and all provisioning data has been lost. If done properly, the conversion does not interrupt any calls.

General: This procedure can be used to upgrade a SLC[®]-2000 Access System from Release 3.02 or 3.22 DLC version software to Release 3.03 or higher (during this upgrade, all of the other nodes on the same network should be updated simultaneously to minimize service interruption).

1. Connect COM1 port of a personal computer to the CIT port. DLP-524
Ensure that the baud rates match between the PC and the CIT port.

2.



NOTE:

Depending on the format of the release diskettes, you may have to download the release software onto the PC hard drive before you install it in the system. This procedure assumes that it will be provided on 3-1/2 inch double-sided double-density (2HD) diskettes.

Insert disk 1 of Release 3.03.00 or higher of the DLC software into the floppy disk drive of the PC and enter **A:** .

DO ITEMS BELOW IN ORDER LISTED FOR DETAILS, GO TO

3. If you have two or fewer diskettes for the release, enter **checkpgm** and follow the directions to verify that the floppy disks for the upgrade are error free. After completion of *checkpgm*, reinsert disk 1 of the release.

4.



CAUTION:

Unexpected problems can result when loading software from an MS-DOS window running under the Windows 95 platform. When loading software in the SLC-2000 Access System, run the CTRM program directly from DOS. Failure to follow this precaution can corrupt the memory in the SMU and a service outage may occur (if a spare SMU is not available).

Enter **term**. After starting the terminal emulator, disregard the message **Can't find script <init>**.

Response: A brief message is displayed, and you are instructed to **Press any key to continue . . .** After you press any key, the ctrm emulator is loaded and the terminal responds with **CTRM ready (Enter Alt-h for help) Communications established**.

-
5. Press . The PC begins communicating with the system. The shelf responds with: **Enter a "1" to proceed. Subsystem =**

-
6. Press and . The system responds with the following: **login <**

Enter **ATT01** (default login) and press .

The PC responds with: **password <**

Enter **SLC-2000** (default password) and press .

Lucent Technologies copyright information is displayed.

Press to continue.

DO ITEMS BELOW IN ORDER LISTED FOR DETAILS, GO TO



NOTE:

Record the TID information (**site1ne1**), which is displayed immediately following the . For example, the header format is displayed as follows:

**site1ne1 94-07-28 13:21:02 system SLC-2000
SONET (R6.2.2)**

Response: A detailed SONET subsystem status and alarm message will be displayed on the screen. A detailed DLC subsystem status and alarm message will be displayed on the screen in response to a **Y** .
If no DLC status and alarm messages are required, press **N** .

-
7. Enter **ins-prog** to begin downloading the software.

Response: The PC will respond with **TID #:**

-
8. Enter the target identifier (TID); for example, **site1ne1** .
The PC will respond with the following message:

```
Testing for program installation
/* Caution! Execution of this command will erase the
current generic n.n.n at system name and replace it with
generic m.m.m. If this fails prior to completion, the
control system will likely become inoperable until another
install program attempt is successful. This command will
terminate any other active CIT sessions. This command will
take about nn minutes to install the new program.
*/
Execute? (y/n) or CANCEL/DELETE to quit =
```

If this message says **...replace it with generic 3.03.00**, continue with Step 9. Otherwise, press or , get the correct release software, and start again from Step 2.

Comment: You may want to record the estimate of how long it will take to install the new program.

DO ITEMS BELOW IN ORDER LISTED FOR DETAILS, GO TO

9. When you have verified the software being downloaded is DLP-500
R3.03.00 or higher, press and . The new software
is being loaded when the PC responds with:
In progress

Response: When the download from disk 1 is completed, you will
be prompted to insert the next diskette. Remove disk
1, insert disk 2, and press . Continue until all
release diskettes have been downloaded.

-
10. Press the **Scroll Menu** up or down arrow button until
RETRIEVE-PROG-VRSN <ent> is displayed and press **Enter**.
Press the **Scroll Menu** down arrow button until **SMU: DLC**
version is displayed. Verify that the *version* is 3.03.00 or higher
(**Sys: 3.03.00**).

-
11. DLP-500



CAUTION:

*To avoid interrupting service, make sure no manual
conditions (manual/force/lockout) exist before enabling the
SMU with the **SET-STATE-SMU** or **ED-STATE-SMU**
command.*

On the UIP, press , then press the **Scroll Menu** up or
down arrow button until **SET-STATE-SMU <ent>** is displayed and
press . Press the **Scroll Menu** up or down arrow button
until **SET-SMU: ENABLED <ent>** is displayed and press .
When **CONFIRM? Y<ent> N<esc>** is displayed, press .

Response: The **SMU** loads software in the **PDC**, the UIP
displays **NE:pdcc SW Installing** then **MN:NE:pdcc**
unavailable, and the **PDC FAULT** LED flashes. The
software is then installed in the **TSIs**, then **MDCs**,
then **VTUs**.

Comment: Ignore alarms. The retrieve faults UIP command
(while the software is installing) will display
dlcsys SW installing.

STOP. YOU HAVE COMPLETED THIS PROCEDURE.

Upgrade DLC Subsystem *SPQ*[®]809 to *SPQ*810

DO ITEMS BELOW IN ORDER LISTED FOR DETAILS, GO TO



CAUTION:

Read through this procedure prior to starting. Follow this procedure in the exact order listed or the conversion may fail.

General: This procedure can be used to upgrade a *SLC*[®]-2000 remote terminal (RT) Release 4.04.0X DLC version software with *SPQ*809 DT Servers to *SPQ*810 DT Servers to provide octet mode of operation at the DDM-2000 FiberReach narrowband shelf (NBS).



CAUTION:

*This procedure will interrupt service for any *SLC*-2000 multi-services distant terminal (MSDT) or FiberReach NBS currently connected to the DT Server being upgraded.*



NOTE:

This procedure should not be performed if a BIU/DSXBIU software installation and download is in progress.

1. Use **ed-dt** to reprovision service on the NBS for 0 lines of service. (Refer to document 363-208-003, *SLC-2000 Access System, Commands and Messages*, for the **ed-dt** command pages.)

DO ITEMS BELOW IN ORDER LISTED FOR DETAILS, GO TO

2.



CAUTION:

Refer to the SPQ810 DT Server data sheet, 363-005-389, and the chapter entitled "About This Document" for the proper precautions to observe when handling circuit packs to prevent damage caused by electrostatic discharge.

After the SPQ809 Server has reset, remove it from the MDS shelf and replace it with the SPQ810 Server.

3. Observe the **FAIL** LED on the SPQ810 Server.

If the **FAIL** LED is lighted, the SPQ810 DT Server has failed power-up tests and should be replaced with a new unit.

4. Use **ed-dt** to reprovision service on the NBS per the work order.
Use **rtrv-nbs** to check the status of the NBS.

Response: The system displays the provisioning mode of the NBS.

STOP. YOU HAVE COMPLETED THIS PROCEDURE.

Upgrade SONET Subsystem OC-3 Ring Network to OC-12 Ring Network Using OC-3 Shelves In Service

DO ITEMS BELOW IN ORDER LISTED FOR DETAILS, GO TO

General: This procedure is used to convert an OC-3 VT1.5 path protected ring network to an OC-12 path protected ring network using **24G-U OLIUs** in the SONET subsection of *SLC-2000* shelves. It is assumed that the fiber being used in the current OC-3 ring network will be used to build the new OC-12 ring.

This procedure uses a four-node OC-3 ring as an example for the OC-3 optics to OC-12 optics ring upgrade (Figure 1). This upgrade starts at Node 1 and proceeds clockwise. Other network upgrades are possible and can be done using these procedures with minor modifications. Local procedures will have to be written, using the concepts of this procedure, to upgrade the particular configuration that you have.

DO ITEMS BELOW IN ORDER LISTED FOR DETAILS, GO TO

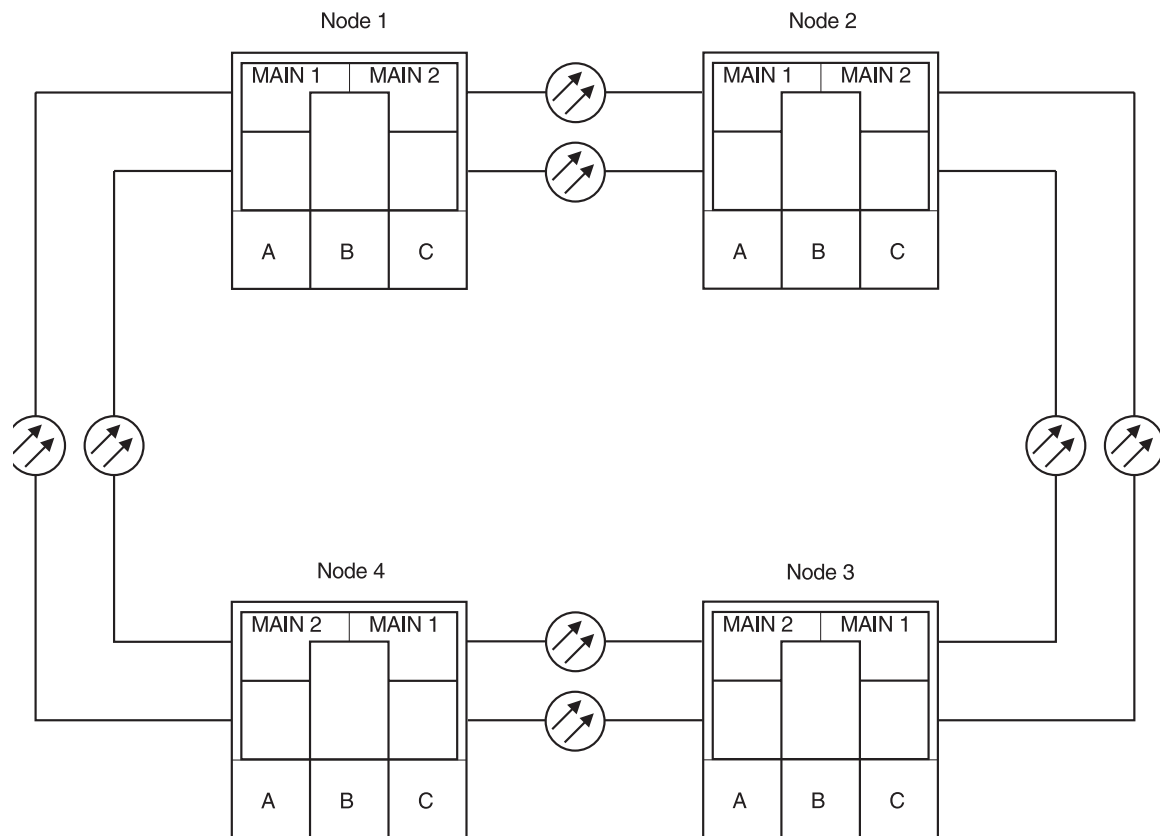


Figure 1 – Example of OC-3 to OC-12 Ring Upgrade

DO ITEMS BELOW IN ORDER LISTED FOR DETAILS, GO TO

⇒ **NOTE:**
OC-3 Release 11 software must be installed in all OC-3 node shelves in the ring.

⇒ **NOTE:**
You may also contact Lucent Technologies to provide this in-service upgrade. Experienced Lucent Technologies installers will help you plan and execute the network upgrade. For more information, contact your Lucent Technologies Account Representative.

1. Use the **rtrv-alm:** command at the OC-3 ring to verify that no alarms, locks, or switches are present.

2. Before beginning this procedure, verify ring integrity and path protection switching function. At the start node, remove the receive (**IN**) fiber from ONE of the **MAIN OLIUs**. Verify no critical (**CR**) alarms are present. Reconnect the fiber and wait until alarms clear. Repeat this step on the other **MAIN OLIU**.

3. Notify maintenance center that alarms will be generated.

4. Use **rtrv-map-network:** and **rtrv-map-neighbor:** commands to determine the configuration of the OC-3 ring being upgraded and how the individual nodes are connected.

5. Upgrade all nodes to OC-3 Release 11 or later software.

A. In-Service Local Software Download	DLP-538

B. In-Service Remote Software Download	DLP-537

DO ITEMS BELOW IN ORDER LISTED FOR DETAILS, GO TO

6.



CAUTION:

Sync autoconfiguration must be enabled at each line-timed node in the network.

At each node in the network, use

set -oc3:syncmsg=Kbyte/Sbyte command to set Kbyte or Sbyte sync messages. Use the **set -sync:auto=enabled** command to enable Sync auto-reconfiguration.



NOTE:

Before proceeding, check to see that all nodes have sync auto-reconfiguration set to enabled.

7.



NOTE:

A "CP removed" alarm will occur when the **OLIU** is removed. An *inc. OC-3 LOS* (blinking **FAULT** LED on **OLIU**) alarm will occur at the other node connected to the removed fibers. Other nodes will receive *inc.VT and STS AIS* alarms.

At the starting Node (in this example, Node 1), remove optical fibers from **MAIN 2 OLIU**, then remove **MAIN 2 OLIU**.

8.



NOTE:

When the **24-Type OLIU** is installed in this step, an *unexpected CP type* status and *inc. OC12 LOS* alarm will occur. At the connecting node, an *inc. OC3 LOS alarm* will occur. When fibers are reconnected, the *unexpected CP type* status is still present at this Node and an *inc. OC12 LOF* alarm will occur. An *inc. OC3 LOF* alarm will occur at the connecting Node.

At the starting Node, install a **24-Type OLIU** into **MAIN 2 OLIU** slot and reconnect optical fibers.

DO ITEMS BELOW IN ORDER LISTED FOR DETAILS, GO TO

9.



NOTE:

A *CP removed* alarm will occur in this step when the **MAIN 1 OLIU** is removed. An *inc. OC12 LOS* alarm will occur at the connecting Node with the **24-Type OLIU** installed.

At the other end of the OC12 optical span being established, remove optical fibers from **MAIN 1 OLIU**, then remove **MAIN 1 OLIU**.

10.



NOTE:

When the **24-Type OLIU** is installed, an *unexpected CP type* status alarm will occur. The alarm clears at both ends of the span. The *inc. VT and STS AIS* alarms clear downstream.

Install a **24-Type OLIU** into **MAIN 1 OLIU** slot and reconnect optical fibers. **Wait until the blinking FAULT LED goes off before continuing.**

11.



NOTE:

A *CP removed* alarm will occur and an *inc. OC-3 LOS* alarm will occur at the connecting Node when the **MAIN 2 OLIU** is removed from this Node. Other nodes will receive *inc. VT and STS AIS* alarms.

Remove optical fibers from **MAIN 2 OLIU** for next span being established, then remove **MAIN 2 OLIU**.

12.



NOTE:

When the **24-Type OLIU** is installed an *unexpected CP type* status and alarm will occur. An *inc. OC-12 LOF* alarm will occur at the Node connected to this **OLIU**.

Install a **24-Type OLIU** into **MAIN 2 OLIU** slot and reconnect optical fibers.

DO ITEMS BELOW IN ORDER LISTED FOR DETAILS, GO TO

13.



CAUTION:

*After the **24G-U OLIUs** and faceplate connectors have been installed in the SLC-2000 ARM shelf, the left front shelf cover, when closed, may contact the OLIU faceplate connectors causing a potential service or equipment problem. To prevent or reduce the possibility of a problem occurring, the line assignment card, located inside the left hand shelf cover, must be moved as far left in the cover slot as possible so it does not contact the faceplate connectors when the cover is closed.*

Connect the OC12 faceplate connector between **MAIN 1** and **MAIN 2 24-Type OLIUs**. Wait until *OC12 connector failed* alarm clears.

14.



CAUTION:

*The update (**UPD**) command must be executed at the Node with both **24-Type OLIUs** installed.*



NOTE:

After the update at this node, the *inc. OC-12 LOF* alarm remains until the **24-Type OLIU** is installed at the connecting Node.

Momentarily press the **UPD** button on the **SYSCTL** or execute the update (**UPD**) command at the Node with both **24-Type OLIUs** installed.

15. Repeat Steps **9** through **14** for all Nodes until you arrive back at the starting Node.

DO ITEMS BELOW IN ORDER LISTED FOR DETAILS, GO TO

Last Span Optical Upgrade

16.



NOTE:

A *CP removed* alarm will occur when the **MAIN 1 OLIU** is removed from the starting Node.

At the starting Node, remove optical fibers from **MAIN 1 OLIU**, then remove **MAIN 1 OLIU**.

17.



NOTE:

When the **24-Type OLIU** is installed, an *unexpected CP type* status and alarm will occur. They should clear at both ends of the span. The *inc. VT and STS AIS* alarms clear downstream.

Install a **24-Type OLIU** into **MAIN 1 OLIU** slot and reconnect optical fibers.

18.



CAUTION:

*After the **24G-U OLIUs** and faceplate connectors have been installed in the SLC-2000 ARM shelf, the left front shelf cover, when closed, may contact the OLIU faceplate connectors causing a potential service or equipment problem. To prevent or reduce the possibility of a problem occurring, the line assignment card, located inside the left hand shelf cover, must be moved as far left in the cover slot as possible so it does not contact the faceplate connectors when the cover is closed.*

At the starting Node, connect the OC12 faceplate connector between **MAIN 1** and **MAIN 2 24-Type OLIUs**.

19. Momentarily depress the **UPD** button on the **SYSCTL** or execute the update (**UPD**) command at the starting Node.

20. If an OC-12 shelf is to be added to this new ring configuration, Use the procedures in the OC-12 Volume 2 TOP User/Service Manual (363-206-290).

Add DS1 Service to an In-Service SLC®-2000 TR-303 System

DO ITEMS BELOW IN ORDER LISTED FOR DETAILS, GO TO

Summary: This procedure gives the steps for adding DS1 service to an in-service metallic fed SLC-2000 TR-303 system.

 **CAUTION:**
When handling circuit packs, always wear an electrostatic discharge wrist strap connected to an ESD ground jack on the user interface panel (UIP).

 **CAUTION:**
Take care to avoid damaging the LEDs that protrude through the openings in the faceplate of the circuit packs during handling and circuit pack installation.

 **NOTE:**
Clear all existing alarms prior to executing this procedure.

1. Does an LIU circuit pack need to be installed so that DS1 service can be added (refer to work order)?

If **YES**, continue with Step 2.
If **NO**, proceed to Step 12.

-
2. Install the **BBG267 LIU** in the **VTU/LIU** slot chosen.

 **NOTE:**
The **FAULT** LED on the **LIU** flashes fast when installing the software load and remains on throughout the pack initialization process. Wait 3 minutes after installation for the LIU circuit pack to stabilize.

-
3. After 3 minutes, does the LIU **FAULT** LED remain lighted?

If **YES**, continue with Step 4.
If **NO**, proceed to Step 5.

DO ITEMS BELOW IN ORDER LISTED FOR DETAILS, GO TO

4. Remove the LIU with the lighted **FAULT** LED and obtain a new LIU. ***Return to Step 2.***
-

5. Using the work order, have all LIUs been installed?

If **NO**, continue with Step 6.

If **YES**, proceed to Step 7.

6. Using the work order, choose the next **VTU/LIU** slot in which to install an LIU. ***Return to Step 2.***
-

7. Are there empty **VTU/LIU** slots?

If **YES**, continue with Step 8.

If **NO**, proceed to Step 9.

8. Install **BBG268** retainer card in any empty **VTU/LIU** slot.



NOTE:

BBG268 retainer cards must be installed in all unused **VTU/LIU** slots for LIU protection switching to operate properly. If the retainer cards are not used, transmission may be corrupted.

9. Are there DS1 alarms on the system?

If **YES**, continue with Step 10.

If **NO**, proceed to Step 11.

10. At the UIP, press the **Update** key. ***Wait for transient alarms to clear.***
-

11. At the CIT, enter **dlc** at the command prompt to toggle to the DLC subsystem command operations.
-

12. At the RT, install T1 cross-connections using the DLC **ENT-CRS-T1** CIT command.



NOTE:

If T1 cross-connections other than the standard cross-connections are used, refer to the work order and install the T1 cross-connections using the CIT and local procedures.

DO ITEMS BELOW IN ORDER LISTED FOR DETAILS, GO TO

13. At the DSX-1 panel, make the proper connections between the SLC DSX and the local digital switch (LDS) DSX.
14. Request the craftsperson at the LDS to put in service the new DS1 lines associated with the RT.
15. Check for alarms at the SLC-2000 RT and use the CIT **RTRV - T1** command to verify the in service (IS) condition and the B8ZS line format for the new DS1. At the LDS, verify the condition of the new DS1
16. Are any system alarms present?

If **YES**, proceed to **TAP-102**.
If **NO**, continue with Step **17**.
17. Update office records to reflect DS1 growth at the RT.

STOP. YOU HAVE COMPLETED THIS PROCEDURE.

Provision Individual DS0 Circuits for Service

DO ITEMS BELOW IN ORDER LISTED FOR DETAILS, GO TO

General: This procedure can be used to provision individual DS0 circuits prior to being turned up for service.

1. Verify that the RT or COT terminal, as appropriate, has been turned up for service and is equipped with the correct software load.
2. Consult the work order document (WORD) or other service order and determine the DS1 facility digroup and metallic distribution shelf (MDS) to be used to carry the new circuits.
3. Determine and record the DS0 and DS1 cross-connections required to achieve continuity from the facility to the MDS.
4. Use the craft interface terminal (CIT) to establish the cross-connections determined in Step 3.
5. Refer to the WORD and obtain the correct channel unit required for the type of service to be established.
6. Provision the DS0 circuits using the following guidelines:
 - If the CU is POTS, multiparty, coin, FSR, manual ringdown, PLAR, DC bypass, or DC alarm, provision the DS0 circuits using the **ENT-T0**, **ED-T0**, or **CPY-T0** command. Select OTHER for the functional *CLEI* code and DFLT for the function code.

DO ITEMS BELOW IN ORDER LISTED FOR DETAILS, GO TO

- If the CU is a DPT type for the RT end of a direct-inward-dial (DID) locally switched trunk, provision the DS0 circuits by selecting OTHER for the functional *CLEI* code. If the DID trunk terminates on a TR-303 LDS other than a *5ESS* or *GTD-5* switch, provision the DS0 circuits for the RVT function code. (The RVT function code is required in a TR-303 application in order to provision the RT to translate the signaling states between those that the CU uses and those that the TR-303 LDS recognizes.) If the TR-303 LDS is a *5ESS* or *GTD-5* switch, the DS0 circuits are provisioned to the RVT function code by the switch using an embedded operations channel (EOC) message and the DS0 circuits only need to be provisioned locally for the *CLEI* code.
- For other types of CUs, follow the provisioning procedure listed in Chapter 5, "Administration and Provisioning", for the software release being used. Additional provisioning information can also be found in document 363-208-003, *SLC-2000 Access System, Commands and Messages*.

STOP. YOU HAVE COMPLETED THIS PROCEDURE.

Introduction

General

This tab provides procedures to clear troubles on a *SLC*[®]-2000 Access System. These procedures assume that at a previous time, the system was in-service and no alarms were present. **TAD-100** provides the recommended order for clearing troubles on a *SLC*-2000 Access System.

The *SLC*-2000 RT consists of three subsystems:

- An optional SONET subsystem based on DDM-2000 OC-3 circuit packs in the access resource manager (ARM) shelf (see Figure 1)
- A digital loop carrier (DLC) subsystem comprised of a bandwidth management core in the ARM shelf, **VTU** or **LIU** circuit packs in the ARM shelf, and the metallic distribution shelf (MDS) assemblies (see Figure 2)
- An optional integral test head (ITH) subsystem in the ARM shelf that provides a channel testing interface.

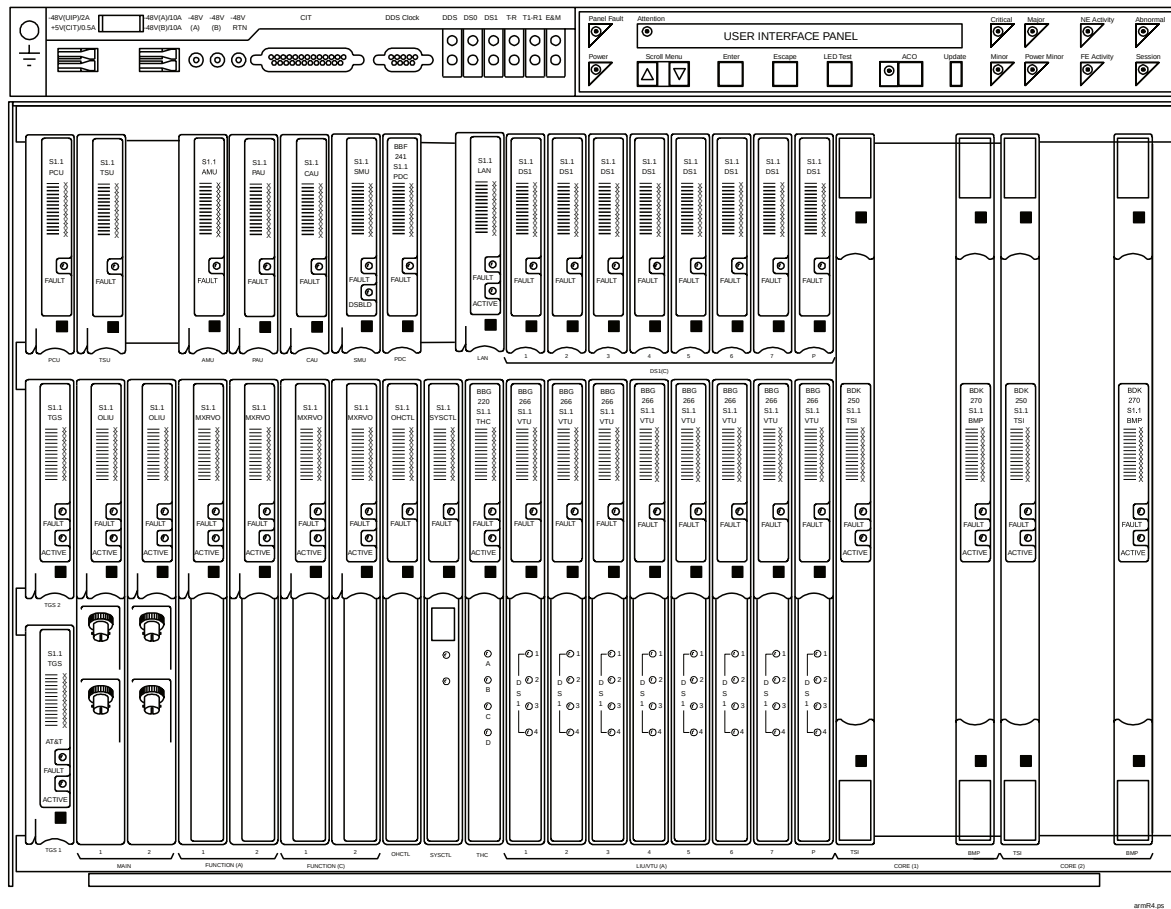
The alarms generated from all three subsystems are combined and displayed on the user interface panel.

Any power supply troubles must be cleared first. Verify that AC power is present, that DC and ringing voltages (not required for fiber distribution) are present, and that no fuses or circuit breakers are blown or tripped on the power shelf equipment.

Maintenance

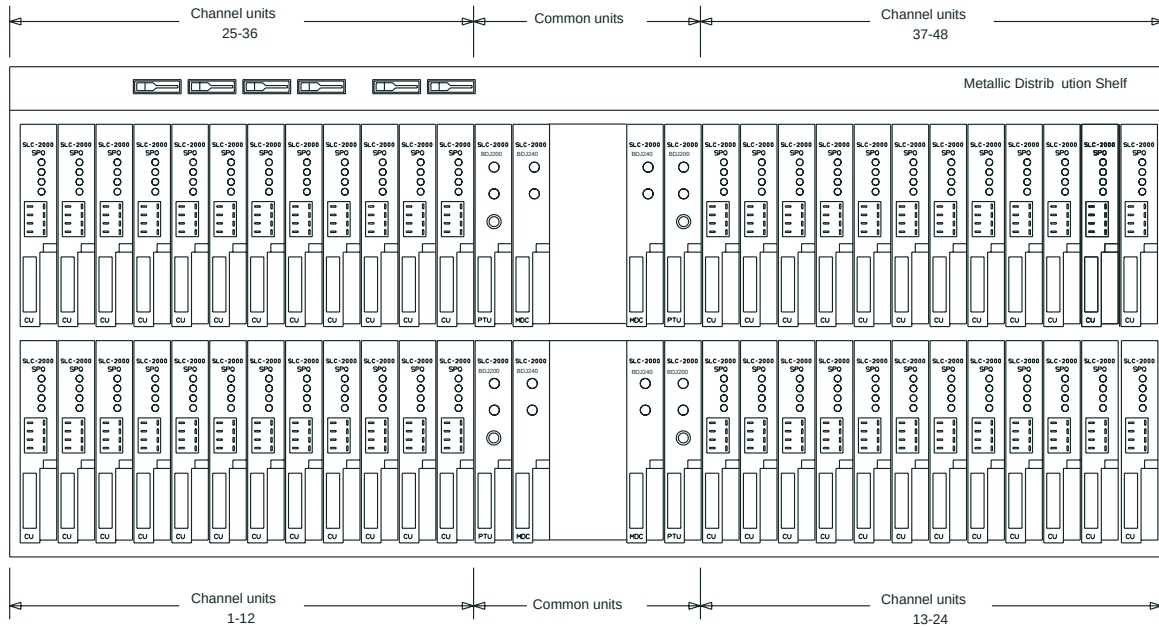
The trouble-clearing procedures in this section are designed to clear alarm conditions quickly. Certain faults can cause different alarm severity levels depending on the circumstances. A failure of a protected or duplicated circuit pack will cause a **Minor** alarm. But if the protection or backup circuit pack is unavailable, the same fault may cause a **Critical** or **Major** alarm. Therefore, the alarm severity is not included in the procedures for clearing troubles that cause a **FAULT** LED to light on a circuit pack.

When clearing a trouble associated with the SONET subsystem, the trouble-clearing procedures found in 363-206-202, *DDM-2000 OC-3 Multiplexer, User/Service Manual*, may be used (for clearing trouble from a SONET-only point of view).



Note: For Releases 3.1, 3.2, and 3.3, the circuit pack code for the PDC circuit pack is BBF240. For Release 4.0 and later, the circuit pack code for the PDC circuit pack is BBF241. The BMP circuit pack is used in Release 4.0 and later.

Figure 1 – Access Resource Manager Shelf



Note: The configuration shown is for Software Release 4.0 and later TR-303 interfaced SLC-2000 Access System RTs. Releases 3.1, 3.2, or 3.3 and Release 4.0 and later interfaced SLC-2000 Access RTs will include T8U circuit packs.

847801.eps

Figure 2 – First Metallic Distribution Shelf Assembly

Contents of This Tab

 **CAUTION:**
Take care to avoid damaging the LEDs that protrude through the openings in the faceplate of the circuit packs during handling and circuit pack installation.

 **CAUTION:**
When handling circuit packs, always wear an electrostatic discharge wrist strap connected to an ESD ground jack on the user interface panel (UIP).

 **CAUTION:**
In dusty areas (for example, near construction sites), tent the RT cabinet to protect electronic equipment whenever cabinet doors are open for extended periods.

Maintenance Philosophy	TAD-100
Isolate Trouble to a SLC®-2000 Access System COT or RT	TAP-101
Clear Alarms on a SLC-2000 Access System	TAP-102
Clear OLIU or Fiber Trouble on a SLC-2000 Access System When OLIU FAULT LED Is Flashing	TAP-103
Use UIP or CIT to Isolate Trouble on a SLC-2000 Access System	TAP-104
Clear Blown Fuse Trouble at a SLC-2000 Access System	TAP-105
Clear SONET Subsystem Trouble at a SLC-2000 Access System	TAP-106
Clear Customer Channel Failure Trouble Report at a SLC-2000 Access System	TAP-107
Clear Trouble During Program Upgrade at a SLC-2000 Access System	TAP-108
Isolate Fiber Distribution (FITL) Trouble at a SLC-2000 Remote Terminal	TAP-109
Clear Data Link Related Trouble Reports at a SLC-2000 Access System	TAP-110

Clear Trouble with the Tollgrade Digital DC Bypass Pair Channel Units.	TAP-111
Clear Blown Fuse in the MDS or HDOS Assembly During Acceptance Testing	TAP-112
Clear Lighted DS1() VTU/LIU LED During MDS Assembly Turn-up.	TAP-113
Clear Powering Trouble	TAP-114
Clear FAULT LED Lighted But Not Flashing	TAP-115
Clear Flashing FAULT LED(s)	TAP-116
Clear Brownout Condition — Flashing Letter "L" in SYSCTL FE ID Display	TAP-117

The following procedures are located behind the ***Detailed Level Procedures*** tab.

Check 4A, 4B, or 4G Fan Unit Operation.	DLP-514
Replace Core Circuit Packs	DLP-528
Replace VTU/LIU Circuit Packs	DLP-529

Maintenance Philosophy

Overview

The *SLC*®-2000 Access System is comprised of four subsystems:

- An optional synchronous optical network (SONET) transport system
- An optional metallic transport system
- A digital loop carrier (DLC) system
- An optional integral test head (ITH) system.

Either a SONET transport system (based on DDM-2000) or a direct metallic DS1 interface is used as the carrier facility. A digital loop carrier (DLC) subsystem provides the customer access interface that is connected by the SONET subsystem, or the metallic DS1s, to central office carrier system equipment such as a *SLC* 96 Carrier System central office terminal (COT), a *SLC*-2000 Access System COT, or integrated directly to a *5ESS*® digital carrier line unit/integrated digital carrier unit (DCLU/IDCU) for TR-08, or a *5ESS* IDCU for TR-303. The integral test head subsystem provides a channel and drop testing interface to an automated testing system such as Mechanized Loop Testing (MLT). The user interface panel (UIP) displays a composite of alarms from all four subsystems. The trouble-clearing procedures in this document clear system alarms caused by *SLC*-2000 equipment faults, and it is assumed that you have isolated the trouble to a *SLC*-2000 COT or RT using **TAP-101**.

The maintenance philosophy is built on gathering system information at three levels. The first maintenance level is a local visual inspection of the UIP (see Table A) and the circuit pack LEDs (see Table B). The UIP LEDs show a composite of near- and far-end alarms from all four subsystems.

In a SONET equipped site, the **FE SEL** button on the **SYSCTL** circuit pack will display the SONET subsystem alarm conditions at any site. The DLC and integrated test head subsystem alarms are not carried by the SONET subsystem and are not displayed when the **SYSCTL FE SEL** button is pressed. This makes it easy to determine if a fault is caused by the SONET subsystem. Most problems can be corrected at this level.

The second maintenance level is provided by the **RETRIEVE-FAULTS** and **RETRIEVE-ALARMS** UIP scroll menu command (see Table C). The **RETRIEVE-FAULTS** prints a list of all faults detected by the *SLC-2000* RT equipment. This command is the most useful tool for detecting the root cause of a system failure. The **RETRIEVE-ALARMS** command prints a list of all alarms being received and transmitted by the *SLC-2000* system as a result of locally or remotely detected faults.

A third maintenance tool is provided by a craft interface terminal (CIT). When SONET is equipped, the CIT provides detailed information on the local and/or remote SONET OC-3 terminals (local SONET subsystem and far-end DDM-2000 terminal).

The CIT also retrieves detailed reports about performance monitoring, alarms and status, and system configuration for near- and far-end terminals for the SONET subsystem (when equipped), the DLC subsystem, or the ITH subsystem. Document 363-208-003, *SLC-2000 Access System, Commands and Messages*, provides a description of the commands available for a CIT connected to a *SLC-2000* system.

Trouble Analysis Procedures

The trouble analysis procedures in this document involve replacing faulty circuit packs and obtaining performance reports and/or alarm and status reports for analysis to determine proper system operation and/or trouble. If the trouble cannot be corrected or identified, the procedures direct the technician to obtain assistance because no more step-action procedural data is known for the specific trouble.

RTAC Assistance

The technician must make the decision regarding trouble analysis, corrective action, and obtaining assistance. The technician and his/her local technical support staff may choose to continue trouble analysis based on their knowledge or experience on the *SLC-2000* and *DDM-2000* systems, or they may elect to obtain assistance by calling the Regional Technical Assistance Center **1-800-225-RTAC** (7822).

COACH Assistance

Various customer computer-support tools are on-line and available by means of customized on-line aid for customer help (COACH). A login identification and password must be obtained to gain access to the COACH tools. Contact your regional SLC-2000 and DDM-2000 coordinator for information on obtaining a COACH login.

Diagnostic Dictionary—The Diagnostic Dictionary tool gives the user access to previously detected symptoms, problems, temporary fixes, cautions, and solutions. These may be usable in diagnosing, correcting, or avoiding a system problem.

Compatibility Data—The Compatibility Data tool gives the user access to hardware configuration data that is compatible to a user-specified software generic.

News and Bulletin—The News and Bulletin tool allows the user to process News and Bulletin information. News consists of messages that may be of general interest to the user. Bulletins contain information of a more urgent nature.

Circuit Pack Failures

Circuit pack failures are identified by LEDs (see Table B) and reported by system alarms and/or manual or automatic diagnostic reports. When this occurs, a determination must be made as to why a circuit pack has failed. Whenever possible, cross check **FAULT** LEDs with the UIP **RETRIEVE-FAULTS** command or the CIT **RTRV -ALMS** command. If a circuit pack with a **FAULT** LED lighted is not identified as failed, do not remove the pack until these procedures direct you to. One recommendation as a first step for determining the cause of a failure is to unseat and then reseat the suspected circuit pack. For example, if a DS1 circuit pack is reported faulty, that pack should be unseated and then resealed before being returned as defective. This will cause an automatic recovery and diagnostic operation to be performed on that DS1 circuit pack. If there is a contact problem such as dirt, oil, or lack of total contact connection, this may be corrected by reseating and thus avoiding the return of a good unit for repair. Use caution when unseating circuit packs.

Before removing an active **TSI** or **BMP**, change the active core by using the UIP SWITCH-CORE or CIT **SW-TOPROTN** command. Refer to **DLP-528**.

Before removing an active **LIU**, change to the protection **LIU** by using the UIP **SWITCH-LIU** or CIT **SW-TOPROTN** command. Refer to **DLP-529**.

Before removing an active **VTU**, change to the protection **VTU** by using the SONET CIT **sw-1s** command. Refer to **DLP-529**.

Before removing a **SYSCTL**, always perform a countdown procedure by momentarily depressing, at the same time, the **FE SEL** button on the **SYSCTL** and the **ACO** button on the UIP. Refer to **DLP-502**.

When circuit packs are to be replaced in a specified sequence to clear a trouble, ***replace only one circuit pack at a time, wait for transient alarms to settle, and wait for circuit packs to finish initialization. Never replace more than one pack at the same time.*** Whenever replacement of a circuit pack does not cure the trouble, the original circuit pack should be returned to operation. You should not remove circuit packs that are not *failed* (not in the *retrieve-faults* list) unless the procedure tells you to (removing an in-service circuit pack may interrupt service).

Any options on the replacement circuit pack must be set per the appropriate facility record. Incorrectly setting options on the **OHCTL** or **SYSCTL** may cause the **FAULT** LED to light.

Electrostatic Discharge (ESD) Considerations

Any integrated circuit on a circuit pack can be damaged by static electricity that builds up within a work area, particularly in areas with low relative humidity. This static buildup on work surfaces and on personnel and their clothing is produced by the various charging effects of even simple movements and by contact between various objects.

As a rule, the greatest potential for electrostatic damage occurs in areas with the lowest relative humidity. But, because such damage can occur anywhere, all personnel handling circuit packs should take the following precautions:

1. Since materials such as food wrappers, plastics, and Styrofoam* containers tend to generate static electricity, keep them away from all circuit packs.
2. Be sure to read all warning labels on bags and cartons before opening any packaging.
3. If possible, open all circuit packs at a static-safe work position using properly grounded wrist straps and table mats that can dissipate static electricity.
4. Whenever possible, wait to remove circuit packs from their protective antistatic packaging until it is time to insert them into a bay.
5. Never touch circuit pack components, conductors, or connector pins. Handle all circuit packs only by the faceplate or latch or by the top and bottom outermost edges.
6. When opening and handling circuit packs or when working on backplanes, always wear a grounded wrist strap or wear a heel strap and stand on a grounded floor mat that can dissipate static electricity.
7. Always store and transport circuit packs in static-safe packages. (Shielding is not required unless specified.)
8. Whenever you remove circuit packs from a shelf, immediately put them into static-safe packages.
9. Try to keep relative humidity above 20 percent.
10. SLC-2000 and DDM-2000 shelves are equipped with grounding jacks for connecting static ground wrist straps. The jacks are located on the bottoms of the user panels.

* Registered trademark of The Dow Chemical Company.

Table A – UIP Display Alarm and Status Indicators

Indicator	Type	LED Color	Description
Power	Status	Green	The UIP detects –48 V at its power feeder input.
Attention	Status	Yellow	The alphanumeric display has new fault or alarm messages to be reviewed.
Critical	Alarm	Red	A system failure has caused loss of service to more than 128 customers (critical alarm).
Major	Alarm	Red	A system failure has caused loss of service to 24 - 128 customers (major alarm).
NE Activity	Status	Yellow	Local (remote terminal) end of the system has active alarm/status condition(s) (near-end activity).
Abnormal	Status	Yellow	The system is configured for testing or some arrangement other than providing service. Conditions for this alarm include the following: • Forced or denied protection switch • Manually switched synchronization reference (from the CIT) • Active loopbacks • Active <i>locally induced</i> system or circuit testing • Missing retainer card (177A) in the DS1 low-speed interface (distribution section) in slots without DS1 circuit packs • Missing system memory unit (SMU) • SMU program installation disabled by means of the UIP.
Panel Fault	Status	Red	The UIP has detected a failure in its circuits or in the display module.
ACO	Status	Green	The alarm cutoff (ACO) push button has been pressed during an active alarm condition.
Minor	Alarm	Yellow	A system failure has caused loss of service to 0 - 23 customers (minor alarm).
Power Minor	Alarm	Yellow	Reports batteries on discharge, usually caused by a switch from AC power to battery backup at the remote terminal (power minor alarm).
FE Activity	Status	Yellow	Far end of the system has active alarm/status condition(s) (NE ACTY lighted at far end, or far end transmitted alarm to remote terminal).
Session	Status	Yellow	A remote CIT session to this remote terminal is in progress. This LED alerts the local technician at the remote terminal of CIT maintenance from the other end.
Alphanumeric display	—	Red	The alphanumeric message display (AMD) is a 24-character single-line dot matrix LED. The AMD shows one line at a time of the main menu (of basic system commands) and of system alarm and status reports, without a CIT.

Table B – Faceplate Indicators, Controls, and Inputs

Plug-In CUs*	Controls	LEDs				Tst Pts/Jacks T, R, T1, R1
		Red	Yellow	Green	7-seg	
	TEST, O or E, LB	BUSY, FAIL, STATUS		19.2, 38.4, SW56, SYNC		
PTU	Test	FAULT		TEST		
MDC		FAULT	INCOMP			
T8U		FAULT				
THC		FAULT		TEST ABCD bits (signaling) or RESYNC (flashing)		
PCU		FAULT				
AMU		FAULT				
PAU		FAULT				
CAU		FAULT				
SSU		FAULT				
TSU		FAULT				
TSI		FAULT		ACTIVE		
BMP		FAULT		ACTIVE		
PDC		FAULT				
SMU		FAULT	DSBLD			
SYSCTL	FE SELECT UPD/INT UPD/INIT	FAULT			SELECTED NODE	
OHCTL		FAULT				
MXRVO		FAULT		ACTIVE		
OLIU		FAULT		ACTIVE		Optical LPBK jacks
TGS		FAULT		ACTIVE		
VTU		FAULT	DS1(4)			
LIU		FAULT	DS1(4)			
DS1		FAULT				
DT Servers		FAULT	CLF DT CONFIG			

* SLC®-2000 channel units (CUs) can have a variety of faceplate indicators, controls, and inputs depending on the CU type. Please reference the CU data sheets for specific details. A list of the CU data sheets can be found in document 363-208-000, *SLC®-2000 Access System, Applications, Planning, and Ordering Guide*

Table C – UIP Command Entry and Miscellaneous Push Buttons

Button	Type	Description
Scroll Menu  (up) and  (down)	Command	(two buttons) The Scroll Up push button scrolls the display backward one line at a time through the menu selections. The Scroll Down push button scrolls the display forward through menu selections. To see the next line of a menu, press Scroll Down.
Enter	Command	Selects the menu item or executes the command currently displayed.
Escape	Command	Returns the user to the command menu.
LED Test	Misc	Lights the system indicators (including all segments of the display) except for Series 5 System channel unit indicators. This function may be operated from the UIP or the MDS assembly (each metallic distribution shelf has this push button to allow LED testing of shelves that may not be visible from the UIP).
ACO	Misc	When this push button is pressed while an alarm is active, the ACO indicator lights.
Update	Misc	Updates the equipment list in the system database to reflect the current hardware configuration and incoming signals.

Isolate Trouble to a *SLC*[®]-2000 Access System COT or RT

Summary: This procedure directs the craftsperson to the *SLC*-2000 remote terminal (RT) if no trouble is found at the central office, or directs the craftsperson to the central office if no trouble is found at the *SLC*-2000 RT.

1. From which location are you starting this sectionalization?
If ***SLC*-2000 RT**, continue with Step 2.
If ***SLC*-2000 COT**, go to Step 6.
If ***SLC* 96 COT, Digital Switch, or local DDM-2000**, go to Step 10.
2. Is the green **POWER** LED lighted?

If **YES**, continue with Step 3.
If **NO**, go to **TAP-102**.
3. At the UIP, press the **LED Test** button.
4. Do *any* LEDs light when the **LED Test** button is pressed?

If **YES**, continue with Step 5.
If **NO**, go to **TAP-102**.

5. On the **SYSCTL** pack at the *SLC-2000* terminal, press the **SYSCTL FE SEL** button to display the local shelf alarms on the UIP (***STATUS -LOCAL SYSTEM*** is printed on the display). Proceed with the sectionalization as follows:

If ...	And ...	Then ...
Your system has fiber distribution	Neither NE nor FE Activity is lighted, but there is one or more LEDs lighted on the MSDT Server	Clear fiber-in-the-loop (FITL) trouble using TAP-109 .
The NE Activity alarm is lighted	System displays the local shelf alarms	Clear <i>SLC-2000</i> system SONET trouble using TAP-102 .
The <i>SLC-2000</i> displays any of the following: • FE Activity lighted • No alarms • No Flashing FAULT LEDs	—	Clear DDM-2000 trouble using Operations and Maintenance procedures in document 363-206-202 (also go to Step 11 to locate SONET trouble).
The NE Activity lights	All other alarms go off when the local site and shelf alarms are displayed	Clear <i>SLC-2000</i> DLC subsystem trouble using TAP-102 .
The FE Activity lights	All other alarms go off when the local site and shelf alarms are displayed	The trouble is with the central office terminal or digital switch. Note: If the far-end alarms cannot be displayed, you may have facility trouble, trouble at the far-end system, or both ends may have the OHCTL Site ID or SYSCTL Network ID set to the same number.
You are having problems with the TR-303 data links between the LDS and the <i>SLC-2000</i> system	—	Go to TAP-110 .
Line testing no longer completes due to resources being unavailable, or test access is blocked	PTU cards installed without their associated MDC cards	Remove PTU cards that do not have an MDC card.
You are using a Tollgrade digital DC bypass pair channel unit	You cannot perform line testing	Go to TAP-111 .

6. Is the green **POWER** LED lighted?

If **YES**, continue with Step 7.

If **NO**, go to **TAP-102**.

7. At the UIP, press the **LED Test** button.

8. Do *any* LEDs light when the **LED Test** button is pressed?

If **YES**, continue with Step 9.

If **NO**, go to **TAP-102**.

9. On the **SYSCTL** pack at the *SLC-2000* COT, press the **SYSCTL FE SEL** button to display the local shelf alarms on the UIP (***STATUS -LOCAL SYSTEM*** is printed on the display). Proceed with the sectionalization as follows:

If ...	And ...	Then ...
The NE Activity alarm is lighted	System displays the local shelf alarms	Clear <i>SLC-2000</i> system trouble using TAP-102 .
• The <i>SLC-2000</i> system displays any of the following: • FE Activity lighted • No alarms • Flashing FAULT LEDs	—	Clear RT trouble using TAP-102 .
NE Activity is lighted	All other alarms go off when the local site and shelf alarms are displayed	Clear <i>SLC-2000</i> DLC subsystem trouble using TAP-102 .
FE Activity is lighted	All other alarms go off when the local site and shelf alarms are displayed	Clear trouble with the remote terminal. Note: If the far-end alarms cannot be displayed, you may have facility trouble, trouble at the far-end system, or both ends may have the OHCTL Site ID or SYSCTL Network ID set to the same number.

10. At the *SLC* 96 COT or digital switch, sectionalize trouble as follows:

If you are at a ...	And ...	Then ...
<i>SLC</i> 96 COT or Digital Switch	Far-end (FE) and major (MJ) or minor (MN) alarms and possibly digroup alarms are present	Clear trouble with the <i>SLC</i> -2000 RT.
	The LIU RCV indicator is lighted	- Check local DDM-2000 shelf for possible low-speed pack failure. Clear the problem if found. - If the DDM-2000 shelf is OK, clear trouble at the <i>SLC</i>-2000 RT.
	A near-end (NE) alarm is present	Clear the trouble with the COT or digital switch before going to the local DDM-2000 or <i>SLC</i> -2000 RT.
Local DDM-2000 shelf	The NE or any FAULT LED alarms are lighted while displaying the local shelf alarms by pressing the SYSCTL FE SEL button to display the local site ("L" displayed)	Clear DDM-2000 trouble using Operations and Maintenance procedures in document 363-206-202.
	The FAULT LED is flashing on any low-speed DS1 pack	Clear trouble at the local COT or digital switch.
	The local DDM-2000 shelf displays any of the following: FE lighted - No alarms - No Flashing FAULT LEDs	Clear trouble at the <i>SLC</i> -2000 RT. If needed, go to Step 11 to locate SONET trouble. Note: If the other network element shelf alarms cannot be displayed, you may have facility trouble or trouble at the far-end system.

11. Find the system originating alarms by operating the **SYSCTL FE SEL** button as shown below until the **NE** and major (MJ), minor (MN), or critical alarms are shown:

Press SYSCTL FE SEL button ...	SYSCTL will display ...
Once	Local shelf alarm.
Twice	Local site alarm.
More than twice	Alarms present at other SONET network shelves as identified by the network number displayed on the SYSCTL . <i>Note:</i> To look at different network element alarms, you must press the SYSCTL FE SEL button more than once in a 15-second period.

12. Record the network element and the type of alarm displayed on the **SYSCTL**.
13. After viewing alarms for all network elements, begin trouble clearing at the location with the most severe alarm condition.

Clear Alarms on a *SLC*[®]-2000 Access System

Summary: This procedure directs you to a specific trouble-clearing procedure depending on the trouble your system is experiencing.

Prerequisites: In this procedure the following is assumed:

- At a previous time, the system was connected end-to-end and was functioning with no alarms and all options properly set.
 - The problem has been isolated to either a *SLC*-2000 Access System COT or RT site.
1. Determine the trouble or trouble indication by doing one or more of the following:
 - Retrieving alarms using the CIT or UIP
 - Visually inspecting the system for lighted or flashing red **FAULT** LEDs on individual circuit packs
 - Inspecting the UIP for lighted **Abnormal**, **NE Activity**, or **Minor** LEDs.
 2. Go to the proper procedure to clear trouble using Table A.

Table A – Alarm Indications

Trouble	Indication	Procedure
Power trouble	• Power alarm from UIP or CIT • Blown fuses • No AC power • Faulty UIP display panel	TAP-114
FAULT LED lighted but not flashing	• Alarm from UIP or CIT • Red FAULT LED lighted on circuit pack	TAP-115
FAULT LED flashing	• Alarm from UIP or CIT • Red FAULT LED flashing on circuit pack	TAP-116
Alarm with NO flashing or lighted LED on circuit packs	• Alarm from UIP or CIT with no FAULT LEDs lighted or flashing. The following list gives some of the possible causes for this indication. If none of these problems are found, use local procedures to clear the problem. — Certain fault conditions will light alarm LEDs (such as Abnormal, NE Activity, Minor) without lighting any circuit pack LEDs. Examples of these faults include faulty channel units, external alarms (such as door alarm), and communication link failures between two circuit packs. — The yellow VTU DS1(#) or LIU DS1(#) LED lights when the incoming signal [such as loss of frame (LOF) or alarm indication signal (AIS) as identified by the RETRIEVE-ALARMS command] is bad. This indicates a feeder signal trouble (SONET or far-end DLC) and is not a local DLC subsystem trouble. — An INCOMP alarm on an MDC may be caused by a channel unit installed in the wrong slot. This will occur when an MSDT Server is installed in a provisioned metallic shelf or when an RT channel unit is installed in a provisioned FITL shelf or when a T8U is installed when the T8U has been provisioned as "not required." The MDC INCOMP alarm may be accompanied by CU FAULT alarms identifying the CU generating the incompatible alarm.	TAP-104

Clear OLIU or Fiber Trouble on a *SLC*[®]-2000 Access System When OLIU FAULT LED Is Flashing

Summary: This procedure includes a general discussion of how to sectionalize OLIU and fiber path failures. It then gives a general procedure that will clear most failures. It is assumed you have performed **TAP-102** to replace circuit packs with the **FAULT** LED lighted. Establish communications with the far-end terminal before beginning the procedure. Also, ***read all notes and cautions before beginning the procedure.***

If an **OLIU FAULT** LED is lighted (not flashing) and the **ACTIVE** LED is off, replace the **OLIU** before attempting this procedure. If either the transmitting or receiving circuitry on an **OLIU** has failed, the **OLIU FAULT** LED will be lighted. However, the **OLIU** may still be in service in the other direction because protection switching is unidirectional. For example, the **OLIU ACTIVE** and **FAULT** LEDs are both lighted. *You must use caution when replacing OLIU circuit packs with a SONET subsystem Minor alarm status to avoid service interruption.*

When troubleshooting **OLIU** problems, you must first fully analyze the trouble indications. This may be done by noting **OLIU** LED indications at both ends of the system or using a craft interface terminal (CIT) to log in to the far-end terminal and by using the **rtrv-alm** and **rtrv-state:main** commands to check the far-end status. The LEDs on the OLIU provide the following information:

- **Lighted FAULT LED (not flashing).** A lighted **FAULT** LED on the **OLIU** indicates that either the receiver, transmitter, or both have failed.
- **Flashing FAULT LED.** A flashing **FAULT** LED on the **OLIU** indicates that either the near-end receiver, far-end transmitter, or incoming (receive) fiber has failed.
- **Lighted ACTIVE LED.** A lighted **ACTIVE** LED indicates that the **OLIU** is carrying service (transmitting, receiving, or both).

After determining the trouble indications at both ends, use Table A and Figure 2 to assist in analyzing the trouble. Figure 2 shows both the main and protection OLIUs on both the near end and far end. It includes both the transmit and receive fiber paths (A, B, C, and D). Table A shows the possible status of the **FAULT** and **ACTIVE** LEDs for a given signal path failure.

If a **21G OLIU** is used, use a CIT to verify that the **HIGH/LOW POWER** option is set correctly.

-  **CAUTION:**
Open optical connectors may emit invisible laser radiation. Do not view beam with optical instruments. Avoid direct exposure to the beam.
-  **CAUTION:**
Use of controls or adjustments or performance of procedures other than those specified herein may result in hazardous laser radiation exposure.
-  **CAUTION:**
*When removing plug-ins, ensure that protection switching is available. When available, use a CIT and the **switch-line** command to do a protection switch. The line protection switching request is unidirectional. It may be necessary to perform a **switch-line** at the near end and far end to switch both transmit and receive to the same line.*
-  **CAUTION:**
*When removing plug-ins, always remove the one without a lighted **ACTIVE LED** first.*
-  **NOTE:**
Because the OC-3 line protection switching request is unidirectional, it is possible to have **FAULT** LEDs lighted on both the service and protection **OLIUs** and still be in service. When troubleshooting **OLIU** problems, you must first fully analyze the trouble indications. This may be done by noting LED indications at both ends of the system or using a CIT to log in to the far-end terminal and using the **rtrv-alm** and **rtrv-state** commands to check the far-end status.
-  **NOTE:**
This procedure can be used to clear some troubles, but a knowledge of the **OLIU** protection switching arrangement and the use of CIT commands are necessary to clear other troubles where a service interruption might occur.

1. Is the **FAULT** LED on the near-end OLIU lighted, flashing, or off?

If **lighted (not flashing)**, continue with Step 2.

If **flashing**, go to Step 3.

If **off**, go to Step 6.

2. Sectionalize trouble as follows:

If the Near-End OLIU ...	And the Far-End OLIU ...	Then the ...
FAULT LED is on	FAULT LED is off	Near-end OLIU has a bad receive circuit. See Caution 3. Replace the near end OLIU. Go to Step 5.
	FAULT LED is flashing	Near-end OLIU has a bad transmit circuit. See Caution 3. Replace the near end OLIU. Go to Step 5.

3. Is the **FAULT** LED on the far-end OLIU off?

If **YES**, continue with Step 4.

If **NO**, go to Step 6.

4. Sectionalize trouble as follows:

If the ...	And ...	Then, do the following ...
Near-end OLIU FAULT LED is flashing AND Far-end OLIU FAULT LED is off	You have an optical test set	a. At the near end, measure the power on the input fiber with the test set. Requirement: –7.0 to –34.0 dBm If input power is good, replace the near-end OLIU and go to Step 5. (See Caution 3.) If input power is bad, continue procedure at far end. b. At the far-end OLIU, check the output power of the OLIU with the test set. Requirement: –2.5 to –5.0 dBm (HIGH OLIU option) –7.5 to –11.4 dBm (LOW OLIU option) If OLIU output power is bad, have the far end replace the OLIU. Go to Step 5. If OLIU output power is good, repair the fiber facility. Go to Step 5.
	You do not have an optical test set	a. At the far end, replace the OLIU. If near-end OLIU FAULT LED stops flashing, go to Step 5. If near-end OLIU FAULT LED keeps flashing, continue with Step b. b. At the near end, replace the OLIU. See Caution 3. If new OLIU FAULT LED is NOT flashing, go to Step 5. If new OLIU FAULT LED is flashing, repair the fiber facility. Go to Step 5.

5. Has the trouble cleared?
If **NO**, continue with Step 6.
If **YES**, **STOP. YOU HAVE COMPLETED THIS PROCEDURE.**
6. At the *SLC-2000* terminal, press the **SYSCTL FE SEL** button to display the local shelf alarms on the UIP. Note the alarm status (**Minor** or **Critical**) on the SONET subsystem.

Press SYSCTL FE SEL button ...	SYSCTL will display ...
Once	Local shelf alarm.
Twice	Local site alarm.
More than twice	Alarms present at other SONET network shelves as identified by the network number displayed on the SYSCTL . Note: To look at different network element alarms, you must press the SYSCTL FE SEL button more than once in a 15-second period.

⇒ **NOTE:**
In this procedure it is assumed that any SONET subsystem faults (failure of both **TGSs**, **MXRVOs**, or more than one **DS1** pack) that would cause a **Critical** alarm have been eliminated.

⇒ **NOTE:**
In this procedure it is assumed that at least one **OLIUFault** LED is flashing or lighted (may be lighted at the far-end DDM-2000 shelf). Most facility troubles will be a half **OLIUFault** (either transmit or receive **OLIUFault** failure) or a fiber fault. It is possible for an **OLIUFault** to fail and not light the **FAULT** LED.

7. Does the SONET subsystem have a **Critical** alarm?
If **YES**, then continue with Step 8.
If **NO**, then go to Step 19.
8. Replace any **OLI**U with a **FAULT** LED lighted and not flashing.
9. Does the SONET subsystem still have a **Critical** alarm?
If **YES**, then continue with Step 10.
If **NO**, **STOP. YOU HAVE COMPLETED THIS PROCEDURE.**
10. Remove the fiber connectors from the **IN** and **OUT** connectors on the OLIU.
 **NOTE:**
With a **Critical** alarm, you may have the **FAULT** LED flashing or lighted on both **OLI**Us. Because service is already lost, you can quickly test the local **OLI**Us with a fiber loopback to check if they are functioning correctly.
11. Is the OLIU a **21G OLI**U?
If **YES**, continue with Step 12.
If **NO**, go to Step 13.
12. Ensure that the **LOW POWER** option is set on the **21G OLI**U (Figure 1).
 **NOTE:**
If needed, remove the **21G OLI**U and set the option to **LOW POWER**, then reinstall the plug-in.

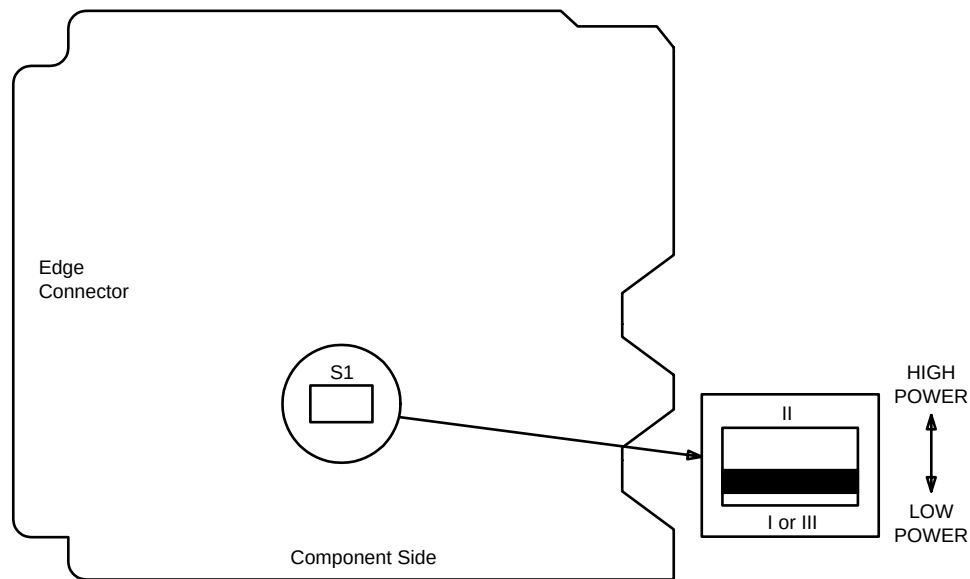


Figure 1 – OLIU Option Switch

13. Connect a *clean* fiber jumper between the **IN** and **OUT** connectors on the OLIU.
14. Does the **FAULT** LED on the OLIU light or flash while looped back?
If **YES**, continue with Step 15.
If **NO**, go to Step 16.
15. Replace the OLIU. (See Caution 3.) Reconnect the fibers to the correct connectors. **Go to Step 17.**

⇒ **NOTE:**
If installing a **21G OLIU**, reset the power option, if needed.
16. Refer problem to fiber facility maintenance for repair.
17. Did the trouble clear?
If **NO**, continue with Step 18.
If **YES**, **STOP. YOU HAVE COMPLETED THIS PROCEDURE.**

18. Sectionalize trouble using local procedures. Refer to Table A and Figure 2, if necessary.

STOP. YOU HAVE COMPLETED THIS PROCEDURE.

19. Remove the fiber connected to the **IN** jack of the OLIU with the flashing LED.

20. Connect the fiber to an optical test set and measure the optical power.

21. Is the optical power between -7.0 and -34 dBm?

If **NO**, continue with Step **22**.

If **YES**, go to Step **23**.

22. Refer trouble to the far end or fiber facility maintenance. Refer to Figure 2 and Table A when assisting with trouble sectionalization.

STOP. YOU HAVE COMPLETED THIS PROCEDURE.

23. Replace the OLIU. (See Caution 3.) Reconnect the fibers to the correct connectors.



NOTE:

If installing a **21G OLIU**, reset the power option, if needed.

24. Did the problem clear?

If **NO**, continue with Step **25**.

If **YES**, **STOP. YOU HAVE COMPLETED THIS PROCEDURE.**

25. Sectionalize trouble using local procedures. Refer to Table A and Figure 2, if necessary.

STOP. YOU HAVE COMPLETED THIS PROCEDURE.

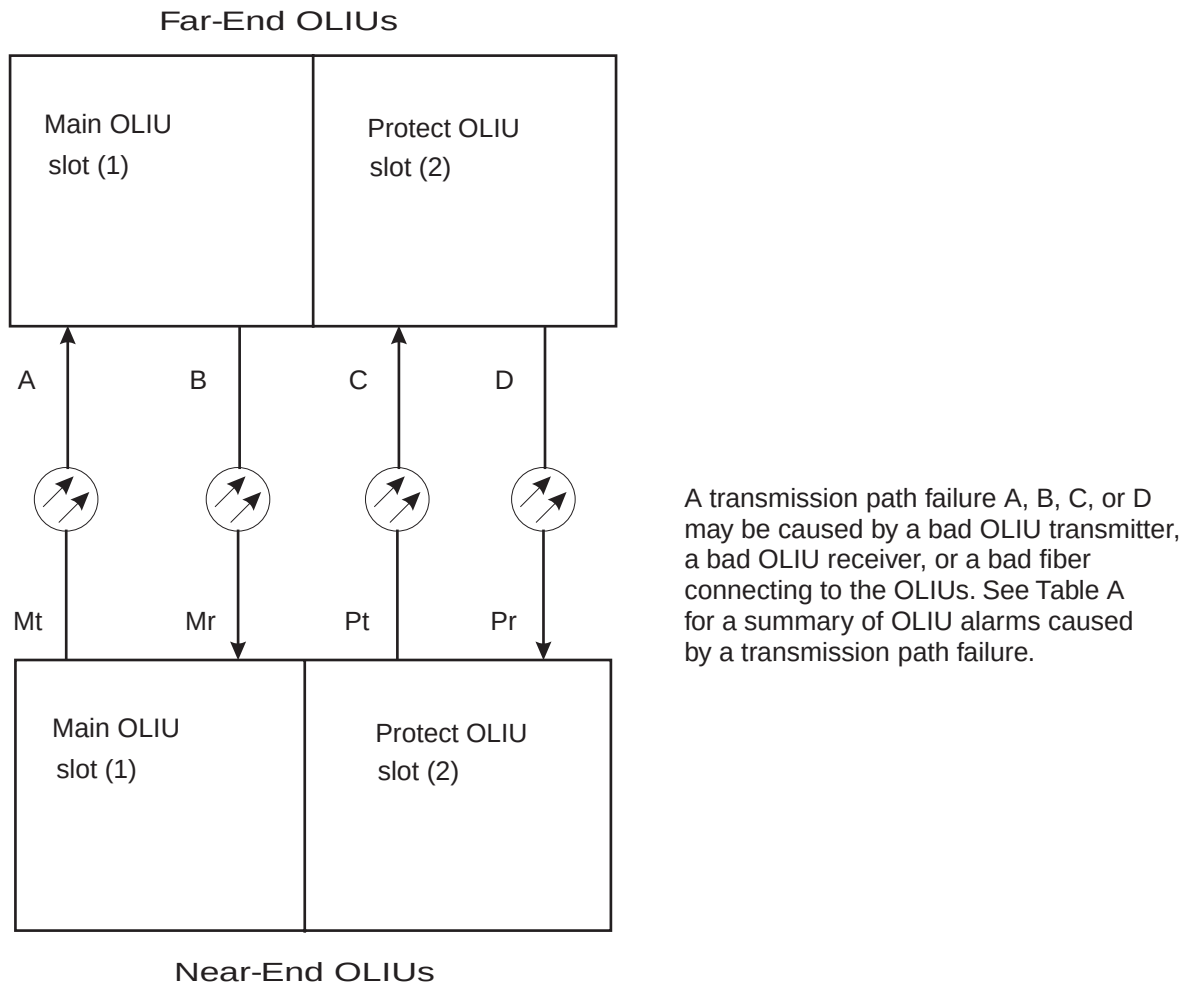


Figure 2 – Fiber Paths Between SONET Terminals

➡ **NOTE:**
For ring configurations, slot 1 and slot 2 go to different locations and the slots are cross-connected (1 to 2 from site to site).

Table A – OC-3 High-Speed OLIU/Fiber Facility Trouble, Minor Alarm Status (Note)

Signal Path Trouble	Near End Active Before Trouble	After Trouble							
		Near-End OLIU				Far-End OLIU			
		Main		Protect		Main		Protect	
		Active	Fault	Active	Fault	Active	Fault	Active	Fault
A	M	on	off	on	off	on	flash	on	off
	P	off	off	on	off	off	flash	on	off
	B(Pt/Sr)	off	off	on	off	off	flash	on	off
	B(Pr/St)	on	off	on	off	on	flash	on	off
B	M	on	flash	on	off	on	off	on	off
	P	on	flash	on	off	off	off	on	off
	B(Pt/Sr)	on	flash	on	off	on	off	on	off
	B(Pr/St)	on	flash	on	off	off	off	on	off
A&B	M	off	flash	on	off	off	flash	on	off
	P	off	flash	on	off	off	flash	on	off
	B(Pt/Sr)	off	flash	on	off	off	flash	on	off
	B(Pr/St)	off	flash	on	off	off	flash	on	off
C	M	on	off	off	off	on	off	off	flash
	P	on	off	on	off	on	off	on	flash
	B(Pt/Sr)	on	off	on	off	on	off	on	flash
	B(Pr/St)	on	off	off	off	on	off	off	flash
D	M	on	off	off	flash	on	off	off	off
	P	on	off	on	flash	on	off	on	off
	B(Pt/Sr)	on	off	off	flash	on	off	off	off
	B(Pr/St)	on	off	on	flash	on	off	on	off
C&D	M	on	off	off	flash	on	off	off	flash
	P	on	off	off	flash	on	off	off	flash
	B(Pt/Sr)	on	off	off	flash	on	off	off	flash
	B(Pr/St)	on	off	off	flash	on	off	off	flash
A&D *	M	off	off	on	flash	on	flash	off	off
	P	off	off	on	flash	off	flash	off	off
	B(Pt/Sr)	off	off	on	flash	off	flash	off	off
	B(Pr/St)	off	off	on	flash	on	flash	off	off
B&C *	M	on	flash	off	off	off	off	on	off
	P	on	flash	off	off	off	off	on	off
	B(Pt/Sr)	on	flash	off	off	off	off	on	off
	B(Pr/St)	on	flash	off	off	off	off	on	off

Note: M=service OLIU in slot (1) is active; P=protection OLIU in slot (2) is active; B(Pt/Sr)=both OLIUs are active, transmitting on protection, receiving on service; B(Pr/St)=both OLIUs are active, transmitting on service, receiving on protection. Transmitting means the far end is using the signal as its active input.

* This type of failure will interrupt service if any OLIU is removed. Verify that fibers are good before replacing OLIUs.

Use UIP or CIT to Isolate Trouble on a SLC[®]-2000 Access System

Summary: This procedure helps identify which SLC-2000 subsystem is causing alarms or faults. Most fault conditions will light or flash the red **FAULT** LED on the circuit pack that has failed diagnostic tests. Once you have verified with the **RETRIEVE-FAULTS** UIP command that the pack is failed, use **TAP-102** to clear the trouble. But certain fault conditions will light alarm LEDs (such as **Abnormal**, **NE Activity**, or **Minor**) without lighting any circuit pack LEDs. Examples of these faults include faulty channel units, external alarms such as an open door alarm, communication link failures between two circuit packs, or a removed circuit pack.

You can check for faults and alarms using one of the following two methods:

- UIP method. The **RETRIEVE-FAULTS** and **RETRIEVE-ALARMS** user interface panel (UIP) commands (**DLP-500**) provide information about the cause of a fault and the types of alarms generated by the SLC-2000 Access System.
- CIT method. The **RTRV-ALM** craft interface terminal (CIT) command is used when the CIT is logged into the DLC subsystem (**DLP-521**, **DLP-525**, or **DLP-541**). This command prints the alarm list and then the fault list on the CIT display. See document 363-208-003, *SLC-2000 Access System, Commands and Messages*, "Output Messages and Reports" for information pertaining to this report.



NOTE:

You can use these commands throughout trouble-clearing activities (assuming the **PDC** has not failed and the **Panel Fault** LED is not lighted) to help identify system troubles. The system orders the fault list by alarm severity (CR, then MJ, then MN/PMN, then ABN), and you should replace the circuit packs identified with the most severe alarm condition first. But the fault list will not identify which SONET subsystem circuit pack(s) causes trouble.

The **RETRIEVE-FAULTS** and **RETRIEVE-ALARMS** UIP commands print a message (using the **Scroll Menu** down arrow once the command is selected) on the display panel with the following general syntax:

Alarm-severity:Which-end:Description

Each variable has the following meaning:

- **Alarm-severity.** The values can be **CR** (critical), **MJ** (major), **MN** (minor), **PMN** (power minor), or **ABN** (abnormal). It is possible for more than one Alarm-severity to be displayed (for example **PMN:ABN**) or no severity to be displayed (such as a channel unit failure).
- **Which-end.** The values can be **NE** (near end) or **FE** (far end). It is possible for both **NE:FE** or neither to be displayed (fault messages assume near end).
- **Description.** This is a description of the fault or alarm and generally will identify the circuit pack with an access identifier (AID) string (see Table A for examples of an AID string). The fault message and alarm message will be the same if the SONET subsystem has a trouble condition. The description will end with **SONET**. A single fault in the DLC subsystem will generate only one fault message, but it may cause more than one alarm message.

Use the **RETRIEVE-ALARMS** command to identify how the system is responding to fault conditions (which alarms are locally active and which alarms are being sent to, or received from, the far-end DLC equipment). However, use the **RETRIEVE-FAULTS** command to isolate non-SONET subsystem troubles to the circuit pack level.

The CIT **RTRV-ALM** prints the same alarm and fault messages as the **RETRIEVE-ALARMS** and **RETRIEVE-FAULTS** UIP commands do.

Refer to the following tables of fault and alarm message description text strings:

UIP Fault Messages — Table B

UIP Alarm Messages — Table C.

Table A – Examples of SLC®-2000 DLC Subsystem Access Identifiers

Object	Entity	Address	Example
ARM Slots	Test Head Controller Slot	thc	thc
	Virtual Tributary Unit (VTU) Slot	ls-a-{1-8}	ls-a-2
	Line Interface Unit (LIU) Slot	ls-a-{1-8}	ls-a-2
	Time Slot Interchange Slot	tsi-{1,2}	tsi-1
	Bandwidth Mgmt. Processor Slot	bmp-{1,2}	bmp-1
	Provisioning and Display Unit	pdc	pdc
	System Memory Unit	smu	smu
	CORE Slots*	core-{1,2}	core-1
Metallic Distribution Shelf (MDS) Slots [†]	Metallic Distribution Controller	mdc-{1-8}-{1,2}	mdc-1-2
	TR-08 Unit	t8u-{1-8}-{1,2}	t8u-2-1
	Power Test Unit	ptu-{1-8}-{1,2}	ptu-1-2
	Metallic Distribution Shelf CU	cu-{1-8}-{1-24}	cu-2-13
	DT Server	dt-{1-8}-{1,3,5,7,13,15,17,19} [†] cu-{1-8}-{1,3,5,7,13,15,17,19} [†]	dt-3-1 cu-3-1
Virtual RT [‡]	TR-08 VRT	vrt-{1-8}	vrt-1
	TR-08 Digroups	dgr-{1-8}-{a-d}	dgr-1-a
	TR303 VRT	v303-{1-2}	v303-1
	INA Digroups	ina-{1-28}	ina-1
Transmission Interface	VTU Low-Speed Interface	a-{1-7}-{1-4}	a-1-4
	LIU Low-Speed Interface	a-{1-7}-{1-4}	a-1-4
Operations Interfaces	User Interface Panel	user panel	user panel
	TR-08 Data Link	tr8dl-{1-8}-{a,c}	tr8dl-1-a
	TR-303 EOC Data Link	v3eoc-{1-2}-{1-2}	v3eoc-1-1
	TR-303 TMC Data Link	v3tmc-{1-2}-{1-2}	v3tmc-1-1
Physical drops [†]	MDS Physical Drop	drop-{1-8}-{1-24}-{1-4}	drop-1-2-4
	DT Physical Drop	dtdp-{1-8}-{1,3,5,7,13,15,17,19}-{1-6}-{1-4}	dtdp-2-1-3-2
RT [§]	Common	—	—

* The "CORE" address is used as a general reference to the slots in the bandwidth management complex in the ARM. "core-1" refers to all slots in side 1 of the CORE; that is, TSI-1 and BMP-1

† For MDS common unit slots, the first number in the address refers to the shelf number while the second number refers to the side.
For CU slots, the first number in the address refers to the shelf while the second number refers to the slot number.
For the distant terminal, the first number in the address refers to the metallic distribution shelf while the second number refers to the slot number where the DT Server is located. For 24-line DT Servers, valid slots are 1, 5, 9, 13, 17, and 21. For a 12-line DT Server, valid slots are 1, 3, 5, 7, 9, 11, 13, 15, 17, 19, 21, and 23. The last two numbers in the dtdp are the channel unit slot number {1-6} in the MSDT or FiberReach multiplexer narrowband shelf (NBS) and the DS0 number within the slot {1-4}.

‡ For TR-08 digroups and data links, the number in the address refers to the VRT number while the letter refers to the digroup within the VRT. Digroups in TR-08 VRTs are designated A through D.

§ The RT object is used as a general reference to the entire SLC-2000 RT system as a whole. Alarms/faults against the RT (Common) entity cannot be isolated to a specific address and affect the operation of the entire RT.

1. Are you using a CIT or a UIP?

If **CIT**, continue with Step 2.

If **UIP**, go to Step 3.

2. With the CIT logged in to the DLC subsystem, enter **RTRV-ALM**. *Go to Step 4.*



NOTE:

For details of logging in to the DLC subsystem, refer to one of the following procedures:

- **Release 3.1, 3.2, or 3.3 — DLP-521 or DLP-541**
- **Release 4.0 or later — DLP-525 or DLP-541.**

3. Press **Escape** then the **Scroll Menu** up or down arrow button until **RETRIEVE-FAULTS: <ent>** is displayed. Then press **Enter**. Press the **Scroll Menu** down arrow button to scroll through the fault list.

4. Does the CIT or UIP indicate *no active faults*?

If **YES**, continue with Step 5.

If **NO**, go to Step 6.

5. Trouble has either cleared or is at the far end. If there is still trouble in the system, refer to the far end.

STOP. YOU HAVE COMPLETED THIS PROCEDURE.

6. Does the first fault list message indicate a SONET trouble?

If **NO**, then continue with Step 7.

If **YES**, go to **TAP-106**.

7. Select the first fault listed in the fault list.

8. Do the following for the selected fault indication:

If the fault list indicates...	Then do the following...	And go to...
<i>circuit pack failed</i>	Reseat the circuit pack identified in the fault message and wait 5 minutes to see if the circuit pack reinitializes. If the circuit pack still has failure, replace the circuit pack and wait for the circuit pack to initialize. This could take up to 10 minutes for the BMP .	Step 17
<i>circuit pack removed</i>	Determine why the circuit pack that had previously been installed in the identified slot was removed and do any of the following that apply: • (See Caution.) If the circuit pack was removed intentionally because service is being removed or changed, press the Update button on the user interface panel.  CAUTION: <i>Caution: Pressing the Update button will cause the system to clear ALL span alarms and LIU or VTU pack removed alarms. Do this only when the pack removed fault is the only fault in the system.</i> • If the circuit pack was removed intentionally because service is being removed or changed and the Update button failed to clear the removed indication, then t0 or t1 connections may still exist to the indicated pack. Remove the cross-connections with the DLT-CRS-T0 or DLT-CRS-T1 CIT command. • If the circuit pack was removed unintentionally or has been temporarily removed, reinstall the correct type circuit pack in the identified slot.	Step 17

Continued on next page

If the fault list indicates...	Then do the following...	And go to...
<i>circuit pack neg or pos rng input</i>	No negative or positive ringing voltage is present. • <i>If all PTUs in an MDS assembly have this fault</i>, check/replace MDS fuses or clear ringing generator trouble. • <i>If only one PTU in an MDS assembly has this fault</i>, replace the identified PTU. Connect a test telephone set to a line in the shelf where the fault occurred and perform ring and talk test. Verify that fault does not return. Call the local test desk and request a channel test and verify the test passes.	Step 17
<i>circuit pack stuck relay or stuck test relay</i>	Press the PTU RESET button. Then reseal the identified circuit pack. Call the local test desk and request a channel test on a line in the shelf where the fault occurred. Verify the test passes and the fault does not return.	Step 17
<i>ABN:CORE forced psw or inhibited</i>	Determine why the CORE was forced to switch or was inhibited. Use the SWITCH-CORE:RESET user interface command (DLP-500) to clear alarm when required.	Step 17
<i>circuit pack to circuit pack link</i>	A communication failure between the two circuit packs has been detected.	Step 9
Any other fault	Refer to Table B.	Step 17

9. Scroll through the list to see if any circuit pack has more than one link fault.



NOTE:

The retrieve fault link message will print two circuit packs that cannot communicate.

10. Replace the circuit pack(s) in the order listed in the fault message list with the following exceptions:

If the FAULT message list indicates link failure between any circuit pack and...	Then do the following...
TSI	Replace this circuit pack first. Use the SWITCH-CORE:FORCE user interface panel command (DLP-500) to force the core to the other side (FORCE->2 or FORCE->1) before replacing the TSI (DLP-528). Use the SWITCH-CORE:RESET user interface panel command to clear the ABN:CORE SWITCH alarm.
BMP, VTU, LIU	This circuit pack is duplicated or protected. Replace this pack first. Refer to the following procedures for circuit pack replacement: • BMP — DLP-528 • VTU, LIU — DLP-529.
MDC, PTU, T8U	Removing these circuit packs in an MDS assembly will interrupt service on two digroups (up to 48 customers). Before removing any of these circuit packs, check to see if service will be interrupted (check for dial tone on channel units in the MDS assembly shelf side). If service is available, but you must replace one of these circuit packs, choose a time when no, or few, customer lines are busy (BUSY LED lighted on the channel units) to replace the circuit pack.

11. Wait 5 minutes for the new pack to fully initialize (10 minutes for a **BMP**).

12. Retrieve the fault list again using the CIT or UIP.

13. Does a link fault still exist?

If **YES**, continue with Step **14**.

If **NO**, go to Step **17**.

14. Replace the next circuit pack in the link fault list.

15. Does a link fault still exist?

If **YES**, continue with Step **16**.

If **NO**, go to Step **17**.

16. Clear trouble using local procedures.

STOP. YOU HAVE COMPLETED THIS PROCEDURE.

17. Are all alarms cleared and no more fault messages present?

If **NO**, continue with Step **18**.

If **YES**, **STOP. YOU HAVE COMPLETED THIS PROCEDURE.**

18. Have you replaced the TSI to clear a TSI/VTU or TSI/MDC link fault?

If **YES**, continue with Step **19**.

If **NO**, go to Step **20**.



NOTE:

If the TSI/MDC or TSI/VTU link faults cannot be cleared after replacing the identified **TSI** once, do not repeat replacing the **TSI**.

19. Clear trouble using local procedures (see Note).

STOP. YOU HAVE COMPLETED THIS PROCEDURE.

20. Have you tried to clear all faults listed in the fault list message?

If **NO**, continue with Step **21**.

If **YES**, go to Step **22**.

21. Select the next fault in the fault list message and ***return to Step 8***.

22. Have you performed an LED test to assist in clearing faults?

If **NO**, continue with Step **23**.

If **YES**, go to Step **25**.

23. Perform an LED test (**DLP-507**).

24. Replace any circuit pack that does not light all LEDs during the LED test.
Repeat this procedure from Step 1.

25. Clear trouble using local procedures. See Note for helpful trouble-clearing hints. Be careful to minimize service interruptions.



NOTE:

The problem may be in the backplane wiring of the *SLC-2000* system. One way to verify this is to swap the **SYSCTL** and any plug-in with an inconsistent diagnostic indication with the corresponding plug-ins in another *SLC-2000* system or *DDM-2000*. If the problem moves with the plug-ins, it means that one or more of the plug-ins are defective. If the problem stays with the original *SLC-2000* system, the entire assembly, except for the plug-ins, should be replaced (you may try replacing the user interface display before replacing the *SLC-2000* assembly). The *SLC-2000* system has a printed backplane and cannot be repaired in the field.

Table B – UIP Fault Messages

Address	Message	Meaning (Note)
pdc, smu, tsi-n, bmp-n, ls-a-n	12v failure*	A fault has been detected in the internal 12 V DC power supply. Likely causes are a fault on the PDC, SMU, TSI, BMP, VTU, or LIU circuit packs, or failure of the UIP circuit module.
ls-c-n	2nd CP	The BBF3 (DS1PM) circuit pack requires both function unit slots in the group to be equipped. Insert a second circuit pack of the same type in the empty function unit slot.
—	48v input A failure	The "A" 48-volt power feed to the ARM shelf has failed. Likely cause is 48-volt fuse on UIP has blown.
—	48v input B failure	The "B" 48-volt power feed to the ARM shelf has failed. Likely cause is 48-volt fuse on UIP has blown.
—	AC power fail	The AC power supply to a remote terminal cabinet has failed.
main-n, fn-c-n	APS chan fail	The SONET automatic protection switching (APS) channel on the protection OC-3 line has failed. Likely causes are failure of the OLIU CP on the protection line at the far end, or failure of the OLIU CP on the protection line at the near end.
ls-a-n, ls-c-n	APS autolock	The service associated with a DS1 CP has been automatically switched and locked onto the protection DS1 CP. The automatic protection switching (APS) lock will remain active until midnight. Likely cause is four automatic switches of a single DS1 CP in 10 minutes, usually because of an intermittent failure of the DS1 CP.
uip	CIT port failed	The CIT port on the UIP has failed.
See notes at end of table.		

Continued on next page

Table B – UIP Fault Messages (Continued)

Address	Message	Meaning (Note)
main-n, fn-{a,c}-n, ls-{a,c}-n, tg-n	CP unknown	For a function unit (FN) slot, an MXRVO or OLIU CP is inserted in a slot provisioned for a DS3 CP. For the AUXCTL slot, a CP other than the TLMCTL is inserted in that slot when the SYSCTL slot is equipped with the BBG1 SYSCTL. For a TG slot, the timing mode switch settings on the TGS CP are either invalid, different from those on the companion TGS CP, or different from what they were before the TGS CP was replaced, or the DS1 format or line coding switches on the TGS CP are not the same as they were before the TGS CP was replaced. For a MAIN slot, a CP other than an OLIU is inserted in the specified slot, or that the optical power switch on the OLIU CP is different from what it was before the OLIU CP was replaced. For a function unit (FN) slot, a DS3 or OLIU CP is inserted in a slot provisioned for an MXRVO CP. For a low-speed (LS) slot, the line coding switches on the DS1 CP are different from what they were before the DS1 CP was replaced. In Release 3.1 or higher, this message may mean that a 22F OLIU is present in a slot in which a 21G OLIU is expected or vice versa.
See notes at end of table.		

Continued on next page

Table B – UIP Fault Messages (Continued)

Address	Message	Meaning (Note)
c	DS1 Freq Err *use CIT*	Indicates that an incoming timing signal has an unacceptable frequency offset. Likely cause is a DS1 external timing reference to the local shelf or a remote shelf has a frequency offset greater than about 20 Hz. The CIT must be used to obtain details.
c-n-m	DS1 sgnl fail	Bit error ratio (BER) in the DS1 signal incoming from the DSX-1 exceeds the provisioned failure threshold, 10^{-3} or 10^{-6} . Likely causes include failure of upstream equipment or facility (towards the DSX-1), cross talk in office wiring, or failure of the DS1 CP.
ref-n	DS1 sync fail	The DS1 synchronization reference signal #n has failed. Likely causes include failure of upstream equipment or facility (toward the DSX-1), failure of the incoming DS1 synchronization reference signal, upstream failure in the clock providing the reference signal, high BER on the received signal caused by failure of the office timing supply that provides the DS1 timing reference, the system is provisioned for SF format on the specified DS1 synchronization reference signal and the received DS1 signal is in ESF format, failure of the connection to the timing supply, the frequency of the clock providing the DS1 reference signal is out of specification, or failure of the office timing supply that provides the DS1 timing reference.

See notes at end of table.

Continued on next page

Table B – UIP Fault Messages (Continued)

Address	Message	Meaning (Note)
c	DS3 Freq Err *use CIT*	Indicates that an incoming timing signal has an unacceptable frequency offset. Likely cause is a DS3 external timing reference to the local shelf or a remote shelf has a frequency offset greater than about 20Hz. The CIT must be used to obtain details.
c	DS3 sgnl fail	Bit error ratio (BER) in the incoming DS3 signal exceeds the provisioned failure threshold of 10^{-3} or 10^{-6} . Likely causes include failure of the upstream equipment or facility (towards the DSX-3), cross talk in office wiring, or unprotected failure of DS3 CP.
dt-m-n	DT CLF	Loss of DS1 signal from DT supported by the DT Server in slot #n of metallic distribution shelf #m. May also be caused by a failure at the MSDT or FiberReach narrowband shelf (NBS) (such as power loss), or a power or OU failure in the HDOS.
dt-m-n	DT CU failed	A CU has failed in the DT supported by the DT Server in slot #n of metallic distribution shelf #m.
c	EC1 sgnl fail	The bit error ratio (BER) in the received EC-1 signal exceeds the provisioned threshold. Likely causes include failure of the STS1E CP at the near end, failure of the incoming cable, cross talk in office wiring, or failure of the incoming signal from the STSX-1.
dtcu-m-n-p	ISDN cnflt	ISDN channel unit placement violation in slot #p of the distant terminal supported by the DT Server in slot #n of metallic distribution shelf #m. [See document 363-205-004, <i>SLC-2000 Multi-Services Distant Terminal (MSDT) Feature, User/Service and Ordering Manual</i> , or document 363-206-301, <i>DDM-2000 FiberReach Multiplexer, Wideband/Narrowband Shelf, User/Service Manual</i> , for ISDN CU placement restrictions.]

See notes at end of table.

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Table B – UIP Fault Messages (Continued)

Address	Message	Meaning (Note)
dt-m-n	ISDN slot err	ISDN channel unit placement violation in DT supported by the DT Server in slot #n of metallic distribution shelf #m. [See document 363-205-004, <i>SLC-2000 Multi-Services Distant Terminal (MSDT) Feature, User/Service and Ordering Manual</i> , or document 363-206-301, <i>DDM-2000 FiberReach Multiplexer, Wideband/Narrowband Shelf, User/Service Manual</i> , for more information.]
main-n, fn-c	OC3 sgnl fail	The bit error ratio (BER) in the received OC-3 signal exceeds 10^{-3} . Likely causes include failure of the OLIU CP at the near end, failure of the receive fiber, or failure of the OLIU CP at the far end.
main-n, fn-c	OC3 LOP **use CIT**	There are one or more OC3 STS-1 loss-of-pointer (LOP) conditions active in the SONET subsystem. The CIT must be used to obtain details.
main-n, fn-c	OC3 SD **use CIT**	There are one or more OC3 STS-1 Signal degraded conditions active in the SONET subsystem. The CIT must be used to obtain details of the alarm.
a-m-n	PCM path failed	There is an internal transmission problem for the feeder DS1 signal #n on VTU #m. Likely cause is TSI, VTU, LIU, MDC, or T8U circuit packs.
—	PDC/SYSCTL incompat.	The PDC has detected an incompatibility with the communication protocol between the PDC and the SYSCTL. Incompatible SYSCTL software may cause this to be reported.
smu	SMU powering up	The SMU circuit pack is powering up. A test of the stored software is being performed. The system will clear this condition when it completes the SMU powerup.
—	SONET	Provides a summary of the active alarms and status conditions in the SONET subsystem. Use the CIT to get detailed information.

See notes at end of table.

Continued on next page

Table B – UIP Fault Messages (Continued)

Address	Message	Meaning (Note)
{m,a,c}-m-n	STS1 BER	For ring applications, the bit error ratio (BER) of the specified STS-1 signal exceeds the signal fail threshold (10^{-6}). For VT1.5 path-switched rings, the system responds by inserting VT Path AIS in each pass-through VT contained in the STS-1. Locally, the system will select the VTs from the STS-1 on the other ring, as appropriate. Likely causes include failure of the near-end OLIU CP reporting the STS-1 failure, failure of the far-end OLIU, or failure of the receive fiber if the OC-3 is also reporting a failure.
—	STS1 SD **use CIT**	There are one or more STS1 signal degrade conditions active in the SONET subsystem. The CIT must be used to obtain details.
ls-a-n, mdc-m-n, tsi-n, bmp-n	SW installing	Software is being installed onto this pack from the SMU by the automatic installation feature. The system will clear this condition when it completes the installation.
—	TID map full *use CIT*	The size of the directory services network element (DSNE) database at the gateway network element (GNE) has been exceeded. Likely cause is NEs have been removed from the network but not from the DSNE database located at the GNE. (See the CIT SONET subsystem command, dlt-tadmap.) The CIT must be used to obtain details.
—	Uneq. STS **use CIT**	There are one or more STS1 unequipped in the SONET subsystem. The CIT must be used to obtain details.
—	Uneq. VT **use CIT**	There are one or more VTUs unequipped in the SONET subsystem. The CIT must be used to obtain details.
uip	VRT test in progress	A VRT test (initiated using the UIP command, TEST-VRT-ALM) is in progress.

See notes at end of table.

Continued on next page

Table B – UIP Fault Messages (Continued)

Address	Message	Meaning (Note)
—	VT LOP **use CIT**	There are one or more VT LOP conditions active in the SONET subsystem. The CIT must be used to obtain details.
—	VT SD **use CIT**	There are one or more VT signal degrade conditions active in the SONET subsystem. The CIT must be used to obtain details.
—	VT yel **use CIT**	There are one or more VT yellow alarm conditions active in the SONET subsystem. The CIT must be used to obtain details.
mdc-m-n, tsi-n, ls-a-n, bmp-n	aborted SW	Aborted software installation on the identified pack. Likely cause is the circuit pack has failed. The system will attempt to re-install the software. If the installation continues to fail, the system will diagnose the problem and raise the appropriate alarm.
mdc-m-n, pdc, ls-a-n, tsi-n, bmp-n	awaiting SW	The identified circuit pack is waiting for a software (SW) installation from the SMU. The Fault LED of most circuit packs should be blinking.
smu	bad data	The DLC subsystem software on the SMU is corrupted. A software download of the DLC subsystem software to the SMU must be performed, or the SMU must be replaced to correct this situation.
tsi-n	bad data memory	The copy of the system database stored on the indicated TSI contains uncorrectable errors. If only one TSI indicates this fault, it is probably failed. If both TSIs show this fault, then re-install the original TSIs from the system to permit the errors to be corrected, or use the INITIALIZE-SYSTEM command to clear both database copies.

See notes at end of table.

Continued on next page

Table B – UIP Fault Messages (Continued)

Address	Message	Meaning (Note)
dt-m-n	batt chrg fail	PIU failure in DT supported alarm by the DT Server in slot #n of metallic distribution shelf #m.
dt-m-n	biu failed	BIU failure in DT supported by the DT Server in slot #n of metallic distribution shelf #m. Replace the BIU.
dt-m-n	cdtu failed	CDTU failure in DT supported by DT Server in slot #n of metallic distribution shelf #m.
dcc-n	channel fail	The system cannot communicate with the far-end system through the SONET section data communications channel (DCC). Likely causes include SYSCTL CP failure, reset, or initialization at the far end; failed program installation at far end; program installation in progress at the far end; or SYSCTL or OHCTL CP failure at the near end.
dt-m-n	config	Configuration error of conflicting or zero time slots assigned to DT Server in slot #n of metallic distribution shelf #m (DT Server in wrong channel slot in the shelf).
dcc-n	communication fail	The system is not communicating with another shelf in the subnetwork. The rtrv-nmap command will report the name of the system(s) with which this system is not communicating. Likely causes are an unprotected OC-n line failure in the subnetwork; a controller failure, reset, or initialization on another shelf; section DCC channel failure on this or another shelf; or failure of the OHCTL CP.
sysctl	ctrl link fail	The control link between the SYSCTL and OHCTL has failed.
dt-m-n	cu failed	Channel unit failure in the DT supported by the DT Server in slot #n of metallic distribution shelf #m.

See notes at end of table.

Continued on next page

Table B – UIP Fault Messages (Continued)

Address	Message	Meaning (Note)
dt-m-n v3tmc-m-n v3eoc-m-n	data link fail	Lost extended superframe (ESF) data link from DT supported by the DT Server in slot #n of metallic distribution shelf #m. Failure of the TR303 data link in TR-303 VRT #m channel #n.
tsi-n	data mem. updating	The copy of the system database stored on the indicated TSI is being updated.
smu	disabled	The SMU has been disabled. The SET-STATE-SMU command can be used to enable the SMU (make sure the program version is correct first by using the UIP command, RETRIEVE-PROG-VRSN).
smu	dnld aborted	The software download of DLC subsystem software to the SMU was aborted. The DLC subsystem software on the SMU may be corrupt.
dt-m-n	door open	Open door at DT supported by the DT Server in slot #n of metallic distribution shelf #m.
smu	downloading	Software download of DLC subsystem software to the SMU is in progress.
—	dual ringer failure	The external major alarm input on the UIP is active. Typically, the ringing supply to the system has failed.
sysctl	dup. display	Two or more shelves in the network have the same TBOS display number (determined by switches on the SYSCTL CP).

See notes at end of table.

Continued on next page

Table B – UIP Fault Messages (Continued)

Address	Message	Meaning (Note)
—	dup. GNE **use CIT*	A shelf has been provisioned as a gateway network element (GNE) in a network that already has a GNE. Only one NE in the network may be provisioned as the GNE. See the set-ne and rtrv-ne commands for GNE provisioning information. The CIT must be used to obtain details.
sysctl	dup. site/ne	Two or more shelves in the network have the same site address (determined by switches on the SYSCTL CP) and the same network element address (determined by switches on the OHCTL CP).
sysctl	dup. TID	Two or more shelves in the network have the same system name or TID set by the set-ne command.
—	excessive holdover	The system has been in holdover mode for more than 4 hours. May cause degraded performance (high error rates) on the transmitted and/or received signals. Whenever this condition exists, the condition <i>holdover mode active</i> also exists. Likely cause — refer to <i>holdover mode active</i> .
—	external Minor	The UIP external minor input is active. Typically, this input is connected to an external power shelf and means that a single rectifier, a single ringing generator, or the fan shelf has failed. Normally, miscellaneous discrete input number 15 on the SYSCTL is used for this purpose.

See notes at end of table.

Continued on next page

Table B – UIP Fault Messages (Continued)

Address	Message	Meaning (Note)
main-n, fn-{a,c}, ls-{a,c}-n	force psw	For an OC-3 line, the identified line is not selected as the active receiving line, and an automatic or manual protection switch to make this the active receiving line will not be done. The forced switch will remain in effect until the protection switch is reset, or a lockout or inhibit switch request is received. Note that switching is unidirectional. Because of this, the specified line might still be active (if the far end is selecting the specified line to receive traffic), and the far end might still be free to switch the line it is selecting to receive traffic. (See the CIT SONET subsystem command, switch-line.) For a function unit slot or a low-speed service slot, the identified equipment is not active, and an automatic or manual switch to make it active will not be done. The forced switch will remain in effect until the protection switch is reset, or a lockout or inhibit switch request is received. (See the CIT SONET subsystem commands, switch-fn and switch-ls.)

See notes at end of table.

Continued on next page

Table B – UIP Fault Messages (Continued)

Address	Message	Meaning (Note)
—	holdover mode	The system is in holdover synchronization mode. Likely causes include the system was manually switched to holdover mode [with the CIT SONET subsystem command, switch-sync, or in a central office (CO) system, with a TBOS control point] and the switch has not been reset; or the system automatically switched to holdover mode because of failure of the timing references, and either the reference failures have not cleared, or the system is provisioned for nonrevertive synchronization mode switching, or the system is provisioned for <i>external</i> timing and no external timing references are available. The condition can be cleared by repairing at least one timing reference (if both are failed) and resetting synchronization mode protection switching with the command switch-sync:s=mode,pri=reset. In a CO system, the synchronization mode can also be reset with a TBOS control point.
a-m-n	inc. DS1 HBER	The bit error rate (BER) on the identified feeder DS1 signal exceeds 10^{-3} .
a-m-n	inc. DS1 LOF	A loss-of-frame (LOF) condition exists on the identified feeder DS1 signal. Likely cause is failure of far-end signal or hardware.
a-m-n,c-m-n	inc. DS1 LOS	At least 128 consecutive zeros are received in the DS1 signal incoming from the DSX-1, or the energy at the DS1 input is below a preset threshold. Likely causes include hard failure of upstream equipment or facility (towards the DSX-1), the DS1 input is disconnected at the backplane or the DSX-1, or equipment is failed or removed at DSX-1.
See notes at end of table.		

Continued on next page

Table B – UIP Fault Messages (Continued)

Address	Message	Meaning (Note)
c	inc. DS3 LOS	At least 128 consecutive zeros were detected in the DS3 signal received from the DSX-3. Likely causes include equipment failed or removed at DSX-3, or DS3 input disconnected at the DSX-3 or at the DDM-2000 backplane.
c	inc. DS3 OOF	The system has detected a DS3 out-of-frame (OOF) condition in the DEMUX direction (coming from the fiber) for the specified DS3 signal. Reported only if the DS3 interface is provisioned in VM or VMR mode. (See the CIT SONET subsystem commands, set-t3 and rtrv-t3.) Likely causes include an out-of-frame DS3 signal incoming to the DSX-3 at the far end, failure of the DS3 CP at the far end or near end, or the DS3 signal is looped at both ends.
c	inc. EC1 LOF	The system has detected a loss-of-frame (LOF) condition in an incoming EC-1 signal. LOF is defined as an out-of-frame (OOF) condition (five consecutive errored STS-1 framing patterns) that lasts for at least 3 milliseconds. Likely causes include failure of the STS1E or equivalent CP at the far end, failure of the STS1E or equivalent CP at the near end, failure of the incoming cable, or a cable disconnect at the STSX-1 or shelf connector.

See notes at end of table.

Continued on next page

Table B – UIP Fault Messages (Continued)

Address	Message	Meaning (Note)
c	inc. EC1 LOS	The system has detected a loss-of-signal (LOS) condition on the EC-1 line. Likely causes include failure of the incoming signal or cable from the STSX-1, failure of the STS1E CP at the near end, or a cable disconnect at the STSX-1 or shelf connector.
c	inc. EC1 SD	The bit error ratio (BER) in the received EC-1 signal exceeds the provisioned threshold of 10^{-5} to 10^{-9} . Likely causes include failure of the STS1E CP at the near end, failure of the incoming cable, cross talk in office wiring, or failure of the incoming signal from the STSX-1.
tr8dl-m-n	inc.failure	The received TR-08 data link has failed. Likely cause is failure of far-end DLC or digital switch.
main-n, fn-c	inc. OC3 LOF	The system has detected a loss-of-frame (LOF) condition in an incoming OC-3 signal. LOF is defined as an out-of-frame (OOF) condition (five consecutive errored STS-1 framing patterns) that lasts for at least 3 milliseconds. Likely causes include failure of the OLIU CP at the near end, failure of the OLIU CP at the far end, or failure of the receive fiber.
main-n, fn-c	inc. OC3 LOS	The system has detected loss-of-signal (LOS) condition on the OC-3 line. Likely causes include failure of the OLIU CP at the near end, failure of the OLIU CP at the far end, or failure of the receive fiber.
main-n, fn-c	inc. OC12 LOS	The system has detected loss-of-signal (LOS) condition on the OC-12 line. Likely causes include failure of the OLIU CP at the near end, failure of the OLIU CP at the far end, or failure of the receive fiber.
See notes at end of table.		

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Table B – UIP Fault Messages (Continued)

Address	Message	Meaning (Note)
cu-m-n	incompat	The circuit pack in channel unit slot #n on metallic distribution shelf #m is incompatible with the system configuration. Possible errors are DT Server in wrong channel slot in the shelf, a metallic channel unit is installed in a shelf which has been provisioned for FITL operation, or a nonsupported channel unit has been installed.
dtcu-m-n-x	incompat	The CU #x in the DT supported by the DT Server in slot #n of the metallic distribution shelf #m is incompatible with the DT.
t8u-m-n	incompat	The version of the installed T8U is not compatible with FITL, or the shelf m is configured not to have a T8U and one is installed in side n.
sysctl, auxctl, main-n, fn-c-n, tg-n	incomp sw.	For the SYSCTL slot, some of the unused switches are not in the prescribed position. For the AUXCTL slot, an invalid switch setting has been selected on the OHCTL CP.
dt-m-n	in dual mode	Distant terminal supported by the DT Server in slot #n of metallic distribution shelf #m in dual mode — illegal configuration in the SLC®-2000 Access System. (See document 363-205-004, <i>SLC-2000 Multi-Services Distant Terminal (MSDT) Feature, User/Service and Ordering Manual</i> , or document 363-206-301, <i>DDM-2000 FiberReach Multiplexer, Wideband/Narrowband Shelf, User/Service Manual</i> , for more information.)
dt-m-n	in mode err	For DT type <i>msdt</i> , the DT supported by the DT Server in slot #n of MDS #m in dual mode. For DT type <i>nbs</i> , the DT supported by the DT Server in slot #n of MDS #m in mode conflict.

See notes at end of table.

Continued on next page

Table B – UIP Fault Messages (Continued)

Address	Message	Meaning (Note)
tsi-n, bmp-n	inh dly psw	CORE nightly routining protection switching has been inhibited. This will occur if a CORE circuit pack has reset too many times, or if the CORE as a whole has failed to stay active for 24 hours, several days in a row. This may indicate an intermittent fault or a fault on the indicated pack that only shows up when that pack is active. Replace the indicated pack.
main-n, fn-{a,c}, ls-{a,c}-n	inhibit psw	For an OC-3 line, the identified line is not selected as the active receiving line, and a protection switch to make this the active receiving line will not be done. No further protection switching of specified line will be done until the protection switch is reset. Note that line switching is unidirectional. Because of this, the specified line might still be active (if the far end is selecting the specified line to receive traffic), and the far end might still be free to switch the line it is selecting to receive traffic. (See the CIT SONET subsystem command, switch-line.) For a function unit slot, timing slot, or timing reference, the identified equipment or reference is not active, and protection switches to the identified equipment or reference will not be done until the protection switch is reset. (See the CIT SONET subsystem commands, switch-fn and switch-sync.)
core-n	inhib psw	CORE automatic protection switching has been inhibited. Clear using the UIP command, SWITCH-CORE.
—	inhibit TL1	TL1 autonomous alarm reporting is inhibited by the TL1 CIT SONET subsystem command, inh-msg. Clear by enabling autonomous message reporting with the TL1 CIT SONET subsystem command, alw-msg. The alw-msg command is only supported on the TL1/X.25 OS/NE interface.
See notes at end of table.		

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Table B – UIP Fault Messages (Continued)

Address	Message	Meaning (Note)
env-n	input active	The specified environmental alarm point (miscellaneous discrete input) is active. The corresponding alarm message in the CIT alarm report is provisionable, so you must use the CIT to find out the meaning of this alarm.
dt-m-n	is missing	A DT Server previously installed in slot #n of MDS #m and provisioned with 12 or 24 lines has been removed. Reinsert or replace the DT Server, or provision the DT Server for 0 lines.
	link	A link [†] has failed — the addresses identify the elements. Likely causes include MDC failure(s), MDS quadrant has lost power, the SYSCTL has failed (check the fault LEDs and try an LED Test), or the unit may have failed.
x25	link fail	Failure in the X.25 communication channel. Likely causes include failure of the X.25 communication equipment, failure at the OS, or system is provisioned as a TL1/X.25 gateway but this interface is not being used. (See the set-ne command for provisioning.)
tbos-n	link failure	A TBOS link has failed.
ls-a-8	lock prot	No service slot in the whole low-speed group will be allowed to switch to protection. The lockout will remain in effect until the protection switch is reset. (See the CIT SONET subsystem command, switch-ls.) <i>For DS1 feeder configurations</i> , consult the UIP command, SWITCH-LIU.
ls-a-n	lock service	For a low-speed service slot, the specified low-speed service slot is active and will not be switched to protection. The lockout will remain in effect until the protection switch is reset. (See the CIT SONET subsystem command, switch-ls.) <i>For DS1 feeder configurations</i> , consult the UIP command, SWITCH-LIU.

See notes at end of table.

Continued on next page

Table B – UIP Fault Messages (Continued)

Address	Message	Meaning (Note)
main-n, ls-c-n	lockout prot.	For an OC-3 line, the identified protection line is not selected as the active receiving line, and a protection switch to make this the active receiving line will not be allowed. Note that line switching is unidirectional. Because of this, the specified line might still be active (if the far end is selecting the specified line to receive traffic), and the far end might still be free to switch the line it is selecting to receive traffic. The lockout remains in effect until the protection switch is reset or until a protection switch <i>inhibit</i> request is entered. (See the CIT SONET subsystem command, switch-line.) For a low-speed protection slot, no service slot in the whole low-speed group is allowed to switch to protection. The lockout remains in effect until the protection switch is reset. (See the CIT SONET subsystem command, switch-ls.) For a low-speed service slot, the specified low-speed service slot is active and will not be switched to protection. The lockout remains in effect until the protection switch is reset. (See the CIT SONET subsystem command, switch-ls.)
a-m-n	loopback	Line loopback has been established on the identified DS1.
{a,c}-m-n, {a,c}	loopback	<i>For a SONET feeder configuration</i>, the loopback is towards the optical fiber. <i>For a DS1 feeder configuration</i>, for DS1s in the "A" low-speed group (a-m-n) the loopback is towards the DSX-1. (See the CIT SONET subsystem commands, opr-lpbk-t1, rls-lpbk-t1, opr-lpbk-t3, and rls-lpbk-t3.)
See notes at end of table.		

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Table B – UIP Fault Messages (Continued)

Address	Message	Meaning (Note)
ls-a-n	lost 51-MHz clock	The VTU input clock has failed. Normally caused by an MXRV0 failure in the FUNCTION A slot, or a TGS failure.
ls-a-n	ls prot unavailable	VTU/LIU protection is unavailable. An event (such as VTU/LIU failure) has resulted in VTU/LIU protection being unavailable. Minor alarms are being transmitted on each in-service TR-08 VRT.
—	man sync mode psw	The synchronization mode has been manually switched to holdover or free-running and will remain in that mode until the switch request is reset. (See the CIT SONET subsystem command, switch-sync.)
main-n, fn-{a,c}, ls-{a,c}-n	manual psw	The specified DS1 CP is manually switched to protection. The manual switch will remain in effect until the protection switch is reset or until a failure occurs and an automatic switch preempts the manual switch. (See the CIT SONET subsystem command, switch-ls.) <i>For DS1 feeder configurations, consult the UIP command, SWITCH-LIU.</i>
ptu-m-n	neg rng fail	No negative ringing signal is present on the input to PTU #n in metallic distribution shelf #m. Therefore, no ringing is available for the circuits served by the PTU. The likely cause is a misconnection between the MDS and the ringing generator, or a ringing fuse failure on the MDS.
dt-m-n	on loc battery	The distant terminal supported by the DT Server in slot #n of metallic distribution shelf #m is operating on local battery.
ls-a-n	on protection	Service for the indicated VTU/LIU is being provided by the protection VTU/LIU. Another fault message should be in the queue that identifies the reason why this pack is on protection.
dt-m-n	on rmt battery	The distant terminal supported by the DT Server in slot #n of metallic distribution shelf #m is operating on remote battery.

See notes at end of table.

Continued on next page

Table B – UIP Fault Messages (Continued)

Address	Message	Meaning (Note)
pdc, ls-a-n, tsi-n, mdc-m-n, bmp-n, core-n	pack init	Software on the indicated circuit pack is being initialized and a self-test is being performed. A transient condition and should not last for more than 5 minutes. For a core pack init, the packs on that core side are initializing. The core side indicated cannot provide service until this clears.
dt-m-n	pcu failed	PCU failed in DT supported by the DT Server in slot #n of metallic distribution shelf #m.
dt-m-n	piu fuse fail	PIU fuse failed in DT supported by the DT Server in slot #n of metallic distribution shelf #m.
dt-m-n	piu removed	PIU removed or failed in DT supported by the DT Server in slot #n of metallic distribution shelf #m.
ptu-m-n	pos rng fail	No positive ringing signal is present on the input to PTU #n in metallic distribution shelf #m. Therefore, no positive ringing is available for the circuits served by the PTU. Likely cause is ringing generator failure. Alarmed only if a multiparty channel unit is plugged into the quadrant served by the PTU.
dt-m-n	power src fail	AC power failure in DT supported by the DT Server in slot #n of metallic distribution shelf #m.
core-n	psw forced	CORE #n has been forced active. Prevents automatic protection switching. Can be cleared using the UIP command, SWITCH-CORE.
ls-a-n	rcvd bad clk	VTU #n has received a bad clock input. Likely cause is VTU or MXRV0 failure (use SWITCH-LS or SWITCH-FN to switch a VTU or MXRV0 before pulling it).

See notes at end of table.

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Table B – UIP Fault Messages (Continued)

Address	Message	Meaning (Note)
a-m-n	rcvd DS1 AIS	DS1 AIS is being received on the feeder DS1 signal #n on VTU/LIU #m. Likely causes are upstream network equipment or facility (upstream = towards the OC-3 feeder).
a-m-n	rcvd DS1 YEL	The far end is detecting a DS1 signal failure or DS1 AIS. Likely causes include far-end signal failure or a near-end failure which is causing the system to transmit AIS. Only detected on INA DS1s and TR303 DS1s.
main-n, fn-{a,c}-n, ls-{a,c}-n, tg-n	removed	A circuit pack that was previously installed in this system is removed. Replace the CP, or <i>update</i> to remove it from the system equipment list.
mdc-m-n, smu, sysctl, tsi-n, bmp-n, t8u-m-n	removed	A circuit pack that was previously installed in this system is removed. Replace the CP.
smu	removed	The SMU has been removed.
dt-m-n	rgu failed	RGU failed or missing at DT supported by the DT Server in slot #n of metallic distribution shelf #m.
a-m-n, c-m-n	signal degrade	The bit error ratio (BER) in the received DS1 signal exceeds 10^{-6} . Likely causes include failure of the DS1 terminating CP at the far end, far-end cable failure, cross talk in office wiring at the far end, or failure of the far-end signal.
ptu-m-n	stuck relay	A relay is stuck on PTU #n in metallic distribution shelf #m. Try pushing the reset button on the PTU. If this does not clear the problem, the PTU has probably failed.

See notes at end of table.

Continued on next page

Table B – UIP Fault Messages (Continued)

Address	Message	Meaning (Note)
cu-m-n	stuck relay	The test relay on channel unit (CU) #n on metallic distribution shelf #m is stuck. Try reseating the CU. If that does not clear the condition, replace the CU.
cu-m-n	stuck test	The channel units that are inserted at the RT and COT ends are incompatible with each other. As a result, the test relay on the identified channel unit is stuck and no testing can be performed on lines on the shelf that serves that channel unit. Normally happens when an FX0 CU is at one end and POTS CU is at the other.
—	suppt **use CIT**	A SONET alarm exists. The CIT must be used to obtain details.
—	sync quality unknown	The system is in the loop timed synchronization mode in a DS1 feeder configuration and both the primary and secondary timing inputs have failed. (See the RTRV-SYNCN command to determine which feeder DS1 signals are used for this purpose.)
—	sys data memory fault	The system database is not valid. No provisioning activities will be accepted until the fault is corrected. Likely causes include faults which affect both TSIs, or two TSIs which contain error-free but mismatched copies of the database. The INITIALIZE-SYSTEM command must be used to clear the mismatch.
—	sys free-running	The system is no longer locked to a stable timing source. Likely cause is TGS packs failed/removed in a SONET system. In metallic system this can happen if there are no good incoming DS-1 signals to the LIUs.

See notes at end of table.

Continued on next page

Table B – UIP Fault Messages (Continued)

Address	Message	Meaning (Note)
—	system on battery	The power minor alarm input is active, which indicates that the system is operating on battery reserve — input is internally multiplied with the PMN input on the SYSCTL.
cit-n, dcc-n	test in prog	An automatic turnup test is in progress in the SONET subsystem.
c-m-n, c	test in progress	A transmission test using the internal test signal generator and monitor is in progress on the specified T1 or T3 port.
mdc-m-n	to CU link	A link between MDC #n on metallic distribution shelf #m and its supported channel units has failed. Likely cause is a channel unit or MDC failed.
m-1-2-1	unequipped VT	The system has detected the unequipped code (SONET path overhead signal code label byte=0) for an in-service VT1.5 channel. Likely cause — an upstream VT1.5 cross-connection has been deleted.
m-3	unequipped VT	The system has detected the unequipped code (SONET path overhead signal code label byte=0) for an in-service STS-1 channel. Likely cause — an upstream STS-1 cross-connection has been deleted.
tsi-n, bmp-n	unlatched	The faceplate latch for the TSI or BMP circuit pack is not latched. The latch must be closed in order for the circuit pack to operate.
tsi-n	update aborted	An attempt to correct the system database copy on the indicated TSI has failed. Likely causes are removal of the other TSI before the database copy completed, or failure of the indicated TSI.

See notes at end of table.

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Table B – UIP Fault Messages (Continued)

Note: For referenced CIT commands, those shown in lowercase are for the SONET subsystem, while those shown in uppercase are for the DLC subsystem.

* For PTUs, the system will report this condition if the PTU is failed or removed

† Link faults are unisolated faults that occur between circuit packs in the system. These faults typically occur when a circuit pack has failed or is removed. Link alarms may also occur if there are cabling faults between the ARM shelf assembly and MDS assembly, or if there is a backplane fault. The system clears the link faults if and when it has isolated the failure to an individual circuit pack. It will then raise an alarm against the implicated pack. Ignore link alarms that do not persist for more than 3 minutes.

Link AIDs use the form Circuit_Pack_1_AID-Circuit_Pack_2_AID. Circuit_Pack_1_AID is the AID of the circuit pack on one end of the link, and Circuit_Pack_2_AID is the AID of the circuit pack on the other end of the link.

In the CIT DLC subsystem alarm report, the first AID is listed in the address column, the second AID is included in the Description column.

If there are several link alarm messages and the same circuit pack AID is in more than one link AID, the fault most likely lies in that circuit pack.

The link AIDs are identified in the following list:

EOC to EOC — bmp-{1,2}/bmp-{1,2}
EOC to TSI — tsi-{1,2}/bmp-1-{1,2}
MDC to CU bus — mdc-{1-8}-{1,2}/cubus-{1-3}
MDC to MDC — mdc-{1-8}-2/mdc-{1-8}-1
MDC to PTU — mdc-{1-8}-{1,2}/ptu-{1-8}-{1,2}
PDC to SYSCTL — pdc/sysctl
MDC to T8U — mdc-{1-8}-{1,2}/t8u-{1-8}-{1,2}
PDC to TSI — pdc/tsi-{1,2}
PDC to UIP — pdc/uiip
SMU to PDC — smu/pdc
THC to TSI — thc/tsi-{1,2}
TMC to TMC — bmp-{1,2}/bmp-{1,2}
TSI to BMP — tsi-{1,2}/bmp-1-{1,2}
TSI to MDC — tsi-{1,2}/mdc-{1-8}-{1,2}
TSI to TSI — tsi-1/tsi-2
TSI to VTU/LIU — tsi-{1,2}/ls-a-{1-8}
VTU/LIU #8 to VTU/LIU — ls-a-8/ls-a-{1-7}

Table C – UIP Alarm Messages

Address	Message	Meaning
—	OC12 connector failed	Failure or removal of the OC-12 faceplate connector (ribbon cable) which carries STS-1/STS-3c ring pass through traffic on the OC-12 ring interface on the OC-3 shelf. Reconnect faceplate connector or replace, if failed.
—	SONET alarm	A SONET subsystem alarm is active. The condition will be listed in the SONET subsystem CIT report (it may also appear in the UIP fault list).
—	SONET condition	An abnormal condition exists in the SONET subsystem. The condition will be listed in the SONET subsystem CIT report (it may also appear in the UIP fault list).
—	STS1 AIS **use CIT**	There are one or more STS1 AIS conditions active in the SONET subsystem. The CIT must be used to obtain details.
{m,a,c}-c	STS1 yel **use CIT**	There are one or more STS1 yellow alarm conditions active in the SONET subsystem. The CIT must be used to obtain details.
cont-n	TBOS CONTROL	The specified environmental control point (miscellaneous discrete output is active). The <i>real</i> message that appears in the alarm and status report for this condition can be provisioned. This is the default message. (See the CIT SONET subsystem commands, rtrv-attr-cont and set-attr-cont.) The cause is that the system was instructed to close the environmental control point by either a TBOS control point or by the closing of the corresponding environmental control input at the far end.
—	VT AIS **use CIT**	There are one or more VT1.5 AIS conditions active in the SONET subsystem. The CIT must be used to obtain details.

Continued on next page

Table C – UIP Alarm Messages (Continued)

Address	Message	Meaning
site #	acty	There is at least one active alarm at the identified site. The SONET subsystem CIT alarm report should be used to obtain more details.
c	inc. DS3 AIS	The system has detected DS3 AIS in the DEMUX direction (that is, coming from the fiber) for the specified DS3 signal. Likely causes include failure of the office timing supply that provides the DS1 timing reference.
c	inc. EC1 AIS	The system has detected an EC-1 line alarm indication signal (AIS) on an incoming EC-1 line. Likely cause is failure of an STS1E CP at the far end.
c	inc. EC1 FERF	The system has detected the EC-1 far-end receive failure (FERF) signal in the incoming EC-1 signal. Likely cause is the far end has detected an incoming signal failure on the specified EC-1 line. This may be caused by failure of the STS1E CP at the near end, the STS1E CP at the far end, or the transmit cable on the specified line.
main-n, fn-c	inc. OC3 AIS	The system has detected OC-3 line AIS on an incoming OC-3 line. Likely cause is failure of an OLIU CP at the far end.

Continued on next page

Table C – UIP Alarm Messages (Continued)

Address	Message	Meaning
main-n, fn-c	inc. OC3 FERF	The system has detected the OC-3 FERF signal in the incoming OC-3 signal. Likely causes include the far end detecting an incoming signal failure on the specified OC-3 line. This may be caused by failure of the OLIU CP at the near end, the OLIU CP at the far end, or the transmit fiber on the specified line.
cont-n	input active	The specified environmental control point (miscellaneous discrete output) is active. Note that the actual message that appears in the alarm and status report for this condition can be provisioned. This is the default message. (See the CIT SONET subsystem commands, rtrv-attr-cont and set-attr-cont.) Likely cause is the system was instructed to close the environmental control point by either a TBOS control point or by the closing of the corresponding environmental control input at the far end.
dt-m-n	on battery	The distant terminal supported by the DT Server in slot #n of metallic distribution shelf #m is operating on battery power.
dt-m-n	power alarm	The distant terminal supported by the DT Server in slot #n of metallic distribution shelf #m has reported a power fault (PCU, PIU failure).
a-m-n	rcvd DS1 AIS *	DS1 AIS is being received on the feeder DS1 signal #n on VTU #m. Likely causes are upstream network equipment or facility (upstream = towards the OC-3 feeder).
See footnote at end of table.		

Continued on next page

Table C – UIP Alarm Messages (Continued)

Address	Message	Meaning
a-m-n	rcvd DS1 YEL	The far end is detecting a DS1 signal failure or DS1 AIS*. Likely causes include far-end signal failure or a near-end failure that is causing the system to transmit AIS. This is only detected on INA DS1s and TR303 DS1s.
dt-m-n	rcvd FITL Yellow	A yellow alarm signal is being received by the DT Server in slot #n of metallic distribution shelf #m. Likely causes are DT fault, or a local fault which has caused the far end to detect a failure.
dt-m-n	rcvd MISC	A miscellaneous alarm is being reported by the DT Server in slot #n of metallic distribution shelf #m (DT fan, etc.).
vrt-m	rcvd MISC alarm	A power/miscellaneous alarm has been received on the TR-08 data link of VRT #m.
vrt-m	rcvd FELP	A far-end loopback (FELP) message has been received for VRT #m on the TR-08 data link. If a DS1 has been looped back towards the facility, a corresponding fault message is in the Faults queue.
dgr-m-n	rcvd alarm	<i>With major alarm</i> — A major alarm has been received for digroup letter n on VRT #m. Likely causes are local failure in the DLC subsystem that caused the far end to detect a facility failure, or the far-end DLC terminal or digital switch has failed. <i>Without major alarm</i> — A digroup alarm has been received on digroup letter n on VRT #m.
vrt-m	rcvd alarm	<i>With major alarm</i> — A major alarm has been received on VRT #m (without a digroup alarm indication). <i>With minor alarm</i> — A minor alarm has been received on VRT #m (without a digroup alarm indication).

See footnote at end of table.

Continued on next page

Table C – UIP Alarm Messages (Continued)

Address	Message	Meaning
a-m-n	trmt DS1 AIS	DS1 AIS is being transmitted on the feeder DS1 signal #n on VTU/LIU #m. Likely causes are local failure in the DLC subsystem or non-cross-connected DS1.
a-m-n	trmt Yellow	Yellow alarm is being transmitted on the identified feeder DS1 signal. The system has detected either an incoming DS1 signal failure or incoming DS1 AIS.
vrt-m	trmt alarm	<i>With major alarm</i> — A major alarm is being transmitted on the TR-08 data link of VRT #n. Likely cause is ringing generator failure. <i>With minor alarm</i> — A minor alarm is being transmitted on the TR-08 data link of VRT #m. Likely cause is local protected failure.
vrt-m	trmt MISC alarm	A miscellaneous alarm is being transmitted on the TR-08 data link of VRT #m. In the current system release, a TR-08 miscellaneous alarm may be requested by the UIP command, TEST-VRT-ALARMS.
dgr-m-n	trmt alarm	A major alarm is being transmitted on the TR-08 data link of VRT #m for digroup #n. Likely cause is local failure or an incoming facility failure has been detected.
* DS1 AIS is detected on the incoming signals for the feeder DS1s (a-{1-7}-{1-4}). Normally, the AIS is caused by an upstream failure in the network (for example, at another multiplex). However, sometimes this condition is also raised in a <i>SLC</i>[®]-2000 Access System when there is a critical alarm in the <i>main</i> or <i>fn-c</i> slots in the CIT SONET subsystem. In this case, the failure affects the DS1s which are carried on the SONET payload in OC-3 signals terminated on these slots. The system does not use the SONET TSI map to determine which DS1s are affected by these failures. When VT1.5 or STS-1 AIS is received, AIS is sent on the DS1 signals carried in the payload. The system does not correlate these alarms. The observed behavior is similar to that which would occur if the SONET and DLC subsystems were separate multiplexer and DLC systems. AIS indicates that a failure has been detected elsewhere in the network (or in the system in this case) and should not be used to trigger craft personnel dispatch. The system raises a Major alarm when it detects DS1 AIS on the feeder DS1s since these signals are unprotected and receipt of AIS causes the system to initiate trunk processing on the affected lines.		

Clear Blown Fuse Trouble at a *SLC*[®]-2000 Access System

General: This procedure is used to help identify which *SLC*-2000 circuit packs are causing fuses to blow. It is assumed that a replacement fuse blows.

1. Which assembly does the fuse power?

If **MDS**, then continue with Step 2.

If **ARM**, then proceed to Step 47.

If **Power Shelf**, then use documentation for the type of power shelf equipment used to clear the blown fuse.

2. In the MDS shelf, which type fuse is blown?

If **–48 V 5A**, then continue with Step 3.

If **20 Hz 0.5A**, then proceed to Step 19.

3. Using the label with the blown fuse, determine which PTU slot is powered by the blown fuse.



NOTE:

The **–48 V 5A** fuses each power a **PTU** in one side of the MDS assembly shelf. The fuses are labeled for the upper or lower shelf **PTU** slot that is powered by the fuse.

4. Remove the **PTU** in the **PTU** slot powered by the fuse.

5. Replace the blown 5A fuse.

6. With the PTU slot empty, does the fuse blow?

If **NO**, continue with Step 7.

If **YES**, go to Step 9.

7. Install a new PTU into the PTU slot.

8. Does the fuse blow when the new PTU is installed?

If **YES**, continue with Step 9.

If **NO**, **STOP. YOU HAVE COMPLETED THIS PROCEDURE.**

9. Remove all circuit packs from the section powered by the blown fuse (Figure 1).

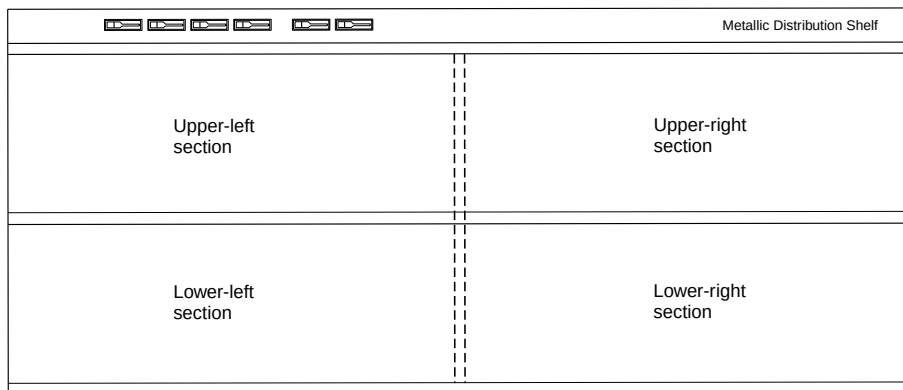


Figure 1 – MDS Sections Powered by PTU Fuses

10. With the section empty, replace the fuse.

11. Does the fuse blow?

If **YES**, continue with Step 12.

If **NO**, go to Step 13.

12. The MDS assembly is defective. Look for bent, broken, or shorted connectors and pins on the backplane. Refer to the appropriate SD drawings to correct wiring. Replace MDS assembly if fuse trouble cannot be cleared.

STOP. YOU HAVE COMPLETED THIS PROCEDURE.

13. Select a circuit pack to reinstall using the order shown in Table A.

Table A – Order of Circuit Pack Reinstallation

Order	Circuit Pack
1	PTU
2	MDC
3	T8U
4	Channel units (one at a time)

14. Reinstall the selected circuit pack.

15. Did the fuse blow?

If **YES**, continue with Step **16**.

If **NO**, go to Step **17**.

16. Replace the defective circuit pack and reinstall other circuit packs if needed.

STOP. YOU HAVE COMPLETED THIS PROCEDURE.

17. Have all circuit packs shown in Table A been reinstalled in the section?

If **YES**, continue with Step **18**.

If **NO**, return to Step **13**.

18. If you still have a fuse problem, use local procedures to clear trouble.

STOP. YOU HAVE COMPLETED THIS PROCEDURE.

19. At the UIP, enter the RETRIEVE-FAULTS command (**DLP-500**).



NOTE:

The **-20Hz/0.5A** fuse provides ringing power to all channel units that require negative ringing current. Similarly, the **+20Hz/0.5A** fuse provides ringing power to all channel units that require positive ringing current (multiparty service). The ringing current is distributed to the channel units through the **PTU** in the MDS assembly shelf side. When a -20 or +20 Hz fuse blows, customers can still dial out but they cannot be called because no ringing current is available. Typically, the cause of a blown ringing current fuse is a bad channel unit.

20. Does the fault list show any channel unit failed?

If **YES**, continue with Step **21**.

If **NO**, go to Step **24**.

21. Replace any channel unit that is identified as failed in the **RETRIEVE-FAULTS** fault message list (**DLP-500**).

22. Replace the blown fuse.

23. Does the fuse blow?

If **YES**, continue with Step **24**.

If **NO**, **STOP. YOU HAVE COMPLETED THIS PROCEDURE.**

24. See Caution. Remove all channel units in the MDS assembly.



CAUTION:

Removing channel units will interrupt customer service.

25. Replace the fuse.

26. Does the fuse blow?

If **YES**, continue with Step **27**.

If **NO**, go to Step **37**.

27. Remove all **PTUs** in the MDS assembly.

28. Does the fuse blow?

If **YES**, continue with Step **29**.

If **NO**, go to Step **30**.

29. If the fuse blows with no **PTUs** and channel units installed, the MDS assembly is defective. Look for bent, broken, or shorted connectors and pins on the backplane. Refer to the appropriate SD drawings to correct wiring. Replace MDS assembly if fuse trouble cannot be cleared.

STOP. YOU HAVE COMPLETED THIS PROCEDURE.

30. Select one of the **PTUs** to reinstall in the MDS assembly.

31. Reinstall the **PTU** into the MDS assembly.

32. Does the fuse blow?

If **NO**, continue with Step **33**.

If **YES**, go to Step **34**.

33. Have all PTUs been reinstalled in the system?

If **NO**, return to Step **30**.

If **YES**, go to Step **45**.

34. Replace the PTU.

35. Replace the blown fuse.

36. Does the fuse blow?

If **NO**, continue with Step **37**.

If **YES**, go to Step **45**.

37. Select a channel unit to reinstall.

38. Reinstall the selected channel unit.

39. Does the fuse blow?

If **NO**, continue with Step **40**.

If **YES**, go to Step **42**.

40. Have all channel units been reinstalled?

If **YES**, continue with Step **41**.

If **NO**, return to Step **37**.

41. While performing this procedure, have you replaced PTUs?

If **YES**, **STOP. YOU HAVE COMPLETED THIS PROCEDURE.**

If **NO**, go to Step **45**.

42. Replace the channel unit.

43. Replace the fuse.

44. Does the fuse blow?

If **YES**, continue with Step **45**.

If **NO**, go to Step **46**.

45. If you still have a fuse problem, use local procedures to clear trouble.

STOP. YOU HAVE COMPLETED THIS PROCEDURE.

46. Reinstall the remaining channel units (if needed).

STOP. YOU HAVE COMPLETED THIS PROCEDURE.

47. Which type fuse is blown?

If **+5 V 0.5A**, then continue with Step **48**.

If **-48 V 2A**, then proceed to Step **49**.

If **-48 V 10A**, then proceed to Step **53**.

48. The **+5 V/0.5A-CIT** fuse is not required for Releases 3.2, 3.3, or 4.0 and later *SLC-2000* applications. This fuse provides power for future equipment that will be connected to the CIT port. Refer to the appropriate SD drawings to correct wiring. Leave the fuse holder empty if fuse trouble cannot be cleared.

STOP. YOU HAVE COMPLETED THIS PROCEDURE.

49. Replace the user interface panel (**DLP-518**).

50. Replace the fuse.

51. Does the fuse blow?

If **YES**, continue with Step **52**.

If **NO**, **STOP. YOU HAVE COMPLETED THIS PROCEDURE.**

52. Refer to the appropriate SD drawings to correct wiring. Replace ARM assembly if fuse trouble cannot be cleared.

STOP. YOU HAVE COMPLETED THIS PROCEDURE.

53. Are both **-48 V 10A** fuses blown?

If **NO**, continue with Step **54**.

If **YES**, go to Step **69**.

54. See Cautions and Notes. Remove the following circuit packs from their respective slots in the ARM shelf:

- SYSCTL (see Caution 2 and Note 1)
- TGS (1)
- MXRVO Function A (slot 1)
- MXRVO Function C (slot 1)
- DS1 (remove one circuit pack).



CAUTION:

Removal of an unprotected circuit pack may cause service interruption.



CAUTION:

*Removing the **SYSCTL** without performing a 10-second countdown sequence on the **FE ID** display (**Note 1**) may result in unexpected and undesirable protection switches, incorrect circuit pack fault indications, or incoming signal failure indications.*



NOTE:

Before removing the **SYSCTL**, you must momentarily depress the **ACO** push button on the UIP and the **FE SEL** push button on the **SYSCTL** at the same time to start a 10-second countdown on the **FE ID** display (9, 8, 7, etc.). During this countdown, the **SYSCTL** may be safely removed. If the **SYSCTL** is failed, the countdown may not occur.



NOTE:

The –48 V power feeders/fuses on the UIP supply power to DC-to-DC converters on the **TGS**, **OLI**, **MXRVO**, **DS3**, and **SYSCTL** plug-ins. It is unlikely that a plug-in failure would cause only one feeder fuse to blow. The more probable cause of failure of only one feeder fuse would be a short of the backplane feeder path or a problem with a plug-in shelf connector. After a thorough inspection of the backplane, if no trouble is found, the plug-ins can be removed one at a time to try to isolate the trouble.

55. Replace the blown fuse.

56. Does the fuse blow?

If **YES**, continue with Step **57**.

If **NO**, go to Step **61**.

57. While performing this procedure, have you performed both Step **54** and Step **60**?

If **YES**, continue with Step **58**.

If **NO**, go to Step **59**.

58. The trouble is in the backplane.

STOP. YOU HAVE COMPLETED THIS PROCEDURE.

59. Reinstall the circuit packs.

60. Remove the following circuit packs from their respective slots in the ARM shelf:

- SYSCTL
- TGS (2)
- MXRVO Function A (slot 2)
- MXRVO Function B (slot 2).

Return to Step 55.

61. Select a circuit pack to reinstall in the order shown in the following list (***select one circuit pack then go to the next step***):

1. SYSCTL
2. TGS
3. MXRVO Function A
4. MXRVO Function C
5. DS1 circuit packs (if needed).

62. Install the selected circuit pack.

63. Does the fuse blow?

If **NO**, continue with Step **64**.

If **YES**, go to Step **65**.

64. Have all circuit packs that were removed been reinstalled?

If **NO**, return to Step **61**.

If **YES**, go to Step **81**.

65. Replace the circuit pack that caused the fuse to blow.

66. Replace the fuse.

67. Does the fuse blow?

If **NO**, continue with Step **68**.

If **YES**, go to Step **81**.

68. Reinstall the remaining circuit packs, if needed.

STOP. YOU HAVE COMPLETED THIS PROCEDURE.

69. Remove all circuit packs in the ARM shelf.

70. Replace both 10A fuses.

71. Do the fuses blow?

If **YES**, continue with Step **72**.

If **NO**, go to Step **73**.

72. Refer to the appropriate SD drawings to correct wiring. If fuse trouble cannot be cleared, replace the ARM assembly.

STOP. YOU HAVE COMPLETED THIS PROCEDURE.

73. Select a circuit pack to reinstall using the order shown in Table B.

Table B – Order to Reinstall Circuit Packs

Order	Circuit Pack	Special Instructions
1	PDC	—
2	SMU	Use SET-STATE-SMU:ENABLED UIP command to enable the SMU (DLP-500) . <i>Caution: To avoid interrupting service, make sure no manual conditions (manual/force/lockout) exist before enabling the SMU with the SET-STATE-SMU or ED-STATE-SMU commands.</i>
3	OHCTL	—
4	SYSCTL	—
5	TGSs	—
6	MXRVOs	—
7	TSIs	See DLP-528 .
8	BMPs	See DLP-528 .
9	VTUs	See DLP-529 .
10	LIUs	See DLP-529 .
11	THC	—
12	PCU	Replace the PCU using the following procedure: A. Remove the THC . B. Install the new PCU . C. Reinstall the THC .
13	AMU, TSU, PAU, SSU, CAU	—
14	DSIs	—

74. Reinstall the selected circuit pack.



NOTE:

Table B gives details for some circuit packs. Follow all details when installing circuit packs.

75. Do the fuses blow when the circuit pack is reinstalled?

If **NO**, continue with Step **76**.

If **YES**, go to Step **77**.

76. Have you reinstalled all circuit packs in the ARM shelf?

If **NO**, return to Step **73**.

If **YES**, go to Step **81**.

77. Replace the circuit pack that caused the fuses to blow.

78. Replace the fuses.

79. Do the fuses blow?

If **NO**, continue with Step **80**.

If **YES**, go to Step **81**.

80. Reinstall the remaining circuit packs in the ARM shelf in the order shown in Table B. Follow any special instructions shown.

STOP. YOU HAVE COMPLETED THIS PROCEDURE.

81. If you still have a fuse problem, use local procedures to clear trouble.

STOP. YOU HAVE COMPLETED THIS PROCEDURE.

Clear SONET Subsystem Trouble at a *SLC*[®]-2000 Access System

General: This procedure is used to clear *SLC*-2000 SONET subsystem troubles causing alarms that do not light or flash the **FAULT** LEDs on the SONET subsystem circuit packs. Use **TAP-102** to clear lighted or flashing **FAULT** LED conditions. It is also assumed you performed **TAP-104** and identified the SONET subsystem as the cause of the alarm(s). This procedure can also be used at the far-end equipment using a craft interface terminal (CIT) to remotely log in to the *SLC*-2000 SONET subsystem.

1. Is a CIT available?

If **YES**, continue with Step 2.

If **NO**, go to Step 5.

2. Connect the CIT to the UIP and log in to the SONET subsystem. For details, refer to one of the following procedures:
 - Release 4.0 or later: **DLP-525** or **DLP-541**
 - Release 3.1, 3.2, or 3.3: **DLP-521** or **DLP-541**.

⇒ **NOTE:**
If you use a lap top personal computer (PC) for a CIT, you must run a terminal emulator program (such as *TERM* that comes with the generic software diskettes) to interface with the SONET subsystem.

⇒ **NOTE:**
If you are at the central office equipment, you must log in and then use the **rlgn** command to access the *SLC*-2000 SONET subsystem at the RT. See document 363-206-202, **TAP-107**, for detailed procedures.

3. Use the **rtrv-alm** command to get a report of status and alarms. Table A provides a detailed description of these messages.

⇒ **NOTE:**
Refer to document 363-208-003, *SLC-2000 Access System, Commands and Messages*, and use the **rtrv-()** commands to further isolate the far-end failure.

4. Use the **rtrv-()** commands (**rtrv-hsty**, **rtrv-state**, **rtrv-sync**, **rtrv-t1**, **rtrv-t3**, etc.) to determine the status of the SONET subsystem. For a list of the circuit pack access identifiers used by the SONET subsystem for CIT commands and reports, refer to document 363-208-003, *SLC-2000 Access System, Commands and Messages*. **Go to Step 6.**



NOTE:

There may be switches, locks, inhibits, loopbacks, etc., that may be released from the near end which could result in partial or complete trouble clearing at the far end.

5. Without a CIT you can look at the *Alarm Level* column of Table A and at the local alarms showing on the SONET subsystem (press **SYSCTL FE DIS** button to display local alarms). Try to match a *Description* to your trouble.



NOTE:

Most SONET subsystem alarms that do not light or flash a circuit pack FAULT LED require a CIT to identify the trouble. Have craftsperson at the central office DDM-2000 equipment remotely log into the *SLC-2000* system, if possible.

6. After identifying the cause of the trouble, perform the necessary actions (such as removing loopbacks, forced switches, etc.) to clear the alarm.
7. Did you clear the alarm?

If **NO**, continue with Step 8.

If **YES**, **STOP. YOU HAVE COMPLETED THIS PROCEDURE.**

8. Perform an LED test and observe the LEDs on the circuit packs (**DLP-507**).
9. Replace any circuit pack that does not light all LEDs during the LED test.
10. Did you clear the alarm?

If **NO**, continue with Step 11.

If **YES**, **STOP. YOU HAVE COMPLETED THIS PROCEDURE.**

11. Clear trouble using local procedures.

STOP. YOU HAVE COMPLETED THIS PROCEDURE.

Table A – RTRV-ALM Message Descriptions

Description	Alarm Level	Meaning
AC power failed - FE	PMN	The AC power supply to a remote terminal cabinet has failed.
ACO active	Status	The parallel telemetry outputs and audible office alarms normally active due to the alarm conditions in the system are being suppressed. (See the opr - aco command.)
APS - automatic lock	MN	The service associated with a DS1 CP has been automatically switched and locked onto the protection DS1 CP. The automatic protection switching (APS) lock will remain active until midnight. Cause: Four automatic switches of a single DS1 CP in 10 minutes, probably because of an intermittent failure of the DS1 CP.
APS channel failed	MN	The SONET Automatic Protection Switching (APS) channel on the protection OC-3 line has failed. Likely causes: Failure of the OLIU CP on the protection line (main-2) at the far end; failure of the OLIU CP on the protection line (main-2) at the near end.
auto switch		An automatic protection switch of a DS1 circuit pack is active. When the failure that caused the switch clears, the switch will be reset automatically. Likely cause: Protected failure of a DS1 CP.
auto turnup test IP	ABN	An automatic turnup test is in progress.
communication failure	Status	The system is not communicating with another shelf in the network. This system is normally communicating with that shelf through the SONET section DCC specified in the address column. The rtrv-nmap command will report the name of the system(s) with which this system is not communicating. Likely cause: A controller failure, reset, or initialization on another shelf; section DCC channel failure on this or another shelf; failure of the OHCTL CP.
controlx	Status	The specified environmental control point (miscellaneous discrete output) is active. Note: The actual message that appears in the alarm and status report for this condition can be provisioned; this is the default message. See the rtrv-attr-cont and set-attr-cont commands. Likely cause: Environmental control by either a TBOS control point or by the closing of the corresponding environmental control input at the far end.

Continued on next page

Table A – RTRV-ALM Message Descriptions (Continued)

Description	Alarm Level	Meaning
CP removed	CR, MJ, or MN	A CP previously installed in this system is removed. The CP should be replaced, or an "update" should be done to remove it from the system equipment list.
DS1 CP failed	MJ or MN	Internal equipment failure of the specified DS1 CP.
DS1 loopback	ABN	A loopback (toward the optical fiber) is active on the specified T1 port. (See the opr-lpbk-t1 and rls-lpbk-t1 commands.)
DS1 trmsn test IP	ABN	A transmission test using the internal test signal generator and monitor is in progress on the specified T1 port. (See the test-trmsn-t1 command.)
DS3 CP failed	CR or MN	Internal equipment failure of the specified DS3 CP.
DS3 loopback	ABN	A loopback (toward the optical fiber) is active on the specified T3 port. (See the opr-lpbk-t3 and rls-lpbk-t3 commands.)
DS3 trmsn test IP	ABN	A transmission test using the internal test signal generator and monitor is in progress on the specified T3 port. (See the test-trmsn-t3 command.)
duplicate site/ne address	MJ	Two or more shelves in the network have the same site address (determined by switches on the SYSCTL CP) and the same network element address (determined by switches on the OHCTL CP). Change the site/network address using DLP-517 .
duplicate TBOS display	MJ	Two or more shelves in the network have the same TBOS display number (determined by switches on the SYSCTL CP). Change the TBOS display number using DLP-517 .
duplicate TID	MJ	Two or more shelves in the network have the same system name or "TID" set by the set-ne command. Change the TID alias name using DLP-517 .
environmentxx	CR, MJ, MN, or none	The specified environmental alarm point (miscellaneous discrete input) is active. Note: The actual message that appears in the alarm and status report for this condition can be provisioned; this is the default message. See the rtrv-attr-env and set-attr-env commands.

Continued on next page

Table A – RTRV-ALM Message Descriptions (Continued)

Description	Alarm Level	Meaning
excessive holdover	MJ	The system has been in holdover mode for more than 4 hours. This may cause degraded performance (high error rates) on the transmitted and/or received signals. Whenever this condition exists, the condition "holdover mode active" also exists. Likely cause: See "holdover mode active", below.
ExternalMinor	CR, MJ, MN, or none	The external minor alarm input (environmental alarm input 15) is active. Typically, this input will be connected to the power shelf and will indicate that the DC power or the cooling fan in a remote terminal cabinet has failed. Note: The actual message that appears in the alarm and status report for this condition can be provisioned; this is the default message. See the rtrv-attr-env and set-attr-env commands.
forced switch	ABN	When associated with an OC-3 line, this message means that the identified line is not selected as the active receiving line, and an automatic or manual protection switch to make this the active receiving line will not be done. The forced switch will remain in effect until the protection switch is reset, or a "lockout" or "inhibit" switch request is received. Note: OC-3 line switching is unidirectional. Because of this, the specified OC-3 line might still be active (if the far end is selecting the specified line to receive traffic), and the far end might still be free to switch the line it is selecting to receive traffic. See the switch-line command. When associated with a function unit slot or a low-speed service slot, this message means that the identified equipment is not active, and an automatic or manual switch to make it active will not be done. The forced switch will remain in effect until the protection switch is reset, or a "lockout" or "inhibit" switch request is received. See the switch-fn and switch-ls commands.

Continued on next page

Table A – RTRV-ALM Message Descriptions (Continued)

Description	Alarm Level	Meaning
holdover mode active	NE ACTY	The system is in holdover synchronization mode. Likely causes: The system was manually switched to holdover mode (with the switch-sync command, or, in a central office system, with TBOS control point 54) and the switch has not been reset; or, the system automatically switched to holdover mode due to failure of the timing references, and either the reference failures have not cleared or the system is provisioned for nonrevertive synchronization mode switching. The condition can be cleared by repairing at least one of the timing references (if both are failed) and resetting synchronization mode protection switch with the command switch-sync:s=mode,pri=reset In a central office system, the synchronization mode can also be reset with TBOS control point 55.
inc. DS1 LOS	MJ, MN, or none	At least 128 consecutive zeros are received in the DS1 signal incoming from the DSX-1, or the energy at the DS1 input is below a preset threshold. Likely causes: Facility (towards the DSX-1). The DS1 input is disconnected at the backplane or the DSX-1; equipment is failed or removed at DSX-1.
inc. DS1 sig failed (BER)	MJ, MN, or none	The bit error ratio (BER) in the DS1 signal incoming from the DSX-1 exceeds the provisioned failure threshold, 10^{-3} or 10^{-6} . Likely causes: Failure of upstream equipment or facility (towards the DSX-1). Cross talk in office wiring. Failure of the DS1 CP.
inc. DS1 sync. ref. AIS	MJ or MN	DS1 alarm indication signal (AIS) is being received from the DS1 synchronization reference signal. Likely causes: Failure of upstream equipment or facility (towards the DSX-1).
inc. DS1 sync. ref. BER	MJ or MN	The bit error ratio (BER) in the DS1 synchronization reference signal exceeds 10^{-3} . Likely causes: Failure of upstream equipment or facility (towards the DSX-1).
inc. DS1 sync. ref. EOOFF	MJ or MN	Excessive out-of-frame (OOF) events were detected in the DS1 synchronization reference signal. Excessive OOF is defined as more than 512 out of frame events in one day. Likely cause: Failure of the incoming DS1 synchronization reference signal.

Continued on next page

Table A – RTRV-ALM Message Descriptions (Continued)

Description	Alarm Level	Meaning
inc. DS1 sync. ref. LOF	MJ or MN	The system is unable to frame on the DS1 synchronization reference signal. Likely causes: Upstream failure in the clock providing the reference signal. High bit error ratio on the received signal, caused by failure of the office timing supply that provides the DS1 timing reference. The system is provisioned for SF format on the specified DS1 synchronization reference signal and the received DS1 signal is in ESF format.
inc. DS1 sync. ref. LOS	MJ or MN	At least 128 consecutive zeros were received in the DS1 synchronization reference signal, or the energy at the DS1 input is below a preset threshold. Likely causes: Failure of the office timing supply that provides the DS1 timing reference or failure of the connection to the timing supply.
inc. DS1 sync. ref. OOL	MJ or MN	The incoming DS1 synchronization reference signal is out-of-lock (OOL). The frequency of the clock providing the DS1 reference signal is out of specification. Likely causes: Failure of the office timing supply that provides the DS1 timing reference.
inc. DS3 AIS	Status	The system has detected DS3 alarm indication signal (AIS) in the demux direction (that is, coming from the fiber) for the specified DS3 signal. Likely causes: The incoming DS3 signal at the far end is failed, or DS3 AIS is received from the DSX-3 at the far end.
inc. DS3 LOS	CR, MJ, MN, or None	At least 128 consecutive zeros were detected in the DS3 signal received from the DSX-3. Likely causes: Equipment failed or removed at DSX-3; DS3 input disconnected at the DSX-3 or at the backplane.
inc. DS3 OOF	NE ACTY	The system has detected a DS3 out-of-frame (OOF) condition in the demux direction (that is, coming from the fiber) for the specified DS3 signal. This condition is reported only if the DS3 interface is provisioned in VM or VMR mode. (See the set-t3 and rtrv-t3 commands.) Likely causes: An out-of-frame DS3 signal incoming to the DSX-3 at the far end. Failure of the DS3 CP at the far end or near end.

Continued on next page

Table A – RTRV-ALM Message Descriptions (Continued)

Description	Alarm Level	Meaning
inc. DS3 sig. failed (BER)	CR, MJ, MN, or None	The bit error ratio (BER) in the incoming DS3 signal exceeds the provisioned failure threshold, 10^{-3} or 10^{-6} . Likely causes: Failure of the upstream equipment or facility (towards the DSX-3). Cross talk in office wiring. Unprotected failure of DS3 CP.
inc. OC3 line AIS	CR or NE ACTY	The system has detected OC-3 line alarm indication signal (AIS) on an incoming OC-3 line. Likely cause: Failure of an OLIU CP at the far end.
inc. OC3 BER inc. OC3 sig. failed (BER)	CR or MN	The bit error ratio (BER) in the received OC-3 signal exceeds 10^{-3} . Likely causes: Failure of the OLIU CP at the near end, failure of the receive fiber, or failure of the OLIU CP at the far end.
inc. OC3 LOF	CR or MN	The system has detected a loss-of-frame (LOF) condition in an incoming OC-3 signal. LOF is defined as an out-of-frame (OOF) condition (four consecutive errored STS-1 framing patterns) that lasts for at least 3 milliseconds. Likely causes: Failure of the OLIU CP at the near end, failure of the OLIU CP at the far end, or failure of the receive fiber.
inc. OC3 LOP STS1 #x	CR or MN	The system has detected a loss-of-pointer (LOP) condition. A valid STS-1 pointer could not be found for eight consecutive frames in the identified STS-1 signal. Likely causes: If this condition occurs on the STS-1 on both OC-3 lines, the likely cause is an unprotected failure of an MXRVO or a DS3 CP at the far end. If this condition occurs on only one OC-3 line, the likely cause is failure of the OLIU CP at the near end or far end.
inc. OC3 LOS	CR or MN	The system has detected loss-of-signal (LOS) condition on the OC-3 line. Likely causes: Failure of the OLIU CP at near end, failure of the OLIU CP at far end, or failure of the receive fiber.
inc. OC3 sig. degrade (BER)	CR or MN	The bit error ratio (BER) in the specified OC-3 line exceeds the provisioned soft error threshold (10^{-9} to 10^{-5}) but below the hard error threshold of 10^{-3} . Likely causes: Failure of the OLIU CP at the near end, failure of the OLIU CP at the far end, failure of the receive fiber, or incorrect setting of the optical power switch on the OLIU CP.

Continued on next page

Table A – RTRV-ALM Message Descriptions (Continued)

Description	Alarm Level	Meaning
inc. STS1 AIS	NE ACTY	The system has detected an incoming STS-1 alarm indication signal (AIS) in the active OC-3 line. The system responds by transmitting DS1 or DS3 AIS toward the DSX and transmitting STS-1 yellow toward the fiber. Likely causes: Unprotected removal or failure of a DS3 or MXRVO CP at the far end.
inc. OC3 FERF	NE ACTY	The system has detected the OC-3 far-end receive failure (FERF) signal in the incoming OC-3 signal. Likely causes: The far end has detected an incoming signal failure on the specified OC-3 line. This may be caused by failure of the OLIU CP at the near end, the OLIU CP at the far end, or the transmit fiber on the specified line.
inc. STS1 yellow	NE ACTY	The system has detected an incoming STS-1 yellow signal, which indicates that the far end is receiving STS-1 AIS on the active OC-3 line. The system responds to the STS-1 yellow signal by transmitting DS1 or DS3 yellow toward the DSX. Likely causes: Unprotected failure of a DS3 or MXRVO CP at the far end, unprotected failure of a DS3 or MXRVO CP at the near end, or unprotected failure of OLIU CP at the near or far end.
inc. VT AIS	NE ACTY	The system has detected VT path alarm indication signal (AIS) incoming from the active OC-3 line. The system responds by transmitting DS1 AIS toward the DSX-1 and VT yellow toward the fiber. Likely causes: Unprotected removal or failure of a DS1 CP at the far end.
inc. VT LOP	MJ	The system has detected a VT loss-of-pointer (LOP) condition. Likely causes: Unprotected failure of a DS1 CP at the near end; unprotected failure of a DS1 CP at the far end; unprotected failure of an MXRVO CP at the near end; unprotected failure of an MXRVO CP at the far end.
inc. VT yellow	NE ACTY	The far end is detecting VT AIS or VT LOP. Likely causes: Unprotected failure of a DS1 CP at the near end, a DS1 CP at the far end, an MXRVO CP at the near end, or an MXRVO CP at the far end.

Continued on next page

Table A – RTRV-ALM Message Descriptions (Continued)

Description	Alarm Level	Meaning
inhibit switch	ABN	When associated with an OC-3 line, this message means that the identified line is not selected as the active receiving line, and a protection switch to make this the active receiving line will not be done. No further protection switching of specified line will be done until the protection switch is reset. Note: OC-3 line switching is unidirectional. Because of this, the specified OC-3 line might still be active (if the far end is selecting the specified line to receive traffic), and the far end might still be free to switch the line it is selecting to receive traffic. See the switch-line command. When associated with a function unit slot, timing slot, or timing reference, this message means that the identified equipment or reference is not active, and protection switches to the identified equipment or reference will not be done until the protection switch is reset. See the switch-fn and switch-sync commands.
lockout of protection	ABN	When associated with an OC-3 line, this message means that the identified line is not selected as the active receiving line, and a protection switch to make this the active receiving line will not be done. Note: OC-3 line switching is unidirectional. Because of this, the specified OC-3 line might still be active (if the far end is selecting the specified line to receive traffic), and the far end might still be free to switch the line it is selecting to receive traffic. The lockout will remain in effect until the protection switch is reset or until a protection switch "inhibit" request is entered. See the switch-line command. When associated with a low-speed protection slot, this message means that no service slot in the whole low-speed group will be allowed to switch to protection. The lockout will remain in effect until the protection switch is reset. See the switch-ls command.
lockout of service	ABN	When associated with a low-speed service slot, this message means that the specified low-speed service slot is active and will not be switched to protection. The lockout will remain in effect until the protection switch is reset. See the switch-ls command.

Continued on next page

Table A – RTRV-ALM Message Descriptions (Continued)

Description	Alarm Level	Meaning
manual switch	ABN	The specified DS1 CP is manually switched to protection. The manual switch will remain in effect until the protection switch is reset or until a failure occurs and an automatic switch preempts the manual switch. (See the switch-ls command.)
manual sync. mode switch	ABN	The synchronization mode has been manually switched to holdover or free-running and will remain in that mode until the switch request is reset. (See the switch-sync command.)
MXRVO CP failed	CR or MN	Internal equipment failure of the specified MXRVO CP.
OLIUI CP failed	CR or MN	Internal equipment failure of the specified OLIUI CP.
OHCTL CP failed	MJ	Internal equipment failure of the OHCTL CP.
program installation IP		System is being used to install software into another system. If this procedure is interrupted before completion, the remote system control circuit packs will likely become inoperable until another install program attempt is successful.
section DCC channel failed	MJ	The system cannot communicate with the far-end system through the SONET section data communications channel (DCC). Likely causes: SYSCTL CP failure at the far end; failed program installation at far end; program installation in progress at the far end; SYSCTL CP failure at the near end; OHCTL switch settings set incorrectly.
SYSCTL CP failed	MJ	Internal equipment failure of the SYSCTL CP. The system has determined that some part of the SYSCTL CP has failed. Note that some types of failures cannot be reported since the SYSCTL CP cannot function under these conditions.
TGS CP failed	CR or MN	Internal equipment failure of the specified CP.
TSI CP failed		Internal equipment failure of the TSI CP.
unexpected CP present	MN	A DS1 CP is installed in a low-speed slot associated with a function unit currently provisioned for DS3 service. The DS1 CP should be removed from the shelf, or the DS3 CP should be replaced with an MXRVO CP.

Continued on next page

Table A – RTRV-ALM Message Descriptions (Continued)

Description	Alarm Level	Meaning
unexpected CP switches	MJ	When associated with the SYSTL slot, this message means the CIT data rate or site switch settings on the SYSTL CP are invalid, or that some of the unused switches are not in the off (down) position.
unexpected CP type	MJ	When associated with a function unit (FN) slot, this message means an MXRVO or OLIU CP is inserted in a slot provisioned for a DS3 CP. When associated with the AUXCTL slot, this message means that a CP other than the TLMCTL is inserted in that slot.
unexpected CP type/switches	CR, MJ, or MN	When associated with a TG slot, this message means: 1. The timing mode switch settings on the TGS CP are: a. invalid, b. different from those on the companion TGS CP, or c. different from what they were before the TGS CP was replaced. 2. The DS1 format or line coding switches on the TGS CP are not the same as they were before the TGS CP was replaced. When associated with a MAIN slot, this message means a CP other than an OLIU is inserted in the specified slot, or that the optical power switch on the OLIU CP is different from what it was before the OLIU CP was replaced. When associated with a function unit (FN) slot, this message means a DS3 or OLIU CP is inserted in a slot provisioned for an MXRVO CP. When associated with a low-speed (LS) slot, this message means the line coding switches on the DS1 CP are different from what they were before the DS1 CP was replaced. In Release 3 or higher, this message may mean that a 22F OLIU is present in a slot in which a 21G OLIU is expected or vice versa.
X.25 communication failure		Failure in the X.25 communication channel. Likely causes: Failure of the X.25 communication equipment; failure at the OS; system is provisioned as a TL1/X.25 gateway but this interface is not being used. (For provisioning, see the CIT SONET subsystem command set -ne .)

Clear Customer Channel Failure Trouble Report at a *SLC*[®]-2000 Access System

Summary: This procedure clears customer service failures of the digital loop carrier (DLC) subsystem (single or multiple channels). It assumes that the trouble is at the *SLC*-2000 Access System and that the necessary actions (such as replacing central office channel units, running MLT channel tests, ...) have been done to isolate the trouble to the *SLC*-2000 RT. Typically, a customer service complaint or failed routine channel tests will generate a trouble report that requires you to use this procedure.



NOTE:

If line testing cannot be performed because of resources not being available or if test access is blocked, it may be because a **PTU** is installed without its associated **MDC**. If this condition exists, remove the **PTU**.

Channel units in the metallic distribution shelf (MDS) assembly are powered by the **PTU** (in the same shelf side of the MDS assembly), controlled by the **MDC** and **T8U** (TR-08 Mode 1 or 2) or **BMP** (TR-303), and interface to either the SONET subsystem through the **VTU** and **TSI** circuit packs or a metallic system through the **LIU** and **TSI** circuit packs.

This procedure assumes that no **FAULT** LEDs are lighted on any circuit packs (except possibly on a channel unit) and that the **RETRIEVE-FAULTS (DLP-500)** fault list messages (if any) only identify *CU* troubles (**TAP-104**). If you see any lighted or flashing **FAULT** LEDs, clear trouble using **TAP-102**.

A failed channel unit may generate an **NE** alarm at the *SLC*-2000 Access System. If it does, the **RETRIEVE-FAULTS** message will identify the failed channel unit.

There is an **MDC** fault condition where groups of four consecutive channel units (for example, slots **1** through **4** or **17-20** through **45-48**) will not work when installed. The **MDC** in the associated MDS assembly shelf side **MDC-()** slot is defective and needs to be replaced. If quad channel units are installed in these slots, their LEDs will not light during an **LED Test**.

1. At the UIP, is the **NE Activity** or **Attention** LED lighted?

If **YES**, continue with Step 2.

If **NO**, go to Step 3.

2. Go to **TAP-104** and use the **RETRIEVE-FAULTS** command to identify which channel unit is bad. Replace channel unit (or link fault circuit packs) identified in the fault message. After replacing circuit packs, verify that service has been restored.

STOP. YOU HAVE COMPLETED THIS PROCEDURE.

3. How many customers are affected?

If **only one customer**, then continue with Step 4.

If **only customers associated with one channel unit**, then proceed to Step 10.

If **customers associated with 1 or 2 digroups (up to 48)**, then proceed to Step 15.

If **customers associated with 1 system (up to 96)**, then proceed to Step 28.

If **ISDN customers associated with an entire TR-303 VRT**, then proceed to Step 44.



NOTE:

Customer service hits or glitches may be caused by lack of synchronization (which causes DS1 slips) between the central office (CO) equipment and the DDM-2000 shelf at the CO. All equipment connected to the CO DDM-2000 must obtain synchronization from the same source (including the 64-kHz composite clock used with *SLC 96* central office terminals).

4. At the protector associated with the customer, check for opens, shorts, and foreign voltages on the customer drop and, if possible, remove the protector and connect a test telephone set to the channel unit circuit associated with the trouble report and make a test call.
5. Did you find open/short/foreign voltage on the drop or could you make a test call at the channel unit?

If **YES**, continue with Step 6.

If **NO**, go to Step 10.

6. Clear drop distribution trouble using local procedures (if possible).

7. Did the drop distribution trouble clear?

If **YES**, continue with Step **8**.

If **NO**, go to Step **10**.

8. Call the local test desk and request a channel test on the line/shelf in question and verify that the test passes and no faults appear at the RT after the test is completed.

9. Do faults return?

If **NO**, **STOP. YOU HAVE COMPLETED THIS PROCEDURE.**

If **YES**, return to Step **1**.

10. Press the **PTU RESET** button.

11. Check for customer service.

12. Do you have customer service?

If **NO**, continue with Step **13**.

If **YES**, **STOP. YOU HAVE COMPLETED THIS PROCEDURE.**

13. Replace the channel unit.

14. Do you have customer service?

If **NO**, continue with Step **15**.

If **YES**, **STOP. YOU HAVE COMPLETED THIS PROCEDURE.**

15. Press the **LED TEST** button and observe the LEDs on the **PTU**, **MDS**, and **T8U**.

16. Do all LEDs light on the following circuit packs?

- **PTU**
- **MDS**
- **T8U**.

If **NO**, continue with Step **17**.

If **YES**, go to Step **20**.

17. Replace any of the three circuit packs that contain LEDs that do not light.

18. Press the **PTU RESET** button and check for customer service.

19. Do you have customer service?

If **NO**, continue with Step 20.

If **YES**, **STOP. YOU HAVE COMPLETED THIS PROCEDURE.**

20. Remove all channel units from the MDS assembly section affected. See Figure 1 for MDS assembly sections.

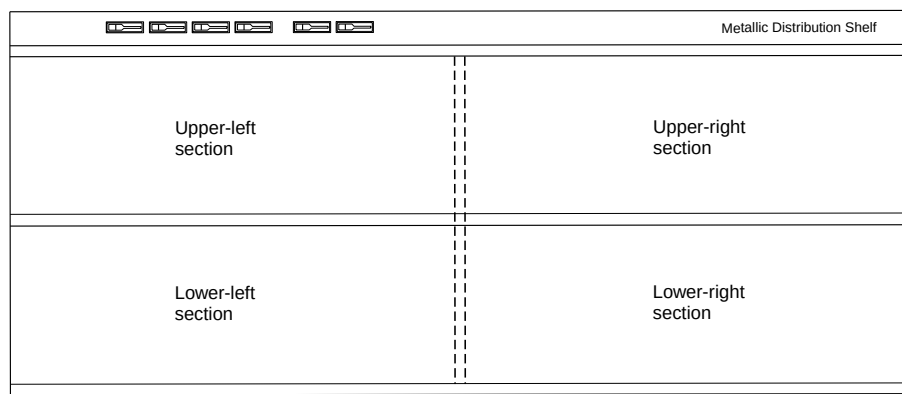


Figure 1 – MDS Assembly Sections

21. Select a channel unit to reinstall (any one of the channel units removed in Step 20).

22. Reinstall the selected channel unit and check for service.

23. Do you have customer service?

If **YES**, continue with Step 24.

If **NO**, go to Step 25.

24. Have all channel units been reinstalled or replaced?

If **NO**, return to Step 21.

If **YES**, go to Step 28.

25. Replace the channel unit with a new channel unit.

26. Do you have customer service?

If **YES**, continue with Step **27**.

If **NO**, return to Step **24**.

27. If needed, reinstall any remaining channel units.

STOP. YOU HAVE COMPLETED THIS PROCEDURE.

28. Is the problem on the MDS assembly section ringing trouble only?

If **NO**, continue with Step **29**.

If **YES**, go to Step **34**.

29. Replace the **MDC** in the affected section and check for customer service.

30. Do you have customer service?

If **YES**, **STOP. YOU HAVE COMPLETED THIS PROCEDURE.**

If **NO**, continue with Step **31**.

31. Replace the **T8U** in the affected section and check for customer service.

32. Do you have customer service?

If **YES**, **STOP. YOU HAVE COMPLETED THIS PROCEDURE.**

If **NO**, continue with Step **33**.

33. Have you replaced the **PTU**?

If **NO**, continue with Step **34**.

If **YES**, go to Step **37**.

34. Replace the **PTU** in the affected section and check for customer service.

35. Do you have customer service?

If **YES**, **STOP. YOU HAVE COMPLETED THIS PROCEDURE.**

If **NO**, continue with Step **36**.

36. Have you replaced the **MDC** in the affected section?

If **YES**, continue with Step **37**.

If **NO**, return to Step **29**.

37. See Note. In the ARM shelf, replace the **VTU/LIU** that corresponds with the affected customer service (**DLP-529**).



NOTE:

There is no fixed mapping between **VTUs** or **LIUs** and **MDCs** in a TR303 system.

38. Do you have customer service?

If **YES**, **STOP. YOU HAVE COMPLETED THIS PROCEDURE.**

If **NO**, continue with Step **39**.

39. In the ARM shelf, replace the BMP that corresponds with the affected customer service (**DLP-528**).

40. Do you have customer service?

If **YES**, **STOP. YOU HAVE COMPLETED THIS PROCEDURE.**

If **NO**, continue with Step **41**.

41. In the ARM shelf, replace the **TSI** that corresponds with the affected customer service (**DLP-528**).

42. Do you have customer service?

If **YES**, **STOP. YOU HAVE COMPLETED THIS PROCEDURE.**

If **NO**, continue with Step **43**.

43. If you still cannot clear the trouble, use the appropriate drawings to check the wiring between the access resource manager (ARM) assembly and the MDS. If no wiring trouble is found, you may need to replace the MDS assembly. Use your local company procedures for technical assistance.

STOP. YOU HAVE COMPLETED THIS PROCEDURE.

44. Is ISDN telephone setup correctly?

If **YES**, proceed to Step **46**.

If **NO**, continue with Step **45**.

45. Refer to the ISDN telephone user's manual and set the telephone options correctly.

STOP. YOU HAVE COMPLETED THIS PROCEDURE.

46. Is local digital switch (LDS) provisioned correctly for TR-303 ISDN applications and clear of alarms?

If **YES**, proceed to Step **48**.
If **NO**, continue with Step **47**.

47. Refer trouble to LDS technical support personnel.

STOP. YOU HAVE COMPLETED THIS PROCEDURE.

48. At the CIT, enter the following DLC commands for the INACTIVE core circuit packs:

CPY-MEM: : : : , SMU , , BMP - X;
CPY-MEM: : : : , SMU , , TSI - X;

Where: X=INACTIVE core side, 1 or 2.

Wait 15 minutes before proceeding to the next step.

49. Verify that there are no system alarms and enter the following DLC commands for the ACTIVE core circuit packs at the CIT:

CPY-MEM: : : : , SMU , , BMP - X;
CPY-MEM: : : : , SMU , , TSI - X;

Where: X=ACTIVE core side, 1 or 2.

Response: After the first command is entered, the core will automatically switch and become inactive.

50. Do you have customer service?

If **YES**, **STOP. YOU HAVE COMPLETED THIS PROCEDURE.**
If **NO**, obtain technical assistance using local company procedures.

Clear Trouble During Program Upgrade at a *SLC*[®]-2000 Access System

1. Was the following prompt,

Select "1" to continue.
subsystem =

printed indicating communication was established with near-end shelf?

If **NO**, continue with Step 2.

If **YES**, go to Step 12.



NOTE:

Program installation may fail due to failure of communication link between personal computer (PC) and *SLC*-2000, failure of the floppy disk on the PC, failure or loss of power in the PC, or failure of the **SYCTL** or **OHCTL**.



NOTE:

This message is different from the response you get when connecting a craft interface terminal (CIT) to a *SLC*-2000 system.

2. Is the system equipped with a **BBG8 SYCTL** (R4.2 and later)?

If **NO**, go to Step 10.

If **YES**, continue with Step 3.

3. Verify that the **BBG8 SYCTL** shelf ID is correct using the CIT **SET - NE** command.

4. Was the **BBG8 SYCTL** shelf ID correct?

If **NO**, go to Step 5.

If **YES**, continue with Step 6.

5. Correct the **BBG8 SYSTCL** shelf ID setting.

STOP. YOU HAVE COMPLETED THIS PROCEDURE.

6. Check the PC to **CIT** port connections. Make sure the cable is connected between the PC **COM1** port and the **CIT** port on the UIP.

7. Check CTRM setup and make sure COM port is configured for COM1.

8. Are the connections and COM port configuration correct?

If **NO**, go to Step 9.

If **YES**, continue with Step 18.

9. Make necessary corrections to the connections and/or COM port.

STOP. YOU HAVE COMPLETED THIS PROCEDURE.

10. On the **BBG5 SYSCTL**, verify that the front access baud rate CIT option and the shelf ID are correctly set. Refer to **DLP-502** for option settings.



NOTE:

To avoid downloading troubles (garbage printed on the screen because of baud mismatch), the option switches S3-1, S3-2, and S3-3 on the **BBG5 SYSCTL** *must match the baud rate used by the user interface panel and CTRM*.



NOTE:

The recommended setting for the front access baud rate CIT option is 9600 (**S3-1 ON, S3-2 OFF, S3-3 OFF**).

The shelf ID should be set to 1 (**S2-4, S2-5, and S2-6 toward ON**).

11. Were the **BBG5 SYSCTL** settings correct?

If **NO**, continue with Step 12.

If **YES**, go to Step 13.

12. Correctly set the **BBG5 SYSCTL** switches (**DLP-502**).

STOP. YOU HAVE COMPLETED THIS PROCEDURE.

13. Check the PC to **CIT** port connections. Make sure the cable is connected between the PC **COM1** port and the **CIT** port on the UIP.

14. Ensure that the baud rate is set the same as on the CTRM terminal emulator (**SET-BAUD** UIP command).

15. Check CTRM setup and make sure COM port is configured for COM1.

16. Are the connections, baud rate, and COM port correctly set?

If **NO**, continue with Step 17.

If **YES**, go to Step 18.

17. Make the necessary corrections to the connections, baud rate, and/or COM port.

STOP. YOU HAVE COMPLETED THIS PROCEDURE.

18. Are you sure the PC is good and cable connections are correct?

If **YES**, continue with Step **19**.

If **NO**, go to Step **37**.



NOTE:

The equipment is probably good if the PC and cable work with a different system.

19. Replace the user interface panel.

STOP. YOU HAVE COMPLETED THIS PROCEDURE.

20. Was the following message received?

/* Status, execution stopped. */

/* Communication link could not be established.

Please connect PC with DDM-2000 upgrade program and start again. */

If **NO**, continue with Step **26**.

If **YES**, go to Step **21**.

21. Ensure that you are using a PC to upgrade the program. Also, check the following:

- PC is functioning properly.
- Disk drive is functioning properly.
- Diskette has not been removed.
- Program has not previously been erased from the **SYCTL**. Correct any problems found.



NOTE:

A program upgrade to the near-end DDM-2000 cannot be performed with a CIT. Ensure that you are using a PC to upgrade the program.

⇒ **NOTE:**
If PC disk errors occur during the software download, the terminal emulator (CTRM program) may print references to error numbers and the PC may print an error message such as:

Disk error Abort, Retry, Ignore?

If you have this trouble, you will need to repeat the generic installation procedure after determining why the PC failed (bad diskettes, bad drive/PC, drive latch not closed, corrupt files, etc.).

⇒ **NOTE:**
If the system is equipped with a **BBG5 SYSCTL** and the screen started printing garbage character strings, correct the **SYSCTL** and UIP baud rate settings. See **DLP-502** for correct settings.

22. Has program installation procedure been tried more than once?

If **YES**, continue with Step **23**.

If **NO**, go to Step **30**.

23. Was the following message received?

ins-prog:tid DENY

SSTP

/* Status, execution stopped. */

/* Far end not responding.

If **YES**, continue with Step **24**.

If **NO**, go to Step **26**.

24. Is **SYSCTL** and **OHCTL** plug-in installed at far end?

If **YES**, go to Step **26**.

If **NO**, continue with Step **25**.

25. Determine the reason the **SYSCTL** (and **OHCTL**, if used) is not installed. The **SYSCTL** (and **OHCTL**, if used) must be installed to upgrade the program. Reinstall the **SYSCTL** (and **OHCTL**, if installed) and repeat the program installation procedure.

STOP. YOU HAVE COMPLETED THIS PROCEDURE.

26. Did **SYSC**TL or **OHCT**L fail, indicated by the following or similar "SYSCTL CP failed" message?

ins-prog:tid DENY

SSTP

/*Status, execution stopped.*/

/*Installation cannot be done because of SYSCTL test failure. */

If **YES**, go to Step 32.

If **NO**, continue with Step 27.

27. Did the **FAULT** LED on **SYSC**TL light and did the **SYSC**TL FE ID display go off?

If **YES**, go to Step 34.

If **NO**, continue with Step 28.

28. Check the PC COM1 port to CIT connection. Check PC disk drive and floppy diskette.



NOTE:

It is assumed that the program installation failed in one of two ways:

- Before the old program was erased
- After the old program was erased.

If the program installation failed after 1 minute, the DDM-2000 may have erased its old program and will be unable to report alarms or do protection switches. If program installation failed within 1 minute, the old program may not have been erased and the DDM-2000 may have automatically reset and restarted its old program. A new attempt must be made to install the program.

29. Has program installation procedure been tried more than once?

If **NO**, continue with Step 30.

If **YES**, go to Step 31.

30. See Note. Disconnect the PC and repeat program installation procedure. Use your *backup diskettes* containing new generic program, if available.



NOTE:

The new program installation may have failed because of faulty diskettes.

31. Proceed as follows:

If the new program installation ...	And the old program has ...	Then do the following ...
Is completed	—	STOP. YOU HAVE COMPLETED THIS PROCEDURE.
Cannot be completed	Been erased	Use one of the following procedures to restore the old program or install a different version program: • Go to the far-end shelf and establish session with a CIT. Enter the ins-prog:tid command where the <i>tid</i> is the <i>tid</i> (shelf name) for the failed shelf where you want to install the old program. • Replace the SYSCTL (and OHCTL, if installed) with one that has compatible software. Refer to DLP-502 (BBG5 SYSCTL) or DLP-534 (BBG8 SYSCTL) and DLP-501 (OHCTL). • If a "C" was displayed in the FE ID display during a software upgrade, indications are that the software being loaded will not support the current system transmission configuration. This indicates a problem with the version of software you are trying to install, or you are trying to install an older version of software that does not support the system configuration that you have. To load another version of software, unplug and then reseat the SYSCTL and immediately push and hold the FE SEL and UPD/INIT buttons at the same time until a "P" appears in the FE ID display. Release buttons and install program using DLP-513. If you need technical assistance, notify your supervisor, your local technical support organization, or call RTAC, per local operating instructions. STOP. YOU HAVE COMPLETED THIS PROCEDURE.

32. See Caution and Note. Unplug and reseal **SYSCTL** to perform reset.



CAUTION:

*If the old program is still running, removing the **SYSCTL** without performing a 10-second countdown sequence on the **FE ID** display (**Note 1**) may result in unexpected and undesirable protection switches, incorrect circuit pack fault indications, or incoming signal failure indications.*



NOTE:

Before removing the **SYSCTL**, you must momentarily depress the **ACO** push button on the user interface panel and the **FE SEL** push button on the **SYSCTL** at the same time to start a 10-second countdown on the **FE ID** display (9, 8, 7, etc.). During this countdown, the **SYSCTL** may be safely removed. If the **SYSCTL** is failed, the countdown may not occur.

33. Is alarm still present?

If **YES**, continue with Step **34**.

If **NO**, go to Step **36**.

34. Has the **SYSCTL** (and/or **OHCTL**, if installed) been replaced?

If **NO**, continue with Step **35**.

If **YES**, go to Step **37**.

35. Replace the **SYSCTL** and/or **OHCTL**. Refer to **DLP-502 (BBG5 SYSCTL)** or **DLP-534 (BBG8 SYSCTL)** and **DLP-501 (OHCTL)**.



CAUTION:

*Replacing the **SYSCTL** involves updating the internal memory on the plug-in.*

36. Repeat program installation procedure.

STOP. YOU HAVE COMPLETED THIS PROCEDURE.

37. If you need technical assistance, contact your local or regional maintenance group. The telephone number for RTAC is listed in the front of this manual.

STOP. YOU HAVE COMPLETED THIS PROCEDURE.

Isolate Fiber Distribution (FITL) Trouble at a *SLC*[®]-2000 Remote Terminal

General: This procedure is used to isolate trouble associated with the fiber in the loop (FITL) distribution equipment. The severity of alarms generated by a failure will depend on how many circuits are affected. This procedure is used only at the *SLC*-2000 site. Use document 363-205-004, *SLC-2000 Multi-Services Distant Terminal (MSDT) Feature, User/Service Manual*, at the *SLC*-2000 MSDT or document 363-206-301, *DDM-2000 FiberReach Multiplexer, Wideband/Narrowband Shelf, User/Service Manual*, at the FiberReach narrowband shelf (NBS). If, after performing a step, alarms clear, then **STOP. YOU HAVE COMPLETED THIS PROCEDURE**. If, after performing a step, alarms do not clear or change, continue with the next steps. If the alarms do not change when a circuit pack is replaced, reinsert the original circuit pack.

1. Is the DT Server connected to an optical facility through an optical unit in the high density optics shelf (HDOS)?

If **YES**, then continue with Step 2.

If **NO**, then proceed to Step 4.

2. Replace any blown fuses in the high density optics shelf (HDOS). If a replacement fuse blows, remove the associated **PCU** and **OU** circuit packs. If a replacement fuse still blows, correct HDOS wiring using appropriate drawings. Install **PCU** then **OU** circuit packs and replace the circuit pack that causes the fuse to blow.
3. Replace any HDOS **PCU** with a **FAIL** LED lighted.
4. Refer to Table A for the user interface panel (UIP) alarm and fault messages associated with FITL distribution. To view alarm or fault messages, press the UIP **Escape** button. Then press the **Scroll Menu** down arrow until **RETRIEVE-ALARMS: <ent>** or **RETRIEVE-FAULTS: <ent>** is displayed. Then press **Scroll Menu** down arrow to scroll through the messages.

Table A – UIP Alarm and Fault Messages Associated with FITL Distribution Mode (Notes)

UIP Alarm Messages		
Severity	Message	Meaning
MJ or MN	{aid} rcvd FITL YEL	Yellow alarm received from DT
MN	{aid} rcvd MISC	MISC alarm received from DT
MN	{aid} on battery	DT on battery power
MN	{aid} power alarm	Power source failure at DT
UIP Fault Messages		
Severity	Message	Meaning
MJ or MN	{aid} biu failed	DT BIU/DSXBIU plug-in failed
MJ or MN, NE	{aid} DT CLF	RT-to-DT carrier-line-failure
MN	{aid} ISDN slot err	ISDN CU placement violation in DT
MN	{aid} data link fail	RT-to-DT ESF data link failed
MN	{aid} cu failed	CU failed in DT
MN	{aid} DT CU failed	
MN	{aid} door open	DT door(s) open
MJ or MN	{aid} rgu failed	DT ringing generator failed
MN	{aid} pcu failed	DT power converter unit failed
MN	{aid} piu removed	PIU removed or failed at DT
MN	{aid} cdtu failed	DT channel & drop-test unit failed
MJ	{aid} is missing	DT Server with 24 lines provisioned is removed
MN	{aid} is missing	DT Server with 12 lines provisioned is removed
MN, NE	{aid} config	DT Server configuration error
MJ or MN, NE	{aid} failed	DT Server failed
MN	{aid} incompat	Incompatible CU in DT
MN	{aid} on rmt battery	DT on remote battery
MN	{aid} on loc battery	DT on local battery
MN	{aid} piu fuse fail	DT PIU fuse failed
MN	{aid} batt chrg fail	DT battery charger failed
MN	{aid} ISDN cnflt	DT ISDN CU placement violation
ABN	{aid} dnld abort	BIU/DSXBIU software installation failed
ABN	{aid} downloading	BIU/DSXBIU software installation in progress

Notes:

1. The general syntax of UIP messages: Alarm-severity:which end:AID message.
2. Each error message will print a circuit pack address identifier {aid}. For FITL error messages the AID will generally begin with the characters "dt", with the exception of errors involving the DT Server, which may begin with "cu" (referencing the MDS CU slot holding the server). Beginning with Software Release 4.0, AIDs for some FITL error messages may also identify a specific CU at the DT beginning with the characters "dtcu".
3. Note that the DT Server's DT LED will also light when the error is reported by the MSDT or FiberReach NBS.
4. The NE Activity is indicated where the cause of the message calls for corrective action starting at the RT.

5. Examine the DT Server channel unit alarms and perform trouble-clearing procedures in document 363-205-004, *SLC-2000 Multi-Services Distant Terminal (MSDT) Feature, User/Service Manual*, at the SLC-2000 MSDT location or document 363-206-301, *DDM-2000 FiberReach Multiplexer, Wideband/Narrowband Shelf, User/Service Manual*, at the FiberReach NBS.

Clear Data Link Related Trouble Reports at a *SLC*[®]-2000 Access System

⇒ **NOTE:**
In this procedure it is assumed that all alarms have been cleared in the RT using **TAP-101** and that the data links at one time were operational.

⇒ **NOTE:**
In this procedure it is also assumed that the provisioning of the feeders has not changed in the local digital switch (LDS), the RT, or the SONET subsystem (if present). Incorrect provisioning can lead to incorrect span connections, thereby causing data links from the LDS to not reach the correct termination on the RT.

Summary: This procedure is used to clear problems relating to the time slot management channel (TMC) and embedded operations channel (EOC) data links of a *SLC*-2000 Access System. Most problems that occur with the data links are detected at the local digital switch (LDS). From the **CIT**, the user can also dump the errors but will only indicate if Layer 1 or 2 has any errors. The user needs to refer to the LDS user guide for the operations concerning the LDS as they are not covered in this TAP.

The problems with the data links can be divided into three categories, as follows:

- Layer 3. This area deals with the higher level protocol between the LDS and the RT. It is associated with Q.931 or ASN.1 messages having to do with call processing and administration. Layer 3 errors occur because these messages are received either late or out of sequence. Certain LDSs (such as *5ESS*[®] switch) keep count of these errors and, if a certain threshold is reached, will take the associated data link out of service. The assumption by the LDS is that there must be something wrong with the RT. From the RT perspective, this type of occurrence only happens under heavy overload of the data link. Once the overload condition subsides, the RT will return to normal operation.
- Layer 2. Layer 2 problems deal with errors that occur in the link access protocol access for the D-channel (LAPD) protocol. From the LDS perspective, errors occurring at this level again indicate some kind of problem with the RT. Layer 2 in the RT is more robust than Layer 3 so that errors detected here are more likely to do with actual hardware failures such as a noisy span or an internal hardware fault at the RT.

- Layer 1. Layer 1 problems deal with errors that are more related to actual hardware problems or the data base not being correctly initialized. See **TAP-101** to clear these problems.

1. Is the span associated with the out-of-service data link out-of-service at the LDS?



NOTE:

Determine this at the LDS maintenance terminal.

If **YES**, then continue with Step 2.

If **NO**, then go to Step 3.

2. At the LDS maintenance terminal, put the span in service. Does it return to service?

If **YES**, then **STOP. YOU HAVE COMPLETED THIS PROCEDURE.**

If **NO**, then go to Step 4.

Comment: The span had enough errors that the LDS took the span out of service. This in turn breaks the connection to the RT's data links. Depending on the LDS, a craftsperson performing a restoral may be required to bring the span back in service. Usually, the break could have been associated with the span being broken for a long period of time or the RT's span being incorrectly provisioned for a nonextended superframe (ESF) format.

3. Does restoring the data link to service at the LDS maintenance terminal bring the data links back in service?

If **YES**, then **STOP. YOU HAVE COMPLETED THIS PROCEDURE.**

If **NO**, then go to Step 6.

Comment: Under extreme conditions, the RT may not keep up with the LDS. This most likely can happen under heavy call traffic, or under certain instances it can occur during heavy provisioning traffic. The RT has created enough Layer 3 errors to cause the LDS to go over its counter threshold for Layer 3 errors. The LDS makes the assumption that because of the data link problems, the RT is having problems and puts the data link out of service. In the case of the 5ESS switch, this type of error is usually corrected within 5 minutes by an audit on the LDS.

4. Are there any alarms or faults at the RT concerning the span (such as yellow or AIS alarm)?



NOTE:

See **TAP-101** to determine correction of any span problems.

If **YES**, then continue with Step 5.

If **NO**, then go to Step 6.

5. The problems appear to be related to the physical plant. These need to be corrected.

STOP. YOU HAVE COMPLETED THIS PROCEDURE.

6. Do any alarms exist relating to the **BMP**, **TSI**, or **VTU/LIU**?

If **YES**, then go to **TAP-102** and fix the problem.

If **NO**, then continue with Step 7.

7. Switch active cores, and at the LDS maintenance terminal put the data links in service. Use the **CIT** command switch-core to perform the switch. Do the data links stay in service?

If **YES**, then continue with Step 8.

If **NO**, then go to Step 10.

8. Does replacing the standby **BMP** and making it active correct the problem? (See **DLP-528**.)

If **YES**, then **STOP. YOU HAVE COMPLETED THIS PROCEDURE.**

If **NO**, then continue with Step 9.

Comment: There appears to be an internal hardware error that the diagnostics of the **BMP** are unable to detect. This could include either processor chips or the path routing the data link from the processor to the active **TSI** pack.

9. Return the **BMP** to its slot and replace the **TSI** (see **DLP-528**). Does this fix the problem?

If **YES**, then **STOP. YOU HAVE COMPLETED THIS PROCEDURE.**

If **NO**, then continue with Step 10.

Comment: There appears to be an internal fault with the **TSI** that does not correctly carry the data links from the **BMP** to the associated **VTU/LIU**. **STOP. YOU HAVE COMPLETED THIS PROCEDURE.**

10. Switch back to the original core. Use either the UIP **SWITCH-CORE** or CIT **SW- TOPROT** command to perform the switch.
11. Switch to the protection **LIU/VTU**. Place the data link in service using the LDS maintenance terminal. Use the **CIT** command **sw- ls** or the UIP **SWITCH-LIU** command to perform the switch. Do the data links stay in service?

If **YES**, then continue with Step **12**.

If **NO**, then go to Step **13**. Nothing appears faulty in the RT.

12. Replace the **VTU/LIU** (see **DLP-529**).

Comment: There appears to be a fault with the **VTU/LIU** that causes the data link to be incorrectly carried from the span to the **TSI**.

STOP. YOU HAVE COMPLETED THIS PROCEDURE.

13. Replace the packs related to the alarm on the **VTU/LIU** (see **DLP-529**). Nothing appears faulty in the RT.

STOP. YOU HAVE COMPLETED THIS PROCEDURE.

Clear Trouble with the Tollgrade Digital DC Bypass Pair Channel Units

1. Check the green synchronization LEDs on both the RT and D4 Tollgrade channel units. Are both LEDs on?

If **YES**, go to Step 6.

If **NO**, continue with Step 2.

2. Check the INA cross-connections using the **RTRV - INA** CIT command. Are the cross-connections in-service (IN)?

If **YES**, go to Step 4.

If **NO**, continue with Step 3.

3. Verify that the INA cross-connections are made correctly.



NOTE:

See **DLP-526** and **DLP-527** for more information on establishing INA cross-connections.

4. Verify that the Tollgrade channel units are installed in the correct slots. If they are not installed in the correct slots, correct the problem and return to Step 1.
5. Replace the Tollgrade channel units and return to Step 1.
6. Check the wiring from the *MCU5405* channel unit to the RT's test bus. Correct any errors found.
7. Check the wiring from the *MCU4496* to the LDS test bus and verify the option settings using the *MCU4496* circuit pack's documentation. Correct any errors found.
8. Verify the transmission of signals by applying a known resistance on the RT side of the test bus and checking for their reception on the LDS side of the test bus. If the resistance is not transmitted correctly, **return to Step 4**.

STOP. YOU HAVE COMPLETED THIS PROCEDURE.

Clear Blown Fuse in the MDS or HDOS Assembly During Acceptance Testing

Summary: Perform this procedure when fuses blow while installing circuit packs in the MDS or HDOS assembly during acceptance testing.

If an MDS assembly fuse blows when a circuit pack is installed, replace the fuse. If the fuse blows again, replace the circuit pack then the fuse. If the fuse blows after replacing the circuit pack, refer trouble to installation personnel or use schematic diagram to correct wiring trouble. If no wiring trouble is found, replace the MDS or HDOS assembly.



CAUTION:

*Use this procedure to isolate problems **ONLY** during acceptance testing. For any other problem with blown fuses, go to **TAP-105**.*

1. Replace the MDS or HDOS assembly fuse that blew.
2. Did the MDS or HDOS assembly fuse blow again?

If **YES**, continue with Step 3.

If **NO**, **STOP. YOU HAVE COMPLETED THIS PROCEDURE.**

3. Replace the circuit pack, then replace the blown fuse.
4. Does the fuse blow again?

If **NO**, **STOP. YOU HAVE COMPLETED THIS PROCEDURE.**

If **YES**, continue with Step 5.

5. Refer problem to installation personnel or use schematic diagram to correct wiring trouble.
6. Was a wiring problem found?

If **YES**, continue with Step 7.

If **NO**, go to Step 8.

7. Correct the wiring problem.

STOP. YOU HAVE COMPLETED THIS PROCEDURE.

8. Contact your supervisor or technical assistance using your local procedures.

STOP. YOU HAVE COMPLETED THIS PROCEDURE.

Clear Lighted DS1() VTU/LIU LED During MDS Assembly Turnup



CAUTION:

*Perform this procedure only during MDS assembly turnup. Clear other alarms using **TAP-102**.*

1. Are you connecting to an integrated network access (INA) system?

If **NO**, continue with Step 2.

If **YES**, go to Step 3.

2. Determine which digroup corresponds with the lighted LED and proceed as follows:

If ...	Then go to ...
Digroup A (mode 1)	Step 3
Digroup AB (mode 2)	
Digroup B (mode 1)	Step 4
Digroup C (mode 1)	
Digroup D (mode 1)	
Digroup CD (mode 2)	

3. Have the CO craftsperson check for wiring problems. Go to Step 5.
4. Have the CO craftsperson check for wiring problems between the CO equipment and the DDM-2000.
5. Did the CO craftsperson find a wiring problem?
6. Have the CO craftsperson correct the wiring problem.
7. With the wiring problem corrected, does the lighted LED go off?

If **NO**, continue with Step 8.

If **YES**, **STOP. YOU HAVE COMPLETED THIS PROCEDURE.**

8. Is the system configured for *ring* and/or *VT1.5 taper* configurations?

If **YES**, continue with Step **9**.

If **NO**, go to Step **13**.

9. Verify that the proper VT1 cross-connections have been made at all SONET nodes.

10. Have the proper cross-connections been made?

If **NO**, continue with Step **11**.

If **YES**, go to Step **13**.

11. Make the proper cross-connections.



NOTE:

Refer to the work order for the proper cross-connections. See the *Detailed Level Procedures* tab (**DLP-522**) to establish default cross-connections.

12. With the proper cross-connections, does the lighted LED go off?

If **NO**, continue with Step **13**.

If **YES**, **STOP. YOU HAVE COMPLETED THIS PROCEDURE.**

13. Are you connecting to an INA system?

If **YES**, continue with Step **14**.

If **NO**, go to Step **18**.

14. Check the frame and line code format (B8ZS or AMI) of the DDM-2000 low-speed circuit packs.



NOTE:

Refer to the work order for the proper frame and line code format.

15. Is the frame and line code format of the DDM-2000 low-speed circuit packs correct?

If **NO**, continue with Step **16**.

If **YES**, go to Step **18**.

16. Correct the frame and line code format of the DDM-2000 low-speed circuit packs.

17. With the frame and line code format corrected, does the lighted LED go off?

If **NO**, continue with Step **18**.

If **YES**, **STOP. YOU HAVE COMPLETED THIS PROCEDURE.**

18. Resolve problem using local procedures.

Clear Powering Trouble

Summary: Before trying to clear troubles at a SLC[®]-2000 Access System, verify that AC power is present and that there are no tripped circuit breakers and no blown fuses in the power shelf, access resource manager (ARM) shelf, metallic distribution shelf (MDS) assemblies, and, if equipped, high-density optics shelf (HDOS). The ARM shelf has a green **Power** LED that is lighted when –48 V DC is present. The **LED Test** button can be used to quickly verify that power is fed to the ARM shelf and MDS assembly circuit packs (assuming controlling circuit packs have not failed). Also, if there is power and the user interface panel is functional, the **Attention** LED will be lighted if there are any fault or alarm messages.

1. Verify that there are no blown fuses in the following equipment:
 - ARM shelf behind the UIP cover (Figure 1)
 - Each MDS assembly (Figure 2)
 - Each HDOS (if equipped) (Figure 3)
 - Power equipment.

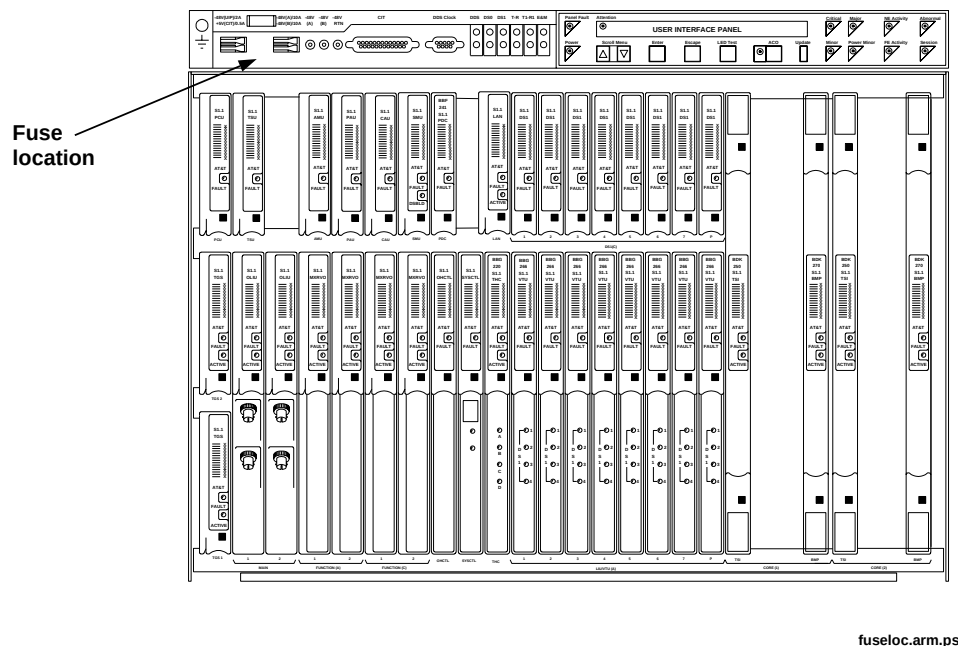


Figure 1 – ARM Shelf and UIP Fuse Location

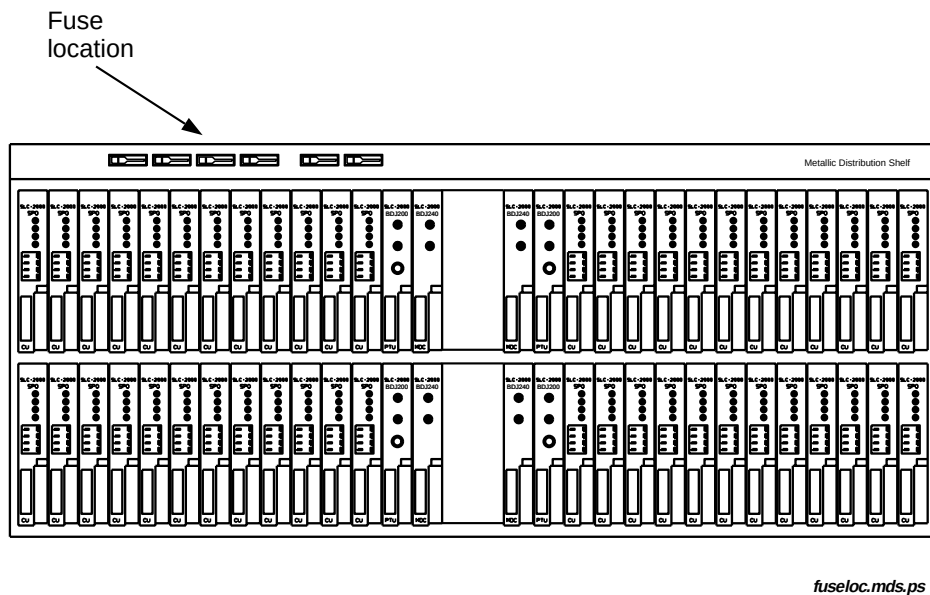


Figure 2 – MDS Assembly Fuse Location

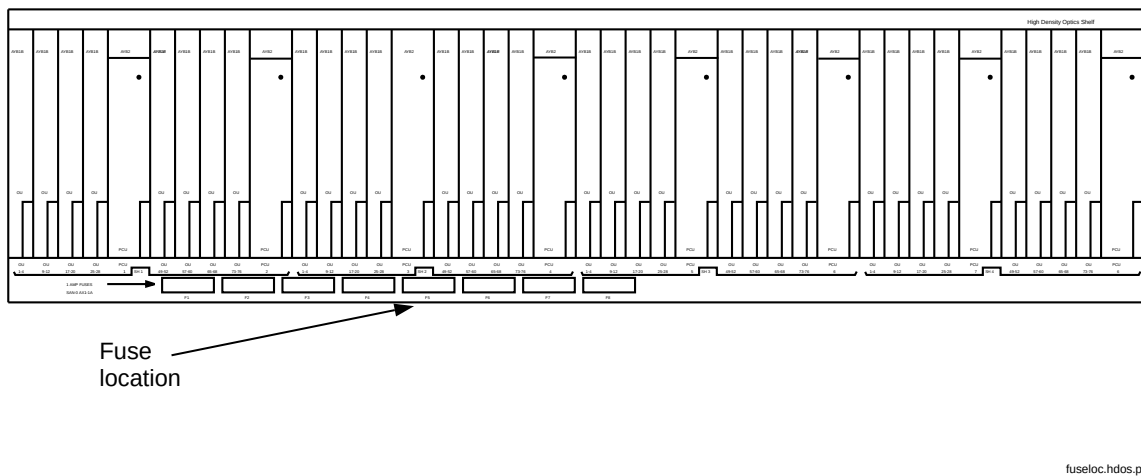


Figure 3 – HDOS Assembly Fuse Location

2. Did you find blown fuses in the system?

If **YES**, continue with Step 3.

If **NO**, go to Step 5.

3. Replace blown fuses using WP-90247 fuse extractor tool or equivalent (Figure 4).

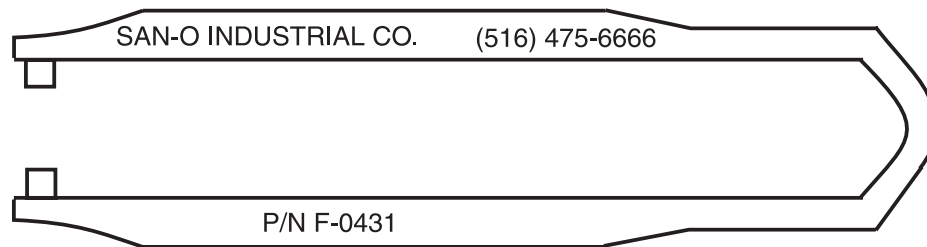


Figure 4 – WP-90247 Fuse Extractor Tool

4. Did any fuse replaced in the ARM shelf or MDS assembly blow again?

If **NO**, **STOP. YOU HAVE COMPLETED THIS PROCEDURE.**

If **YES**, go to **TAP-105.**

5. Verify that AC power is present and that there are no alarms on the power shelf equipment.
6. Are there alarms in the power shelf?

If **YES**, continue with Step 7.

If **NO**, go to Step 8.

7. Replace the power shelf circuit packs that are faulty using appropriate documentation.

STOP. YOU HAVE COMPLETED THIS PROCEDURE.

8. Press **LED Test** button on the UIP and verify that all LEDs and display elements on the UIP light (**DLP-507**).



NOTE:

Failure of the **PDC** circuit pack may prevent the LED test from lighting other *SLC-2000* circuit pack LEDs. Failure of the **SYSCTL**, **TSI**, **MDC**, **PTU**, and **THC** also affects the LED test. Normally, all LEDs on all *SLC-2000* circuit packs (except some version channel units and **ITH** circuit packs) light for the UIP LED test.

9. Did all UIP LEDs and display elements light?

If **YES**, continue with Step **10**.

If **NO**, go to Step **11**.

10. Is the **Panel Fault** LED lighted?

If **YES**, continue with Step **11**.

If **NO**, go to Step **12**.

11. Replace the UIP display panel (**DLP-518**).

STOP. YOU HAVE COMPLETED THIS PROCEDURE.

12. Clear trouble using local procedures.

STOP. YOU HAVE COMPLETED THIS PROCEDURE.

Clear FAULT LED Lighted But Not Flashing

Summary: This procedure clears troubles on circuit packs when the **FAULT** LED is lighted *continuously* and not flashing. If the LED is flashing, go to **TAP-116** to clear the trouble. ***Read all notes and cautions before beginning this procedure.***



CAUTION:

*Removing the **SYCTL** without performing a 10-second countdown sequence on the **FE ID** display may result in unexpected and undesirable protection switches, incorrect circuit pack fault indications, or incoming signal failure indications.*



NOTE:

A fault on one circuit pack may affect the functionality of other circuit packs.



NOTE:

If more than one circuit pack has a **FAULT** LED lighted, the order in which the circuit packs are replaced is important. Replace SONET subsystem circuit packs first. Replace the circuit pack that appears at the beginning of the user interface panel **RETRIEVE-FAULTS** command fault list (**TAP-104**) next.



NOTE:

If, after replacing a circuit pack, the **FAULT** LED on the replacement pack lights, reinstall the original circuit pack (with options set correctly) and continue replacing other circuit packs with **FAULT** LEDs lighted.



NOTE:

Before removing the **SYCTL**, you must momentarily depress the **ACO** push button on the user interface panel and the **FE SEL** push button on the **SYCTL** at the same time to start a 10-second countdown (9, 8, 7, etc.) on the **FE ID** display. During this countdown, the **SYCTL** may be safely removed. If the **SYCTL** is failed, the countdown may not occur.



NOTE:

When the **SLC**®-2000 Access System is connected to the network, you may have a **Major** alarm and a **FAULT** LED lighted on the **SYCTL** and/or **OHCTL** caused by a duplicated site/ne address, TBOS display, or TID. Use the **CIT rtrv-alm** command to look for this type of trouble. **DLP-517** can be used to clear this trouble by changing the appropriate setting.

⇒ **NOTE:**
FAULT LEDs of **VTU** packs do not flash when you are installing software; their **FAULT** LEDs remain lighted. Check for this condition by using the UIP **RETRIEVE-FAULTS** command.

⇒ **NOTE:**
PDC, TSI, BMP, MDC, VTU, and LIU packs will have lighted **FAULT** LEDs while the packs are completing initialization. Check for this condition by using the UIP **RETRIEVE-FAULTS** command.

1. Does more than one circuit pack have its **FAULT** LED lighted?

If **NO**, continue with Step 2.

If **YES**, go to Step 3.

2. Replace the circuit pack with the **FAULT** LED lighted as shown in Table A (see Note). If applicable, follow any special instruction shown. Refer to the DLPs when indicated. **Go to Step 5.**

⇒ **NOTE:**
When replacing the **SYSCTL, BBG7 OHCTL, TGS, and OLIU** circuit packs, ensure that the option switches are correctly set.

3. Using the order shown in Table A, select the first circuit pack that has the **FAULT** LED lighted to replace.
4. Replace the selected circuit pack as shown in Table A (see Note). If applicable, follow any special instruction shown. Refer to the DLPs when indicated.

⇒ **NOTE:**
When replacing the **SYSCTL, BBG7 OHCTL, TGS, and OLIU** circuit packs, ensure that the option switches are correctly set.

5. Did the LED go off and remain off on the circuit pack replaced?

If **NO**, continue with Step 6.

If **YES**, go to Step 8.

6. Reinstall the circuit pack. Be sure any options are correctly set.
7. Using the order shown in Table A, select the next circuit pack in the table after the circuit pack that has the **FAULT** LED lighted. **Return to Step 4.**

8. Do other circuit packs contain lighted **FAULT** LEDs?

If **NO**, **STOP. YOU HAVE COMPLETED THIS PROCEDURE.**

If **YES**, continue with Step 9.

9. Using the order shown in Table A, select the next circuit pack that has the **FAULT** LED lighted to replace. ***Return to Step 4.***

Table A – Lighted FAULT LED Trouble Clearing

Circuit Pack	Special Instruction	Details
SYSCTL	Press IPD/INT button within 10 seconds after the SYSCTL INITIALIZATION is displayed on the UIP. <i>Note:</i> If the letter C , P , or d appears on the SYSCTL FE ID display after the SYSCTL has been replaced, you must load a compatible version generic software using DLP-513 .	DLP-502 or DLP-534
OHCTL	If the letter C , P , or d appears on the SYSCTL FE ID display after the OHCTL has been replaced, you must load a compatible version generic software using DLP-513 .	DLP-501
TGS	—	DLP-503
OLIU *	Perform TAP-103 if the FAULT and ACTIVE LEDs are lighted on the OLIU .	DLP-504
MXRVO *	—	—
DS1 *	If the replacement DS1 pack FAULT LED lights, replace the active MXRVO in Function Group C. If the Panel Fault or PDC FAULT LEDs are not lighted, replace the circuit pack that appears at the beginning of the UIP RETRIEVE-FAULTS command fault list (TAP-104) first.	DLP-510
Panel Fault	Remove and replace the following, one at a time, until FAULT LED goes off 1. PDC circuit pack 2. –48V/2A-UIP fuse on UIP 3. UIP display.	DLP-518
PDC	—	—
SMU	Enable the SMU with the SET-STATE-SMU command.	DLP-500
TSI	Use the SWITCH-CORE UIP command to force the other CORE active before removing a TSI with ACTIVE LED lighted.	DLP-528

See footnotes at end of table.

Continued on next page

Table A – Lighted FAULT LED Trouble Clearing (Continued)

Circuit Pack	Special Instruction	Details
BMP	Use the SWITCH-CORE UIP command to force the other CORE active before removing a BMP with ACTIVE LED lighted.	DLP-528
VTU [*]	The FAULT LED will be lighted if both TSIs are failed or removed. Use the sw - ls CIT command to force the protection VTU active before removing an active VTU .	DLP-529
LIU [†]	Use the SWITCH-LIU UIP command to force the protection LIU active before removing an active LIU .	DLP-529
PTU	Press RESET before replacing.	—
T8U	—	—
MDC	—	—
THC	—	—
PCU	Replace the PCU using this procedure: 1. Remove the THC . 2. Remove the PCU . 3. Install the new PCU . 4. Reinstall the THC .	—
TSU	—	—
AMU	—	—
PAU	—	—
SSU	—	—
CAU	—	—

* SONET system only.

† Metallic system only.

Clear Flashing FAULT LED(s)

Summary: This procedure clears troubles on circuit packs that have *flashing FAULT* LEDs only. If the LED is on and *not* flashing, go to **TAP-115** to clear the trouble.

A flashing **FAULT** LED on an interface circuit pack (such as a **DS1** or **OLI**) indicates that the circuit pack has lost the input signal or the input signal has unacceptable errors in it. When discontinuing service on **DS1** channels or removing an input signal to a **DS1** pack, the flashing **FAULT** LED can be cleared by pressing the **SYSCTL UPD/INIT** button.

The **TSI**, **BMP**, **MDC**, **LIU**, and **PDC FAULT** LEDs will flash two flashes per second while these units are having software loaded from the **SMU** and one flash per second when waiting to be loaded from the **SMU**.

⇒ **NOTE:**
The flashing **FAULT** LED on the **TSI**, **BMP**, **MDC**, **LIU**, or **PDC** indicates that the circuit pack is good while loading software from the **SMU**. The time it takes for the software to load varies with the system configuration and the type of circuit pack being installed. The **BMP** pack consists of two processors each trying to operate the **FAULT** LED at the same time, which may cause irregular **FAULT** LED operation. Check for software installation by using the UIP **RETRIEVE-FAULTS** command.

You can acquire useful information by executing the **RETRIEVE-FAULTS** UIP command and the **rtrv-hsty** SONET CIT command before beginning this procedure.

1. Determine which circuit pack has a flashing **FAULT** LED and proceed as follows:

If circuit pack FAULT LED is flashing ...	Then go to ...
TGS	Step 2
DS1	Step 6
TSI, BMP, MDC, LIU, PDC	Step 11
OHCTL	Step 19

2. Ensure that the option switches on the **TGS** circuit pack are set correctly.



NOTE:

See **DLP-503** for the correct option switch settings.

3. Are the option switches on the **TGS** set correctly?

If **NO**, continue with Step 4.

If **YES**, go to Step 5.

4. Set the option switches as shown in **DLP-503** and reinstall the circuit pack.

STOP. YOU HAVE COMPLETED THIS PROCEDURE.

5. Obtain a new **TGS** circuit pack and install it in the system (**DLP-503**).

STOP. YOU HAVE COMPLETED THIS PROCEDURE.

6. Using the CIT, manually switch service to the protection **DS1** circuit pack.

7. After service is switched, does the **FAULT** LED on the protection DS1 circuit pack flash?

If **YES**, continue with Step 8.

If **NO**, go to Step 9.

8. Issue a trouble report for a bad incoming signal. Use the appropriate documentation for the type of equipment connected to the DS1 circuit pack to clear the trouble.

STOP. YOU HAVE COMPLETED THIS PROCEDURE.

9. Replace the service DS1 circuit pack (not the protection DS1 circuit pack).

10. Switch service from the protection DS1 circuit pack to the service DS1 circuit pack.

STOP. YOU HAVE COMPLETED THIS PROCEDURE.

11. Use the UIP **RETRIEVE-FAULTS** command to see if a software installation is in progress.

12. Is a software installation in progress?

If **YES**, continue with Step **13**.
If **NO**, go to Step **14**.

13. Wait for the software installation to complete.

STOP. YOU HAVE COMPLETED THIS PROCEDURE.

14. Verify that the SMU is installed, not failed, and does not have its **DISBLD** LED lighted.

15. Is the **FAULT** LED lighted on the **SMU**?

If **YES**, continue with Step **16**.
If **NO**, go to Step **18**.

16. Replace the **SMU** and enable it with the **SET-STATE-SMU** UIP command.



NOTE:

See **DLP-500** for more information on UIP commands.

17. Does the **FAULT** LED stop flashing after the **SMU** has been replaced and enabled?

If **NO**, continue with Step **18**.
If **YES**, **STOP. YOU HAVE COMPLETED THIS PROCEDURE.**

18. Clear trouble using local procedures.

STOP. YOU HAVE COMPLETED THIS PROCEDURE.

19. Is a new software generic being downloaded to the **SYSCTL** at the far-end terminal (program upgrade)?

If **NO**, continue with Step **20**.

If **YES**, **STOP. YOU HAVE COMPLETED THIS PROCEDURE.**



NOTE:

It is normal for the **FAULT** LED on the near-end **OHCTL** to flash if a program installation is being performed to a far-end **SYSCTL**.

20. Do you have a CIT logged in to the SONET subsystem connected to this system?

If **NO**, continue with Step **21**.

If **YES**, go to Step **22**.

21. Connect a CIT to the system and log in to the SONET subsystem (**DLP-521** or **DLP-525**).

22. Obtain an alarm report using the **rtrv-al** command.

23. In the alarm report, is there any indication of **OLI** or fiber trouble at the near end or far end such as **inc.OC FERF** alarm message?

If **YES**, continue with Step **24**.

If **NO**, go to Step **32**.

24. Note the **Source Address** of the DCC channel failure and check the optical fibers connected through the **Source Address** using local procedures.

25. Was optical fiber trouble found?

If **NO**, continue with Step **26**.

If **YES**, **STOP. YOU HAVE COMPLETED THIS PROCEDURE.**

26. Replace the near-end **OLI**.

27. Did the **FAULT** LED on the **OHCTL** stop flashing?

If **NO**, continue with Step **28**.

If **YES**, **STOP. YOU HAVE COMPLETED THIS PROCEDURE.**

28. Reinstall the near-end **OLI** removed in Step **26**.

29. Have far-end personnel replace the far-end **OLI**.

30. Did the **FAULT** LED on the **OHCTL** stop flashing?

If **NO**, continue with Step **31**.

If **YES**, **STOP. YOU HAVE COMPLETED THIS PROCEDURE.**

31. Clear problem using local procedures.

STOP. YOU HAVE COMPLETED THIS PROCEDURE.

32. Reset the near-end **SYSCTL** by either using the CIT and the **reset** command or by unplugging and reseating the **SYSCTL**.

33. Did the **FAULT** LED on the **OHCTL** stop flashing (**section DCC channel failed**)?

If **NO**, continue with Step **34**.

If **YES**, **STOP. YOU HAVE COMPLETED THIS PROCEDURE.**

34. Using the CIT and the **rlgn** command, log in to the far-end terminal and use the **reset** command to reset the far-end **SYSCTL**.

35. Did the **FAULT** LED on the **OHCTL** stop flashing (**section DCC channel failed**)?

If **NO**, continue with Step **36**.

If **YES**, **STOP. YOU HAVE COMPLETED THIS PROCEDURE.**

36. Replace the near-end **SYSCTL** (**DLP-502** or **DLP-534**).

37. Did the **FAULT** LED on the **OHCTL** stop flashing (**section DCC channel failed**)?

If **NO**, continue with Step **37**.

If **YES**, **STOP. YOU HAVE COMPLETED THIS PROCEDURE.**

38. Reinstall in the near-end **SYSCTL** removed in Step **36** (**DLP-502** or **DLP-534**).

39. Have far-end personnel replace the far-end **SYSCTL**.

40. Did the **FAULT** LED on the **OHCTL** stop flashing?

If **NO**, continue with Step **41**.

If **YES**, **STOP. YOU HAVE COMPLETED THIS PROCEDURE.**

41. Have far-end personnel reinstall the far-end **SYSCTL** removed in Step **39**.

42. Replace the near-end **OHCTL** (**DLP-501**).
43. Did the **FAULT** LED on the **OHCTL** stop flashing?
If **NO**, continue with Step **44**.
If **YES**, **STOP. YOU HAVE COMPLETED THIS PROCEDURE.**
44. Reinstall the near-end **OHCTL** removed in Step **42** (**DLP-501**).
45. Have far-end personnel replace the far-end **OHCTL**.
46. Did the **FAULT** LED on the **OHCTL** stop flashing?
If **NO**, continue with Step **47**.
If **YES**, **STOP. YOU HAVE COMPLETED THIS PROCEDURE.**
47. Clear trouble using local procedures.
STOP. YOU HAVE COMPLETED THIS PROCEDURE.

Clear Brownout Condition — Flashing Letter "L" in SYSCTL FE ID Display

Summary: This procedure clears trouble on a *SLC*®-2000 Access System shelf that is experiencing a low-voltage condition (brownout) as indicated by the flashing letter "L" on the **SYSCTL FE ID** display.

1. Is UIP fuse –**48V (A)** or –**48V (B)** blown?

If **YES**, then continue with Step 2.

If **NO**, then proceed to Step 5.

2. Replace –48 V blown fuse.

3. Did fuse blow again?

If **YES**, then continue with Step 4.

If **NO**, **STOP. YOU HAVE COMPLETED THIS PROCEDURE.**

4. Trouble in UIP or backplane connector. If you need assistance, notify your supervisor, your local technical support organization, or call Lucent Technologies RTAC, per local operating instructions. If the UIP needs to be replaced, refer to **DLP-518**.

STOP. YOU HAVE COMPLETED THIS PROCEDURE.

5. Obtain multimeter capable of measuring DC voltage in the 40- to 60-volt range.
6. Condition multimeter to measure DC voltage.

7.



CAUTION:

*If fuse on UIP is not blown, trouble may be a failure of **one** of the –48 V DC power feeders. Removing the wrong fuse or disconnecting the wrong feeder for power measurement will cause service interruption.*



CAUTION:

–48 V DC is present in the UIP –48V (A) and –48V (B) fuse holders.

Measure voltage at UIP fuse holder –48V (A) or –48V (B).

8. Does voltage measure less than –40 volts DC?

If **YES**, then continue with Step 9.

If **NO**, then proceed to Step 10.

9.



CAUTION:

*During brownout conditions the **SYSC**TL will suspend normal operations. No alarms will be generated and CIT commands will **not** work. Local and remote logins will **not** work.*

Trouble in power feeder(s). Check office battery distribution panel for low-voltage condition.

STOP. YOU HAVE COMPLETED THIS PROCEDURE.

10. Are frame ground and battery return feeders at the same potential?

If **NO**, then continue with Step 11.

If **YES**, then proceed to Step 12.

11. Trouble in frame ground or battery return. Frame ground and battery return should be at about the same potential (traceable to the same source). Find and correct problem.

STOP. YOU HAVE COMPLETED THIS PROCEDURE.

12.



NOTE:

Unseating and reseating **SYSC**TL circuit pack performs a **reset** procedure which restarts the software program.

Unseat and reseat **SYSC**TL circuit pack or use **reset** command. Do not press **UPD/INIT** push button.

13. Is trouble cleared?

If **YES**, then **STOP. YOU HAVE COMPLETED THIS PROCEDURE.**
If **NO**, then continue with Step 14.

14.



CAUTION:

*Replacing the **SYSCTL** involves updating the internal memory on the circuit pack.*

*Replace the **SYSCTL** (DLP-534).*

STOP. YOU HAVE COMPLETED THIS PROCEDURE.

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with HDOS to a DLC R4.5 or Later Enhanced FITL System
(1,152 Lines) DLP-539

Convert a Conventional *SLC*[®]-2000 FITL System (768 Lines)
with FiberReach NBS to a DLC R4.5 or Later Enhanced FITL
System (1,152 Lines) DLP-540

Condition and Connect Modems to Establish Communication
From Remote CIT Location. DLP-541

Perform Commands from the User Interface Panel

Overview: The user interface panel (UIP) has a 24-character alphanumeric message display (AMD). The purpose of the UIP AMD is to allow the craft personnel to perform basic system functions without the need for a craft interface terminal (CIT) being connected to the system. The type of information printed on the display falls into two categories, automatic and user controlled. The automatic messages are triggered by a system failure or a normal system operational condition. User controlled commands are viewed using the **Scroll Menu** up and down arrow buttons and are selected by pressing **Enter**. The **Escape** key is used to return to the Main Menu or to interrupt some commands.

The basic command string has three formats:

- ***command-name <ent>***

This type of command has no selections or options.

- ***command-name:option <ent>***

This type of command has a parameter option menu associated with it.

- ***command-name:selection:option <ent>***

This type of command has a selection option menu and a parameter option menu associated with it.

A choice is made by pressing **Enter** (<ent>) when the desired item is displayed.



NOTE:

The display is normally off and has a 90-minute time-out after a command is done or an automatic message is printed. Pressing any button on the UIP will activate the display. Normally, you should press **Escape**, **Enter**, or a **Scroll Menu** up or down button. If there is a message waiting to be printed (for example, while a command is in progress and an automatic message is generated), the **Attention** LED will light. The **Attention** LED will also be lighted if the 90-minute time-out has occurred and a message needs to be read. Pressing the **Enter** button will print these messages.

Command strings are built by selecting the command-name from the Main Menu by using the **Scroll Menu** up and down arrow buttons. Once the desired command is displayed, press **Enter** to choose this command or press **Escape** to return to the top of the Main Menu. Selection menus and option menus work the same way. Selection menus are used to choose which subsystem you want to option.

Option menus always begin with the current setting (or **default**) enclosed by brackets [**current setting**] after the command-name (or command-name:selection). All command string prompts end with <ent> or <esc>. To select or confirm the current menu, press **Enter** (<ent>). To start over and return to the Main Menu, press **Escape** (<esc>).

Other aspects associated with commands are as follows:

- Confirmation Message — **CONFIRM?** *Y*<ent> *N*<esc>
Some commands require you to press the **Enter** button to confirm your choice before executing.
- In-progress message — *command-name: identifier: message*
Some commands will print a message indicating that the command is being performed.
- Interrupts — **** Command Cancelled ****
Some commands can be aborted by pressing the **Escape** button while the command is being performed.
- Completion message — *command-name: option done/PASS/FAIL*
Some commands will print a message indicating that the command is finished executing and will give results.
- Error message — **DENY:** *reason*
When a command cannot execute, an error message will print indicating the reason the command was unable to execute.
- The menus are displayed in the order listed in Table A.

Table B shows the alphanumeric message display (AMD), a description of the message, and a description of the user options.

Table A shows the UIP command with the menus and submenus associated with the command.

Table A – UIP Commands

Command	Description	Description of User Options
MAIN MENU	Lists the system commands.	Use the Scroll Menu up and down buttons until the desired item is displayed, then press Enter to choose or confirm your choice. Press Escape to start over.
RETRIEVE-FAULTS	Lists active faults local to the RT with highest priority fault listed first.	Use Scroll Menu buttons to scan through fault messages.
RETRIEVE-ALARMS	Lists active system alarms local to the RT with most critical alarm listed first sent or received by the RT.	Use Scroll Menu buttons to scan through alarm messages.
INITIALIZE-CRS	Establishes the DS1 feeder to VRT (T1) and DS0 time slot in DS1s (T0). (For TR-08 VRTs only.)	Use Scroll Menu buttons to view menu and submenu and enter to confirm your choice.
INITIALIZE-SYSTEM	Initialize provisioning memory of DLC subsystem (used only during initial turnup). (Clears the NVDS memory.)	Use Scroll Menu buttons to view menu and submenu and enter to confirm your choice.
RETRIEVE-PROG-VRSN	Lists the system and SMU software version information for all subsystem software packages: DLC (digital loop carrier), SNT (SONET), TST (test head controller).	Use the Scroll Menu buttons to view the list.

Continued on next page

Table A – UIP Commands (Continued)

Command	Description	Description of User Options
<i>RETRIEVE-STATE</i>	Returns the states of VRTs 1 through 8 per VTU (12—34—56—78) with i (in service) or - (out of service).	Use Scroll Menu buttons to scan through states.
<i>SET-BAUD</i>	Sets baud rate for local craft interface terminal access.	Use Scroll Menu buttons to view menu and submenu and enter to confirm your choice.
<i>SET-DISTRIBUTION</i>	Sets the distribution configuration of a VRT to METL (metallic drops) or FITL (fiber in the loop).	Use Scroll Menu buttons to view menu and submenu and enter to confirm your choice.
<i>SET-FEEDER</i>	Selects the feeder facility configuration.	Use Scroll Menu buttons to view menu and enter to confirm your choice.
<i>SET-MODE-TR8</i>	Selects the TR-08 mode of operation for VRT pairs in an MDS assembly.	Use Scroll Menu buttons to view menu and submenu and enter to confirm your choice.
<i>SET-NE</i>	Configures the DLC subsystem for either RT or COT operation.	Use Scroll Menu buttons to view menu and enter to confirm your choice.

Continued on next page

Table A – UIP Commands (Continued)

Command	Description	Description of User Options
<i>SET-STATE-SMU</i>	Enables or disables the software installation feature in the SMU.	Use Scroll Menu buttons to view menu and enter to confirm your choice.
<i>SWITCH-CORE</i>	Forces switch, inhibits switching, or resets protection switch priority in bandwidth management section (CORE).	Use Scroll Menu buttons to view menu and enter to confirm your choice.
<i>SWITCH-LIU</i>	Forces switch, locks out switching, manually switches or resets protection switch priority in LIU feeder circuit packs.	Use Scroll Menu buttons to view menu and submenu and enter to confirm your choice.
<i>TEST-SHELF</i>	Performs LED test on MDS to check intershelf connectivity.	Use Scroll Menu buttons to view menu and enter to confirm your choice.
<i>TEST-VRT-ALARM</i>	Sends an alarm from a VRT to far-end equipment to test remote alarm links.	Use Scroll Menu buttons to view menu and submenu and enter to confirm your choice.

Table B – UIP Commands (Menus and Submenus)

Command	Menu	Submenu	User Options (Note)
MAIN MENU	—	—	Scroll
RETRIEVE-FAULTS	—	—	Enter or Escape
RETRIEVE-ALARMS	—	—	Enter or Escape
INITIALIZE-CRS	INIT-CRS:T1 INIT-CRS:T0	SET-CRS:T#:vrt1 SET-CRS:T#:vrt2 SET-CRS:T#:vrt3 SET-CRS:T#:vrt4 SET-CRS:T#:vrt5 SET-CRS:T#:vrt6 SET-CRS:T#:vrt7 SET-CRS:T#:vrt8	Enter or Escape
INITIALIZE-SYSTEM	—	—	Enter or Escape
RETRIEVE-PROG-VRSN	—	—	Enter or Escape
RETRIEVE-STATE	—	—	Enter or Escape
SET-BAUD	4800 9600 19200	—	Enter or Escape
SET-DISTRIBUTION	SHELF 1 SHELF 5 SHELF 2 SHELF 6 SHELF 3 SHELF 7 SHELF 4 SHELF 8	MET FITL	Enter* or Escape
SET-FEEDER	VTU LIU	—	Enter* or Escape
SET-MODE-TR8	SET-MODE:vrt1&2 SET-MODE:vrt3&4 SET-MODE:vrt5&6 SET-MODE:vrt7&8	SET-MODE:vrt#s:1 SET-MODE:vrt#s:2	Enter* or Escape

See note and caution at end of table.

Continued on next page

Table B – UIP Commands (Menus and Submenus) (Continued)

Command	Menu	Submenu	User Options (Note)
SET-NE	SET-NE:RT SET-NE:COT	—	Enter* or Escape
SET-STATE-SMU	ENABLED DISABLED	—	Enter* or Escape
SWITCH-CORE	RESET INHIBIT FORCE → 1 FORCE → 2	—	Enter* or Escape
SWITCH-LIU	SWITCH-LIU:1 SWITCH-LIU:2 SWITCH-LIU:3 SWITCH-LIU:4 SWITCH-LIU:5 SWITCH-LIU:6 SWITCH-LIU:7 SWITCH-LIU:8	SWITCH-LIU:#:Reset SWITCH-LIU:#:Lockout SWITCH-LIU:#:Force SWITCH-LIU:#:Manual	Enter* or Escape
TEST-SHELF	1&2 3&4 5&6 7&8	—	Enter or Escape
TEST-VRT-ALARM	VRT1 VRT2 VRT3 VRT4 VRT5 VRT6 VRT7 VRT8	MJ MN DGRP A DGRP B DGRP C DGRP D	Enter* or Escape

Note: The Escape option is used to return to the Main Menu.

* Caution: You must confirm these commands because they may affect service.

Install OHCTL Circuit Pack

1. Is the **BBG7** or **BBG9 OHCTL** being installed?

If **BBG7**, go to Step 3.

If **BBG9**, continue with Step 2.

- 2.



NOTE:

A **BBG9 OHCTL** must have software installed and it must be compatible with the software in the **BBG8 SYSCTL**. If no software is installed or if the software is not compatible, you must find circuit packs with compatible software or install new software in both the **OHCTL** and **SYSCTL** when the **SYSCTL** is installed. The shelf must be equipped with both **OHCTL** and **SYSCTL** circuit packs before new software can be installed (**DLP-513**).

Install the **OHCTL**.



NOTE:

When the **OHCTL** is installed, the **FAULT** LED will light and remain lighted until the **SYSCTL** is installed.

STOP. YOU HAVE COMPLETED THIS PROCEDURE.

3. Using office records or the work order, determine the network element number for your system.



NOTE:

A **BBG7 OHCTL** must have software installed and it must be compatible with the software in the **BBG5 SYSCTL**. If no software is installed or if the software is not compatible, the letter **C**, **P**, or **d** will be displayed in the **FE ID** display on the **SYSCTL** when installed. If this occurs, you must find circuit packs with compatible software or install new software in both the **OHCTL** and **SYSCTL**. The shelf must be equipped with both **OHCTL** and **SYSCTL** circuit packs before new software can be installed (**DLP-513**).

⇒ **NOTE:**
Switches **S1-1**, **S1-2**, and **S1-3** on the **OHCTL** set the network element number of the shelf. The network element number and the site ID (set on the **SYSCTL**) form a unique address for a shelf at a site. If two shelves within the same control network have the same address, a **duplicate site id** alarm is declared.

⇒ **NOTE:**
See your local company documentation for specific option settings. In some cases, special arrangements have been made with specific companies to include their option settings as an appendix to this document.

4. On the **OHCTL**, set **S1** switches to the correct positions for the network element number of your system. Refer to Table A and Figure 1.

⇒ **NOTE:**
Switch 1, sections 4 through 8 (**S1-4**, **S1-5**, **S1-6**, **S1-7**, and **S1-8**) must be set to the **ON** position. If they are set to the **OFF** position, the **FAULT** LED will light on the **OHCTL** and an alarm will be generated.

5. See Notes below. Using the examples in Figure 2 and Figure 3 or the work order, set **S2** switches for OSI interworking. (The necessary switch settings in Figure 2 and Figure 3 are highlighted in bold type. For example, in Figure 2, the optical span between RT1 and RT3 requires that switch **S2-3** at RT1 be set to **OFF** and switch **S2-1** at RT3 be set to **ON**.)

⇒ **NOTE:**
Switches **S2-1** through **S2-4** on the **OHCTL** are used to control the identification of the DCC for open systems interconnection (OSI) interworking. For a given optical span, the network elements that terminate on each side of the optical span must have their "network side"/"user side" parameters set to opposite values to avoid an **inconsistent DCC switches** alarm. Switch **S2** is set to **OFF** for the network side and **ON** for the user side of network elements in an optical span. Figure 2 illustrates the **S2** switch settings for switches associated with **OLIUs** in the **MAIN** and **FUNCTION UNITS** slots at each end of the interconnected optical spans for linear/hub configurations. Figure 3 illustrates the switch settings for ring configurations.

⇒ **NOTE:**
Note that factory settings for switch **S2** are:

- **S2-1: ON**
- **S2-2: OFF**
- **S2-3: OFF**
- **S2-4: OFF.**

This will permit the establishment of a linear/hub system without changing any **S2** switch settings except on the **OHCTL** at the CO. In this case, **S2-1** on the **OHCTL** at the CO would be set to **OFF**. Factory settings also allow the establishment of a ring configuration without changing any **S2** switch settings.

6. Set the remaining unused **S2** switches to **OFF**.

Table A – OHCTL Switch 1 (S1) Network Element Number

Network Element	Switch S1 Settings			Unused (Note)				
	S1-1	S1-2	S1-3	S1-4	S1-5	S1-6	S1-7	S1-8
1	ON	ON	ON	ON	ON	ON	ON	ON
2	OFF	ON	ON	ON	ON	ON	ON	ON
3	ON	OFF	ON	ON	ON	ON	ON	ON
4	OFF	OFF	ON	ON	ON	ON	ON	ON
5	ON	ON	OFF	ON	ON	ON	ON	ON
Invalid*	OFF	ON	OFF	ON	ON	ON	ON	ON
Invalid*	ON	OFF	OFF	ON	ON	ON	ON	ON
Invalid*	OFF	OFF	OFF	ON	ON	ON	ON	ON

Note: Switch 1, sections 4 through 8 (**S1-4, S1-5, S1-6, S1-7, and S1-8**) must be set to the **ON** position. If they are set to the **OFF** position, the **FAULT** LED will light on the **OHCTL** and an alarm will be generated.

- * If an invalid setting is selected, the **FAULT** LED is lighted and an **unexpected switches** alarm is generated.

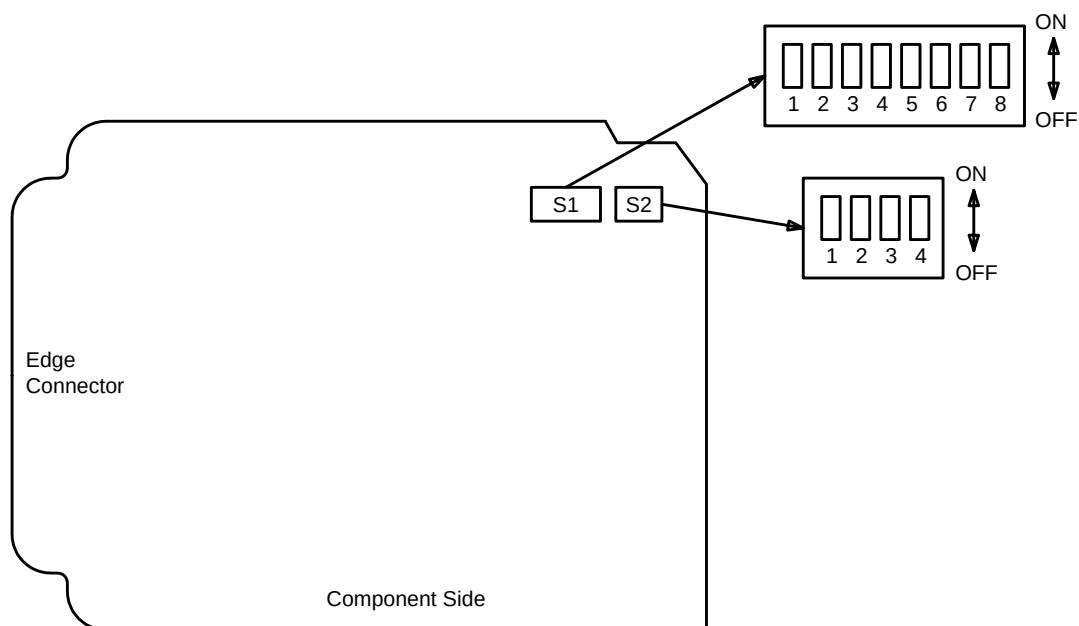


Figure 1 – OHCTL Option Switch

7. Install the **OHCTL**.



NOTE:

When the **OHCTL** is installed, the **FAULT** LED will light and remain lighted until the **SYSCTL** is installed.

STOP. YOU HAVE COMPLETED THIS PROCEDURE.

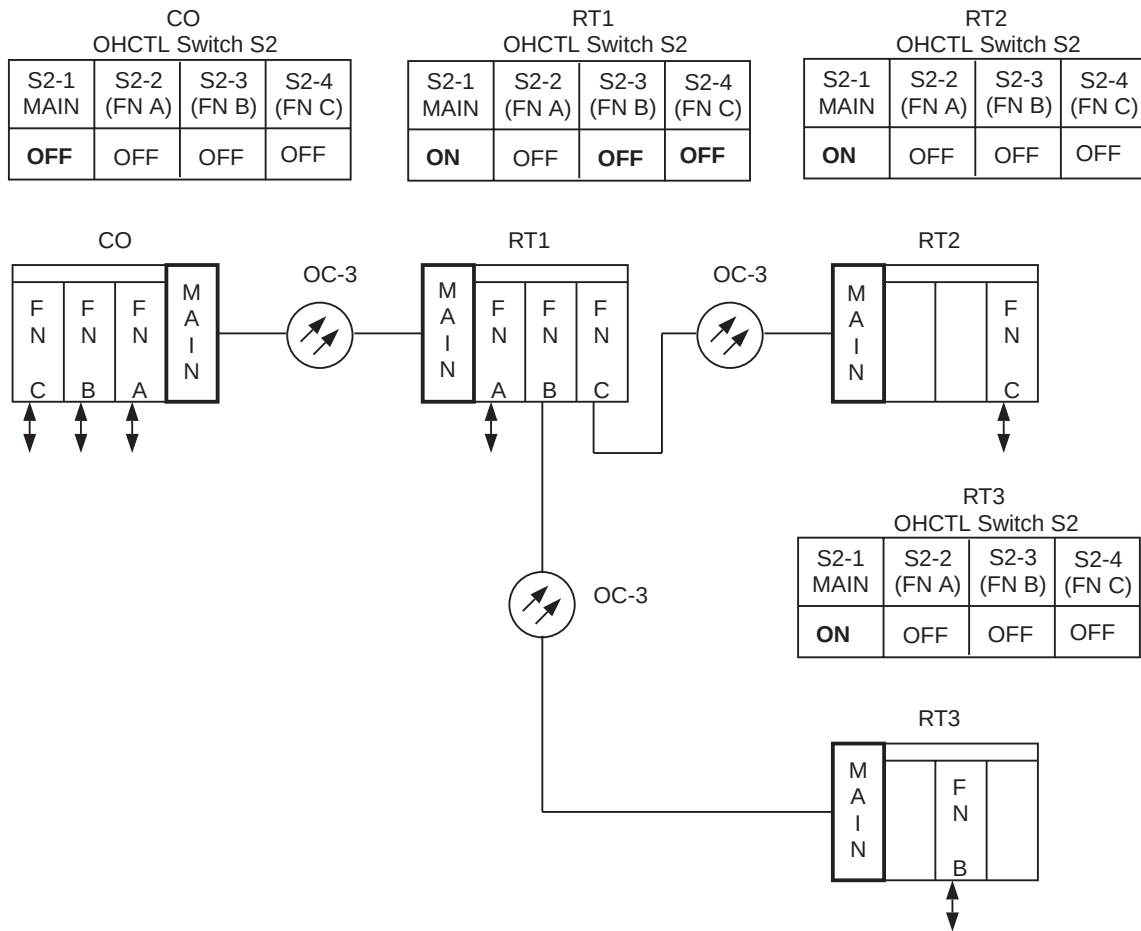


Figure 2 – Example OHCTL Switch S2 Settings — OC-3 Linear/Hub Configuration

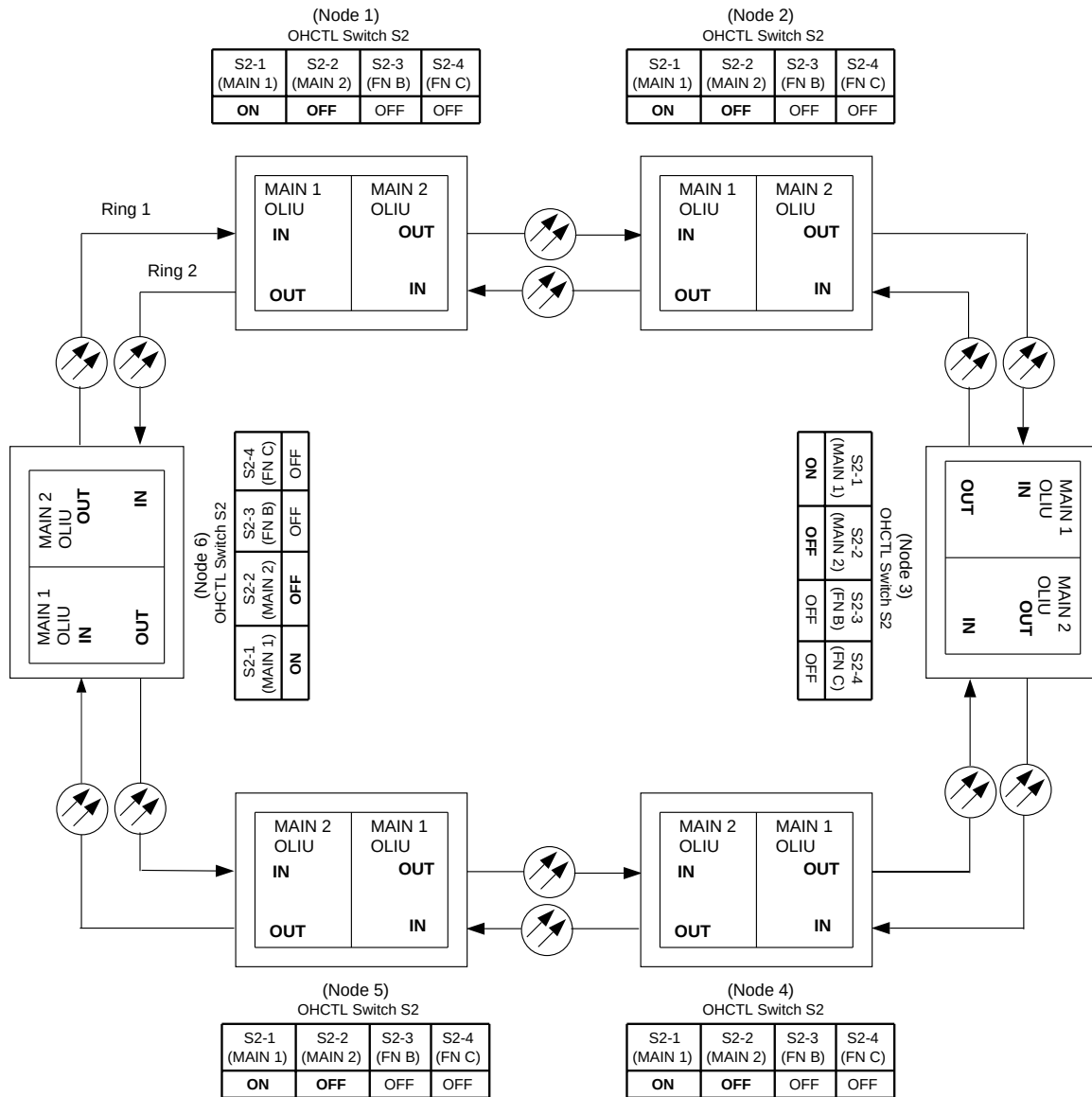


Figure 3 – Example OHCTL Switch S2 Settings — OC-3 Ring Configuration

Install or Replace BBG5 SYSCTL

1. Ensure that the **BBG7 OHCTL** is installed (**DLP-501**).



CAUTION:

Take care to avoid damaging the LED(s) that protrude through the openings in the faceplate of the circuit packs during handling and circuit pack installation.



NOTE:

Both the **BBG5 SYSCTL** and **BBG7 OHCTL** must be installed for the controllers to function.

2. Proceed as follows:

If you are ...	Then go to ...
Installing a new SYSCTL (during system turnup)	Step 3
Updating parameters on an existing SYSCTL (such as TBOS display number or site ID)	Step 6
Replacing the existing SYSCTL with a different SYSCTL (updating or trouble clearing)	Step 9

3. Obtain a **SYSCTL**.

4. Using office records, work order, or other local company information, set the option switches to the correct positions as follows:
 - **S1-1, S1-2, S1-3**: TBOS Display Number
 - **S2-1, S2-2, S2-3**: Site ID number
 - **S3-7**: PMN (generates a major or minor alarm)
 - **All other switches on S1, S2, S3, and S4**: As shown in Figure 1.

Refer to Notes below.

⇒ **NOTE:**
For *SLC*[®]-2000 system applications, the **S1-4** through **S1-8** TBOS options must be set as shown in Figure 1. The TBOS display number must be unique for each piece of equipment in a SONET network. The craft interface terminal (CIT) baud rate interface to the user interface panel (UIP) is set for 9,600 but can be changed with the UIP display **SET-BAUD** command. Tables A, B, C, and D provide a summary of **SYSCTL** option switch settings.

⇒ **NOTE:**
The data rate for front access with the CIT is selected by option switches **S3-1, S3-2, and S3-3** and is set for 9,600 baud (the recommended CIT rate to download software). If you plan to use some other baud rate to download software, you must set these switches to that rate to avoid downloading trouble.

⇒ **NOTE:**
See your local company documentation for specific option settings. In some cases, special arrangements have been made with specific companies to include their option settings as an appendix to this document.

5. **Read all of Step 5 before installing the SYSCTL.** Install the SYSCTL circuit pack and proceed as follows:

If SYSCTL indicates...	Then ...
Compatible software	After about 20 seconds, the SYSCTL FAULT LED goes off and the OHCTL FAULT LED cycles on and off. STOP. YOU HAVE COMPLETED THIS PROCEDURE.
Incompatible software (displaying C)	Determine if you want to "force" the present version software to run. If the NTP referencing this DLP did not specifically say to "force" the software, you must load compatible software (DLP-513). If installing a SONET configuration, the TGS/TG3 circuit pack and the OLIUs have to be installed before using DLP-513 . If the NTP tells you to force the present software, return to the NTP (you may need to force the software to run if you are upgrading to a different SONET configuration).
No software (displaying P or d)	Load the generic software using DLP-513 . If installing a SONET configuration, the TGS/TG3 circuit pack and the OLIUs have to be installed before using DLP-513 .
Previous software download attempt failed (displaying P.)	New software must be downloaded locally using these procedures.
Option switch S1 set incorrectly (displaying U)	Correct switch S1 setting using DLP-534 .
Faceplate latch not fully latched (displaying F)	Unplug and reseal SYSCTL circuit pack.
A low-voltage condition (brownout) on the shelf (displaying flashing L)	Clear trouble using Trouble Clearing: TAP-117 .

⇒ **NOTE:**
If this is the first pair of plug-ins being installed in the SONET subsystem, ignore all alarms on the user interface panel.

STOP. YOU HAVE COMPLETED THIS PROCEDURE.

6. See Caution. On the **SYSCTL** in the system, press and hold the **FE SEL** button and the UIP **ACO** button at the same time. Remove the **SYSCTL** during the 10-second countdown.

⚠ **CAUTION:**
*Before removing the **SYSCTL**, you must momentarily press the **ACO** push button on the user interface panel (UIP) and the **FE SEL** push button on the **SYSCTL** at the same time to start a 10-second countdown (9, 8, 7, etc.) on the **FE ID** display. During this countdown, the **SYSCTL** may be safely removed. If the **SYSCTL** is failed, the countdown may not occur.*

⇒ **NOTE:**
This may cause **Major** and **NE Activity** alarms to light.

7. Using office records, work order, or other local company information, change the option switches to the correct positions:
 - **S1-1, S1-2, S1-3:** TBOS Display Number
 - **S2-1, S2-2, S2-3:** Site ID number
 - **S3-7:** PMN (generates a major or minor alarm)
 - **All other switches on S1, S2, S3, and S4:** As shown in Figure 1.
 - Refer to Notes below.

⇒ **NOTE:**
For *SLC-2000* system applications, the **S1-4** through **S1-8** TBOS options must be set as shown in Figure 1. The TBOS display number must be unique for each piece of equipment in a SONET network. The craft interface terminal (CIT) baud rate interface to the user interface panel (UIP) is set for 9,600 but can be changed with the UIP display **SET-BAUD** command. Table A, B, C, and D provide a summary of **SYSCTL** option switch settings.

- ⇒ **NOTE:**
The data rate for front access with the CIT is selected by option switches **S3-1**, **S3-2**, and **S3-3** and is set for 9,600 baud (the recommended CIT rate to download software). If you plan to use some other baud rate to download software, you must set these switches to that rate to avoid downloading trouble.
- ⇒ **NOTE:**
See your local company documentation for specific option settings. In some cases, special arrangements have been made with specific companies to include their option settings as an appendix to this document.
8. Install the **SYSCTL**. *Go to Step 12.*
- ⇒ **NOTE:**
You can reinstall the same **SYSCTL** in the same system without initializing the system.
- ⇒ **NOTE:**
FAULT LED on **BBG5 SYSCTL** lights.
- FAULT** LEDs on the **SYSCTL** and **OHCTL** go off within 30 seconds.
- SYSCTL INITIALIZATION** is displayed on the UIP display.
- After another 10 seconds, **SYSCTL EXTENDED INITZN** is displayed on the UIP display, and then **SYSCTL EXTND INITZN done** will be displayed. (If plug-ins are installed, all the LEDs on all plug-ins in the **SLC-2000 SONET** subsystem should be off. Any LEDs remaining on or flashing represent a failure condition.)
9. See Caution. On the **SYSCTL** in the system, press and hold both UIP **ACO** and **SYSCTL FE SEL** buttons. Remove the **SYSCTL** during the 10-second countdown.
- ⚠ **CAUTION:**
*Before removing the **SYSCTL**, you must momentarily depress the **ACO** push button on the user interface panel (UIP) and the **FE SEL** push button on the **SYSCTL** at the same time to start a 10-second countdown (9, 8, 7, etc.) on the **FE ID** display. During this countdown, the **SYSCTL** may be safely removed. If the **SYSCTL** is failed, the countdown may not occur.*
- ⇒ **NOTE:**
This may cause **Major** and **NE Activity** alarms to light.

10. Using office records, work order, or other local company information, set the option switches to the correct positions:
 - **S1-1, S1-2, S1-3**: TBOS Display Number
 - **S2-1, S2-2, S2-3**: Site ID number
 - **S3-7**: PMN (generates a major or minor alarm)
 - **All other switches on S1, S2, S3, and S4**: As shown in Figure 1.

Refer to Notes below.

⇒ **NOTE:**
For *SLC-2000* system applications, the **S1-4** through **S1-8** TBOS options must be set as shown in Figure 1. The TBOS display number must be unique for each piece of equipment in a SONET network. The craft interface terminal (CIT) baud rate interface to the user interface panel (UIP) is set for 9,600 but can be changed with the UIP display **SET-BAUD** command. Table A, B, C, and D provide a summary of **SYCTL** option switch settings.

⇒ **NOTE:**
The data rate for front access with the CIT is selected by option switches **S3-1, S3-2, and S3-3** and is set for 9,600 baud (the recommended CIT rate to download software). If you plan to use some other baud rate to download software, you must set these switches to that rate to avoid downloading trouble.

⇒ **NOTE:**
See your local company documentation for specific option settings. In some cases, special arrangements have been made with specific companies to include their option settings as an appendix to this document.

11. Read Caution and Notes 1 and 2 before performing this step. Install the **SYCTL** and, after **SYCTL INITIALIZATION** is displayed, press the **UPD/INIT** button on the **SYCTL**.

⚠ **CAUTION:**
*If you do not initialize the SYCTL within the 10-second allotted time, you will lose any provisioned SONET data (parameters assigned using **set**, **conv**, **ent**, or **dlt** commands), and you may introduce erroneous provisioning data.*

⇒ **NOTE:**
The **UPD/INIT** push button on the **SYCTL** is recessed to prevent its accidental operation. You will need a small pointed object such as a ball-point pen to operate it.

⇒ **NOTE:**
You have only 10 seconds to press the **SYSCTL UPD/INIT** button and initialize the system while **SYSCTL INITIALIZATION** is displayed on the UIP display. It may take up to 30 seconds for **SYSCTL INITIALIZATION** to be displayed on the UIP display after the **SYSCTL** is installed.

⇒ **NOTE:**
FAULT LED on **BBG5 SYSCTL** lights.

FAULT LEDs on the **SYSCTL** and **OHCTL** go off within 30 seconds.

Then the UIP display prints **SYSCTL INITIALIZATION**.

Within 2 minutes of pressing **UPD/INIT**, **SYSCTL EXTENDED INITZN** is displayed on the UIP display, and then the system prints:

SONET EXTEND INITN done

(If plug-ins are installed, all the LEDs on all plug-ins in the *SLC-2000* SONET subsystem should be off. Any LEDs remaining on or flashing represent a failure condition.)

12. Did both **Major** and **NE Activity** alarms go off?

If **NO** (one or both do not), go to Step **16**.

If **YES**, continue with Step **13**.

13. Retrieve the generic software version ID using the **RETRIEVE-PROG-VRSN** user interface panel display command (see **DLP-500**).

14. Is the software version correct?

If **NO**, continue with Step **15**.

If **YES**, **STOP. YOU HAVE COMPLETED THIS PROCEDURE.**

15. Find plug-ins with the correct software (**Sys:SNT ver. 6.02.## or 7.01.##**) or install new software using the procedures in **DLP-513**.

STOP. YOU HAVE COMPLETED THIS PROCEDURE.

16. Check the UIP fault list for other troubles (**TAP-104**) (**RETRIEVE-FAULTS**, **DLP-500**).

17. Are other troubles found on the fault list?

If **NO**, continue with Step **18**.

If **YES**, go to **TAP-104**.

18. Sectionalize the problem as follows:

If SYSCTL FE ID displays ...	And the FAULT LED on either the SYSCTL or OHCTL...	Then ...
C	—	Determine if you want to "force" the present version software to run. - If the NTP referencing this DLP did not specifically say to force the software, you must load compatible software (DLP-513). - If the NTP tells you to force the present software, return to the NTP (you may need to force the software to run if you are upgrading to a different SONET configuration).
C, P, or d	Lights	Circuit pack has not failed. Find plug-ins with compatible software or install new software using the procedures in DLP-513 before continuing.
C, P, or d	Does <i>not</i> light	
Nothing	Lights	Circuit pack has failed. Replace the SYSCTL or OHCTL (DLP-501) that displays the lighted FAULT LED.
—	Lights with a Major alarm and your <i>SLC-2000</i> system is connected to the network	This could be caused by a duplicated site/ne address, TBOS display, or TID. Use the CIT rtrv-alm command to look for this type of trouble. Use DLP-517 to clear this trouble by changing the appropriate setting.

➤ **NOTE:**
Compatible software must be installed in both the **BBG7 OHCTL** and the **BBG5 SYSCTL**. When the **SYSCTL** is installed, if software is not installed or is not compatible, the letter **C**, **P**, or **d** will be displayed in the **FE ID** display.

STOP. YOU HAVE COMPLETED THIS PROCEDURE.

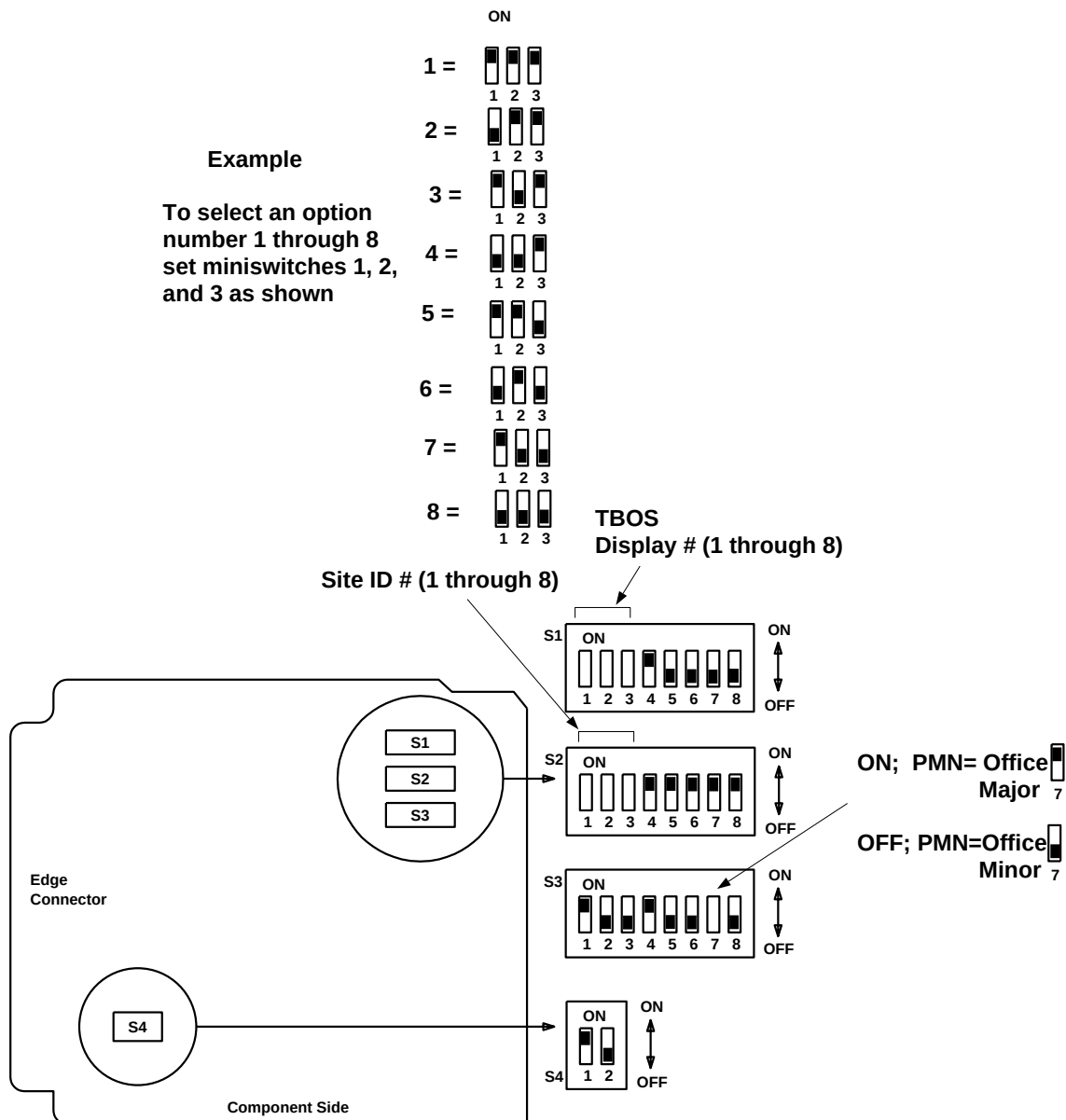


Figure 1 – BBG5 SYSCTL Option Settings

Table A – BBG5 SYSCtl Switch S1 (Note)

TBOS Display Number				TBOS Backup Number			CO/RT Select	
Display	S1-1	S1-2	S1-3	Backup	S1-4	S1-5	Value	S1-6
1	ON	ON	ON	Primary	ON	ON	RT	OFF
2	OFF	ON	ON	Secondary	OFF	ON	CO	ON
3	ON	OFF	ON	Normal	OFF	OFF	Remote TBOS	
4	OFF	OFF	ON	No TBOS	ON	OFF		
5	ON	ON	OFF				Enabled	OFF
6	OFF	ON	OFF				Disabled	ON
7	ON	OFF	OFF					
8	OFF	OFF	OFF					

Note: Switch **S1-8** must be **OFF** on **BBG5 SYSCtl**.

Table B – BBG5 SYSCtl Switch S2 (Note)

Site ID	S2-1	S2-2	S2-3	Shelf ID	S2-4	S2-5	S2-6
1	ON	ON	ON	1	ON	ON	ON
2	OFF	ON	ON	2	OFF	ON	ON
3	ON	OFF	ON	3	ON	OFF	ON
4	OFF	OFF	ON	4	OFF	OFF	ON
5	ON	ON	OFF	5	ON	ON	OFF
6	OFF	ON	OFF	6	OFF	ON	OFF
7	ON	OFF	OFF	7	ON	OFF	OFF
8	OFF	OFF	OFF	8	OFF	OFF	OFF

Note: Switches **S2-7** and **S2-8** must be **ON**. The shelf ID is used by DDM-2000 in multisystem wired bays. For *SLC*®-2000, systems are not wired together and the Shelf ID must be set to 1.

Table C – BBG5 SYSCCTL Switch S3 (Note)

CIT Front Access Data Rate				CIT Rear Access Data Rate				PMN Alarm	
Baud	S3-1	S3-2	S3-3	Baud	S3-4	S3-5	S3-6	Alarm	S3-7
300	OFF	OFF	OFF	300	OFF	OFF	OFF	Major	ON
1,200	OFF	OFF	ON	1,200	OFF	OFF	ON	Minor	OFF
2,400	OFF	ON	OFF	2,400	OFF	ON	OFF		
4,800	OFF	ON	ON	4,800	OFF	ON	ON		
9,600	ON	OFF	OFF	9,600	ON	OFF	OFF		
19,200	ON	OFF	ON	19,200	ON	OFF	ON		
Invalid*	ON	ON	OFF	Invalid*	ON	ON	OFF		
Invalid*	ON	ON	ON	Invalid*	ON	ON	ON		

Note: Switch **S3-8** must be **OFF**.

* Invalid setting defaults to 1,200 baud and does *not* generate an alarm.

Table D – BBG5 SYSCCTL Switch S4

TBOS Termination (Note)

Shelf	S4-1
Not last	OFF
Last	ON

Note: Switch **S4-2** must be set to **OFF**.

Install TGS Circuit Packs

Summary: The *SLC®-2000* Access System requires *free running* (S1-3 ON, S1-4 ON, [S1-5 OFF on the **BBF2B TGS**]) when it is optically looped back. All modes of timing are supported with the *SLC-2000* Access System.

1. Determine the timing mode required for both TGS circuit packs as follows:

If you are ...	Then set both TGS circuit pack timing mode options for ...
Turning up a system that will have the optical jumpers looped back	Free-running mode
Connecting a system end-to-end and turning up an RT	Line-timed mode
Turning up a COT	• DS1 external multimode or • DS1 external sync out mode (Check the work order for the proper setting.)

2. Set the option switches for the correct timing mode using Figure 1 and Tables B and C.

⇒ **NOTE:**
To set switch to ON, depress rocker or slide switch toward side labeled **ON** in Figure 1. To set switch to OFF, depress rocker or slide switch toward side labeled **OFF** in Figure 1.

⇒ **NOTE:**
If an invalid switch setting is selected, the **TGS FAULT** LED lights and an alarm is generated. Tables A, B, C, and D provide a summary of **TGS** option switch settings.

- Using the work order, Figure 1, Tables A, B, C, and D, set the other option switches on both **TGS** circuit packs.



NOTE:

See your local company documentation for specific option settings. In some cases, special arrangements have been made with specific companies to include their option settings as an appendix to this document.

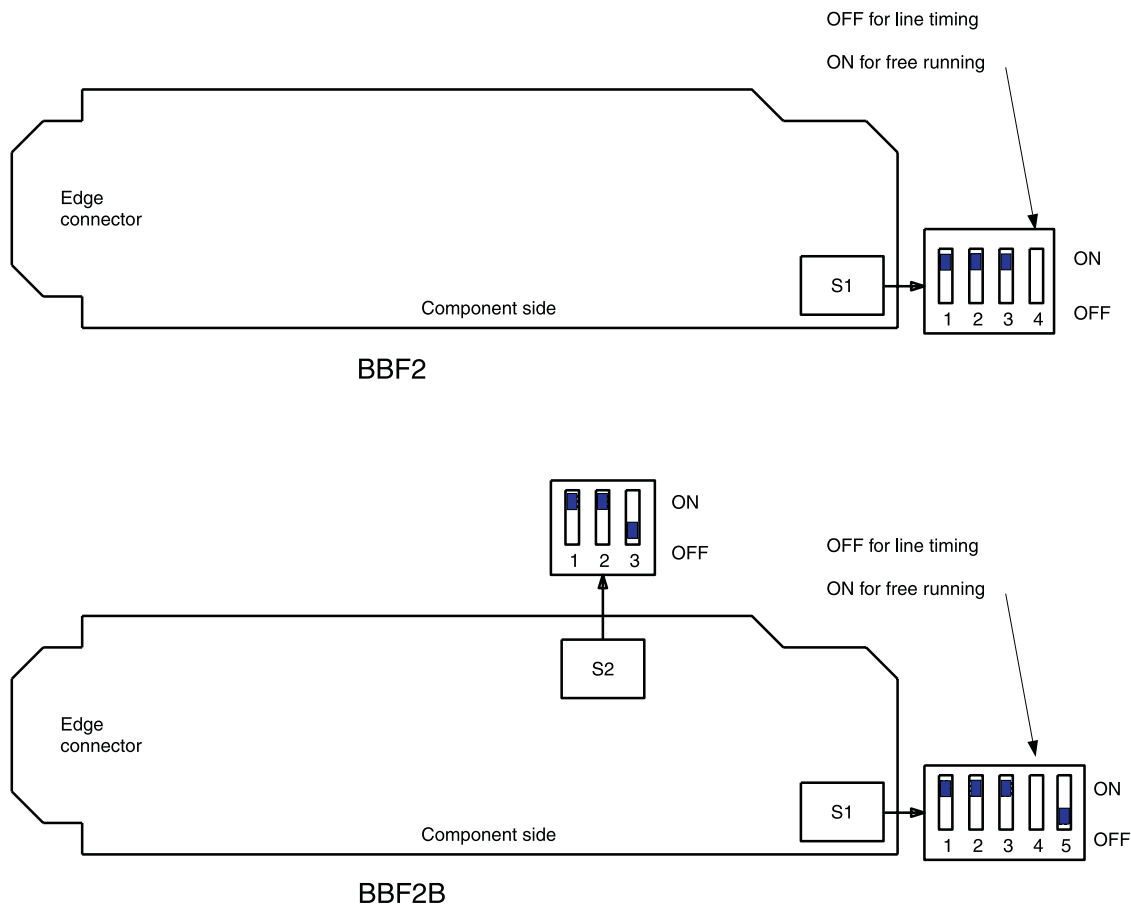


Figure 1 – BBF2 and BBF2B TGS Option Switches

Table A – BBF2/BBF2B TGS Line Code and Frame Format

DS1 Line Code	S1-1	DS1 Frame Format	S1-2
AMI	ON	SF	ON
B8ZS	OFF	ESF	OFF

Table B – BBF2 TGS Timing Mode

Timing Mode	S1-3	S1-4
Free Running	ON	ON
DS1 External	OFF	ON
Line Timed	ON	OFF
Invalid	OFF	OFF

Table C – BBF2B TGS Timing Mode

Timing Mode	Switch S1 Settings		
	OC-3		
	S1-3	S1-4	S1-5
Free Running	ON	ON	OFF
DS1 External, Mult Mode	OFF	ON	OFF
Line Timed	ON	OFF	OFF
Line Timed, Sync Out Mode	ON	OFF	ON
DS1 External, Sync Out Mode	ON	ON	ON
Invalid	OFF	OFF	ON
Invalid	OFF	OFF	OFF
Invalid	OFF	ON	ON

Table D – BBF2B TGS Equalizer Switch

Equalization	S2-1	S2-2	S2-3
0' to 131'	ON	ON	OFF
>131' to 262'	ON	OFF	ON
>262' to 393'	ON	OFF	OFF
>393' to 524'	OFF	ON	ON
>524' to 655'	OFF	ON	OFF
Invalid	OFF	OFF	OFF
Invalid	OFF	OFF	ON
Invalid	ON	ON	ON

4. See Caution. Install the first **TGS** circuit pack in **TGS (1)** slot.

Response: **FAULT** LED on the **TGS** lights and goes off within 1 minute. Critical or Major, near end, and attention alarms will be lighted. See Notes below.

 **CAUTION:**
Take care to avoid damaging the LEDs that protrude through the opening in the faceplate of the TGS.

 **NOTE:**
If the response is not correct in the following procedures, check option switches and replace the **TGS**. When a circuit pack is inserted, the **FAULT** LED lights immediately and remains lighted until the circuit pack passes the self-diagnostic test. The green **ACTIVE** LED lights on the first **TGS** plug-in installed. After the **TGS** tests good, the **FAULT** LED goes off.

 **NOTE:**
If the option switch setting is changed, an update must be done by momentarily depressing the **UPD/INIT** button on the **SYSCTL** after the **TGS** packs are reinstalled.

5. Install the second (protection) **TGS** circuit pack in **TGS (2)** slot.

Response: **FAULT** LED on **TGS** lights and goes off within 1 minute. **ACTIVE** LED remains off.
See Note.



NOTE:

If the timing mode option switches are not set the same on the two **TGS** packs, the **FAULT** LED will remain lighted on the second pack installed.

6. If the **TGS** circuit packs were previously installed in the system, did you change options on the circuit packs?

If **YES**, continue with Step 7.

If **NO**, **STOP. YOU HAVE COMPLETED THIS PROCEDURE.**

7. Press the **SYSCTL UPD/INIT** button to clear both **TGS FAULT** LEDs after changing options on the **TGS**.

STOP. YOU HAVE COMPLETED THIS PROCEDURE.

Install OLIU Plug-Ins with Optical Fibers Not Connected

1.



CAUTION:

Open optical connectors may emit invisible laser radiation. Do not view beam with optical instruments. Avoid direct exposure to the beam.



CAUTION:

Performance of procedures other than those specified herein may result in hazardous laser radiation exposure.



CAUTION:

*The **HIGH/LOW POWER** option switch on the **21G/21G-U OLIU** must be set to the **LOW POWER** position when the **21G/21G-U OLIU** is looped on itself. There are no option switches on the other type of OLIUs. The **22G-U** and **24G-U OLIU** require a 10-dB LBO when looped. The **27G-U OLIU** requires a 15-dB LBO when looped.*



CAUTION:

*Before installing **OLIUs**, ensure that all optical fiber connectors and couplings have been properly cleaned (**DLP-506**). Signal performance may be degraded if the connectors and couplings are not cleaned properly.*



NOTE:

22-type OLIUs are required for OC-3 ring applications.

Are **21G/21G-U OLIUs** being installed?

If **YES**, then continue with Step **2**.

If **NO**, then proceed to Step **3**.

2.



NOTE:

It is assumed that the loss of the optical facility is known from office records or that a measurement has been made. When first turning up the SONET subsystem, the **OLIUs** will be looped back until end-to-end spans are established. Therefore, set the option for LOW POWER.

Refer to Table A and Figure 1, and set the **HIGH/LOW POWER** option switch to proper setting.

Table A – 21G/21G-U OLIU Option Switch

Facility Loss	Transmitter Switch
0 - 6 dB	LOW Power
Greater than 6 dB	HIGH Power

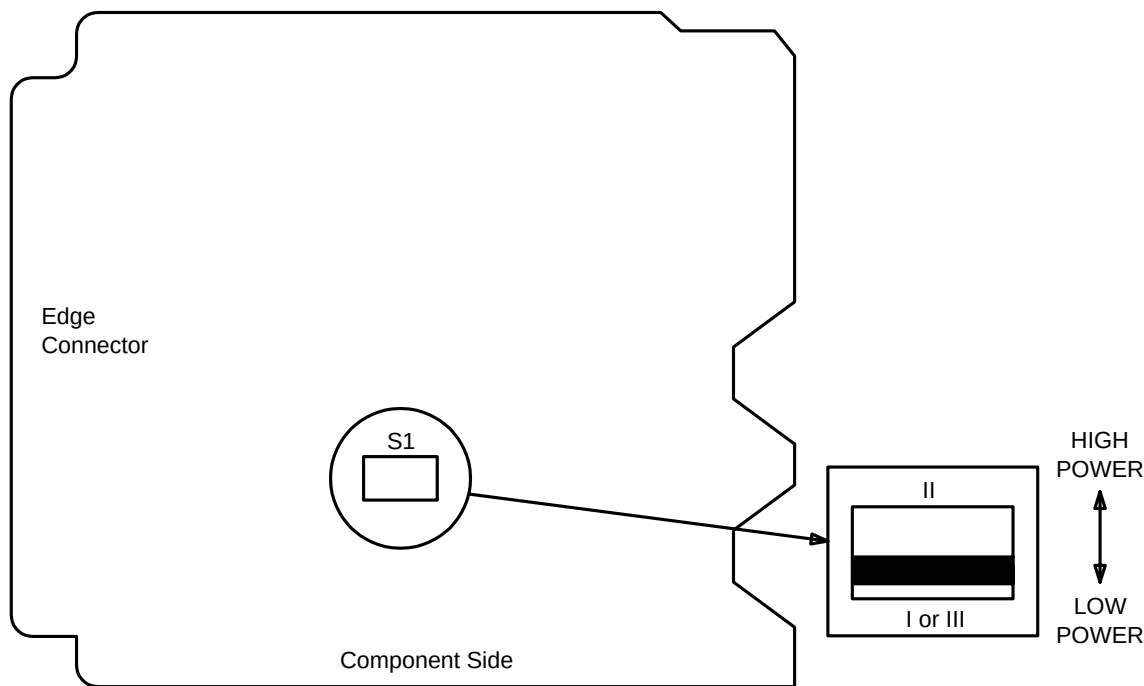


Figure 1 – 21G/21G-U OLIU Option Switch

3.



CAUTION:

If optical fiber cables are in the tray beneath the OLIUs, be careful not to pinch or crush the fibers when the OLIUs are inserted.



NOTE:

The red **FAULT** LED flashes when no signal is present.



NOTE:

When using the following procedures to install the **OLIUs**, if the responses are not correct, check option switches (**21G/21G-U** OLIUs only) and/or connections. If switches (**21G/21G-U** OLIUs only) and/or connections are correct, replace the **OLIU** that has the wrong response.

Install **OLIU** into **MAIN 1** slot.

Response: **FAULT** LED and **ACTIVE** LEDs light on the **OLIU**. **FAULT** LED on the **OLIU** begins flashing after about 10 to 30 seconds. [The **OHCTL FAULT** LED may begin flashing if far-end communications (fecom) is enabled and then may remain lighted. Ignore this alarm.]
The **Critical** or **Major** and **NE Activity** LEDs are lighted on the UIP.

Comment: Some versions of ring software may not light **Critical** alarm; those versions may light only **Minor** alarm.

4.



NOTE:

When the second **24G-U OLIU** is seated in the **MAIN 2(P)** slot, an *OC12 connector failed* alarm will occur. Normally, the alarm occurs because the OC-12 faceplate ribbon connector is not installed. To clear the alarm, install the OC-12 faceplate ribbon connector on the **24G-U OLIUs** seated in the **MAIN 1** and **MAIN 2** slots.

Install second **OLIU** (if required) into **MAIN 2** slot.

Response: **FAULT** LED and **ACTIVE** LEDs light. **FAULT** LED begins to flash within 1 minute. (The **FAULT** LED may go off for a few seconds before starting to flash.) The **ACTIVE** LED on both **OLIUs** remains lighted.

The **Critical** or **Major** and **NE Activity** LEDs remain lighted on the UIP.

5. Press the **UPD/INIT** button on the **SYSCTL**.

Response: The UIP displays **SONET SUBSYS UPDATE done**.

STOP. YOU HAVE COMPLETED THIS PROCEDURE.

Connect Optical Loop

1.



CAUTION:

Open optical connectors may emit invisible laser radiation. Do not view beam with optical instruments. Avoid direct exposure to the beam.



CAUTION:

Use of controls or adjustments or performance of procedures other than those specified herein may result in hazardous laser radiation exposure.



CAUTION:

*Take care to avoid damaging the LEDs that protrude through the opening in the faceplate of the **OLIU**.*



CAUTION:

*The **HIGH/LOW POWER** option switch on the **21G/21G-U/21G2-U OLIU** must be set to the **LOW POWER** position when the **21G/21G-U/21G2-U OLIU** is looped on itself. There are no option switches on the other type of OLIUs. The **22G-U** and **24G-U OLIU** require a 10-dB LBO when looped. The **27G-U/27G2-U OLIU** requires a 15-dB LBO when looped.*



CAUTION:

*Avoid excessive bending of the optical jumper used to loop the **OLIU** on itself.*



CAUTION:

*All optical fiber connectors and couplings should be properly cleaned (**DLP-506**). Signal performance may be degraded if the connectors and couplings are not cleaned properly.*

Are **21G/21G-U OLIUs** being looped?

If **YES**, then continue with Step 2.

If **NO**, then proceed to Step 3.

2. Refer to Figure 1 and set the option switch on the **21G/21G-U OLIU** to the **LOW POWER** position, if not already performed.

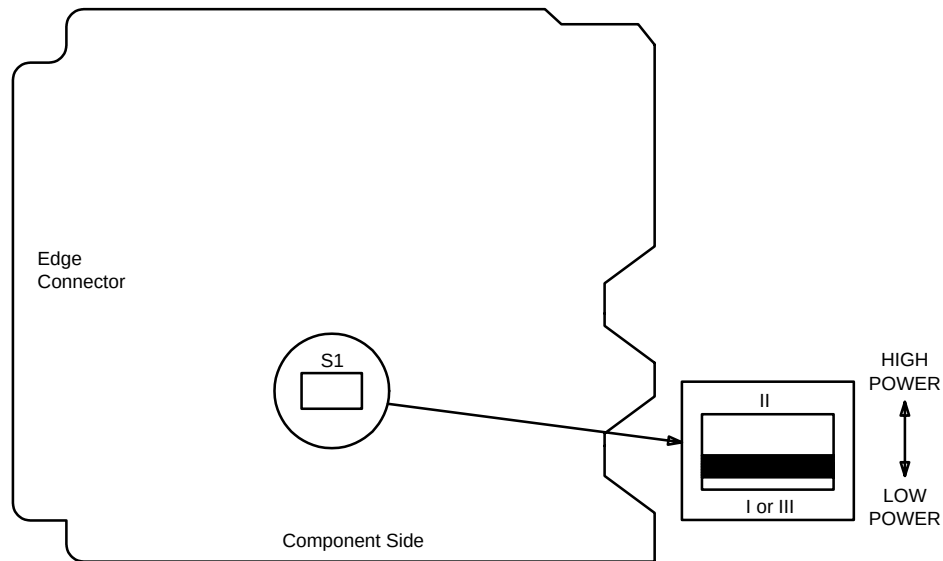


Figure 1 – OLIU Option Settings

3. The **TGS** packs must be optioned for *free running* when the **OLIUs** are optically looped back. Set the *free running* option (**DLP-503**) on both **TGS** packs if not already selected. Press **Update** if you change option settings.

4.

- ⇒ **NOTE:**
It may take up to 3-1/2 minutes for the **FAULT** LEDs to stop flashing after loopback is made, depending on the setting of the signal degrade threshold.
- ⇒ **NOTE:**
The lightguide jumpers used to loop the **OLIUs** must be equipped with **ST®** connectors at both ends. These connectors are spring loaded and have notches that must be aligned with the **OLIU** optical connector tabs before pushing in and turning the connector.
- ⇒ **NOTE:**
The **21G-U**, **21G2-U**, **22F**, **22F-U**, **22F2-U**, and **22G2-U** require FS1E-E-02 single mode lightguide jumpers. **21D/21D-U/22D-U** OLIUs require FL1E-E-02 multimode lightguide jumpers.

Use lightguide jumpers to loop the **IN** and **OUT** connectors of the **MAIN 1** or **FUNCTION-()-1 OLIU**. Within 3-1/2 minutes you will see the following responses.

Response: **FAULT** LED goes off. **Major** or **Critical** and **NE Activity** alarms light. **ACTIVE** LED remains on.

5. Use lightguide jumpers to loop the **IN** and **OUT** connectors of the **MAIN 2** or **FUNCTION-()-2 OLIU**. Within 3-1/2 minutes you will see the following responses.

Response: **ACTIVE** LED goes off for point-to-point or taper configurations (both OLIU **ACTIVE** LEDs stay lighted for ring configurations). **FAULT** LED goes off. **Critical** or **Major** and **NE Activity** alarms are lighted.

STOP. YOU HAVE COMPLETED THIS PROCEDURE.

Clean Optical Fibers, Connectors, and Lightguide Build-Outs

1.



CAUTION:

Open optical connectors may emit invisible laser radiation. Do not view beam with optical instruments. Avoid direct exposure to beam.



NOTE:

Disconnect and clean only one set of connectors at a time when cleaning internal **OLIU** connectors.



NOTE:

Always clean all *ST*[®] connectors and couplings before doing initial connections or reconnections.

Clean optical fibers and connectors on **OLIU** or lightguide build-outs.

If **21G/21G-U/21D/22F OLIU**, go to Step 2.

If **23G OLIU**, go to Step 7.

If **lightguide build-outs**, go to Step 11.

If **lightguide fibers**, go to Step 15.

2. On printed wiring board side of **OLIU** faceplate, disconnect one of *ST* connectors from faceplate coupling.
3. Clean end and sides of connector tips with lint-free, optical quality tissue moistened with isopropyl alcohol.
4. Carefully wipe connector end again with clean, dry, lint-free optical quality tissue.
5. Blow any lint or dust from connector using canned air duster 3 inches from face of connector.

6. Install *ST* connectors onto coupling by aligning mark on rim of connector body with slot in coupling. Push connector onto coupling with clockwise twist-locking motion.

STOP. YOU HAVE COMPLETED THIS PROCEDURE.

7. Remove **lightguide build-out** from **OUT** connector on **23G OLIU**.
8. Clean couplings on faceplate of **23G OLIU** by rotating a pipe cleaner moistened with isopropyl alcohol inside coupling.
9. Blow any lint or dust from inside coupling using canned air duster 3 inches from coupling.
10. Install *ST* connectors onto coupling by aligning mark on rim of connector body with slot in coupling. Push connector onto coupling with clockwise twist-locking motion.

STOP. YOU HAVE COMPLETED THIS PROCEDURE.

11. Is lightguide build-out 0-dB or attenuated?

If **0 dB lightguide build-out**, continue with Step **12**
If **attenuated lightguide build-out**, go to Step **14**.

12. Clean lightguide build-out by placing a pipe cleaner moistened with isopropyl alcohol inside lightguide build-out and rotating the pipe cleaner.
13. Blow any lint or dust from inside the lightguide build-out using canned air duster 3 inches from lightguide build-out.

STOP. YOU HAVE COMPLETED THIS PROCEDURE.

14.



CAUTION:

Attenuated lightguide build-out has lens. Do not use pipe cleaner.

Clean lightguide build-out by canned air only. Blow any lint or dust from inside lightguide build-out using canned air duster 3 inches from lightguide build-out.

STOP. YOU HAVE COMPLETED THIS PROCEDURE.

15. Clean fiber-end face and sides of connector with lint-free, optical quality tissue moistened with isopropyl alcohol.
16. Carefully wipe fiber-end face and sides of connector again with clean, dry, lint-free optical quality tissue.
17. Blow any lint or dust from fiber-end face and sides of connector using a canned air duster 3 inches from connector.

STOP. YOU HAVE COMPLETED THIS PROCEDURE.

Perform LED Test

1. Press the **LED Test** button on the user interface panel (UIP).

Response: All LEDs on circuit packs except ITH and channel units installed in the *SLC*®-2000 RT and CO will light on systems equipped with releases prior to R4.0. *SLC*-2000 systems equipped with R4.0 or later will light channel unit LEDs during an LED test. AUA93 and AUA293 BRITE channel units may flash the LEDs depending on the type of service for which they are set. The LEDs on the UIP display will also light.



NOTE:

For Software Release 4.0 or later, *SPQ*®-type and ISDN (AUA93, AUA94, and AUA293) circuit pack LEDs will light and all other AUA-type circuit pack LEDs will not light.

Comment: There is an **MDC** fault condition where groups of four consecutive channel units (for example, slots **1-4** or slots **9-12**) will not work when installed. The **MDC** associated with those channel units is defective and needs to be replaced. If quad channel units are installed in these slots, their LEDs will not light during an LED Test.

Comment: HDOS circuit pack LEDs do not respond to the LED Test.

Comment: If no LEDs on an equipped MDS assembly light, check the MDS assembly fuses and the cabling between the ARM shelf and the MDS assembly.

2. Was response correct?

If **YES**, then **STOP. YOU HAVE COMPLETED THIS PROCEDURE.**

If **NO**, then continue with Step 3.

3. Did all of the LEDs in the *SLC-2000* fail to light?

If **YES**, then proceed to Step 6.

If **NO**, then continue with Step 4.

- 4.



CAUTION:

Replacement plug-ins may have option switches which must be properly set before the plug-in is installed.



CAUTION:

Take care to avoid damaging the LEDs that protrude through the openings in the faceplates of the plug-ins.

Replace the plug-in that failed the LED test. Repeat the LED test. Set any options on the replacement circuit pack the same as the one being replaced.

Comment: Use the UIP display command **RETRIEVE-FAULTS (TAP-102)** to identify order that faulty circuit packs should be replaced.

5. Did the same LED fail the test again?

If **YES**, then continue with Step 6.

If **NO**, then **STOP. YOU HAVE COMPLETED THIS PROCEDURE.**

6.



CAUTION:

*Removing the **SYCTL** without performing a 10-second countdown sequence on the **FE ID** display (**Note 1**) may result in unexpected and undesirable protection switches, incorrect circuit pack fault indications, or incoming signal failure indications.*



NOTE:

Before removing the **SYCTL**, you must momentarily press the **ACO** push button on the UIP and the **FE SEL** push button on the **SYCTL** at the same time to start a 10-second countdown on the **FE ID** display (9, 8, 7, etc.). During this countdown, the **SYCTL** may be safely removed. If the **SYCTL** is failed, the countdown may not occur.

Unplug and reseal **SYCTL** plug-in. Do not press **Update** button.

7. Repeat the LED test.

8. Did the same LED(s) fail the test again?

If **YES**, then continue with Step 9.

If **NO**, then **STOP. YOU HAVE COMPLETED THIS PROCEDURE.**

9. Verify that the **-48V/2A-UIP** fuse and all other ARM shelf fuses are not blown. If a fuse is blown, replace the fuse and repeat the LED test.

10. Did the same LED(s) fail the test again?

If **YES**, then continue with Step 11.

If **NO**, then **STOP. YOU HAVE COMPLETED THIS PROCEDURE.**

11. Replace the **PDC** and repeat the LED test.

12. Did the LED test fail again?

If **YES**, then continue with Step **13**.

If **NO**, then **STOP. YOU HAVE COMPLETED THIS PROCEDURE.**

13.



CAUTION:

*Replacing the **SYSCTL** involves updating the internal memory on the plug-in.*

Replace the **SYSCTL** (**DLP-502** or **DLP-534**) and repeat the LED test.

14. Did the LED test fail again?

If **YES**, then continue with Step **15**.

If **NO**, then **STOP. YOU HAVE COMPLETED THIS PROCEDURE.**

15. You need technical assistance; notify your supervisor, your local technical support organization, or call RTAC, per local operating instructions.

STOP. YOU HAVE COMPLETED THIS PROCEDURE.

Perform Automatic Local Transmission Test

General: This command will always **fail** for SONET ring configurations. Do not do this DLP for SONET ring configurations.

1.



CAUTION:

Open optical connectors may emit invisible laser radiation. Do not view beam with optical instruments. Avoid direct exposure to the beam.



CAUTION:

*This test may only be performed with the SLC®-2000 out of service. No circuit packs should be inserted or removed while this test is in progress. If either the **SYSCTL** or **OHCTL** is removed while the test is in progress, or if the system is reset while the test is in progress, the test must be run again and allowed to complete normally.*



CAUTION:

Unterminated DS1 ports should be terminated or looped back before performing this test. Reflections from unterminated low-speed cross-connections can cause low-speed packs to incorrectly appear failed.



NOTE:

It is assumed that the SLC-2000 system is installed, powered, and running and that no alarms or LED indicators are activated.



NOTE:

This test is automatically performed on both muldem groups and cannot be done on an individual group.



NOTE:

It is recommended that all group slots and signal paths be equipped and tested before the shelf is put into service. If packs are not available for all groups, test one group, move the packs to another group, and press **SYSCTL UPD/INT** button; then repeat this test on the next group. If a group is equipped with an **OLI** pack, it is recommended that the group first be tested with the **OLI** pack, then the pack be replaced with an **MXRVO** pack and that the test be repeated with all low-speed slots of the group equipped with **DS1** packs. This will ensure that all low-speed slots are good if you later want to convert a group to DS1 service.

Refer to **DLP-505** and install **OLIU** optical loops, if not already installed. See Figure 1.

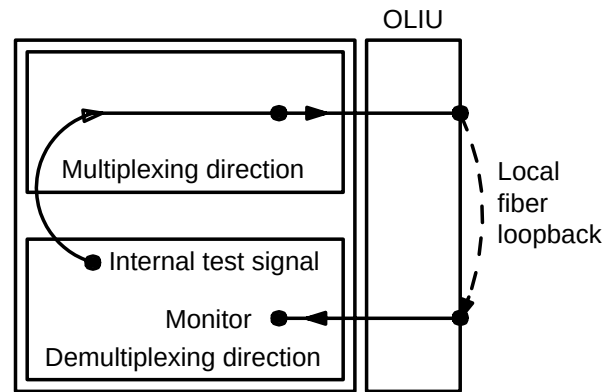


Figure 1 – Automated Internal Test of Local Equipment (test - auto : md = local)

2. The **TGS** packs must be optioned for *free running* timing mode to pass this test. Set the *free running* option (**DLP-503**) on both **TGS** packs if not already selected. Press **Update** if you change option settings.

⇒ **NOTE:**
Disable the far-end communication channel (DCC) using the following command:

set - fecom : dcc - all : com = disabled

3. At the CIT, enter the following command:

test-auto:md=local

When the CIT responds with **Execute?**, enter **y**.

Response: After completing the tests, the CIT will display the *Auto-Turnup Report*. In the report, the following characters show the status of each automatic test:

- **g** stands for good.
- **F** stands for failed.
- **?** stands for unknown due to other failures.
- **-** stands for not applicable (slots not equipped).

In addition to the *Auto-Turnup Report*, a circuit pack LED indicator will light if the circuit pack has failed. See document 363-208-003, *SLC-2000 Access System, Commands and Messages Manual*, for more details of the **test-auto** command.

4. Did all tests pass?

If **YES**, then **STOP. YOU HAVE COMPLETED THIS PROCEDURE.**
If **NO**, then continue with Step 5.

- 5.



CAUTION:

*During the test, any failure will be indicated by a lighted **FAULT** LED on the affected plug-in. This indication will remain on for 1 minute at the end of the test.*

Replace any circuit pack (with same option settings) whose **FAULT** LED lighted during the test. Repeat this procedure after replacing circuit pack(s). If the test fails again, call RTAC (1-800-225-7822) for technical assistance.

Comment: Use the UIP display command **RETRIEVE-FAULTS (DLP-500)** to identify the order in which faulty circuit packs should be replaced.

Start replacing circuit packs in the fault list that cause **Critical** (fault message begins with **CR:** followed by an identifier to the faulty pack), then **Major (MJ:**), then **Minor (MN:**) alarms.

Test the SONET Feeder Protection Switching Function

1. To test a high-speed switch to protection, unplug an **MXRVO** plug-in with a lighted **ACTIVE** LED.



NOTE:

The green **ACTIVE** LED on the companion plug-in lights. The **Critical** or **Major** and **NE Activity** LEDs on the UIP light.

2. Reseat the plug-in that was removed (see Note).



NOTE:

Repeat Steps **1** and **2** if you want to test the other direction protection switching function.

3. Are both **ACTIVE** LEDs lighted on a pair of **OLIUs**?

If **YES**, continue with Step **4**.

If **NO**, proceed to Step **8**.



CAUTION:

Unterminated optical connectors may emit invisible laser radiation. Eye damage may occur if beam is viewed directly or with improper optical instruments. Avoid direct exposure to the beam.

4. Is the SONET system being configured for *ring* (see Note)?

If **NO**, continue with Step **5**.

If **YES**, go to Step **11**.



NOTE:

Both **OLIUs** are always active for *ring* configurations.

5. For point-to-point or taper configurations, remove and immediately reconnect the upper **IN** fiber from one **OLI**U. Wait for the red **FAULT** LED to stop flashing.

6. Did the green **ACTIVE** LED go off on the **OLI**U?

If **NO**, continue with Step 7.

If **YES**, go to Step 8.

7. Remove and immediately reconnect the upper **IN** fiber from the other **OLI**U. Wait for the red **FAULT** LED to stop flashing.

8. Remove the upper **IN** fiber from the **OLI**U with the lighted **ACTIVE** LED.



NOTE:

Minor and **NE Activity** LEDs on UIP light after a few seconds. **FAULT** LED flashes on the **OLI**U, and **ACTIVE** LED on companion **OLI**U lights. **ACTIVE** LED remains lighted only for protection **OLI**U (in **OLI**U 2 slot) with fiber disconnected.



NOTE:

The **ACTIVE** LED response is different when testing from **OLI**U 1 to **OLI**U 2 (**ACTIVE** on **OLI**U 1 does not remain lighted when the **OLI**U 1 **IN** fiber is removed) than when testing for **OLI**U 2 to **OLI**U 1 (**ACTIVE** remains lighted when the **OLI**U 2 **IN** fiber is removed).

9. Reconnect the fiber. All alarms clear when the **OLI**U **FAULT** LED stops flashing.

10. Remove and immediately reconnect the upper **IN** fiber from the other **OLI**U.



NOTE:

ACTIVE LED goes off only if the **OLI**U in **OLI**U 2 slot just had the fiber removed. **Minor** and **NE Activity** LEDs are lighted while **OLI**U **FAULT** is flashing. All alarms clear when the **OLI**U **FAULT** LED stops flashing.

STOP. YOU HAVE COMPLETED THIS PROCEDURE.

11. Remove and immediately reconnect the upper **IN** fiber from one of the **OLIUs**.



NOTE:

Both **OLIUs** are always active for *ring* configurations.

12. Verify that the **Critical** alarm does not light.

13. Does the **Critical** alarm light?

If **NO**, continue with Step **14**.

If **YES**, go to Step **16**.

14. Have you tested both **OLIUs**?

If **NO**, continue with Step **15**

If **YES**, **STOP. YOU HAVE COMPLETED THIS PROCEDURE.**

15. Remove and immediately reconnect the upper **IN** fiber from the other **OLIU**.
Return to Step 12.

16. Replace the other **OLIU**. ***Return to Step 12.***

Install DS1/DS1PM Low-Speed Interface Plug-Ins

1.



CAUTION:

*Take care to avoid damaging the LEDs that protrude through the opening in the faceplate of the **DS1/DS1PM**.*



NOTE:

Switch 1, sections 1 through 3 (**S1-1, S1-2, S1-3**) are set according to the length of DS1 cabling between the *SLC*[®]-2000 system and the DSX-1 cross-connection and are assumed to be very short (within the same enclosure). Table A lists the line build-out option settings. Refer to document 363-005-363 Data Sheet for detailed option switch setting for the **BBF1 DS1** circuit pack. Switch 1, sections 4 through 7 (**S1-4, S1-5, S1-6, S1-7**) are set for the type of line coding (B8ZS or AMI) required of the DS1 signal. Switch 1, section 8 (**S1-8**) must be set toward OFF.



NOTE:

To set switch to ON, depress rocker or slide switch toward side labeled **ON** in the figure. To set switch to OFF, depress rocker or slide switch toward side labeled **OFF** in the figure.



NOTE:

If a **DS1PM** is installed in a **DS1(C)** slot, the CIT **SET - FEAT** command must be used to enable the circuit pack to provide performance monitoring

Refer to Figure 1 and Table A for LBO option switch settings. Set S1-1 through S1-3 to OFF if cable length is short or set LBO per Table A for longer lengths.

Table A – DS1/DS1PM Cable LBO Settings

613C (608C) Cable Length (Feet)	1249C Cable Length (Feet)	Other Cable dB Loss at 772 kHz	Switch S1 Settings		
			S1-1	S1-2	S1-3
0 to 133	0 to 90	0 to 0.6	OFF	OFF	OFF
>133 to 267	>90 to 180	>0.6 to 1.2	OFF	OFF	ON
>267 to 400	>180 to 270	>1.2 to 1.8	OFF	ON	OFF
>400 to 533	>270 to 360	>1.8 to 2.4	OFF	ON	ON
>533 to 655	>360 to 450	>2.4 to 2.8	ON	OFF	OFF

2.



NOTE:

DS1 line coding may be set using either the option switches OR the craft interface terminal **set - t1** command. For *SLC-2000* system applications, it is recommended that a policy be established to set line coding using the switches. If DS1 line code (lc) parameters are set using the **set - t1** command, a software override will be active and the plug-in switch settings will have no effect. The software override will remain active until the **set - t1** command is executed again and the **noOverride** option is selected. The **rtrv - t1** command may be used to check line code settings.

Refer to Table B and Figure 1 and set the line code option switches, if required.

Table B – DS1/DS1PM Line Code Settings

Line Code Format	Switch S1 Settings (Note)			
	S1-4 (Chan 1)	S1-5 (Chan 2)	S1-6 (Chan 3)	S1-7 (Chan 4)
B8ZS	OFF	OFF	OFF	OFF
AMI	ON	ON	ON	ON

Note: Switch 1, section 8 (S1-8) must be set toward OFF.

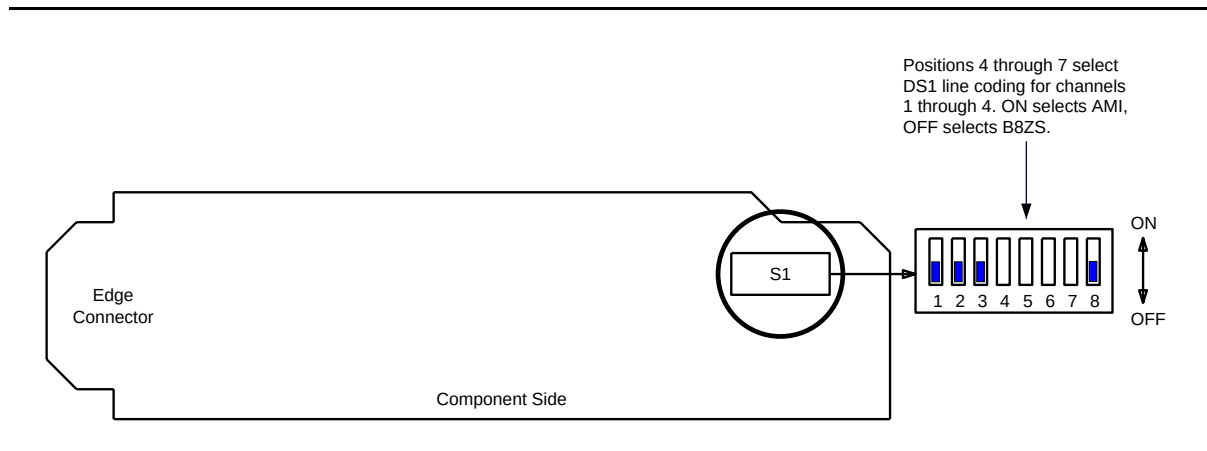


Figure 1 – DS1/DS1PM Option Settings

3.



NOTE:

If the response is not correct when the **DS1/DS1PM** plug-in is installed, check option switch setting. If settings are correct, replace the **DS1/DS1PM** plug-in.

Install **DS1/DS1PM** plug-in in required **DS1(C)** slot of low-speed group being equipped.

Response: **FAULT** LED on **DS1/DS1PM** plug-in lights and then goes off within 1 minute.

4. Repeat this procedure from Step 1 for each service **DS1/DS1PM** plug-in being installed in slots 1 through 7.

5. Is protection **DS1/DS1PM** being installed?

If **YES**, continue with Step 6.

If **NO**, **STOP. YOU HAVE COMPLETED THIS PROCEDURE.**



NOTE:

One protection **DS1/DS1PM** plug-in may be installed in slot **P** of **DS1 (C)** group being equipped. The **SYSC** automatically provisions the protection **DS1/DS1PM** plug-in to match the line code setting of any service **DS1/DS1PM** plug-in that it protects.

6. Obtain the proper protection circuit pack (see Note).



NOTE:

If **BBF3 DS1PM** circuit packs are installed in service slots, then a **BBF3 DS1PM** circuit pack must be installed in the protection slot, if protection is required.

7. Set the LBO option switches on the protection **DS1/DS1PM** circuit pack using Figure 1 and Table A.
8. Install the protection **DS1/DS1PM** plug-in into slot **8(P)** of **DS1 (LS-C)** group.
9. Install **177A** retainer cards in all unequipped **DS1 (LS-C)** slots if protection **DS1/DS1PM** pack is equipped.

STOP. YOU HAVE COMPLETED THIS PROCEDURE.

Connect **SLC[®]-2000** Access System to Point-to-Point or Taper/Drop Optical Facility

1.



CAUTION:

Open optical connectors may emit invisible laser radiation. Do not view beam with optical instruments. Avoid direct exposure to the beam.



CAUTION:

Use of controls or adjustments or performance of procedures other than those specified herein may result in hazardous laser radiation exposure.



CAUTION:

When handling the optical pigtails or jumpers, take care to keep the bending radius as large as possible.



NOTE:

It is assumed that the optical jumpers used to connect the **SLC-2000** Access System to an optical interconnection point are equipped with **ST[®]** lightguide cable connectors. These connectors are spring loaded and have notches that must be aligned with the **OLIU** optical connector tabs before pushing on and turning the connector.

2. Route the optical jumpers up through the fiber tray at the bottom left-front corner of the **SLC-2000** system and up to the **OLIUs**.
3. Establish communication with craftsperson at the other end of the optical span. This procedure requires both ends of the fiber span to be connected for proper alarm responses.

4.

- ⇒ **NOTE:**
The optical connector labeled **OUT** is the output from the **OLIU**. The connector labeled **IN** is the input to the **OLIU**.
- ⇒ **NOTE:**
For **21G/21G-U** and **22F OLIUs**, the output connections **MUST** be made using single-mode optical jumpers. **21D OLIUs** use multimode optical jumpers.
- ⇒ **NOTE:**
Optical fibers connecting this shelf with a far-end shelf should not be connected to the **OLIU** until at least 45 seconds after an optical loopback is removed.
- ⇒ **NOTE:**
It may take from 15 seconds to 3 minutes and 25 seconds for the **FAULT** LEDs to stop flashing after the cables are connected, depending on the setting of the OC-3 signal degrade threshold (-5 to -9).
- ⇒ **NOTE:**
21G/21G-U and **22F OLIU** input connections may be made with single-mode or multimode optical jumpers. **21D OLIUs** use multimode optical jumpers.

Remove the protective covers from the optical jumper cables. Clean the fibers with optical quality, lint-free tissue and a compressed air duster.

Reference: **DLP-506**

5. At both ends, remove optical loopback jumpers for the **OLIU(s)** in the **MAIN** (or function group to be tested) function group.

Comment: This will cause the **OLIU FAULT** LED to flash and the **Critical** and **NE Activity** LEDs to light.

6. At one end, connect the output optical fiber jumper for service **OLIU** in slot **1** to the service **OLIU** output connector (labeled **OUT**). At the other end, connect the input optical fiber jumper for service **OLIU** in slot **1** to the service **OLIU** input connector (labeled **IN**).

Comment: At the end with the **IN** fiber connected, the **OLIU FAULT** LED stops flashing (the **ACTIVE** LED may also light). The **OHCTL FAULT** LED at that same end may start flashing.

7. At both ends, connect the other optical pair jumper to the **OLIU 1 IN** or **OUT** connector as required.

Response: **OLIU 1 FAULT** LED stops flashing and the **ACTIVE** LED must light within 4 minutes.

Comment: The **Critical** alarm clears. **Minor** and **NE Activity** light.

Comment: When the *SLC-2000* RT is connected to the network, you may have a **Major** alarm and a **FAULT** LED lighted on the **SYSCTL** and/or **OHCTL** caused by a duplicated site/ne address, TBOS display, or TID. Use the craft interface terminal **rtrv-alm** command to look for this type of trouble. **DLP-517** can be used to clear this trouble by changing the appropriate setting.

8. Did the **OLIU 1 FAULT** LEDs go off?

If **NO**, then proceed to Step **12**.

If **YES**, then continue with Step **9**.

9. At both ends, connect **OLIU 2 IN(s)** and **OUT(s)** optical jumper cables associated with the protection **OLIU**.

Response: **OLIU 2 FAULT** LED stops flashing and all alarms clear within 4 minutes.

10. Did the **OLIU 2 FAULT** LEDs go off?

If **NO**, then proceed to Step **12**.

If **YES**, then continue with Step **11**.

11. Verify that the optical fiber cables are placed correctly in the fiber tray and properly routed in the bay framework.

STOP. YOU HAVE COMPLETED THIS PROCEDURE.

12.



NOTE:

When connecting the point-to-point or taper/drop *SLC-2000* SONET subsystem to a central office DDM-2000, a **Minor** alarm will be generated if the Function Groups (A and C) are not equipped the same [for example a **VTU** in Function Group A slot 1 needs a **DS1** pack installed at the central office end DDM-2000 shelf Function Group A slot (or appropriate cross-connected slot), to avoid **Minor**, **Attention**, and **NE Activity** alarms]. You can use **Circuit Order: NTP-062, Discontinue Service at a SLC-2000 Remote Terminal**, to remove service from the *SLC-2000* system. It is recommended that the Function Groups at both ends be equipped the same (empty slots, or equipped DS1 slots) when establishing the OC-3 network.

Check optical jumper connections at both ends of the fiber. Verify the integrity of the fiber connections. Ensure that the **OLIU** output at one end is connected to the correct **OLIU** input at the other end. If all fiber connections are correct, clear trouble with optical span cable.

If you have an optical test set, check the signal level on the **IN** fiber and **OUT OLIU** connector. The **21G/21G-U OLIU** optical output power should be -2.5 to -7.0 dBm with **HIGH POWER OLIU** option (or **OLIUs** with no power option) or -7.5 to -11.4 dBm with **LOW POWER OLIU** option. The fiber connected to the **OLIU IN** should have an optical power range from -7.0 to -34 dBm.

After both service (slot 1) and protection (slot 2) fibers have been connected, perform **TAP-103** to clear trouble.

Perform Automatic End-to-End OC-3 Line Test

1.



CAUTION:

Open optical connectors may emit invisible laser radiation. Do not view beam with optical instruments. Avoid direct exposure to the beam.



NOTE:

This test is used to verify the integrity of the OC-3 optical fiber lines between two *SLC*[®]-2000/DDM-2000 shelves. It may be performed with the *SLC*-2000/DDM-2000 Access System in service or out-of-service. This test checks the transmission across all shelf optical interfaces. For example, this test performed at an intermediate shelf checks the optical span from both the **MAIN** and Function Group **C** slots.



NOTE:

It is assumed that each *SLC*-2000/DDM-2000 system has passed the automatic local transmission tests. If these tests have not been completed, refer to the appropriate NTP procedure and perform the tests.



NOTE:

Far-end communications (fecom) must be enabled at both shelves in the optical span being tested. See SET-FECOM in document 363-208-003, *SLC-2000 Access System, Commands and Messages*.

At each end of the optical span being tested, ensure that both the service and protection **OLIUs** (slots **1** and **2**) have been connected to the optical facility (a total of four connections at each end of the span).

Reference: **DLP-511** for point-to-point

DLP-519 for ring configurations.

2. At the CIT, enter the following command:

test-auto:md=optics

When the CIT responds with **Execute?**, enter **y**.

Response: After completing the tests, the CIT will display the *Auto-Turnup Report*. In the report, the following characters show the status of each automatic test:

- **g** stands for good.
- **F** stands for failed.
- **?** stands for unknown due to other failures.
- **-** stands for not applicable (slots not equipped).

In addition to the *Auto-Turnup Report*, a circuit pack LED indicator will light if the circuit pack has failed. See document 363-208-003, *SLC-2000 Access System, Commands and Messages*, for more details of the **test-auto** command.

3. Did all tests pass?

If **YES**, then **STOP. YOU HAVE COMPLETED THIS PROCEDURE.**
If **NO**, then continue with Step 4.

- 4.



NOTE:

A lighted or flashing **FAULT** LED on an **OLIU** indicates that either an **OLIU** plug-in is failed or there is trouble in the optical fiber line or connections between the *SLC-2000* and *DDM-2000* shelves.

Clean optical fiber connections.

Reference: **DLP-506**

5. Is **FAULT** LED lighted or flashing on any **OLIU**?

If **YES**, then continue with Step 6.
If **NO**, then **STOP. YOU HAVE COMPLETED THIS PROCEDURE.**

6. Perform the following to clear optics test trouble:
 - a. Replace any **OLIU** that has the **FAULT** LED lighted.
 - b. A flashing **FAULT** indicates that the near-end receiver, far-end transmitter, or incoming (receive) fiber has failed. Replace the local **OLIU**, then the far-end **OLIU**. If after both **OLIUs** have been replaced, the **FAULT** LED is still flashing, the trouble is in the optical fiber cabling. Clear trouble using local procedures.

Reference: Use **DLP-504** to replace an **OLIU**.

Comment: In this procedure it is assumed there were no alarms before executing the optics test.

7. Use **Trouble Clearing Tab** procedures (Clear OLIU or Fiber Trouble) if this procedure cannot clear the optics test trouble.

Install New SONET Generic Program New Shelf Installation Only

General: This procedure is intended to be used at a *SLC*[®]-2000 Access System local network element only when a **SYCTL** and **OHCTL** with the proper version generic cannot be obtained. Ideally, the **SYCTL** and **OHCTL** used at the *SLC*-2000 RT should be loaded through a central office system where the environment is more suitable for using the personal computer (PC). You must connect a PC either locally to the user interface panel (UIP) or remotely to the rear **CIT** port and run **TERM** to load software.

The software loading procedure requires nothing on the **SYCTL FE ID** display when upgrading software or the letter **P** to be displayed on the **SYCTL FE ID** display. You can force a download by unplugging and reseating the **SYCTL** and then immediately pressing and holding both **FE SEL** and **UPD/INT** buttons at the same time until a **P** appears in the **FE ID** display. Then the generic will automatically load when a PC running the craft interface terminal (CIT) software is connected to the SONET subsystem.

To upgrade the generic software, use the CIT **ins-prog:tid** command when nothing is displayed (blank) in the **FE ID** display, or use the procedure to force the **P** and automatically load the software.

If a generic upgrade is being installed, you should load the software from the central office and then to the *SLC*-2000 RT using the **ins-prog:tid** command.

Loading the wrong version generic (older version) may interrupt service. In this procedure it is assumed you have the correct version generic software and you have determined that you must load the software at the SLC-2000.

⇒ **NOTE:**
Before beginning software installation, refer to the *Software Release Description* for the software being installed for a description of any special considerations required when installing this version of the software.

⇒ **NOTE:**
This procedure may be used to install a new program because of a system upgrade, when a **BBG5 SYCTL/BBG7 OHCTL** or **BBG8 SYCTL/BBG9 OHCTL** has no software, or when the software is incompatible.



NOTE:

If you are upgrading to SONET R6.2.1 linear or R7.2.1 rings or later, the OHCTL version, as shown on the front of the circuit pack, should be **S2:4A** or later.

Observe one of the following indications on the **SYSCTL FE ID** display. Note the indication and follow the suggested procedure:

- a. The letter **P** in the **FE ID** display indicates that the **SYSCTL** has no software. The generic software will automatically load when the PC running the CIT software is connected to the SONET subsystem.
- b. The letter **P** followed by a period (**P.**) in the **FE ID** display indicates that a previous software download attempt has failed. New software must be downloaded locally using these procedures.
- c. Nothing displayed in the **FE ID** display. This is when you want to install an updated (different) version generic. Use the CIT **ins-prog:tid** command to upgrade the software or perform the button sequence in Step **18** to force a program download.
- d. The letter **d** in the **FE ID** display indicates that the **OHCTL** has no software or that software in the **OHCTL** and **SYSCTL** is incompatible. You must perform the button sequence in Step **18** to force a program download.
- e. The letter **C** displayed in the **FE ID** display indicates that software is installed in the **OHCTL** and **SYSCTL**, but it will not support the current shelf transmission configuration. You must perform the button sequence to force a program download.

If a **C** is displayed on the **SYSCTL**, you must load a compatible version of software unless the NTP that sent you here requires you to force the software to run this version software while the system is being changed (some SONET system reconfigurations may light the "C" until completed).

1. If necessary, connect the CIT to the SLC-2000 RT using the procedure in **DLP-521** or **DLP-525** (local access) or **DLP-541** (remote access).
2. Obtain working copies of the new system generic program diskette(s) and the Software Release Description for the software being installed.
3. If the system is equipped with the **BBG5 SYSCTL**, option switches S3-1, S3-2, and S3-3 on the **SYSCTL** *must match the baud rate used by the UIP and CTRM* to avoid downloading troubles. Refer to **DLP-502** to select a baud rate CIT option (the setting for a baud rate of 9,600 is S3-1 ON, S3-2 OFF, S3-3 OFF and is the recommended setting).

4.



NOTE:

In this procedure it is assumed the installation will be done using the diskette(s). You can **copy** all files on the source diskette(s) to a directory (such as GEN_ *ver* where *ver* should be 345 for generic version 3.4.5) on a PC with a hard disk and load the generic from that hard drive directory.



CAUTION:

Unexpected problems can result when loading software from an MS-DOS window running under the Windows 95 platform. When loading software in the SLC-2000 Access System, run the CTRM program directly from DOS. Failure to follow this precaution can corrupt the memory in the SMU and a service outage may occur (if a spare SMU is not available).

Start *MS-DOS* operating system on the PC.

Response: PC displays the prompt (**A: \>**, **C: \>**, etc.) determined by the PC.

5.



NOTE:

The new generic program may be on many floppy disks. The PC will prompt you to insert disks as needed after the first disk is installed.

Insert the first floppy disk into the PC drive (if not using a hard drive).

6. Use the appropriate *MS-DOS* command (for example, **a:** or **b:**) to go to the drive with the floppy disk installed (or use the **cd** command to move to the appropriate hard drive directory).

Response: PC displays the appropriate prompt.

Comment: If you get a disk error message, verify that the drive latch is locked and you have the proper diskette installed in the drive.

7. Execute the command **checkpgm** to check the version number of the program you are installing. This command may take up to 15 minutes to run and may require swapping diskettes in the disk drive if the software is on a floppy disk drive.

Response: **PC has DDM-2000 program version #.#.#** appears on the screen. **Checking files** is displayed on the screen followed by several periods.

Once the program has checked all of the files and all files are good, then **/* ALL FILES OK */** appears on the screen. If a problem is detected in the files, get new software and repeat this step.

8. Enter **term** or **term COMn** to select a PC serial communication port (COM2, COM3, or COM4) other than the default COM1 port.

Response: A brief message is displayed and you are instructed to **Strike a key when ready . . .** After you press any key, the terminal emulator loads and the terminal responds as follows:
CTRM ready. (Type Alt-h for help.)
Communications established.

9. Was response correct?

If **YES**, then proceed to Step **12**.

If **NO**, then continue with Step **10**.

10. Ensure first (number 1) disk of program being installed is inserted. Ensure diskette is inserted in correct drive and that the right command was used to go to the drive with the diskette installed.

- 11.

 NOTE:

The default data rate for the CTRM terminal emulator is 9,600 baud.

If the data rate other than 9,600 baud is being used, enter "**Alt-c**" and follow the instructions on the CTRM screen to set the terminal emulator data rate to match the selected data rate select by the **SET-BAUD** UIP command.

12.



NOTE:

The CIT response from a *SLC-2000* system is different than the response from a *DDM-2000* system.

Enter? or **RETURN**.

Response: PC prompts with:

```
/* Enter a "1" to proceed */  
subsystem =
```

13. Was response correct?

If **YES**, then go to Step **15**.

If **NO**, then continue with Step **14**.

14. Check PC to **CIT** port connections. For local CIT access, make sure the cable is connected between the PC **COM1** port and the **CIT** port on the UIP. For remote CIT access, make sure the cables are connected between the CIT **COM1** port, modems, and the rear **CIT** port. If the system is equipped with the **BBG5 SYSCTL**, set the **SYSCLT** front access baud rate option switches **S3-1**, **S3-2**, and **S3-3 (DLP-502)** to the baud rate being used and ensure that the baud rate is set the same (**SET-BAUD** UIP command) as on the CTRM terminal emulator and **SYSCTL**. Verify that the shelf ID on the **SYSCTL** is set to 1 (for the **BBG5 SYSCTL**, switches **S2-4**, **S2-5**, and **S2-6** toward **ON**). Check CTRM setup and make sure COM port is configured for COM1. If you know the PC is good and cable connections are correct (if the PC and cable work with a different system), replace the user interface panel (**DLP-518**) if the CIT is located locally or replace the **BBF250 LAN** pack if the CIT is located remotely. Repeat this procedure from Step **6**.

15.



NOTE:

If the **SYSCTL** display shows a **P**, the system will display **In Progress. . . .** In this case, you will not enter the **ins-prog** command to start program installation. Wait until the program installation is complete for this shelf. See *Software Release Description* for more detail and approximate time required to download software.

Press **1** then **Enter** several times as necessary to proceed.

Response: PC responds with either:

```
/* Site#NE# attempting to initiate program
install */
In Progress. . .
```

If you get this response, go to Step **23**.

or

login < appears immediately after you enter 1. If you get this response, continue with Step **16**.

16. At the **login <** prompt, press the PC keyboard **Return** key or enter login and the password.

Response: The PC prompts with **Press <CR> to continue . . .**

Press **Return** after system prompts to generate alarm summaries.

Response: The CIT will display an alarm summary generated by the **rtrv-alm: all** command.

Comment: If the system does not respond with login and password prompts, proceed to Step **18** and force the software download.

17.



NOTE:

To upgrade or change a generic software version while nothing is displayed on the **SYSCTL FE ID** display (blank display), you can use the **ins-prog** CIT command. If this command does not work, you can force the software to load by forcing a **P** to be displayed and letting the system automatically load the software. Also, when a **C** or **d** is lighted on the **SYSCTL FE ID** display, *you must force the software to load.*

To force a software download (**C** or **d** lighted on the **SYSCTL FE ID** display) continue with **Step 18**. To upgrade a generic software using the **ins-prog** command (only when the **SYSCTL FE ID** display is blank), proceed to **Step 19**.

Comment: This assumes all necessary steps, such as changing cross-connections and removing **TGS 1** have been done before doing the "force."

18. To force a software download, unplug and reseal the **SYSCTL** and then immediately press and hold both **FE SEL** and **UPD/INT** buttons at the same time until a **P** appears in the **FE ID** display (about 15 seconds). The **P** will time out in 1 minute. Then proceed to **Step 23** when the **In Progress. . .** message is displayed.

19.



NOTE:

After the system prompt (**login <**), the system will respond normally to commands entered. Document 363-208-003, *SLC-2000 Access System, Commands and Messages*, gives a description of the commands.

Use **rtrv-nmap** command to retrieve the name (**tid**) of the near-end shelf having new program installed.

20. Enter the command **ins-prog:TID**.

Response: **/* Testing For Program Installation... */**

The PC displays a **Caution!** message followed by the prompt:

Execute? (y/n or cancel/delete to quit) =

21. Was response correct?

If **YES**, then continue with Step **22**.

If **NO**, then do **Trouble Clearing: TAP-108**.

22. Enter a **"y"** or **"yes"** and a carriage return to continue with software installation.

23. The generic software comes in many files and may be on several diskettes. If the software is on separate floppy disks, you must swap disks in the drive after this message appears:

Ready for next diskette.

Please insert next diskette and strike the spacebar when ready.

If PC disk errors occur during the software download, the terminal emulator (CTRM program) may display references to error numbers, and the PC may display an error message such as

Disk error Abort, Retry, Ignore?

If you have this trouble, you will need to repeat this procedure after determining why the PC failed (bad diskettes, bad drive/PC, drive latch not closed, corrupt files, etc.).

When the generic SONET software is loading at the *SLC-2000* system, you will notice the following:

Response: The PC starts download and displays the following message:

In progress

The dots continue to display until program installation is complete. After installation is completed, the PC displays the following completion message:

ins-prog: TID COMPLD
/* Generic #.#.# is installed */

The **SYSCTL** resets and the CIT is disconnected from the system. The LEDs go off on the UIP and **SYSCTL**.

⇒ **NOTE:**
If the software download is being performed from a remote CIT location, there is a possibility that the modem connected to the rear RT **CIT** port will not disconnect properly from the **CIT** port after the software has downloaded. If this happens, the **CIT** port is left in a “hung up” state and the port cannot be used until the modem disconnects from the **CIT** port. To remove the modem from this “hung up” state, reseal the cable attached to the rear **CIT** port connector. If the modem remains in the “hung up” state after resealing the cable, then replace the **BBF250 LAN** pack.

24. Was response correct?

If **YES**, then continue with Step 25.

If **NO**, then do **Trouble Clearing: TAP-108**.

25. Log into system again and use the **rtrv-eqpt:sysctl** CIT command or **RETRIEVE-PROG-VRSN** UIP command (**DLP-500**) to verify that the proper generic version is loaded.

26. Log out (enter **logout** and then press **AL**ternate and **F2** at the same time) and disconnect the PC.

STOP. YOU HAVE COMPLETED THIS PROCEDURE.

Check 4A, 4B, and 4G Fan Unit Operation

Summary: Figure 1 shows the fan unit and its indicators. Table A describes the major differences between the three fan units. The A- and B-type units have a built-in 991A fan controller circuit pack. The G-type unit has a built-in 998A fan controller circuit pack. The A- and B-type fans will start operating at 10°C (+50°F) and run at two speeds depending on temperature and a slower speed (2,800 rpm) if the remote terminal (RT) is on batteries. The G-type fan will start operating at +40°C (+104°F). To check the fans, press the **CHANGE FAN SPEED** button at least three times to verify that the fans run at high speed, low speed, and turn off. The **CHANGE FAN SPEED** button also functions as an LED TEST for the fan **FAULT** indicator. The air is exhausted out of the front grille for the A-type fan. The air is exhausted out of the front and back grilles for the B- and G-type fans.

1. Verify that the DC power equipment has been turned up and batteries have been installed.
2. Verify that the DC circuit breakers are turned on.
3. Has the **CHANGE FAN SPEED** button been pressed in the last 10 minutes?

If **YES**, continue with Step 4.

If **NO**, go to Step 5.



NOTE:

The **CHANGE FAN SPEED** button on the fan unit *should not have been pressed in the last 10 minutes* to perform this procedure. Pressing the button overrides microprocessor control of the fans for 10 minutes. This lets the user manually select the fan speed. Manual mode is indicated by the green LED lighted continuously. This LED can be seen through the front grille on the LED side of the fan unit.



NOTE:

The 4A- and 4B-type units will start operating if the temperature is +10°C (+50°F) or higher and power is supplied. The fans will not turn off until the temperature is -10°C (+14°F) or less. The unit provides **TEMP** jacks that can be used to determine the temperature of the fan controller (1 volt DC per 10°C above 0°C).

The 4G-type unit will start operating if the temperature is +40°C or higher. This fan will turn off at +35°C. This unit is used in a frame or controlled environment. The unit provides **TEMP** jacks that can be used to determine the temperature of the fan controller (1 volt per 10°C above 0°).

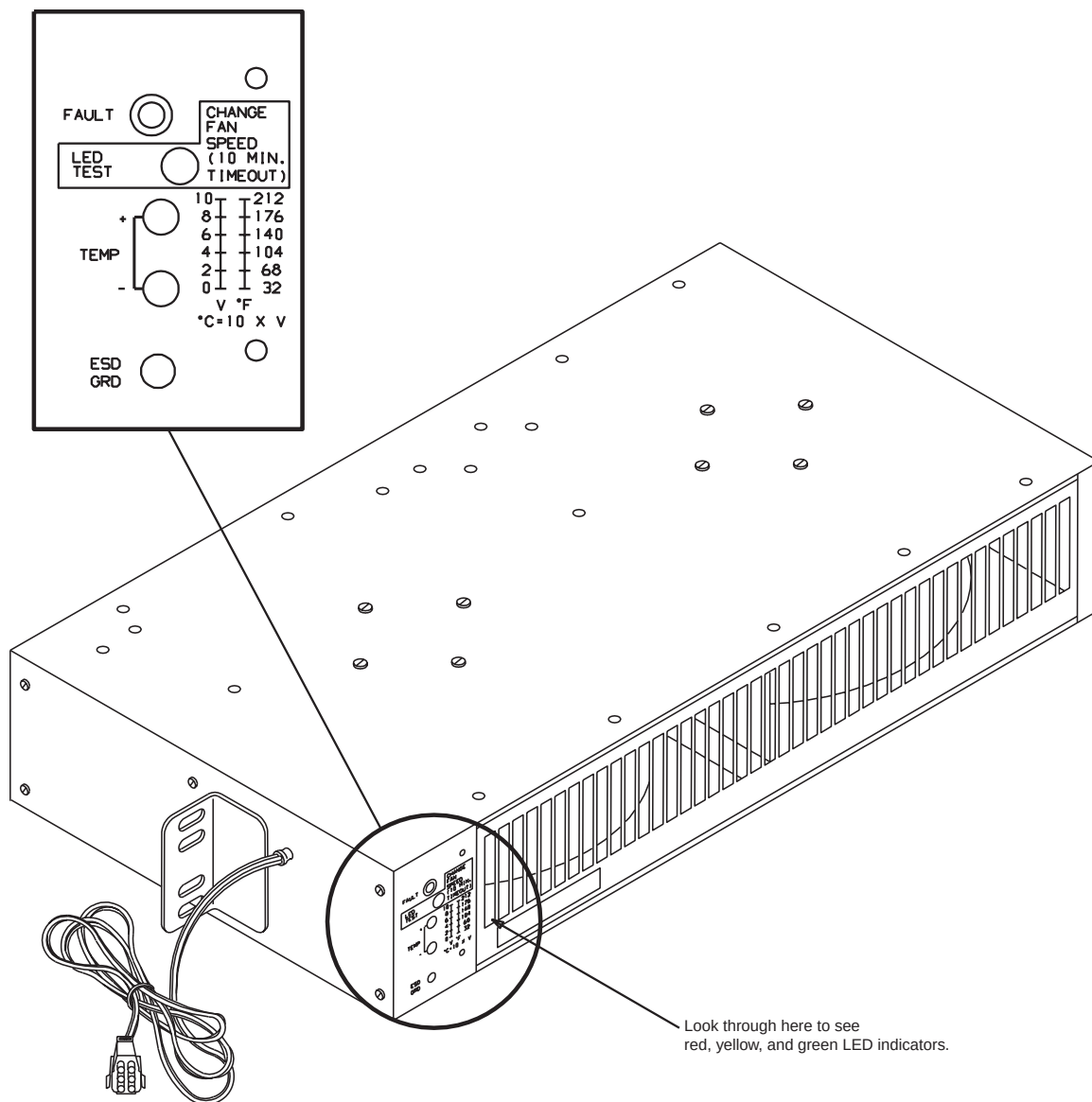
4. Wait at least 10 minutes before continuing this procedure.
5. Is the unit **FAULT** indicator lighted (Figure 1)?

 If **NO**, continue with Step 6.
 If **YES**, go to Step 10.
6. Press and hold down the **CHANGE FAN SPEED** button and verify that the **FAULT** indicator lights.
7. Press and release the **CHANGE FAN SPEED** button at least three times and verify that the fans run at high speed, low speed, and turn off. Leave the fans in the off mode.
8. Did the fans step through three speeds and did the **FAULT** indicator light for the **CHANGE FAN SPEED** test?

 If **NO**, continue with Step 9.
 If **YES**, **STOP. YOU HAVE COMPLETED THIS PROCEDURE.**
9. If **FAULT** indicator did not light and/or fans did not operate, check **P114/J114** connection and verify that the power equipment DC circuit breaker is on. Refer to appropriate SD drawings to clear power trouble. Replace the appropriate control circuit pack in the particular fan unit if no power troubles are found (see Table A for the type of control circuit pack). Then ***repeat this procedure from Step 1.***

10. Sectionalize the trouble as follows:

If your unit is a ...	And ...	Then ...
4A or 4B	The control circuit pack YELLOW indicator is lighted and the GREEN LED is flashing	The thermal sensor may have failed. Check the voltage between TEMP + and – jacks (1 volt DC per 10°C above 0°C). If the voltage indicates a temperature close to the ambient air, unplug and reconnect P114/J114 connector. This will clear the alarm. If the voltage indicates a temperature obviously too high or too low, replace the control circuit pack in the 4A or 4B fan unit. The thermal sensor alarm (YELLOW LED) will light if a temperature change of more than 2.7°C (5°F) has not occurred in the past three days. To clear this alarm, reconnect the P114/J114 connector. To test the sensor, check the voltage between TEMP + and – jacks while blocking airflow from the fan unit. The voltage will rise if the sensor is functional.
	The GREEN indicator is flashing and the RED and YELLOW indicators are off	One or both fans are obstructed or defective (and are rotating at less than 2,000 rpm). Clear obstruction and/or replace defective fan.
	The FAULT LED is lighted with any other combination of control circuit pack indicators	Replace the 991A control circuit pack.
4G	The GREEN indicator is flashing and the RED indicator is off	The fan is obstructed or defective (and is rotating at less than 2,000 rpm). Clear obstruction and/or replace defective fan.
	The FAULT LED is lighted with any other combination of control circuit pack indicators	Replace the 998A control circuit pack.



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Figure 1 – Fan Unit and Control Circuit Pack

Table A – Fan Unit Types

Type	Operating Temperature	Shutoff Temperature	Thermal Sensor Alarm	Environment	Controller Circuit Pack	Airflow Direction
4A	+10°C (+50°F) low speed (3,000 rpm) +40°C (+104°F) high speed (3,600 rpm)	–10°C (+14°F)	Yellow LED if temperature change of less than 5°F over any 3-day period	outdoor cabinet	991A	Exhaust is out front grille
4B	+10°C (+50°F) low speed (3,000 rpm) +40°C (+104°F) high speed (3,600 rpm)	–10°C (+14°F)	Yellow LED if temperature change of less than 5°F over any 3-day period	outdoor cabinet	991A	Exhaust is out front and back grilles
4G	+40°C (+104°F) (3,600 rpm)	+35°C (+95°F)	No thermal sensor alarm	indoor frame [*]	998A	Exhaust is out front and back grilles

* The fan unit is rated for use in outdoor cabinets but currently is used only in indoor frames. The high turn-on and turn-off temperature of the fans reduces acoustic annoyance versus the 4A and 4B types, which would operate continuously in an indoor environment.

Test Single-Party POTS Channel End to End

Summary: At the central office (CO) equipment, determine channel and directory number of channel being tested. At remote terminal (RT), determine corresponding channel and install single-party channel unit. At RT, connect a test telephone set with ringer connected for bridged ringing to channel being tested. Make talking, dialing, ringing, and ring-trip tests on channels 21, 45, 69, and 93 for each equipped shelf in the RT.

1. Establish communication between RT and CO equipment.
- 2.

⇒ **NOTE:**
These test procedures are to be performed on channels 21, 45, 69, and 93.

At CO equipment, select channel to be tested and determine directory number of channel. Inform RT of channel selected.

- 3.

⇒ **NOTE:**
Test telephone set should be connected for bridged ringing. Test telephone may be connected at cross-connection. Test calls should be made from cross-connect field to verify correct wiring from RT to cross-connect field.

At RT, install single-party channel unit into channel unit slot (**6, 12, 18, or 24**) associated with channel selected for testing and temporarily connect a test telephone set to the channel.

Comment: There is an **MDC** fault condition where groups of four consecutive channel units (for example slots **1-4** through **13-16** or **33-36** through **45-48**) will not work when installed. The **MDC** in associated MDS assembly shelf side **MDC-()** slot is defective and needs to be replaced. If quad channel units are installed in these slots, their LEDs will not light during an **LED Test**.

4. At RT, lift handset and check for dial tone.

5. Is dial tone present at RT?

If **YES**, then proceed to Step **9**.

If **NO**, then continue with Step **6**.

6. Request CO personnel to review line assignment to ensure correct test number. If line assignment is correct, check test connections at RT and correct them if needed. If dial tone is still not present, replace RT channel unit and check for dial tone.

7. Is dial tone present at RT?

If **YES**, then proceed to Step **9**.

If **NO**, then continue with Step **8**.

8. At RT, use appropriate SD drawings to check metallic distribution shelf (MDS) wiring. Look for tip and ring reversal between MDS and cross-connect terminal. Correct wiring until dial tone is present at RT and proceed to Step **9**.

9. At RT, dial local main distribution frame (MDF) or CO number and make normal talk tests.

10. Was call completed with normal transmission quality in both directions?

If **YES**, then proceed to Step **14**.

If **NO**, then continue with Step **11**.

11. Replace RT channel unit and repeat normal talk tests.

12. Was call completed with normal transmission quality in both directions?

If **YES**, then proceed to Step **14**.

If **NO**, then continue with Step **13**.

13. At RT, use appropriate SD drawings to check MDS wiring. Check for tip and ring reversal between RT and cross-connect terminal. Correct wiring and repeat Step **10** until talk quality is good in both directions.

14. At CO, dial test line number to ring telephone at RT.

15. At RT, does test telephone ring normally?

If **YES**, then proceed to Step **19**.

If **NO**, then continue with Step **16**.

16. Has tip and ring reversal been checked?

If **YES**, then continue with Step **17**.

If **NO**, then proceed to Step **18**.

17. Replace RT channel unit and repeat this procedure from Step **4**.

18. At RT, look for tip and ring reversal and repeat from Step **14**.

19. At RT, lift telephone handset during ringing.

20. At RT, does ringing trip normally?

If **YES**, then proceed to Step **22**.

If **NO**, then continue with Step **21**.

21. Replace RT channel unit and repeat this procedure from Step **4**.

22. At RT, get VOM and condition it to measure DC volts.

23. Make sure test call is established and held between CO and RT.

24. At RT, connect (+) red lead of VOM to tip terminal and (–) black lead to ring terminal of RT test telephone.

25. At RT, does meter indicate between 4 V and 15 V DC?

If **YES**, then proceed to Step **31**.

If **NO**, then continue with Step **26**.

26. Check RT test connections and correct them, if needed.

27. At RT, does meter now indicate between 4 V and 15 V DC?

If **YES**, then proceed to Step **31**.

If **NO**, then continue with Step **28**.

28. Replace RT channel unit for channel being tested and repeat Steps **4** through **24** and proceed to Step **29**.

29. At RT, does meter now indicate between 4 V and 15 V DC?

If **YES**, then proceed to Step **31**.

If **NO**, then continue with Step **30**.

30. At RT, use appropriate SD drawings to check MDS wiring. Repeat the procedure from Step **24** after locating and correcting the trouble.
31. Is this the last designated channel unit slot to be tested?
- If **YES**, then continue with Step **32**.
If **NO**, then proceed to Step **2**.
32. Is mechanized loop testing (MLT) available for use in testing channels?
- If **NO**, then proceed to Step **41**.
If **YES**, then continue with Step **33**.
33. Request that Repair Service Bureau or Local Test Desk perform necessary channel tests using MLT.
-  **NOTE:**
Use channels 21, 45, 69, and 93 for these tests.
34. Did tests pass?
- If **YES**, then proceed to Step **40**.
If **NO**, then continue with Step **35**.
35. Check test connections and correct them, if needed. If connections are correct, replace RT channel unit. Repeat Step **33** and proceed to Step **36**.
36. Did tests pass?
- If **YES**, then proceed to Step **40**.
If **NO**, then continue with Step **37**.
37. Make sure MLT [and pair gain test controller (PGTC) or test bus control unit (TBCU) interface] is working properly and that you are using proper procedures. Repeat Step **33** and proceed to Step **38**.
38. Did tests pass?
- If **YES**, then proceed to Step **40**.
If **NO**, then continue with Step **39**.
39. At RT, use appropriate SD drawings to check MDS wiring. Check for tip and ring reversal between RT and cross-connect terminal. Correct wiring problem and repeat Step **33** until tests pass. Then proceed to Step **40**.

40. Is this the last designated channel unit slot to be tested with MLT?

If **YES**, then continue with Step **41**.

If **NO**, then repeat from Step **33**.

41. At RT, remove test telephone.

STOP. YOU HAVE COMPLETED THIS PROCEDURE.

Perform Automatic DSX Transmission Test

1.



CAUTION:

This command will interrupt service and should only be performed before any DS1 services are established.

At the DSX panel, install patch cord loopbacks for all DS1 channels.

Comment: DS1 circuit pack FAULT LEDs will flash if the loopbacks are not installed.

2. At the CIT, enter the following command:

test-auto:md=dsx

When the CIT responds with **Execute?**, enter **y**.

Response: After completing the tests, the CIT will display the *Auto-Turnup Report*. In the report, the following characters show the status of each automatic test:

- **g** stands for good.
- **F** stands for failed.
- **?** stands for unknown due to other failures.
- **-** stands for not applicable (slots not equipped).

In addition to the *Auto-Turnup Report*, a circuit pack LED indicator will flash if the circuit pack has failed. See document 363-208-003, *SLC®-2000 Access System, Commands and Messages*, for more details of the **test-auto** command.

3. Did all tests pass?

If **YES**, remove all DSX loopbacks and press UIP **UPDATE**, then **STOP**.
YOU HAVE COMPLETED THIS PROCEDURE.

If **NO**, then continue with **Step 4**.

4.



NOTE:

During the test, any failure will be indicated by a flashing **FAULT** LED on the affected plug-in.

Replace any circuit pack (with same option setting) that has a lighted or flashing **FAULT** LED during the test. Repeat this procedure after replacing circuit pack(s). If the test fails again, call RTAC (1-800-225-7822) for technical assistance.

Comment: Use the user interface panel display command **RETRIEVE-FAULTS (DLP-500)** to identify the order in which faulty circuit packs should be replaced.

Start replacing circuit packs in the fault list that cause **Critical** (fault message begins with **CR:** followed by an identifier to the faulty pack), then **Major (MJ:)**, then **Minor (MN:)** alarms.

Change Site ID, Network Element Address, Target Identification (TID), or TBOS Display Number

SONET system node equipment in the network is identified by a site address (what location) and a network element address (what shelf at the site). These two addresses together form a network identification used to address the node in the SONET network. The target identification (TID) used by the craft interface terminal (CIT) commands defaults to the switch settings, (for example, TID=Site1NE1 if the **SYSCCTL** site address is set to 1 and the **OHCTL** network element address is set to 1) if the **set -ne;TID=name** has never been used to assign an alias name to the SONET node.

Once the **set -ne;TID=name** has been used to assign an alias name (such as "baker-st-1"), this alias will always address the SONET node even if the site and network element address of this node has been changed using the **BBG7 OHCTL** and **BBG5 SYSCCTL** switches.

But if you have never used the **set -ne;TID=name** command, the TID alias follows the switch settings (for example, if you change the OHCTL network element from 1 to 2, the new TID would be *Site1NE2*). You can use the **rtrv-nmap** command to print a map of the SONET network including TID names. Repeat the command using the correct TID when this situation happens.

To avoid this kind of confusion, you should assign a TID alias name to a SONET node instead of using the default TID. You can always change the alias TID name (privileged users) with the **set -ne** command.

1.



CAUTION:

*Pressing the **UPD/INT SYSCCTL** button within 10 seconds after the **SYSCCTL** is installed will reset all critical parameters (such as cross-connect, TID, performance monitors,...) to the default values. Any parameters set with CIT **conv**, **dlt**, **ent**, or **set** commands will have to be reentered.*



NOTE:

Setting the site address or TBOS display number on the **BBG8 SYSCCTL** is accomplished using the CIT.

To change a site address or TBOS display number using the switches on the **BBG5 SYSCTL** circuit pack, press the user interface panel **ACO** and the **SYSCTL FE SEL** buttons at the same time. Remove the **SYSCTL** before the 10-second countdown reaches 1 as displayed on the **SYSCTL**. Set the **BBG5 SYSCTL** (see Figure 1) switch **S1** (TBOS) or **S2** (SID) positions **1, 2, and 3** to the desired site ID number (see Table A). Reinstall the **SYSCTL** but do not press **UPD/INT**.

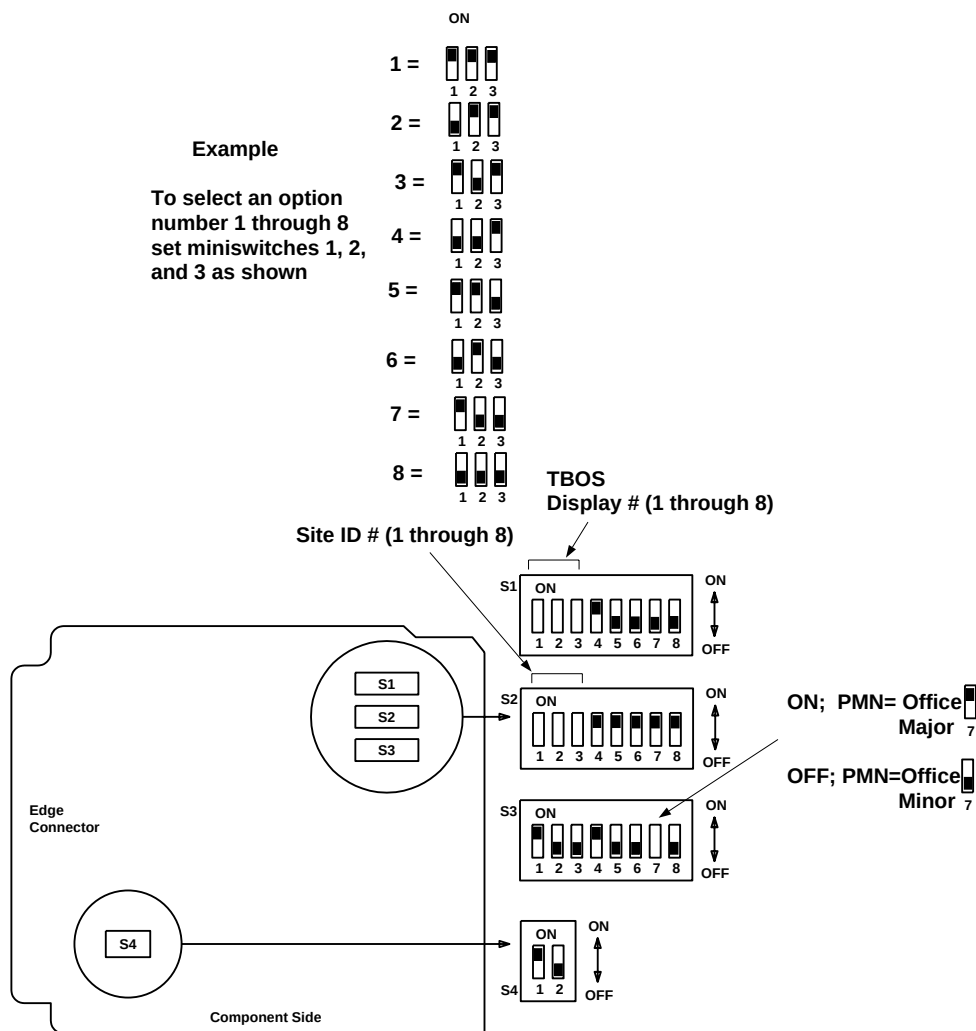


Figure 1 – BBG5 SYSCTL Option Settings

Table A – BBG5 SYSCtl TBOS Display Number, Site ID, and Shelf ID (Note)

TBOS #	S1-1	S1-2	S1-3				
Site ID	S2-1	S2-2	S2-3	Shelf ID	S2-4	S2-5	S2-6
1	ON	ON	ON	1	ON	ON	ON
2	OFF	ON	ON	2	OFF	ON	ON
3	ON	OFF	ON	3	ON	OFF	ON
4	OFF	OFF	ON	4	OFF	OFF	ON
5	ON	ON	OFF	5	ON	ON	OFF
6	OFF	ON	OFF	6	OFF	ON	OFF
7	ON	OFF	OFF	7	ON	OFF	OFF
8	OFF	OFF	OFF	8	OFF	OFF	OFF

Note: The Shelf ID is used by DDM-2000 in multisystem wired bays. For SLC®-2000, systems are not wired together and the Shelf ID must be set to 1.

2.



NOTE:

Setting the network element address on the **BBG9 OHCTL** is accomplished using the CIT.

To change a network element address using the switches on the **BBG7 OHCTL**, remove the **OHCTL** and set the **BBG7 OHCTL** (see Figure 2) switch **S1** positions **1**, **2**, and **3** to the desired network element ID number (see Table B). Reinstall the **OHCTL**.

- Wait 1 minute after changing site and/or network element address switches and reinstalling the pack. Then press **UPD/INT** on the **SYSCtl**.
- To assign a TID alias, use a CIT to log in (using privileged login and password) to the SONET node. Then enter the **set - ne:TID=name** command to assign the TID alias *name* to the node. The alias *name* can be a string of up to 20 uppercase letters, lowercase letters, numbers, and "-" characters.

Table B – BBG7 OHCTL Switch 1 (S1) Network Element Number

Network Element	Switch S1		
	S1-1	S1-2	S1-3
1	ON	ON	ON
2	OFF	ON	ON
3	ON	OFF	ON
4	OFF	OFF	ON
5	ON	ON	OFF
Invalid	OFF	ON	OFF
Invalid	ON	OFF	OFF
Invalid	OFF	OFF	OFF

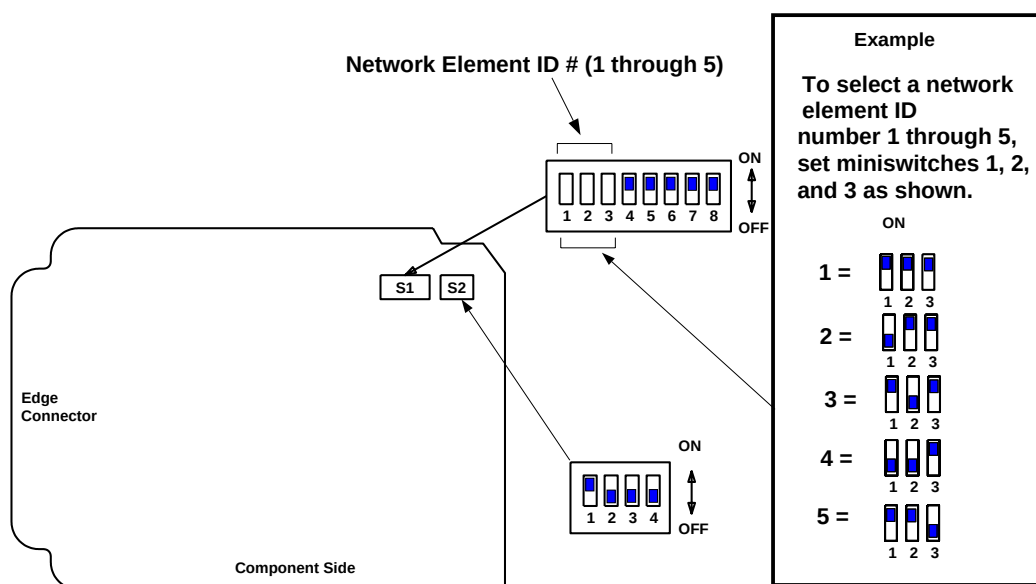


Figure 2 – BBG7 OHCTL Option Settings

Install or Replace the User Interface Display Panel

General: The user interface display panel (UIP) is attached to the access resource manager (ARM) shelf with three snap hooks (top, left, and right sides) and a button-type connection on the bottom. The UIP has four electrical connections (one ground wire, one 24-pin plug, one 20-pin plug, and one 3-pin plug).

1. To install a UIP display panel, proceed to Step 5. To replace a UIP display panel, continue with Step 2.
2. Use a flat blade screwdriver to disconnect the snap hooks on the top, left, and right sides of the UIP. Tilt the top of the user interface panel display away from the frame to remove it.

3.



CAUTION:

Never cut the wire that connects the user interface display panel ESD jack to frame ground.

By removing the top nut, disconnect the ESD ground wire from the back of the user interface display panel.

4. Disconnect **J256** (20 pin on right side), **J214** (24 pin on right side), and **J254** (3 pin in middle) from the back connectors on the UIP (see Figure 1). You must press the connector locking tab to release **J256** and **J214**.

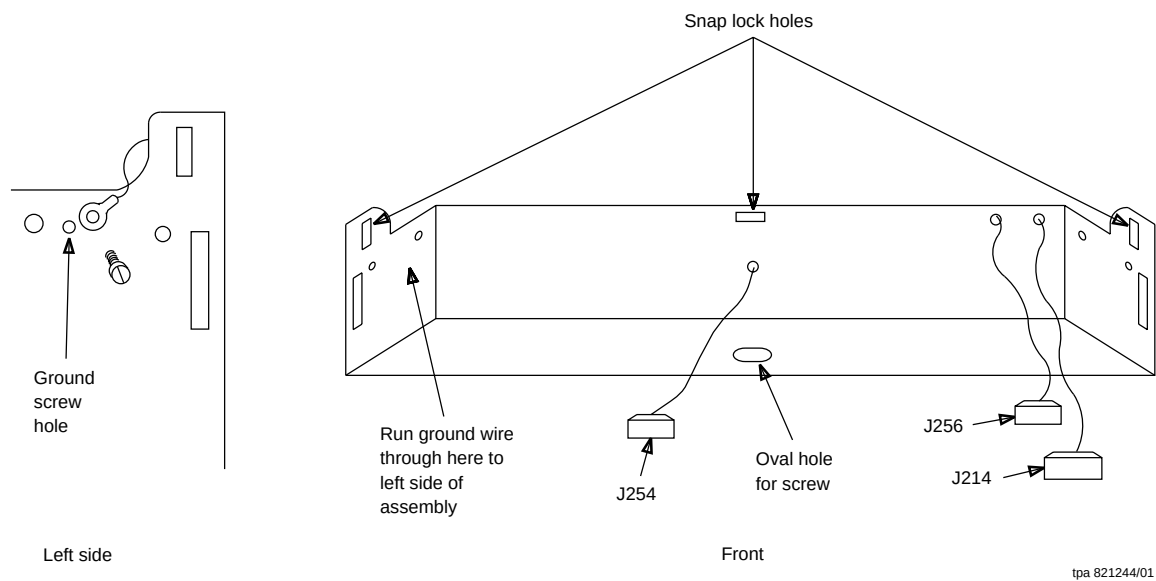


Figure 1 – UIP Display Panel Backplane

5. On UIP display panel being installed, connect:

- **J256** (20 pin on right top side plug),
- **J214** (24 pin on right bottom side plug),
- and **J254** (3 pin in the middle, either way)

to the back connectors on the UIP (see Figure 1).

6. Install the ESD ground wire that is connected to the ARM shelf to the ESD connector on the back of the user interface display panel (Figure 2). The ring lug should be installed between the two nuts on the connector.

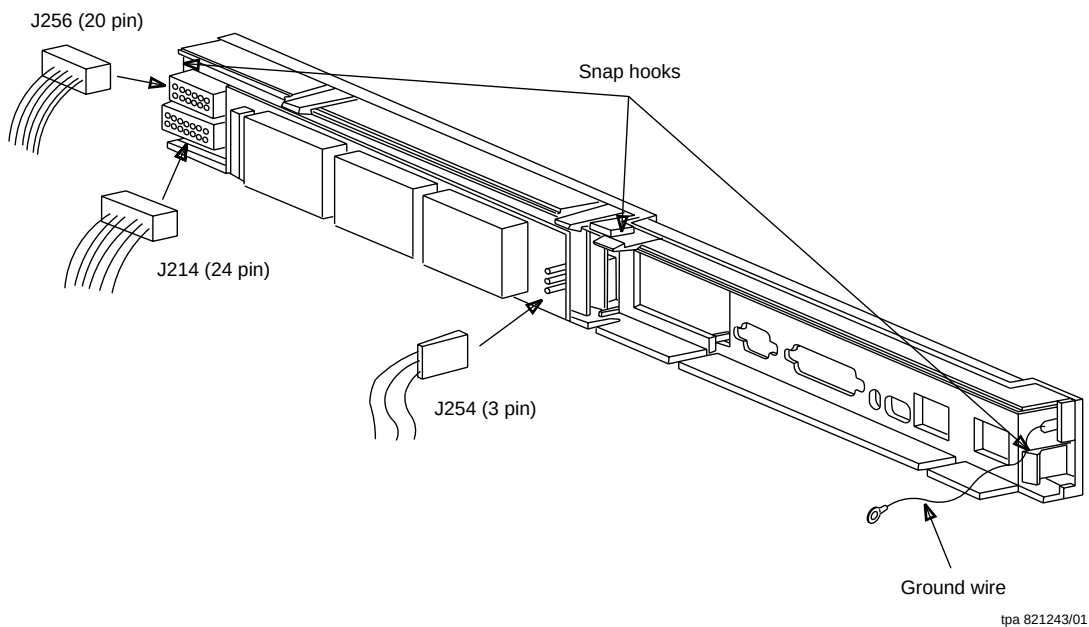


Figure 2 – UIP Display Panel Ground Wire Connection to the ARM Shelf

7. Slide the UIP into place and verify the snap hooks on the top, left, and right sides of the UIP connect to the ARM shelf.
8. Verify 2 Ω or less resistance between the electrostatic discharge (ESD) jack on the UIP and a frame ground point.

STOP. YOU HAVE COMPLETED THIS PROCEDURE.

Connect **SLC[®]-2000** Access System to Ring Optical Facility

1.



CAUTION:

Open optical connectors may emit invisible laser radiation. Do not view beam with optical instruments. Avoid direct exposure to the beam.



CAUTION:

Use of controls or adjustments or performance of procedures other than those specified herein may result in hazardous laser radiation exposure.



CAUTION:

When handling the optical pigtails or jumpers, take care to keep the bending radius as large as possible.



NOTE:

It is assumed that the optical jumpers used to connect the **SLC-2000** Access System to an optical interconnection point are equipped with **ST[®]** lightguide cable connectors. These connectors are spring loaded and have notches that must be aligned with the **OLIU** optical connector tabs before pushing on and turning the connector.

Route the optical jumpers up through the slotted hole(s) at the bottom left-front corner of the **SLC-2000** Access System and up to the **OLIUs**.

2. Establish communication with craftsperson at the other end of the optical span. This procedure requires both ends of the fiber span to be connected for proper alarm responses.

3.

- ⇒ **NOTE:**
The optical connector labeled **OUT** is the output from the **OLIU**. The connector labeled **IN** is the input to the **OLIU**.
- ⇒ **NOTE:**
For **22-type OLIUs**, the output connections **MUST** be made using single-mode optical jumpers.
- ⇒ **NOTE:**
Optical fibers connecting this shelf with a far-end shelf should not be connected to the **OLIU** until at least 45 seconds after an optical loopback is removed.
- ⇒ **NOTE:**
It may take from 15 seconds to 3 minutes and 25 seconds for the **FAULT** LEDs to stop flashing after the cables are connected, depending on the setting of the OC-3 signal degrade threshold (–5 to –9).
- ⇒ **NOTE:**
22-type OLIU input connections may be made with single-mode or multimode optical jumpers.

Remove the protective covers from the optical jumper cables. Clean the fibers with optical quality, lint-free tissue and a compressed air duster.

Reference: **DLP-506**

4.

⇒ **NOTE:**
This procedure requires that only *ONE* **OLIU** (**MAIN 1** at one end, **MAIN 2** at the other end of the optical span) is to be unlooped at a time (to simulate a closed ring). The other ends of the ring (unless closing the ring) must be looped at the **OLIUs** not yet connected to an optical fiber span.

⇒ **NOTE:**
A ring configuration requires that the **MAIN 1 OLIU** at one shelf (node) connects to the **MAIN 2 OLIU** at an adjacent shelf (node). See Figure 1. The procedure to establish the ring configuration starts from one node and continues to an adjacent node, then to the next node until the final connection is made from the last node back to the first node. This procedure is used at a *SLC-2000* ring node.

At the near end, remove the optical loop from *ONE* **OLIU** (for example, **MAIN 2**) associated with the optical span being established. At the other end, remove the optical loop from the associated **OLIU** (for example, **MAIN 1**) in the optical span being established.

Comment: This will cause the **Minor** and **NE Activity** alarms to light and the **OLIU FAULT** LED to start flashing.

5. At one end, connect the output optical fiber jumper for **OLIU** in slot **MAIN 1** to the **OLIU** output connector (labeled **OUT**). At the other end, connect the input optical fiber jumper for **OLIU** in slot **MAIN 2** to the **OLIU** input connector (labeled **IN**).

Comment: You may notice that the **FAULT** LED stops flashing at the end with the **IN** fiber connected. The **OHCTL FAULT** LED may start flashing, and the **Minor** and **FE** LEDs may light at this end.

Just before closing the ring, you may see **NE** and **FE** alarms.

6. At both ends, connect the other optical pair jumper to the **OLIU IN** or **OUT** connector as required.

Requirement: **OLIU FAULT** LED stops flashing and the **ACTIVE** LED lights within 4 minutes. All alarms clear.

Comment: When the *SLC-2000* RT is connected to the network, you may have a **Major** alarm and a **FAULT** LED lighted on the **SYSC** and/or **OHCT** caused by a duplicated site/ne address, TBOS display, or TID. Use the craft interface terminal **rtrv-alm** command to look for this type of trouble. **DLP-517** can be used to clear this trouble by changing the appropriate setting.

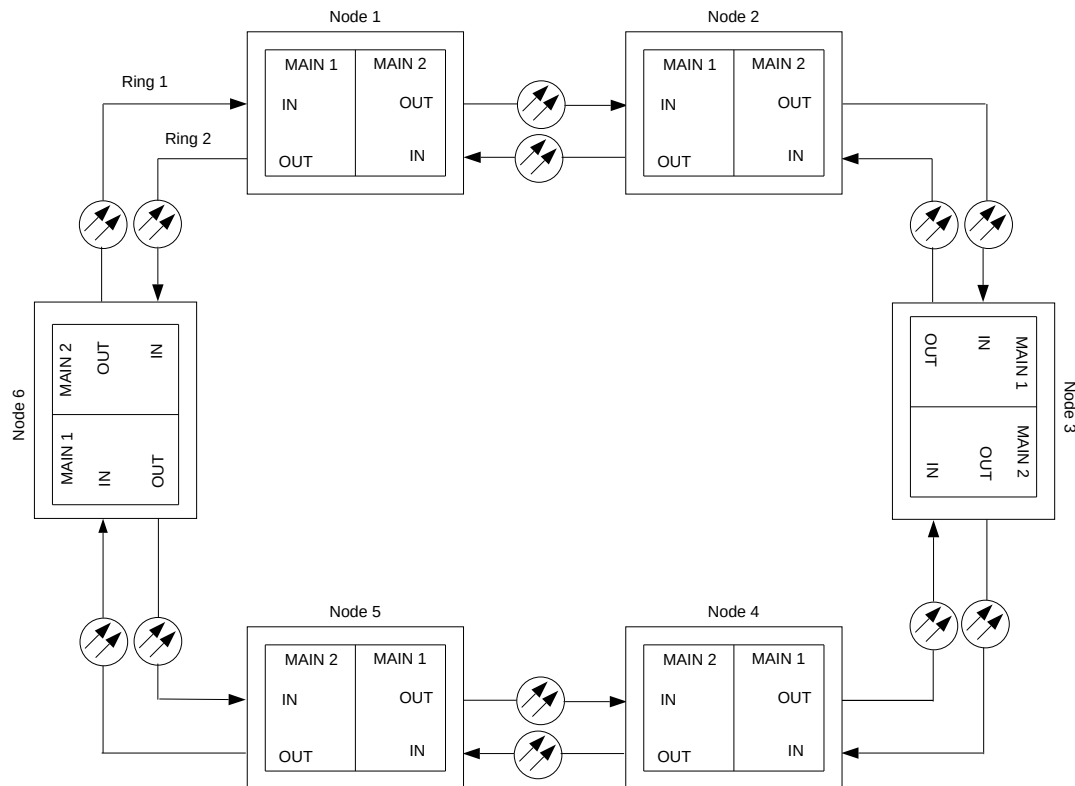


Figure 1 – Example Ring Configuration Connections

7. Did the **OLIU FAULT** LEDs go off?

If **NO**, then proceed to Step **10**.

If **YES**, then continue with Step **9**.

8. Verify that the optical fiber cables are placed correctly in the fiber tray and properly routed in the bay framework.

STOP. YOU HAVE COMPLETED THIS PROCEDURE.

9. Check optical jumper connections at both ends of the fiber. Verify the integrity of the fiber connections. Ensure that the **OLIU** output at one end is connected to the correct **OLIU** input at the other end. If all fiber connections are correct, clear trouble with optical span cable.

If you have an optical test set, check the signal level on the **IN** fiber and **OUT OLIU** connector. The **22-type OLIU** optical output power should be -8.0 to -15.0 dBm. The fiber connected to the **OLIU IN** should have an optical power range from -7.0 to -34.0 dBm.

After both fibers have been connected, do **TAP-103** to clear trouble.

Comment: This procedure must be done for both **MAIN 1** and **MAIN 2 OLIUs**.

SONET Ring or Taper Cross-Connect Philosophy



CAUTION:

Mistakes made when entering cross-connections after a SONET system has been turned up "raw" (with default or no cross-connections made) are the most difficult troubles to identify. When changing (entering or deleting cross-connections), never leave a SONET system alarmed as a result of "just entered cross-connections." Always verify that the origination node and the drop node are equipped with the appropriate low-speed circuit packs to support the service being cross-connected.

General: This philosophy does not attempt to document every possible cross-connect configuration (thousands of combinations are possible). It is not recommended that the SONET subsystem be administered (cross-connections determined and made) from a SLC®-2000 remote terminal. This philosophy gives only three examples for taper (STS-1 and VT1.5 cross-connections) and two examples for ring (VT1 cross-connections) configurations.

The basic idea is to keep all originating node services in a multiplexer group (1, 2, or 3; these refer to Function Group A, B, or C). Then, at the access drop node, you make the appropriate cross-connections to the customer access ports (DLC systems or DS1 channels). At all intermediate nodes (where access service is not dropped), all pass-through ports (VT1 or STS-1) should be cross-connected through. For VT1.5 tapers, no cross-connections (down the taper) should be made for previously "dropped VT1.5s" from the "add node" (originating node). All service is assumed to originate at a DDM-2000 in a central office (CO) node ("add" node) and end at a SLC-2000 Access System node ("drop" node) where the customers are connected.

1. This procedure requires a craft interface terminal (CIT) to be connected to the *SLC-2000* or *DDM-2000*, and it requires the CIT to be logged into the SONET subsystem (see **DLP-521** for Release 3.1, 3.2, or 3.3, **DLP-525** for Release 4.0 or higher, or **DLP-541** for remote CIT access). Use **rtrv-nmap** command to retrieve a map of the SONET subsystem (refer to document 363-208-003, *SLC-2000 Access System, Commands and Messages*) and identify target identification (TID) system names. Use the **rtrv-crs-sts1** or **rtrv-crs-vt1** command at each node to retrieve a cross-connect map. Use **rlgn: TID** to remotely log in to other SONET terminals (you can only "rlgn" to one node at a time, and you must log off before logging on to another remote node).

Comment: If you want to change a previously entered cross-connection, you must first delete the established cross-connection using **dlt-crs-sts1** or **dlt-crs-vt1** command before entering the new cross-connection.

STS-1 Taper

In this example it is assumed a four-node SONET system, one CO DDM-2000 service node and three *SLC-2000* customer access drop nodes are used. It assumes multiplexer group 1 (CO DDM-2000 Function Group A) is used at the first *SLC-2000* system, multiplexer group 2 (CO DDM-2000 Function Group B) is used at the second *SLC-2000* system, and multiplexer group 3 (CO DDM-2000 Function Group C) is used at the third *SLC-2000* system.

For taper configurations, the OC-3 signal enters (from up stream) the *SLC-2000* in **OLI**U slots **MAIN 1** and **MAIN 2** and exits (down stream to the next node) through **OLI**Us in Function Group C slots **1** and **2**. This procedure requires that all the nodes be connected to the SONET subsystem.

2.



NOTE:

You must know the **TID** name (see Step 1) for each node.

At the first *SLC*-2000 system node, enter the following CIT commands:

- **ent-crs-sts1:m-1,a;**
- **ent-crs-sts1:m-2,c-2;**
- **ent-crs-sts1:m-3,c-3;**

3. At the second *SLC*-2000 RT node, enter the following CIT commands:

- **dlt-crs-sts1:m-1,a;**
- **ent-crs-sts1:m-2,a;**
- **ent-crs-sts1:m-3,c-3;**

4. At the third *SLC*-2000 RT node, enter the following CIT commands:

- **dlt-crs-sts1:m-1,a;**
- **ent-crs-sts1:m-3,a;**

This ends the STS-1 taper cross-connection example.



NOTE:

If DS1 services are required, they must be provided from the second *SLC*-2000 RT because they use Function Group C slots equipped with **MXRVO** units. Thus, for taper configurations, a DS1 channel can only be provided from the last RT.

Setting Up a VT1 Taper

For VT1.5 taper configurations, the OC-3 signal enters the *SLC-2000* in **22F OLIU** slots **MAIN 1** and **MAIN 2**. **MAIN 1** exits (down stream to the next node) through **22F OLIUs** in Function Group C slots 1 and 2 to the next SONET node. All nodes in the VT1.5 SONET taper must be connected before entering cross-connections and all nodes must be equipped with **22F OLIUs**.

The SONET generic versions that support taper configurations default to STS-1 cross-connections and must be manually set for VT1.5 cross-connections. After the SONET taper is established, the "set-ne" command is used to set cross-connections to the "manual mode," all default STS-1 must be deleted, and appropriate VT1.5 cross-connections must be made at each node.

5.



NOTE:

You must know the **TID** name (see Step 1) for each node.

At each SONET node, delete all STS-1 cross-connections by entering the following CIT commands:

- **set-ne:tid=x;crs>manual;**
- **rtrv-crs-sts1.**
Use this command to obtain a list of the current STS-1 cross-connections to be deleted (these may be different addresses than the following delete commands assume are present).
- **dlt-crs-sts1:m-1,a-1;**
- **dlt-crs-sts1:m-2,b-2;**
- **dlt-crs-sts1:m-3,c-3;**

VT1 Taper Example 2 (Full System)

In this example it is assumed a seven-node SONET system, one CO DDM-2000 service node, and six mixed mode *SLC*-2000 customer access drop nodes are used. It assumes multiplexer group 1 (CO DDM-2000 Function Group A) is used at the first and second *SLC*-2000 RT nodes, multiplexer group 2 (CO DDM-2000 Function Group B) is used at the third and fourth *SLC*-2000 RT nodes, and multiplexer group 3 (CO DDM-2000 Function Group C) is used at the fifth and sixth *SLC*-2000 RT nodes.

It also arbitrarily assumes that one of the *SLC*-2000 RTs in a multiplexer group is equipped for one Mode 1 and six Mode 2 DLC systems, and the other *SLC*-2000 in a multiplexer group is equipped for one Mode 1 and four Mode 2 DLC systems to take advantage of the OC-3 bandwidth (28 DS1 channels per multiplexer group serving 1,152 customers, 3,456 total).

For this example, the DLC connections to the CO DDM-2000 Function Group X (A, B, or C) must be as follows:

- First *SLC*-2000 in the multiplexer group:
 - DS1 SLOT 1 — to one Mode 1 DLC equipped system
 - DS1 SLOT 2 — to two Mode 2 DLC equipped systems
 - DS1 SLOT 3 — to two Mode 2 DLC equipped systems
 - DS1 SLOT 4 — to two Mode 2 DLC equipped systems.
- Second *SLC*-2000 in the multiplexer group:
 - DS1 SLOT 5 — to one Mode 1 DLC equipped system
 - DS1 SLOT 6 — to two Mode 2 DLC equipped systems
 - DS1 SLOT 7 — to two Mode 2 DLC equipped systems.

6.



NOTE:

You must know the **TID** name (see Step 1) for each node so you can remotely log in (**rlgn:tid=x**) to other nodes and enter cross-connections.



NOTE:

You will generate alarms until you complete all through, drop, and add cross-connections.

At each *SLC-2000* RT, make appropriate pass (STS-1 equivalent) through cross-connections:

- At both RT 1 and RT 2 (first multiplexer group), enter:

ent-crs-vt1:m-2-all,c-2-all;

ent-crs-vt1:m-3-all,c-3-all;.

- At both RT 3 and RT 4 (second multiplexer group), enter:

ent-crs-vt1:m-3-all,c-3-all;.

Comment: If the "**all**" address option is not available, make STS-1 cross-connections and then convert to VT1 cross-connections.
For example:

ent-crs-sts1:m-2,c-2;.

cnvt-crs:m-2,c-2;.

7. Establish cross-connections for multiplexer group x (1, 2, or 3).
The **ent-crs-vt1** has the syntax "*from SONET address*" to "*through or add/drop address*."

Comment: If the "**all**" address option is not available, you must enter each of the following cross-connect commands four times, replacing "**all**" with the DS1 port number (1, 2, 3, and 4).

In the following example, substitute 1, 2, or 3 when you see " x ".

- At the first multiplexer group RT (one Mode 1 and six Mode 2), make the following drop and through cross-connections:
 - a. Drop connections:
ent-crs-vt1:m-x-1-all,a-1-all;
ent-crs-vt1:m-x-2-all,a-3-all;
ent-crs-vt1:m-x-3-all,a-5-all;
ent-crs-vt1:m-x-4-all,a-7-all;
 - b. Through connections:
ent-crs-vt1:m-x-5-all,c-x-5-all;
ent-crs-vt1:m-x-6-all,c-x-6-all;
ent-crs-vt1:m-x-7-all,c-x-7-all;

- At the second multiplexer group RT (one Mode 1 and four Mode 2), make the following drop cross-connections (read the Comment in the previous step):

ent-crs-vt1:m-x-5-all,a-1-all;

ent-crs-vt1:m-x-6-all,a-3-all;

ent-crs-vt1:m-x-7-all,a-5-all;

- At the CO DDM-2000, enter the appropriate cross-connection for the multiplexer group:

For Function Group A (multiplexer group 1)

ent-crs-vt1:m-1-all,a-all;

For Function Group B (multiplexer group 2)

ent-crs-vt1:m-2-all,b-all;

For Function Group C (multiplexer group 3)

ent-crs-vt1:m-3-all,c-all;

Repeat this step for other multiplexer x groups.



NOTE:

DS1 service can only be used at the last RT in a SONET taper system. If DS1 services are required, simply reallocate some DS1 ports used by DLC systems at the last RT node and make sure to cross-connect to Function Group C. For example, to use four DS1 channels at RT last node X, use only four (instead of six) Mode 2 systems and cross-connect the extra ports to Function Group C.

ent-crs-vt1:m-x-7-all,c-1-all;

This command pulls four DS1 channels from the VT1.5 taper (from multiplexer group x, DS1 Slot 7) and drops them in the local shelf (on Function Group C, DS1 Slot 7).

VT1 Taper Example 3 (Add a Mode 2 DLC System)

In this example it is assumed a three or more SONET node system (see "VT1.5 Taper Example 2"), one CO DDM-2000 service node, and at least one *SLC*-2000 customer access drop node somewhere in the taper SONET system are used. It assumes multiplexer group 2 (CO DDM-2000 Function Group B) DS1 slot 7 is used to provide two DS1 ports (3 and 4) to support a Mode 2 DLC system in metallic distribution shelf 8 (system 8 in the upper shelf of MDS assembly 4) at the *SLC*-2000 RT.

8.



NOTE:

You will generate alarms until all cross-connections at all nodes are made correctly.

At the CO originating node, enter the following cross-connections:

```
ent-crs-vt1:m-2-7-3,b-7-3;  
ent-crs-vt1:m-2-7-4,b-7-4;
```

9. At each pass-through node, enter the following cross-connections:

```
ent-crs-vt1:m-2-7-3,c-2-7-3;  
ent-crs-vt1:m-2-7-4,c-2-7-4;
```

10. At the *SLC*-2000 node, enter the following cross-connections:

```
ent-crs-vt1:m-2-7-3,a-7-3;  
ent-crs-vt1:m-2-7-4,a-7-4;
```

Response: All alarms clear after all cross-connections are entered.

VT1 Ring Example 4 (Add a Mode 1 DLC System)

In this example it is assumed a three or more SONET node system, one CO DDM-2000 service node and at least one *SLC*-2000 customer access drop node are used. It assumes multiplexer group 1 (CO DDM-2000 Function Group A) DS1 slot 1 is used to provide four DS1 ports to support a Mode 1 DLC system in metallic distribution shelf 1 at the *SLC*-2000 RT. Figure 1 shows an example of a six-node system, where nodes 1 and 5 are add/drop nodes and all the rest are pass-through nodes.

 **NOTE:**
You will generate alarms until all cross-connections at all nodes are made correctly.

11. At each pass-through node, enter the following cross-connections:

For one DS1 port at a time, enter:

```
ent-crs-vt1:m-1-1-1,m-1-1-1;  
ent-crs-vt1:m-1-1-2,m-1-1-2;  
ent-crs-vt1:m-1-1-3,m-1-1-3;  
ent-crs-vt1:m-1-1-4,m-1-1-4;
```

For four DS1 ports at a time enter:

```
ent-crs-vt1:m-1-1-all,m-1-1-all;
```

12. At both the CO DDM-2000 and the *SLC*-2000 nodes (add/drop nodes), enter the following cross-connections:

For one DS1 port at a time, enter:

```
ent-crs-vt1:m-1-1-1,a-1-1;  
ent-crs-vt1:m-1-1-2,a-1-2;  
ent-crs-vt1:m-1-1-3,a-1-3;  
ent-crs-vt1:m-1-1-4,a-1-4;
```

For four DS1 ports at a time, enter:

```
ent-crs-vt1:m-1-1-all,a-1-all;
```

Response: All alarms clear after all cross-connections are entered.



VT1 Ring Example 5 (Full System)

In this example it is assumed a seven-node SONET system, one CO DDM-2000 service node and six mixed mode *SLC*-2000 customer access drop nodes are used. It assumes multiplexer group 1 (CO DDM-2000 Function Group A) is used at the first and second *SLC*-2000 RT nodes, multiplexer group 2 (CO DDM-2000 Function Group B) is used at the third and fourth *SLC*-2000 RT nodes, and multiplexer group 3 (CO DDM-2000 Function Group C) is used at the fifth and sixth *SLC*-2000 RT nodes.

It also arbitrarily assumes that one of the *SLC*-2000 RTs in a multiplexer group is equipped for one Mode 1 and six Mode 2 DLC systems, and the other *SLC*-2000 in a multiplexer group is equipped for one Mode 1 and four Mode 2 DLC systems to take advantage of the OC-3 bandwidth (28 DS1 channels per multiplexer group serving 1,152 customers, 3,456 total).

For this example, the DLC connections to the CO DDM-2000 Function Group X (A, B, or C) must be as follows:

- First *SLC*-2000 in the multiplexer group:
 - DS1 SLOT 1 — to one Mode 1 DLC equipped system
 - DS1 SLOT 2 — to two Mode 2 DLC equipped systems
 - DS1 SLOT 3 — to two Mode 2 DLC equipped systems
 - DS1 SLOT 4 — to two Mode 2 DLC equipped systems.
- Second *SLC*-2000 in the multiplexer group:
 - DS1 SLOT 5 — to one Mode 1 DLC equipped system
 - DS1 SLOT 6 — to two Mode 2 DLC equipped systems
 - DS1 SLOT 7 — to two Mode 2 DLC equipped systems.

For ring configurations, the OC-3 signal enters and exits the *SLC*-2000 in **OLI** slots **MAIN 1** and **MAIN 2**. **MAIN 1** is connected to **MAIN 2** of the adjacent SONET node. All nodes in the ring must be connected before entering cross-connections.

13.



NOTE:

You must know the **TID** name (see Step 1) for each node so you can remotely log in (**rlgn:tid=x**) to other nodes and enter cross-connections.



NOTE:

You will generate alarms until you complete all through, drop, and add cross-connections.

At each *SLC-2000* RT, make appropriate function group (STS-1 equivalent) through cross-connections:

- At both RT 1 and RT 2 (first multiplexer group), enter:

```
ent-crs-vt1:m-2-all,m-2-all;  
ent-crs-vt1:m-3-all,m-3-all; .
```

- At both RT 3 and RT 4 (second multiplexer group), enter:

```
ent-crs-vt1:m-1-all,m-1-all;  
ent-crs-vt1:m-3-all,m-3-all; .
```

- At both RT 5 and RT 6 (third multiplexer group), enter:

```
• ent-crs-vt1:m-1-all,m-1-all;  
• ent-crs-vt1:m-2-all,m-2-all; .
```

14. Establish cross-connections for multiplexer group *x* (1, 2, or 3).

The **ent-crs-vt1** has the syntax "*from SONET address*" to "*through or add/drop address*."

In the following example, substitute 1, 2, or 3 when you see "x".

- At the first multiplexer group RT (one Mode 1 and six Mode 2), make the following drop and through cross-connections:

- a. Drop connections

```
ent-crs-vt1:m-x-1-all,a-1-all;  
ent-crs-vt1:m-x-2-all,a-3-all;  
ent-crs-vt1:m-x-3-all,a-5-all;  
ent-crs-vt1:m-x-4-all,a-7-all;
```


b. Through connections

```
ent-crs-vt1:m-x-5-all,m-x-5-all;  
ent-crs-vt1:m-x-6-all,m-x-6-all;  
ent-crs-vt1:m-x-7-all,m-x-7-all;
```

- At the second multiplexer group RT (one Mode 1 and four Mode 2), make the following drop and through cross-connections:

a. Drop connections

```
ent-crs-vt1:m-x-5-all,a-1-all;  
ent-crs-vt1:m-x-6-all,a-3-all;  
ent-crs-vt1:m-x-7-all,a-5-all;
```

b. Through connections

```
ent-crs-vt1:m-x-1-all,m-x-1-all;  
ent-crs-vt1:m-x-2-all,m-x-2-all;  
ent-crs-vt1:m-x-3-all,m-x-3-all;  
ent-crs-vt1:m-x-4-all,m-x-4-all;
```

- At the CO DDM-2000, enter the appropriate cross-connection for the multiplexer group:

For Function Group A (multiplexer group 1)

```
ent-crs-vt1:m-1-all,a-all;
```

For Function Group B (multiplexer group 2)

```
ent-crs-vt1:m-2-all,b-all;
```

For Function Group C (multiplexer group 3)

```
ent-crs-vt1:m-3-all,c-all;
```

Repeat this step for other multiplexer x groups.

⇒ **NOTE:**

If DS1 services are required, simply reallocate some DS1 ports used by DLC systems and make sure to cross-connect to Function Group C at the drop node. For example, to use four DS1 channels at RT node 1, use only four (instead of six) Mode 2 systems and cross-connect the extra ports to Function Group C.

```
ent-crs-vt1:m-1-4-all,c-1-all;
```

This command pulls four DS1 channels from the ring (on multiplexer group 1, DS1 Slot 4) and drops them in the local shelf (on function group C, DS1 Slot 1).

Connect CIT and Establish Session (Releases 3.1, 3.2, and 3.3)

General: This procedure is intended to be used at the *SLC*[®]-2000 remote terminal (RT) to connect a craft interface terminal (CIT) and log in to the SONET or digital loop carrier (DLC) subsystem. The CIT is connected to the user interface panel (UIP) **CIT** jack by means of an RS-232 cable. The UIP **CIT** port presents data communication equipment (DCE) as defined in the Electronic Industries Association (EIA) data interchange standards. The UIP **SET-BAUD** command can be used to select the communication baud rate. Both the CIT and the UIP must be set to the same baud rate. The CIT communication parameters must be set for full duplex, 8 data bits, 1 start bit, 1 stop bit, and no flow control. If a personal computer (PC) is used for a CIT, a communication software package (such as *TERM* {ctrm} provided on disk 1 of # with the SONET generic software) must be run to provide a terminal emulator.

Once the CIT is connected to the UIP, enter a 1 to proceed. If security is enabled on the SONET subsystem, you may enter a valid login and password before you are allowed to continue. The *SLC*-2000 SONET subsystem can be remotely accessed from a CIT connected to the DDM-2000 at the central office using the **rlgn:tid** command.

1. Obtain the following equipment:

- a. *IBM*^{*} compatible personal computer (PC) running terminal emulator software using *MS-DOS*[†] operating system, Release 3.0 or later, with a serial port

or

an ASCII terminal.

Comment: Refer to the "Ordering" chapter in document 363-208-000, *SLC-2000 Access System, Applications, Planning, and Ordering Guide*, for a partial summary of compatible CIT terminals, PCs, and modems.

- b. RS-232 cable to connect PC **Serial** port to user interface panel **CIT** port.

Comment: In this procedure it is assumed you are familiar with the characteristics and operating procedures of your terminal or PC and the *MS-DOS* operating system.

* Registered trademark of International Business Machines Corporation.

† Registered trademark of Microsoft Corporation.

2. Press the cover of the UIP to gain access to the CIT port. Connect CIT terminal to **CIT** port by connecting one end of an RS-232 cable to the **COM1** port of the CIT (use a 9-pin to 25-pin converter, if necessary) and the other end of the cable to the user interface panel (UIP) **CIT** port (see Figure 1).
3. Press the user interface panel **Escape** button and then the **Scroll Menu** down arrow button until **SET-BAUD: <ent>** is displayed. Press the user interface panel **Enter** button then the **Scroll Menu** down arrow button until the desired baud rate is displayed (9,600 is the default for the terminal emulator software, **SYSCTL**, and UIP). Press **Enter** to set the CIT baud rate (**DLP-500**).

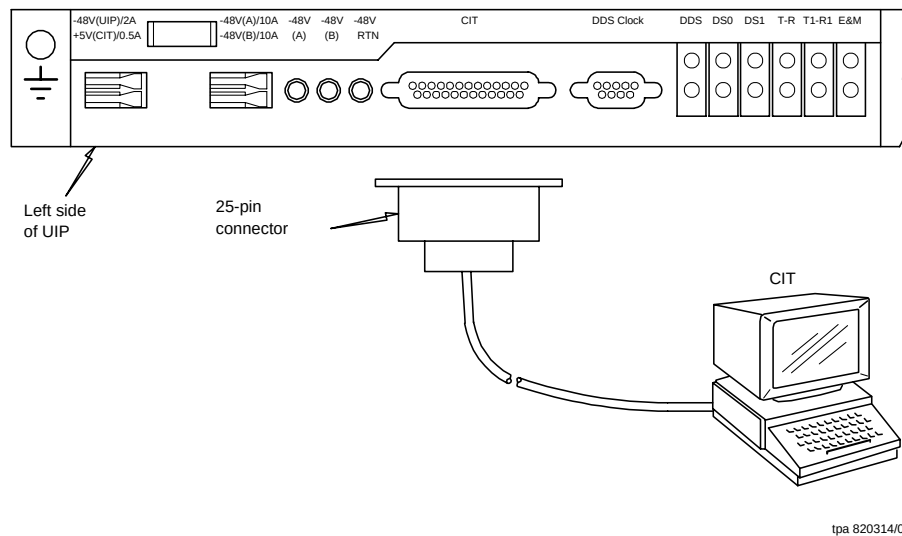


Figure 1 – Typical Craft Interface Terminal (CIT)

4. Turn on the CIT and set the terminal parameters as follows (consult your terminal manual for setup procedures):
 - Full duplex.
 - 8 data bits.
 - 1 start bit.
 - 1 stop bit.
 - No flow control.
 - Baud rate set the same as the **SET-BAUD** UIP command.

Comment: If using a PC as a CIT terminal, run the ctrm terminal emulator software.

5. Enter a question mark (?) or RETURN.

Response: CIT prompts with:

```
/* Enter 1 to continue */  
subsystem =
```

6. Was response correct?

If **YES**, then proceed to Step 8.

If **NO**, then continue with Step 7.

7. Check CIT terminal to **CIT** port connections. Make sure the cable is connected between the CIT communication port and the **CIT** port on the UIP. Ensure that the baud rate is set the same (**SET-BAUD** UIP command) as on the CIT terminal. If you know the CIT is good and cable connections are correct (if the CIT and cable work with a different system), replace the user interface panel (**DLP-518**). Repeat this procedure from Step 2.

8. Enter **1** to enter the SONET subsystem.
9. The CIT will respond with "**login <**". Press the CIT keyboard ENTER/RETURN key or enter login and the password.

Response: The CIT will display a SONET alarm summary generated by the **rtrv-alm:all** command. The CIT will then ask if you want to see the DLC alarm report.

- **If you want to see the DLC alarm report**, type **y** and RETURN.
- **If you DO NOT want to see the DLC alarm report**, type **n** and RETURN.

The CIT will then display a prompt.

10. You are ready to enter commands.
 - **To change to the DLC subsystem after logging in**, enter **DLC** at the prompt.
 - **To change back to the SONET subsystem at any time**, enter **SON** at the prompt.

Refer to document 363-208-003, *SLC-2000 Access System, Commands and Messages*, for available commands. To end a CIT session, enter **logout** and disconnect the CIT.

STOP. YOU HAVE COMPLETED THIS PROCEDURE.

Command Syntax

Most commands used by the *SLC-2000 Access System* require an address parameter of a circuit and possibly parameter values. Some commands do not require either. If an address is required, the circuit's access identifier (AID) is the address.

These commands can be executed in two ways, "*expert*" or "*prompted*". The *expert*, or "*command*" mode, syntax allows you to enter all parameters with a one-line command. All provisionable parameters not entered in this one-line command retain their current values or are initialized to the default values. The syntax of an *expert* command is as follows:

command - name : *address* : *parm=value*, . . . ;

Where:

address is the AID of the circuit.

parm=value are provisionable parameters for the particular circuit selected.

As the name *expert* implies, this command entry syntax should be used with caution and only by experienced craft personnel.

The *prompted* command entry method is started by entering only the **command - name** at the prompt. A menu will prompt you to select a circuit *address*. Subsequent menus will prompt for provisioning parameter values as required. At any time you can enter "?" for help. Entering "?" at the login prompt starts the prompted menu mode.

Establish Standard T1 Cross-Connections

1. Are you installing cross-connections for a TR-08 system or a TR-303 system?

If **TR-08 system**, continue with Step 2.

If **TR-303 system**, go to Step 5.

Comment: See the section on TR-08 and TR-303 cross-connections in Chapter 4 of this manual (before the TOPs section).

2. At the UIP, press the **Escape** button and scroll through the main menu selections until **INITIALIZE-CRS <ent>** is displayed. Press the **Enter** button.
3. Using the up or down arrow key, scroll through the selections until **INIT-CRS:T1 <ent>** is displayed and then press the **Enter** button.

Response: **INIT-CRS:T1:vrt1 <ent>** is displayed on the UIP.

4. Scroll through the menu until the proper VRT number is displayed and press the **Enter** button. The VRTs are numbered 1 through 8 such that VRT 1 is the bottom shelf of MDS assembly #1 and VRT 8 is the top shelf of MDS assembly #4. Press **Enter** to confirm the command.

Response: **INIT-CRS:T1:vrtX In Progress** flashes and **INIT-CRS:T1:vrtX Done** is displayed when the command is completed.

Repeat procedure for all TR-08 VRTs in the system.

⇒ **NOTE:**
The standard TR-08 T1 cross-connections can also be established using the CIT command, **INIT-CRS-T1**. Refer to document 363-208-003, *SLC®-2000 Access System, Commands and Messages*, for information on CIT commands.

STOP. YOU HAVE COMPLETED THIS PROCEDURE.

5. Using the CIT, enter the following command:

ENT-CRS-T1::a-all,v3fdr-1-all;

⇒ **NOTE:**
This command will cross-connect all 28 physical DS1s to all 28 logical DS1s on the TR-303 VRT. For other cross-connect configurations, refer to document 363-208-003, *SLC-2000 Access System, Commands and Messages*, for information on CIT commands.

STOP. YOU HAVE COMPLETED THIS PROCEDURE.

Establish Standard T0 Cross-Connections

⇒ **NOTE:**
The following restrictions should be observed when cross-connecting to a DS1 feeder, using a TR-08 interface, in a SLC®-2000 Access System equipped with the R4.5 enhanced FiberReach/DT feature. For more detail, refer to Chapter 3, “System Configurations and Applications, T0 Cross-Connect/Checkerboarding Restrictions”, of 363-208-000, *SLC-2000 Access System, Applications, Planning, and Ordering Guide*.

If...	Then...
The customer line terminates on a DT hosted by a DT Server located in MDS slot 1, 3, 5, 7, 13, 15, 17, or 19 .	Observe the following restrictions when cross-connecting to a DS1 feeder using one of the following CO interfaces. • TR-303 and INA – no restrictions. • TR-08 Mode 1 – no restrictions. • TR-08 Mode 2 – cross-connections are only allowed within the shelf terminating the customer line.
The customer line terminates on a DT hosted by a DT Server located in MDS slot 9, 11, 21, or 23 .	Observe the following restrictions when cross-connecting to a DS1 feeder using one of the following CO interfaces. • TR-303 and INA – no restrictions. • TR-08 Mode 1 and Mode 2 – not supported. Cross-connections are <i>not</i> allowed from these slots to these types of CO interfaces.

1. Are you installing cross-connections for a TR-08 system or a TR-303 system?

If **TR-08 system**, continue with Step 2.

If **TR-303 system**, go to Step 5.

Comment: See the section on TR-08 and TR303 cross-connections in Chapter 4 of this manual (before the TOPs section).

2. At the UIP, press the **Escape** button and scroll through the main menu selections until **INITIALIZE-CRS <ent>** is displayed. Press the **Enter** button.

3. Using the up or down arrow key, scroll through the selections until **INIT-CRS:T0 <ent>** is displayed and then press the **Enter** button.

Response: **INIT-CRS:T0:vrtX <ent>** is displayed on the UIP.

4. Scroll through the menu until the proper VRT number is displayed and press the **Enter** button. The VRTs are numbered 1 through 8 such that VRT 1 is the bottom shelf of MDS assembly #1 and VRT 8 is the top shelf of MDS assembly #4. Press **Enter** to confirm the command.

Response: **INIT-CRS:T0:vrtX In Progress** flashes and **INIT-CRS:T0:vrtX Done** is displayed when the command is completed.

Repeat procedure for all TR-08 VRTs in the system.

⇒ NOTE:

The standard TR-08 T0 cross-connections can also be established using the CIT command, **INIT-CRS-T0**. Refer to document 363-208-003, *SLC®-2000 Access System, Commands and Messages*, for information on CIT commands.

STOP. YOU HAVE COMPLETED THIS PROCEDURE.

5. Using the CIT, enter the following command:

INIT-CRS-T0::v303-X:::1,8;

Where *X* is 1 for systems equipped with software release R4.2. For systems equipped with R4.2 or later, *X* is either 1 or 2.

⇒ NOTE:

This command will cross-connect 768 physical lines to 768 logical lines of the TR-303 VRT. For other cross-connect configurations, refer to document 363-208-003, *SLC-2000 Access System, Commands and Messages*, for information on CIT commands.

STOP. YOU HAVE COMPLETED THIS PROCEDURE.

Install New DLC Generic Program

Summary: This procedure is to be used at the *SLC*®-2000 Access System when a **BBF261 SMU** needs to be upgraded with a higher generic. You must connect a PC either locally to the user interface panel (UIP) or remotely to the rear **CIT** port and run **TERM** to load software.

To upgrade the DLC generic software, use the CIT **ins-prog:tid ;** command.

In this procedure, it is assumed you have the correct version DLC generic software, and you have determined that you must load the software at the SLC-2000 system.

⇒ **NOTE:**
Before beginning software installation, refer to the *Software Release Description* for the software being installed for a description of any special considerations required when installing this version of the software.

1. If necessary, connect the CIT to the *SLC*-2000 RT using the procedure in **DLP-521** or **DLP-525** (local access) or **DLP-541** (remote access).
2. Obtain working copies of the new system generic program diskette(s) and the Software Release Description for the software being installed.
3. To avoid downloading troubles, the option switches **S3-1**, **S3-2**, and **S3-3** on the **SYSCTL** must match the baud rate used by the UIP and CTRM. If the system is equipped with the **BBG5 SYSCTL**, refer to **DLP-502** to select a baud rate CIT option (9,600 is S3-1 ON, S3-2 OFF, S3-3 OFF and is the recommended setting).
4. Is the software program being installed directly from the 3 1/2 or 5 1/4 inch diskettes (floppies) in the diskette drive or from a directory on the hard drive?

If **hard drive**, continue with Step 5.

If **diskette drive**, proceed to Step 22.

5.



CAUTION:

Unexpected problems can result when loading software from an MS-DOS window running under the Windows 95 platform. When loading software in the SLC-2000 Access System, run the CTRM program directly from DOS. Failure to follow this precaution can corrupt the memory in the SMU and a service outage may occur (if a spare SMU is not available).

Start MS-DOS operating system on the PC.

Response: PC displays the prompt (for example, **C:\>**) determined by the PC.

6. Insert the floppy diskette(s) into the PC drive one at a time in the correct order and copy all files on the source diskette(s) to a directory (such as **GEN_ver** where *ver* should be 311 for generic version 3.1.1) on the PC hard disk.

7. Use the **cd** command to go to the appropriate hard drive directory.

Response: PC displays the appropriate prompt.

8. Execute the command **checkpgm** to check the version number of the program you are installing and to verify that the floppy disks for the upgrade are error free. This command may take several minutes to run.

Response: **PC has slc_dlc program version #.#.#** appears on the screen. **Checking files** is displayed on the screen followed by several periods.

Once the program has checked all of the files and all files are good, then **/* All files OK */** appears on the screen. If a problem is detected in the files, get new software and repeat this step.

9. Enter **term** or **term COMn** to select a PC serial communication port (COM2, COM3, or COM4) other than the default COM1 port.

Response: A brief message is displayed and you are instructed to **Press any key to continue . . .** After you press any key, the terminal emulator loads and the terminal responds as follows:
CTRM ready. (Type Alt-h for help.)
Communications established.

10.



NOTE:

The default data rate for the CTRM terminal emulator is 9,600 baud.

If a data rate other than 9,600 baud is being used, enter "*Alt-c*" and follow the instructions on the CTRM screen to set the terminal emulator data rate to match the selected data rate selected by the **SET-BAUD** UIP command.

11. Enter **?** or **RETURN**.

Response: PC prompts with:

```
/* Enter a "1" to proceed */  
subsystem =
```

12. Was response correct?

If **YES**, then go to Step **14**.

If **NO**, then continue with Step **13**.

13. Check PC to **CIT** port connections. For local CIT access, make sure the cable is connected between the PC **COM1** port and the **CIT** port on the UIP. For remote CIT access, make sure the cables are connected between the CIT **COM1** port, modems, and the rear **CIT** port. If the system is equipped with the **BBG5 SYSCTL**, set the **SYSCTL** front access baud rate option switches **S3-1**, **S3-2**, and **S3-3 (DLP-502)** to the baud rate being used and ensure that the baud rate is set the same (**SET-BAUD** UIP command) as on CTRM terminal emulator and **SYSCTL**. Verify that the shelf ID on the **SYSCTL** is set to 1 (for the **BBG5 SYSCTL**, switches **S2-4**, **S2-5**, and **S2-6** toward **ON**). If the system is equipped with the **BBG8 SYSCTL**, set the product (shelf) type switches **S1-1**, **S1-2**, and **S1-3** to **OFF**. Verify that **BBG8 SYSCTL** switch sections **S2-2**, **S2-3**, **S2-4**, **S2-5**, **S2-6**, **S2-7**, and **S2-8** are all set to **OFF**. Check CTRM setup and make sure COM port is configured for COM1. If you know the PC is good and cable connections are correct (if the PC and cable work with a different system), replace the user interface panel (**DLP-518**) if the CIT is located locally or replace the **BBF250 LAN** pack if the CIT is located remotely. Repeat this procedure from Step 7.

14.



NOTE:

Wait until the program installation is complete for this shelf. See *Software Release Description* for more detail.

Press **1** then **Enter**.

Response: **login <** appears immediately after you enter 1.

15. At the **login** < prompt, enter the login (**LUC01**, **LUC02**, or **LUC03**) and the password (**SLC-2000**).

Response: The PC prompts with **Press <CR> to continue . . .**

Press **Return** after system prompt to generate alarm summaries.

Response: The CIT displays **/* Active Alarm and Status Report** for SONET.

Press **Return** again.

Response: The CIT displays **/* Active Alarm and Status Report** for DLC.

16. Enter the command **ins-prog:tid**.

Response: **/* Testing For Program Installation... */**

The PC displays a **Caution!** message followed by the prompt:

Execute? (y/n) =.

17. Enter a **"y"** or **"yes"** and a carriage return to continue with software installation.

18. If PC disk errors occur during the software download, the terminal emulator (CTRM program) may display references to error numbers and the PC may print an error message such as the following:

Disk error Abort, Retry, Ignore?

If you have this trouble, you will need to repeat this procedure after determining why the PC failed (bad drive/PC, corrupt files, etc.).

When the generic SMU software is downloading to the *SLC-2000* system, you will notice the following:

Response: The SMU **FAULT** LED starts to flash and the disable LED lights, indicating program is being loaded.

The PC starts download and displays the following message:

In progress

The dots continue to display until program installation is complete. After installation is completed, the PC displays the following completion message:

```
ins-prog: TID COMPLD  
/* Generic #.#.# is installed */
```

The **SMU FAULT** LED stops flashing and goes off and the **DSBLD** LED remains lighted.

⇒ **NOTE:**
If the software download is being performed from a remote CIT, there is a possibility that the modem connected to the rear RT **CIT** port will not disconnect properly from the **CIT** port after the software has downloaded. If this happens, the **CIT** port is left in a “hung up” state and the port cannot be used until the modem disconnects from the **CIT** port. To remove the modem from this “hung up” state, reseal the cable attached to the rear **CIT** port connector. If the modem remains in the “hung up” state after reseating the cable, then replace the **BBF250 LAN** pack.

19. Was response correct?

If **YES**, then continue with Step 20.

If **NO**, then do **Trouble Clearing: TAP-108**.

20. Log into system again and use the **RTRV-EQPT:SMU**; CIT command or **RETRIEVE-PROG-VRSN** user interface panel command (**DLP-500**) to verify that the proper generic version is loaded.

21. Log out (enter **logout** and then press **AL**ternate and **F2** at the same time) and disconnect PC.

STOP. YOU HAVE COMPLETED THIS PROCEDURE.

22.



NOTE:

In this procedure it is assumed the installation will be done using the diskette(s).



CAUTION:

Unexpected problems can result when loading software from an MS-DOS window running under the Windows 95 platform. When loading software in the SLC-2000 Access System, run the CTRM program directly from DOS. Failure to follow this precaution can corrupt the memory in the SMU and a service outage may occur (if a spare SMU is not available).

Start *MS-DOS* operating system on the PC.

Response: PC displays the prompt (for example, **A:\>**) determined by the PC.

23.



NOTE:

The new generic program may be on many floppy disks. The PC will prompt you to insert disks as needed after the first disk is installed.

Insert the first floppy disk into the PC drive.

24. Use the appropriate *MS-DOS* command (for example, **a:** or **b:**) to go to the drive with the floppy disk installed.

Response: PC displays the appropriate prompt.

Comment: If you get a disk error message, verify the drive latch is locked and that you have the proper diskette installed in the drive.

25. Execute the command **checkpgm** to check the version number of the program you are installing and to verify that the floppy disks for the upgrade are error free. This command may take several minutes to run and may require swapping diskettes in the disk drive.

Response: **PC has slc_dlc program version #.#.#** appears on the screen. **Checking files** is displayed on the screen followed by several periods.

Once the program has checked all of the files and all files are good, then **/* All files OK */** appears on the screen. If a problem is detected in the files, get new software and repeat this step.

26. Enter **term** or **term COMn** to select a PC serial communication port (COM2, COM3, or COM4) other than the default COM1 port.

Response: A brief message is displayed and you are instructed to
Press any key to continue . . . After you press any key,
the terminal emulator loads and the terminal responds as follows:
CTRM ready. (Type Alt-h for help.)
Communications established.

27. Was response correct?

If **YES**, then go to Step **29**.
If **NO**, then continue with Step **28**.

28. Ensure first (number 1) disk of program being installed is inserted. Ensure diskette is inserted in correct drive and that the correct command was used to go to the drive with the diskette installed.

- 29.

 **NOTE:**
The default data rate for the CTRM terminal emulator is 9,600 baud.

If a data rate other than 9,600 baud is being used, enter "*Alt-c*" and follow the instructions on the CTRM screen to set the terminal emulator data rate to match the selected data rate selected by the **SET-BAUD** UIP command.

30. Enter **?** or **RETURN**.

Response: PC prompts with:
/* Enter a "1" to proceed */
subsystem =

31. Was response correct?

If **YES**, then go to Step **33**.
If **NO**, then continue with Step **32**.

32. Check PC to **CIT** port connections. For local CIT access, make sure the cable is connected between the PC **COM1** port and the **CIT** port on the UIP. For remote CIT access, make sure the cables are connected between the CIT **COM1** port, modems, and the rear **CIT** port. If the system is equipped with the **BBG5 SYSCTL**, set the **SYSCTL** front access baud rate option switches **S3-1**, **S3-2**, and **S3-3 (DLP-502)** to the baud rate being used and ensure that the baud rate is set the same (**SET-BAUD** UIP command) as on CTRM terminal emulator and **SYSCTL**. Verify that the shelf ID on the **SYSCTL** is set to 1 (for the **BBG5 SYSCTL**, switches **S2-4**, **S2-5**, and **S2-6** toward **ON**). If the system is equipped with the **BBG8 SYSCTL**, set the product (shelf) type switches **S1-1**, **S1-2**, and **S1-3** to **OFF**. Verify that **BBG8 SYSCTL** switch sections **S2-2**, **S2-3**, **S2-4**, **S2-5**, **S2-6**, **S2-7**, and **S2-8** are all set to **OFF**. Check CTRM setup and make sure COM port is configured for COM1. If you know the PC is good and cable connections are correct (if the PC and cable work with a different system), replace the user interface panel (**DLP-518**) if the CIT is located locally or replace the **BBF250 LAN** pack if the CIT is located remotely. Repeat this procedure from Step 7.

33.



NOTE:

Wait until the program installation is complete for this shelf. See *Software Release Description* for more detail.

Press **1** then **Enter**.

Response: **login** < appears immediately after you enter 1.

34. At the **login** < prompt, enter the login (**LUC01**, **LUC02**, or **LUC03**) and the password (**SLC-2000**).

Response: The PC prompts with **Press <CR> to continue . . .**

Press **Return** after system prompt to generate alarm summaries.

Response: The CIT displays **/* Active Alarm and Status Report** for SONET.

Press **Return** again.

Response: The CIT displays **/* Active Alarm and Status Report** for DLC.

35. Enter the command **ins-prog:tid**.

Response: **/* Testing For Program Installation... */**

The PC displays a **Caution!** message followed by the prompt:

Execute? (y/n) =.

36. Enter a "y" or "yes" and a carriage return to continue with software installation.
37. The generic software comes in many files and may be on several diskettes. If the software is on separate floppies, you must swap disks in the drive after the following message appears:

**Ready for next diskette.
Please insert next diskette and strike the spacebar when ready.**

If PC disk errors occur during the software download, the terminal emulator (CTRM program) may display references to error numbers and the PC may print an error message such as the following:

Disk error Abort, Retry, Ignore?

If you have this trouble, you will need to repeat this procedure after determining why the PC failed (bad diskettes, bad drive/PC, drive latch not closed, corrupt files, etc.).

When the generic SMU software is downloading to the *SLC-2000* system, you will notice the following:

Response: The SMU **FAULT** LED starts to flash and the disable LED lights, indicating program is being loaded.

The PC starts download and displays the following message:

In progress

The dots continue to display until program installation is complete. After installation is completed, the PC displays the following completion message:

**ins-prog: TID COMPLD
/* Generic #.#.# is installed */**

The **SMU FAULT** LED stops flashing and goes off and the **DSBLD** LED remains lighted.



NOTE:

If the software download is being performed from a remote CIT location, there is a possibility that the modem connected to the rear RT **CIT** port will not disconnect properly from the **CIT** port after the software has downloaded. If this happens, the **CIT** port is left in a “hung up” state and the port cannot be used until the modem disconnects from the **CIT** port. To remove the modem from this “hung up” state, reseal the cable attached to the rear **CIT** port connector. If the modem remains in the “hung up” state after reseating the cable, then replace the **BBF250 LAN** pack.

38. Was response correct?

If **YES**, then continue with Step 39.

If **NO**, then do **Trouble Clearing: TAP-108**.

39. Log into system again and use the **RTRV-EQPT:SMU**; CIT command or **RETRIEVE-PROG-VRSN** user interface panel command (**DLP-500**) to verify that the proper generic version is loaded.

40. Log out (enter **logout** and then press **AL**ternate and **F2** at the same time) and disconnect PC.

STOP. YOU HAVE COMPLETED THIS PROCEDURE.

Connect CIT and Establish Session (Release 4.0 and Later)

General: This procedure is intended to be used at the *SLC*[®]-2000 remote terminal (RT) to connect a craft interface terminal (CIT) and login to the synchronous optical network (SONET) or digital loop carrier (DLC) subsystem. The CIT is connected to the user interface panel (UIP) **CIT** jack by means of an RS-232 cable. The UIP **CIT** port presents data communication equipment (DCE) as defined in the Electronic Industries Association (EIA) data interchange standards. The UIP **SET-BAUD** command can be used to select the communication baud rate used. Both the CIT and the UIP must be set to the same baud rate. The CIT communication parameters must be set for full duplex, 8 data bits, 1 start bit, 1 stop bit, and no flow control. If a personal computer (PC) is used for a CIT, a communication software package (such as *TERM*{ctrm} provided on disk 1 with the SONET generic software) must be run to provide a terminal emulator.

Once the CIT is connected to the UIP, enter a "1" to proceed. If security is enabled on the SONET subsystem, you may enter a valid login and password before you are allowed to continue. The *SLC*-2000 SONET subsystem can be remotely accessed from a CIT connected to the DDM-2000 at the central office using the **r lgn: tid** command.

1. Obtain the following equipment:

- a. *IBM*^{*} compatible personal computer (PC) running terminal emulator software using *MS-DOS*[†] operating system, Release 3.0 or later with a serial port.

or

an ASCII terminal.

Comment: Refer to the "Ordering" chapter in document 363-208-000, *SLC-2000 Access System, Applications, Planning, and Ordering Guide*, for a partial summary of compatible CIT terminals, PCs, and modems.

- b. RS-232 cable to connect PC **Serial** port to user interface panel **CIT** port.

Comment: In this procedure it is assumed you are familiar with the characteristics and operating procedures of your terminal or PC and the *MS-DOS* operating system.

2. Press the cover of the UIP to gain access to the CIT port. Connect CIT terminal to **CIT** port by connecting one end of an RS-232 cable to the **COM1** port of the CIT (use a 9-pin to 25-pin converter, if necessary) and the other end of the cable to the user interface panel (UIP) **CIT** port (see Figure 1).

* Registered trademark of International Business Machines Corporation.

† Registered trademark of Microsoft Corporation.

3. Press the user interface panel **Escape** button and then the **Scroll Menu** down arrow button until **SET-BAUD: <ent>** is displayed. Press the user interface panel **Enter** button then the **Scroll Menu** down arrow button until the desired baud rate is displayed (9,600 is the default for the terminal emulator software, **SYSCtl**, and UIP). Press **Enter** to set the CIT baud rate (**DLP-500**).

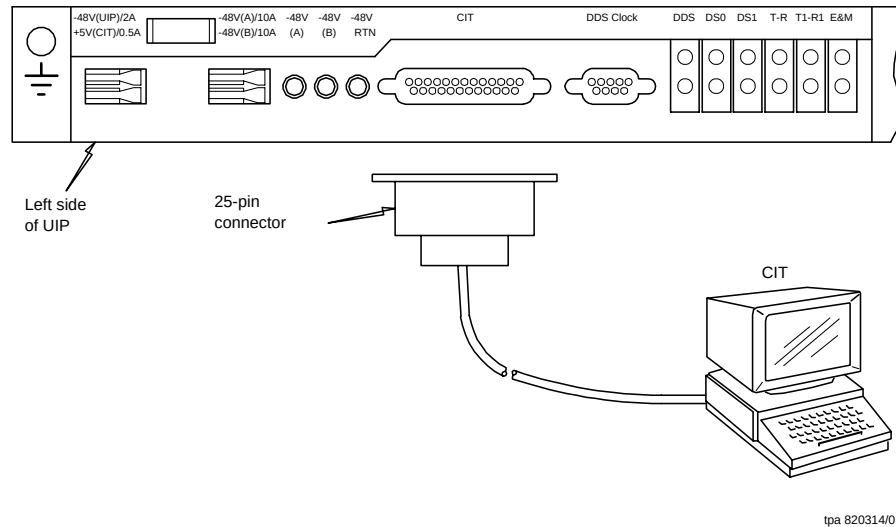


Figure 1 – Typical Craft Interface Terminal (CIT)

4. Turn on the CIT and set the terminal parameters as follows (consult your terminal's manual for setup procedures):
 - Full duplex.
 - 8 data bits.
 - 1 start bit.
 - 1 stop bit.
 - No flow control.
 - Baud rate set the same as the **SET-BAUD** UIP command.

Comment: If using a PC as a CIT terminal, run the *CTRM* terminal emulator software.

5. Enter a question mark (?) or RETURN.

Response: CIT prompts with:

```
/* Enter 1 to continue */  
subsystem =
```

6. Was response correct?

If **YES**, then proceed to Step 8.

If **NO**, then continue with Step 7.

7. Check CIT terminal to **CIT** port connections. Make sure the cable is connected between the CIT communication port and the **CIT** port on the UIP. Ensure that the baud rate is set same (**SET-BAUD** UIP command) as on CIT terminal. If you know the CIT is good and cable connections are correct (if the CIT and cable work with a different system), replace the user interface panel (**DLP-518**). Repeat this procedure from Step 2.

8. Enter **8** to select the DLC subsystem, or enter **13** to select the SONET subsystem.

9. Was DLC or SONET selected?

If **SONET**, then proceed to Step 11.

If **DLC**, then continue with Step 10.

10. The CIT will respond with an identification message followed by a prompt.

You are ready to enter commands. Refer to document 363-208-003, *SLC-2000 Access System, Commands and Messages*, for available commands. To end a CIT session enter, **logout** and disconnect the CIT.

STOP. YOU HAVE COMPLETED THIS PROCEDURE.

11. The CIT will respond with "**login <**" (enter **LUC01**, **LUC02**, or **LUC03**) and "**password**" (enter **SLC-2000**).

Response: The CIT will display a SONET alarm summary generated by the **rtrv-alm: all** command. The CIT will then display a prompt.

You are ready to enter commands. Refer to document 363-208-003, *SLC-2000 Access System, Commands and Messages*, for available commands. To end a CIT session, enter **logout** and disconnect the CIT.

STOP. YOU HAVE COMPLETED THIS PROCEDURE.

Command Syntax

Most commands used by the *SLC-2000 Access System* require an address parameter of a circuit and possibly parameter values. Some commands do not require either. If an address is required, the circuit access identifier (AID) is the address.

These commands can be executed in two ways, "*expert*" or "*prompted*". The *expert*, or "*command*" mode, syntax allows you to enter all parameters with a one-line command. All provisionable parameters not entered in this one line command retain their current values, or are initialized to the default values. The syntax of an *expert* command is as follows:

command - name : address : parm=value,...;

where *address* is the AID of the circuit.

parm=value are provisionable parameters for the particular circuit selected.

As the name *expert* implies, this command entry syntax should be used with caution only by experienced craft personnel.

The *prompted* command entry method is started by entering only the **command - name** at the prompt. A menu will prompt you to select a circuit *address*. Subsequent menus will prompt for provisioning parameter values as required. At any time you can enter "?" for help. Entering "?" at the login prompt starts the prompted menu mode.

Establish INA T1 Cross-Connections

⇒ **NOTE:**
See the section on INA cross-connections in Chapter 4 of this manual (before the TOPs sections).

1. Obtain the work order.
2. Using the work order, establish the INA cross-connection using the **ent-crs-t1** CIT command.

For example:

ent-crs-t1::a-all,ina-all;

⇒ **NOTE:**
Refer to document 363-208-003, *SLC®-2000 Access System, Commands and Messages*, for information on CIT commands.

STOP. YOU HAVE COMPLETED THIS PROCEDURE.

Establish INA T0 Cross-Connections

⇒ **NOTE:**
See the section on INA cross-connections in Chapter 4 of this manual (before the TOPs section).

1. Obtain the work order.
2. Using the work order, establish the INA cross-connection for either metallic circuits or FITL circuits using one of the following CIT commands.

- ***Metallic Circuits:***

```
ENT-CRS-T0::inads0-<inads1>-<ds0>, drop-<shelf>-<cu>-<ckt>;
```

- ***FITL Circuits:***

```
ENT-CRS-T0::inads0-<inads1>-<ds0>, dtdp-<shelf>-<Server Channel  
Unit>-<cu>-<ckt>;
```

⇒ **NOTE:**
Refer to document 363-208-003, *SLC®-2000 Access System, Commands and Messages*, for information on CIT commands.

STOP. YOU HAVE COMPLETED THIS PROCEDURE.

Replace CORE Circuit Packs

Overview: This procedure describes the steps required to minimize the disruption to the SLC[®]-2000 Access System when replacing the core circuit packs. These packs include the **TSI** and the **BMP** circuit pack.

To safely remove a core circuit pack, ensure that it is not in the active state. The best way to check this is to verify that the **ACTIVE** LED is off on all core circuit packs for the side being removed and the **ACTIVE** LED is lighted on all core circuit packs on the side *not* being removed. It is also a good idea to force the core to the side not being removed for the duration of the repair.

1. Is the circuit pack being replaced a **TSI-1** or a **BMP-1**?

If **NO**, then continue with Step 2.

If **YES**, then proceed to Step 5.

2. Is the circuit pack being replaced a **TSI-2** or a **BMP-2**?

If **YES**, then continue with Step 3.

If **NO**, you are in the wrong procedure. Return to **TAP-101**.

3. At the UIP, execute the RETRIEVE-FAULTS command. Are there any fault conditions present for **TSI-1**, **BMP-1**, and/or **CORE-1**? Are the **FAULT** LEDs lighted on **TSI-1** and/or **BMP-1**?

If **YES**, and this condition exists for more than 15 minutes, return to **TAP-101**. Continuing this procedure will most likely result in dropped calls. At this point, you can wait for the conditions to clear (for installation or initialization faults) or return to **TAP-101**.

If **NO**, proceed to Step 4.

4. Replace the **CORE-2** circuit pack as shown in Table A.

Table A – Replacing the CORE-2 Circuit Packs

Step Number	Procedure
1.	At the UIP, execute the SWITCH-CORE:FORCE->1 command.
2.	Replace the circuit pack. Wait for the pack to install and initialize.
3.	When the TSI-2 or BMP-2 and CORE-2 faults clear, execute the SWITCH-CORE:RESET command at the UIP to re-enable protection switching.
4.	At the UIP, execute the SWITCH-CORE:FORCE->2 command to make the newly replaced copy active.
5.	At the UIP, execute the SWITCH-CORE:RESET command to re-enable protection switching.
6.	Monitor the system for fault information for an additional 5 minutes. If faults appear, return to TAP-101 and clear the new faults.

STOP. YOU HAVE COMPLETED THIS PROCEDURE.

5. At the UIP, execute the **RETRIEVE-FAULTS** command. Are there any fault conditions present for **TSI-2**, **BMP-2**, and/or **CORE-2**? Are the **FAULT** LEDs lighted for **TSI-2** and/or **BMP-2**?

If **YES**, and this condition exists for more than 15 minutes, return to **TAP-101**. Continuing this procedure will most likely result in dropped calls. At this point, you can wait for the conditions to clear (for installation or initialization faults) or return to **TAP-101**.
If **NO**, continue with Step 6.

6. Replace the **CORE-1** circuit pack as shown in Table B.

Table B – Replacing the CORE-1 Circuit Packs

Step Number	Procedure
1.	At the UIP, execute the <i>SWITCH-CORE:FORCE->2</i> command.
2.	Replace the circuit pack. Wait for the pack to install and initialize.
3.	When the TSI-1 or BMP-1 and CORE-1 faults clear, execute the <i>SWITCH-CORE:RESET</i> command at the UIP to re-enable protection switching.
4.	At the UIP, execute the <i>SWITCH-CORE:FORCE->1</i> command to make the newly replaced copy active.
5.	At the UIP, execute the <i>SWITCH-CORE:RESET</i> command to re-enable protection switching.
6.	Monitor the system for fault information for an additional 5 minutes. If faults appear, return to TAP-101 and clear the new faults.

STOP. YOU HAVE COMPLETED THIS PROCEDURE.

Replace VTU/LIU Circuit Packs

Overview: This procedure describes the steps required to minimize the disruption to the SLC®-2000 Access System during replacement of **VTU** or **LIU** circuit packs.

To safely remove a service **VTU/LIU** circuit pack, it must be protected by the protection pack (**VTU/LIU-8**). To safely remove a protection **VTU/LIU** circuit pack, it must not be protecting a service pack.

1. Is the circuit pack being replaced a **VTU** or **LIU**?

If **NO**, you are in the wrong procedure. Return to **TAP-101**.
If **YES**, then continue with Step 2.
2. Is the circuit pack being replaced a **VTU**?

If **YES**, then continue with Step 3.
If **NO**, then go to Step 10.
3. Is **VTU-8** the circuit pack being replaced?

If **YES**, then continue with Step 4.
If **NO**, go to Step 6.
4. At the UIP, execute the **RETRIEVE-FAULTS** command to see if there are any **Is-a-x on protection** messages. Is **VTU-8** currently protecting another **VTU**?

If **YES**, then the condition requiring the protection needs to be cleared so that **VTU-8** can be safely replaced. Otherwise, service disruption could occur. Return to **TAP-101** and clear the condition.
If **NO**, proceed to Step 5.
5. Replace the circuit pack. Wait for the pack to install and initialize and associated faults to clear. If new faults appear, return to **TAP-101** and clear the new faults.

STOP. YOU HAVE COMPLETED THIS PROCEDURE.

6. At the UIP, execute the **RETRIEVE-FAULTS** command and look for an ls-a-x on protection message for the pack to be replaced. Is **VTU-8** protecting the **VTU** being replaced?

If **YES**, then continue with Step 7.

If **NO**, go to Step 8.

7. Replace the circuit pack. Wait for the pack to install and initialize and associated faults to clear. If new faults appear, return to **TAP-101** and clear the new faults.

STOP. YOU HAVE COMPLETED THIS PROCEDURE.

8. Is **VTU-8** protecting any other **VTU**?

If **YES**, then the condition requiring the protection of the other pack needs to be cleared, so the pack to be replaced can be protected. Otherwise, service disruption could occur. Return to **TAP-101** and clear the condition.

If **NO**, continue with Step 9.

9. Replace the failed **VTU** as shown in Table A.

Table A – Replacing a VTU Circuit Pack

Step Number	Procedure
1.	Switch the VTU to be replaced to protection using the SONET CIT switch-ls command with the address of the VTU to be switched and the priority FORCED .
2.	Replace the circuit pack. Wait for the pack to install and initialize.
3.	When the faults for the replaced pack clear, re-enable protection switching with the SONET CIT switch-ls command. Use the address of the replaced circuit pack and the priority RESET .
4.	If new faults appear, return to TAP-101 and clear the new faults.

STOP. YOU HAVE COMPLETED THIS PROCEDURE.

10. Is the circuit pack being replaced **LIU-8**?

If **YES**, then continue with Step **11**.

If **NO**, go to Step **13**.

11. At the UIP, execute the **RETRIEVE-FAULTS** command to see if there are any **Is-a-x on protection** messages. Is **LIU-8** currently protecting another **LIU**?

If **YES**, then the condition requiring the protection needs to be cleared so that **LIU-8** can be safely replaced. Otherwise, service disruption could occur. Return to **TAP-101** and clear the condition.

If **NO**, continue with Step **12**.

12. Replace the circuit pack. Wait for the pack to install and initialize and the associated faults to clear. If new faults appear, return to **TAP-101** and clear the new faults.

STOP. YOU HAVE COMPLETED THIS PROCEDURE.

13. At the UIP, execute the **RETRIEVE-FAULTS** command and look for an **Is-a-x on protection** message for the pack to be replaced. Is **LIU-8** protecting the **LIU** being replaced?

If **YES**, then continue with Step **14**.

If **NO**, go to Step **15**.

14. Replace the circuit pack. Wait for the pack to install and initialize and the associated faults to clear. If new faults appear, return to **TAP-101** and clear the new faults.

STOP. YOU HAVE COMPLETED THIS PROCEDURE.

15. Is **LIU-8** protecting any other **LIU**?

If **YES**, then the condition requiring the protection of the other pack needs to be cleared, so the pack to be replaced can be protected. Otherwise, service disruption could occur. Return to **TAP-101** and clear the condition.

If **NO**, proceed to Step **16**.

16. Replace the failed **LIU** as shown in Table B.

Table B – Replacing an LIU Circuit Pack

Step Number	Procedure
1.	Switch the LIU to be replaced to protection using the UIP SWITCH-LIU command with the number of the LIU to be switched and the priority FORCE .
2.	Replace the circuit pack. Wait for the pack to install and initialize.
3.	When the faults for the replaced pack clear, re-enable protection switching with the UIP SWITCH-LIU command. Use the address of the replaced circuit pack and the priority RESET .
4.	If new faults appear, return to TAP-101 and clear the new faults.

STOP. YOU HAVE COMPLETED THIS PROCEDURE.

Determine If Shelves or Assemblies Are Misaligned, Bowed, Bent, or Twisted During Acceptance Testing

Summary: If you have a plug-in unit available for a specific shelf or assembly, insert the plug-in in its slot to determine if it is misaligned, bowed, bent, or twisted. If a plug-in is not available, visually inspect each shelf or assembly.

1. Choose the ARM shelf to begin inspecting for misaligned, bowed, bent, or twisted shelves.
2. Are any of the following plug-ins available for the ARM shelf:
 - VTU
 - PDC
 - TSI?

If **YES**, continue with Step 3.

If **NO**, go to Step 10.

3. Verify that power is not on the shelf or assembly by ensuring that fuses have been removed.
4. Insert one of the shelf or assembly plug-ins into its proper slot.



NOTE:

If there is more than one MDS assembly or HDOS assembly, be sure to inspect each assembly.

5. Check for misaligned, bowed, bent, or twisted shelves.
6. Remove plug-in(s) from shelf or assemblies.



CAUTION:

Do not leave plug-in units inserted into connectors while completing tests and verifications.

7. Determine which shelf or assemblies you have inspected and choose the next assembly for inspecting.

If you've inspected ...	And the system ...	Then ...
ARM shelf only	—	Choose the MDS assemblies and continue with Step 8.
ARM shelf and all MDS assemblies	Includes HDOS assemblies	Choose the HDOS assemblies and go to Step 9.
	Does Not include HDOS assemblies	STOP. YOU HAVE COMPLETED THIS PROCEDURE.
ARM Shelf, all MDS assemblies, and all HDOS assemblies	—	STOP. YOU HAVE COMPLETED THIS PROCEDURE.

8. Are any of the following plug-ins available for the MDS assembly:

- T8U
- MDC
- PTU?

If **YES**, return to Step 3.

If **NO**, go to Step 10.

9. Are any of the following plug-ins available for the HDOS assembly:

- OU
- PCU?

If **YES**, return to Step 3.

If **NO**, continue with Step 10.

10. Visually inspect the shelf or assembly for misaligned, dented, and twisted shelves. **Return to Step 7.**



NOTE:

If there is more than one MDS assembly or HDOS assembly, be sure to inspect each assembly.

Test Individual DS1 Circuits During Turnup

Summary: This procedure gives the steps for testing individual DS1 circuits between the ARM shelf and the cross-connect panel during ARM shelf turnup. You begin by installing a patch cord loopback (**OUT** jack to **IN** jack) at the DSX cross-connect panel for one of the DS1 channels. Remove the loopback patch, and the **FAULT** LED starts to flash on the **BBF1 DS1** pack. Press the user interface panel (UIP) **Update** button to clear the flashing **FAULT**, and repeat the test for the next DS1 channel.

1. Choose the first DS1 channel for testing.
2. Use the CIT **rtrv-t1:all** command to verify that the channel being tested is in the *auto* state.
3. Loop back the DS1 channel at the DSX cross-connect panel from the **OUT** jack to the **IN** jack using a patch cord or looping plug.
4. Use the CIT **rtrv-t1:all** command to verify that the channel being tested is in the *is* (in-service) state.
5. After establishing the loopback, remove the loopback and watch the **FAULT** LED on the DS1 circuit pack associated with the channel under test.
6. Use the CIT **rtrv-alm** command to verify the loss of the DS1 signal.
7. Does the **FAULT** LED on the DS1 circuit pack start to flash?

If **YES**, continue with Step 8.
If **NO**, go to Step 11.
8. Press the UIP **UPDATE** button to clear the flashing **FAULT** LED.

9. Have all DS1 channels been tested?

If **NO**, continue with Step 10.

If **YES**, **STOP. YOU HAVE COMPLETED THIS PROCEDURE.**

10. Choose the next channel to test. ***Return to Step 2.***

11. Replace the DS1 circuit pack.

12. Loop back the DS1 channel at the DSX cross-connect panel from the **OUT** jack to the **IN** jack using a patch cord.

13. After establishing the loopback, remove the loopback and watch the **FAULT** LED on the DS1 circuit pack associated with the channel under test.

14. Does the **FAULT** LED start to flash?

If **YES**, continue with Step 8.

If **NO**, resolve problem using local procedures.

Verify That Alarms Will Activate During MDS Assembly Turnup

Summary: Using the UIP, activate the alarms shown in Table A using the **TEST-VRT-ALARM** command.



CAUTION:

Perform this procedure from the RT only during MDS assembly turnup.



NOTE:

The **TEST-VRT-ALARM** command will send an alarm (Major, Minor, Digroup A, B, C, or D) for 30 seconds in the selected system and then automatically clear the alarm. If remote alarm closures are to be tested, a craftsperson at the remote alarm center must verify that the alarm is received within the 30 seconds that the alarm is activated.

1. Establish communications with the CO or the alarm surveillance center.
2. At the UIP, press **Escape**.
3. Press the **Scroll Menu** down arrow until **TEST-VRT-ALARM <ent>** is displayed, then press **Enter**.
4. Use the down arrow until the appropriate VRT system number (1 through 8) is displayed in the command string and press **Enter**.



NOTE:

Test all in-service VRTs.

5. Use the down arrow until the system displays the selected alarm in the command string (shown in Table A) and press **Enter** to select.



NOTE:

When **CONFIRM? Y<ent> N<esc>** is displayed, press **Enter**.

6. Using Table A, verify that the proper alarms activate at both the near end and far end.

Table A – TEST-VRT-ALARM Alarm Summary

Alarm Selected	SLC®-2000 Alarms	Central Office DLC Alarms	Remote Alarms
MAJOR Alarm	Major, NE Activity, Abnormal	FE, MJ	IDX, MJ, FE
MINOR Alarm	Minor, NE Activity, Abnormal	FE, MN	IDX, MN, FE
Digroup A [B,C,D] Alm	NE Activity, Abnormal	A [B,C,D]	IDX, A [B,C,D]

7. Did the proper alarms activate?

If **YES**, continue with Step 8.

If **NO**, go to Step 9.

8. Have all alarms shown in Table A been tested?

If **NO**, return to Step 4.

If **YES**, **STOP. YOU HAVE COMPLETED THIS PROCEDURE.**

9. Work with the far end to sectionalize the problem. Refer to the "Cabling, Wiring, Assembling, and Application Schematic Diagram" section in *Tab 4* of this document if necessary (See Note). If problem still exists, resolve problem using local procedures.



NOTE:

One possible near-end problem could be a defective UIP. If you suspect this problem, replace the UIP using **DLP-518**.

Perform Channel Tests During MDS Assembly Turnup

Summary: With an **AUA57** in slot 1 at the RT, connect a test telephone set to the channel unit. Verify that you can dial, talk, ring, and trip-ring on the first channel. Repeat the procedure with the channel unit in slot 5.



CAUTION:

Perform this procedure only during MDS assembly turnup. Ensure that optical units (OUs) are not installed in the HDOS slots associated with the MDS slot being tested.



NOTE:

The CO equipment must assign FSR or multiparty service to channels 1 and 25 to support slots 1 and 5, respectively.

1. Obtain the following equipment:
 - **AUA57** channel unit
 - Channel unit adapter test cord
 - Test telephone set.
2. Install the **AUA57** channel unit in slot 1 of the shelf.
3. Using the channel unit adapter cord, connect a test telephone set to the upper jack on the faceplate.
4. Is this an INA system?
 - If **YES**, continue with Step 5.
 - If **NO**, go to Step 7.
5. At the INA bank in the CO, install an **AUA57** channel unit if at a **SLC**®-2000 COT or a **WP33** **SLC** 96 FSR channel unit if at a D4 bank terminal.

6. At the CO, connect dial tone to the following channels:
 - **Slot 1** — Channel 1
 - **Slot 5** — Channel 25.
7. With the telephone set at the RT, verify that you can dial, talk, ring, and trip-ring on channel 1.
8. Have you tested with the channel unit in slot 5?

If **NO**, continue with Step 9.
If **YES**, go to Step 10.
9. Remove the **AUA57** channel unit from slot 1 and install it in slot 5. **Return to Step 3.**
10. Remove the **AUA57** channel unit from slot 5.

STOP. YOU HAVE COMPLETED THIS PROCEDURE.

Install or Replace BBG8 SYSCTL

1. Ensure that the **BBG9 OHCTL** is installed (**DLP-501**).



CAUTION:

Take care to avoid damaging the LEDs that protrude through the openings in the faceplate of the circuit packs during handling and circuit pack installation.



NOTE:

Both the **BBG8 SYSCTL** and **BBG9 OHCTL** must be installed for the controllers to function.

2. Is the **BBG8 SYSCTL** being installed in the shelf for the first time (initial shelf turnup) or is it being replaced in an in-service system?

If **BEING INSTALLED**, then continue with Step 3.

If **BEING REPLACED**, then proceed to Step 6.

3. Obtain a **BBG8 SYSCTL** circuit pack and set switch **S1** sections **S1-1**, **S1-2**, and **S1-3** to **OFF**, **OFF**, **OFF**, respectively, to set the product (shelf) type. See Figure 1.
4. Set TBOS termination switch **S2-1** per Table A.



NOTE:

If TBOS is disabled (not used), disregard the switch setting for switch **S2-1**.

Table A – SYSCTL Switch 2 (S2) TBOS Link Terminator

Shelf Position	Switch S2-1
Last	ON
Not Last	OFF

5. Set all **SYSCTL** switch **S2** sections **S2-2**, **S2-3**, **S2-4**, **S2-5**, **S2-6**, **S2-7**, and **S2-8** to **OFF**.

Proceed to Step 8.

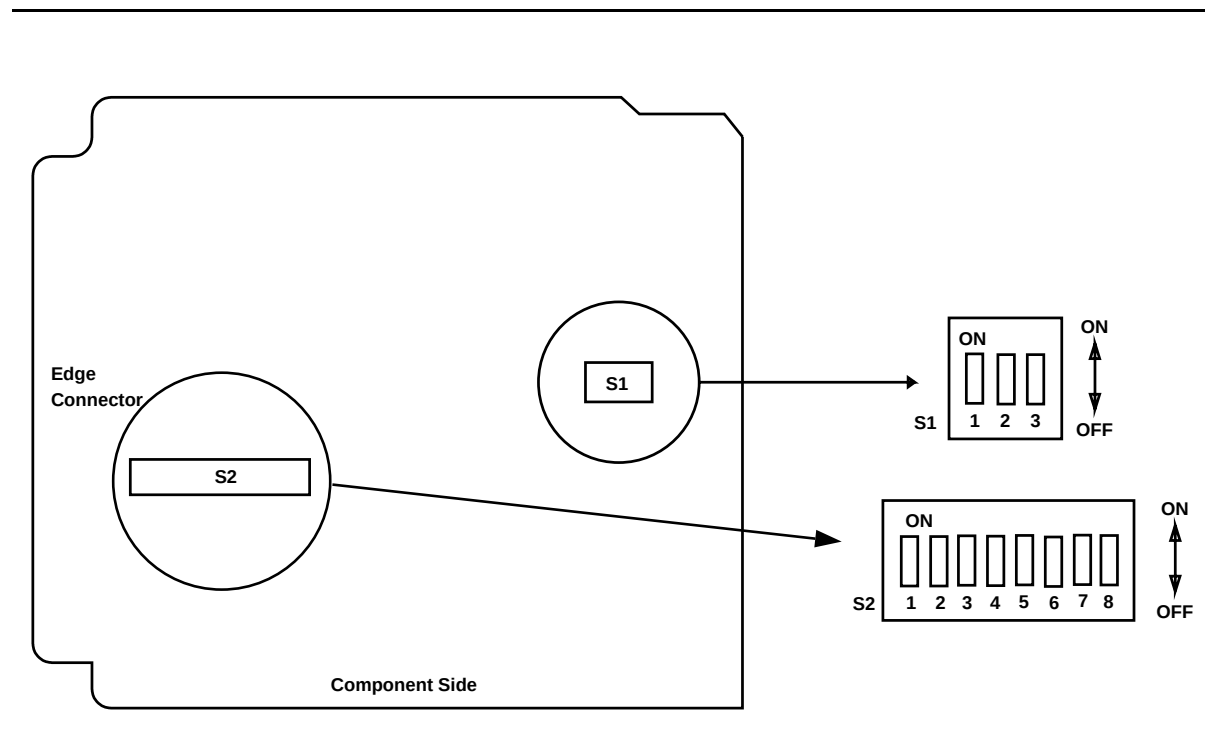


Figure 1 – BBG8 SYSCTL Option Settings

6.



CAUTION:

Transmission configuration information for in-service systems is stored on the **TGS** circuit pack in **TIMING** slot 1. In some instances (for example, during some upgrades, system tests, or training classes), if the system is in service and a **SYSCTL** and **OHCTL** are being installed that contain a version of software not compatible with the current transmission configuration, it may be necessary to remove the **TGS** circuit pack in **TIMING** slot 1 in order to force the system to run the software currently in the **SYSCTL**. If both **TGS** circuit packs are not installed, removal of the only **TGS** circuit pack will cause service interruption.

⇒ **NOTE:**
If the system is in service and both the **SYSCTL** and **OHCTL** are being replaced, the following step is highly recommended to protect against a loss of service because of installing a **SYSCTL** with incompatible software. But, if you are **sure** that you want to install a **SYSCTL** with incompatible software, you may elect to remove the **TGS** in **TIMING** slot **1** and allow the software to run without having to force the system to run the software.

Before performing this procedure on an in-service system, it is strongly suggested that *both* **TGS** circuit packs be installed in the shelf and the **switch-sync:s=circuitpack,pri>manual** command be used to switch to the protection **TGS-2** circuit pack if not already **ACTIVE**. Use **rtrv-sync:** command to verify that the **TGS-2** circuit pack is **ACTIVE**.

7. Remove and inspect the **SYSCTL** circuit pack being replaced for proper option switch settings. Set option switches on the replacement **BBG8 SYSCTL** the same as the original.

Proceed to Step **10**.

8.

⚠ **CAUTION:**
*When a **SYSCTL** is replaced or installed for the first time, you **MUST** initialize the **SYSCTL** to prevent service interruption or incorrect alarms. It is **NOT** recommended to initialize the **SYSCTL** if it is only removed and reseated in the same shelf.*

Is **SYSCTL** being reseated in the same shelf?

If **YES**, then continue with Step **9**.

If **NO**, then proceed to Step **10**.

9.

⇒ **NOTE:**
Ignore the **MJ**, **MN**, and **NE ACTY** LEDs on the User Panel.

Install the **SYSCTL** circuit pack.

If the following responses do not occur, proceed to Step **13**. Otherwise, proceed to Step **14**.

Response: **FAULT** LED on **BBG8 SYSCTL** lights after approximately 5 seconds. **MJ** and **NE** may light or flash briefly. **FAULT** LED on the **SYSCTL** goes off after approximately 5 seconds. **FAULT** LED on **OHCTL** lights and goes off within 2 minutes.

10.

⇒ **NOTE:**
Steps **11** and **12** must be performed without unnecessary delays. Familiarize yourself with these steps before continuing with the procedure.

Read Steps 11 and 12 before proceeding.

11.

⚠ **CAUTION:**
*If replacing a **SYSCTL** circuit pack, initializing the **SYSCTL** in the following steps will momentarily interrupt service if protection switches are activated.*

⇒ **NOTE:**
The **SYSCTL** circuit pack *remembers* critical parameters about its previous environment. If the previous environment was the same shelf, an *initialization* is not necessary. If the previous environment was another shelf or the **SYSCTL** is new from the factory, an *initialization* **MUST** be done. If a new **SYSCTL** is not *initialized* after insertion, it may affect service or cause incorrect alarms. By initializing the **SYSCTL**, it automatically *learns* all the critical parameters about its new environment and will not affect service.

⇒ **NOTE:**
Ignore the **MJ**, **MN**, and **NE ACTY** LEDs on the User Panel.

Install the **SYSCTL** circuit pack.

If the following responses do not occur, proceed to Step **13**.

Response: **FAULT** LED on **BBG8 SYSCTL** lights and **Abnormal** LED on the User Panel lights after approximately 5 seconds. **MJ** and **NE** may light or flash briefly. **FAULT** LED on the **SYSCTL** goes off after approximately 5 seconds. **Abnormal** LED goes off after approximately 15 seconds. Approximately 1 minute and 30 seconds after the **Abnormal** LED goes off, the **FAULT** LED on the **OHCTL** goes off.

12.

⇒ **NOTE:**
The **UPD/INIT** push button on the **SYSCTL** is recessed to prevent its accidental operation. You will need a small pointed object to operate it.

After the UIP display changes from **SYSCTL INITIALIZATION** to **SYSCTL EXTENDED INITZN**, press the **SYSCTL UPD/INIT** push button.

Response: The UIP displays **SYSCTL EXTND INITZN done**.

Proceed to Step **16**.

13.

⇒ **NOTE:**
Compatible software must be installed in both the **BBG9 OHCTL** and the **BBG8 SYSCTL**. When the new **SYSCTL** is installed, if software is not installed in the **SYSCTL** or the software is not compatible with the software in the **OHCTL**, the letter **P** or **d** will be displayed in the **SYSCTL FE ID** display. For a replacement **SYSCTL**, if the software in the **SYSCTL** and **OHCTL** is not compatible with the transmission configuration, the letter **C** will be displayed in the **FE ID** display.

Displayed letters or conditions indicate one of the following:

- a. Nothing displayed in the **FE ID** display indicates that compatible software is installed in the **OHCTL** and **SYSCTL**.
- b. The letter **P** displayed in the **FE ID** display indicates that no software is installed in the **SYSCTL**. If the **P** is followed by a period (**P.**), it means the software may be downloaded either locally or remotely using the **ins-prog:tid** command. If there is no period (**P**) the software can only be downloaded locally.
- c. The letter **C** displayed in the **FE ID** display indicates that software is installed in the **OHCTL** and replacement **SYSCTL**, but it will not support the current transmission configuration.
- d. The letter **d** displayed in the **FE ID** display indicates the **OHCTL** has no software or that the software in the **OHCTL** and **SYSCTL** is incompatible.
- e. The letter **U** displayed in the **FE ID** display indicates that **SYSCTL** Switch **S1** is not set properly for the type of shelf being equipped. Repeat this procedure from Step **1**.
- f. The letter **E** displayed in the **FE ID** display indicates that the **SYSCTL** must be replaced. Replace the **SYSCTL** and repeat this procedure.
- g. The letter **F** displayed in the **FE ID** display indicates that the **SYSCTL** faceplate latch is not fully latched. Latch the faceplate. (A reset occurs after the faceplate is latched.)
- h. A flashing letter **L** displayed in the **FE ID** display indicates a low-voltage condition (brownout) on the shelf.

14. Did the letter "**P**" or "**d**" appear in the **FE ID** display?

If **YES**, then continue with Step **15**.

If **NO**, then proceed to Step **16**.

15. Find circuit packs with compatible software and repeat this procedure, or install new software using the procedures of **DLP-513**.

STOP. YOU HAVE COMPLETED THIS PROCEDURE.

16. Is the **BBG8 SYSCTL** being installed in the shelf for the first time (initial shelf turnup) or is it being replaced in an in-service system?

If **BEING INSTALLED**, then continue with Step 17.

If **BEING REPLACED**, then proceed to Step 18.

17. Retrieve generic software version ID using the **RETRIEVE-PROG-VRSN** user interface panel display command (see **DLP-500**).
If the software version is not the correct version, you must find circuit packs with the correct software, or install new software using the procedures of **DLP-513**.

STOP. YOU HAVE COMPLETED THIS PROCEDURE.

18. Did the letter "C" appear in the **FE ID** display?

If **YES**, then continue with Step 19.

If **NO**, then proceed to Step 22.

19.



CAUTION:

*If the system is in service and is forced to run the current software in the **SYSCTL** that is displaying a **C**, service interruption may result.*



NOTE:

Indications are that the software in the **SYSCTL** and **OHCTL** you have installed will not support the system transmission configuration that you have. If this occurs, you must reload the original version of software, load another version of software, or *force* the system to run the current software that is in the **SYSCTL**.

You must decide if you want the system to run this current version of software or if you want to download another version (original version or new version) of software.

Do you want to run the current version of software that is in the **SYSCTL**?

If **NO**, then continue with Step 20.

If **YES**, then proceed to Step 21.

20. Find circuit packs with compatible software and repeat this procedure, or install new software using the procedures of **DLP-513**.

STOP. YOU HAVE COMPLETED THIS PROCEDURE.

21. To *force* the system to run the current software, perform the following:
- a. Ensure that a **TGS** circuit pack is installed in the **TGS-2** slot.
 - b. Check that **TGS-2** circuit pack is active (**ACTIVE** LED lighted).
 - c. Remove the **TGS-1** circuit pack and reset (unplug and reseal) the **SYSCTL** to force it to run the current software.
 - d. After the current software is up and running (no alarm LEDs lighted or you can log into the shelf), reinstall the **TGS-1** circuit pack.
22. Retrieve generic software version ID using the **RETRIEVE-PROG-VRSN** user interface panel display command (see **DLP-500**).
If the software version is not the correct version, you must find circuit packs with the correct software, or install new software using the procedures of **DLP-513**.

23.



NOTE:

If you are using this procedure to replace a **SYSCTL** that was already in service, there may have been some options set using the craft interface terminal (CIT).

Use the CIT to set any required options.

STOP. YOU HAVE COMPLETED THIS PROCEDURE.

Convert FiberReach NBS Quadrant From Quad to Octet Mode

General: Beginning with Software Release 4.4 (R4.4), you are allowed to provision each DSX-1 signal terminating on the FiberReach narrowband shelf (NBS) for either the quad or octet mode. When provisioned for the quad mode, each DSX-1 signal provides service to one of two 24-line V-DT shelves in the NBS. When provisioned for the octet mode, each DSX-1 signal provides service to one of four sets of three channel unit slots in the NBS. Each set of three channel unit slots is referred to as an NBS quadrant (NBSQ). A mix of quad and octet modes in a single NBS is also allowed.

When one of the NBSQs in an NBS is converted to the octet mode, the first two slots can contain *SPQ*®494 channel units. The third slot can contain any of the other channel units available for the NBS. If the third slot contains an AUA94 channel unit, this will allow the NBSQ to support a total of ten ISDN lines, with each line offering 2B+D service.

➡ **NOTE:**
The *SPQ*494 channel unit can only be installed in an NBSQ provisioned for the octet mode.

The time slots associated with these ten ISDN lines must be correctly cross-connected to the actual channel units slots in the NBS using the **CIT ent-crs-t0** command. The system uses a *virtual channel unit slot* concept for the ISDN time slots to be correctly cross-connected to the actual slots in the NBS. Using the *virtual* concept as shown in Figure 1, the *SLC*®-2000 HDT software, when provisioning ISDN circuits, "thinks it sees" a six-slot V-DT instead of a three-slot V-DT. As Figure 1 shows, slots 4, 5, and 6 of the V-DT are *not* physically present. However, they are present in the software and are called *virtual slots*.

When installing and cross-connecting ISDN circuits in an NBS with DS1 feeders provisioned for the octet mode, you must understand the relationship between the NBS, octet mode, and actual or virtual slots. For a detailed description of the *virtual channel unit slot* concept, refer to **Channel Unit Installation: DLP-617** or document 363-208-000, *SLC-2000 Access System, Applications, Planning, and Ordering Guide*.

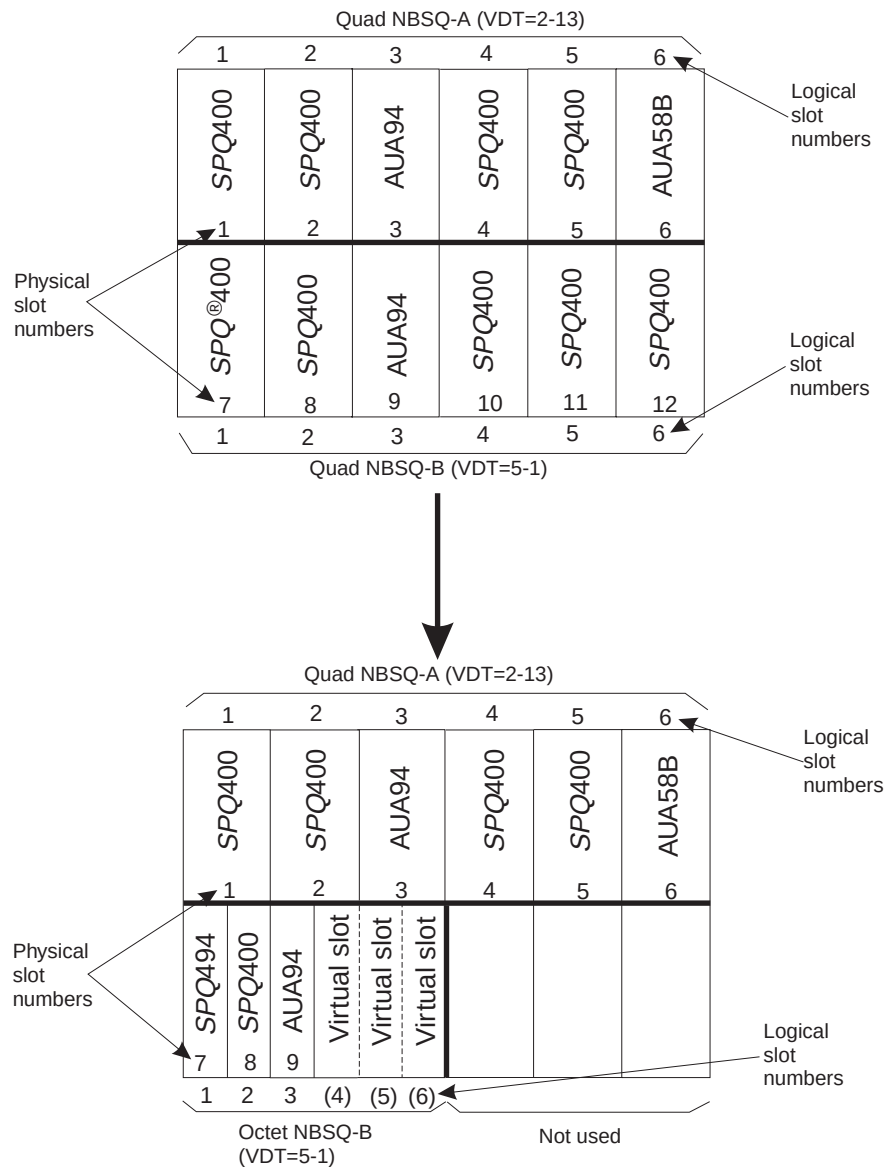


Figure 1 – NBS Quad Mode to Octet Mode Conversion

This procedure uses CIT commands in the following sequence to convert an NBSQ from quad mode to octet mode:

- Delete all ISDN T0 provisioning in the NBSQ using the **dlt-t0** command.
- Delete the T0 cross-connections associated with the NBSQ being converted using the **dlt-crs-t0** command.
- Change the provisioning of the NBSQ from the quad to the octet mode using the **ed-dt** command.
- After replacing appropriate channel unit(s), create T0 cross-connections for each digital subscriber line (DSL) using the **ent-crs-t0** command.

As an aid in understanding the correct entries required for the CIT commands used in this procedure, each step is provided with an example (refer to Figure 1).

The example assumes the following:

- MDS shelves 2 and 5 are configured as FITL.
- The DT Server in slot 13 on MDS shelf 2 is connected to NBSQ-A.
- The DT Server in slot 1 on MDS shelf 5 is connected to NBSQ-B.
- All ISDN lines are configured appropriately in LDS.

⇒ **NOTE:**
Refer to "Channel Unit Installation: Introduction-000" for slot restrictions that must be observed when installing the AUA94 and SPQ494 channel units in a FiberReach NBS. Refer to document 363-208-003, *SLC-2000 Access System, Commands and Messages*, for a detailed description of the CIT commands used in this procedure.

⇒ **NOTE:**
The AUA94 and SPQ494 channel unit parameters are not provisioned using the CIT. Instead, the T0 and T1 cross-connections for B1 are provisioned from either the CIT or LDS followed by the LDS provisioning the unit parameters and remaining cross-connections.

1. Delete all ISDN T0 provisioning in NBSQ being converted using the **dlt-t0** command.

Example of deleting ISDN T0 provisioning in NBSQ-B (Figure 1):

⇒ NOTE:

The only ISDN lines in NBSQ-B are associated with the AUA94 channel unit located in physical slot 9.

```
dlt-t0::dtdp-5-1-3-1; <-- for NBSQ-B  
dlt-t0::dtdp-5-1-3-2; <-- for NBSQ-B
```

2. Use the CIT **dlt-crs-t0** command to delete the T0 cross-connections.

Example of deleting T0 cross-connections (Figure 1):

⇒ NOTE:

The slot numbers that appear in parentheses in the following example are the logical slot numbers shown in Figure 1.

For NBSQ-B:

```
dlt-crs-t0::v3dp-1-162,dtdp-5-1-1-1; <--CH1 SPQ400 (slot 1)  
dlt-crs-t0::v3dp-1-163,dtdp-5-1-1-2; <--CH2 SPQ400 (slot 1)  
dlt-crs-t0::v3dp-1-164,dtdp-5-1-1-3; <--CH3 SPQ400 (slot 1)  
dlt-crs-t0::v3dp-1-165,dtdp-5-1-1-4; <--CH4 SPQ400 (slot 1)  
dlt-crs-t0::v3dp-1-166,dtdp-5-1-2-1; <--CH1 SPQ400 (slot 2)  
dlt-crs-t0::v3dp-1-167,dtdp-5-1-2-2; <--CH2 SPQ400 (slot 2)  
dlt-crs-t0::v3dp-1-168,dtdp-5-1-2-3; <--CH3 SPQ400 (slot 2)  
dlt-crs-t0::v3dp-1-169,dtdp-5-1-2-4; <--CH4 SPQ400 (slot 2)  
dlt-crs-t0::v3dp-1-170,dtdp-5-1-3-1; <--CH1 AUA94 (slot 3) (ISDN line)  
dlt-crs-t0::v3dp-1-171,dtdp-5-1-3-2; <--CH2 AUA94 (slot 3) (ISDN line)  
dlt-crs-t0::v3dp-1-174,dtdp-5-1-4-1; <--CH1 SPQ400 (slot 4)  
dlt-crs-t0::v3dp-1-175,dtdp-5-1-4-2; <--CH2 SPQ400 (slot 4)  
dlt-crs-t0::v3dp-1-176,dtdp-5-1-4-3; <--CH3 SPQ400 (slot 4)  
dlt-crs-t0::v3dp-1-177,dtdp-5-1-4-4; <--CH4 SPQ400 (slot 4)  
dlt-crs-t0::v3dp-1-178,dtdp-5-1-5-1; <--CH1 SPQ400 (slot 5)  
dlt-crs-t0::v3dp-1-179,dtdp-5-1-5-2; <--CH2 SPQ400 (slot 5)  
dlt-crs-t0::v3dp-1-180,dtdp-5-1-5-3; <--CH3 SPQ400 (slot 5)  
dlt-crs-t0::v3dp-1-181,dtdp-5-1-5-4; <--CH4 SPQ400 (slot 5)  
dlt-crs-t0::v3dp-1-182,dtdp-5-1-6-1; <--CH1 SPQ400 (slot 6)  
dlt-crs-t0::v3dp-1-183,dtdp-5-1-6-2; <--CH2 SPQ400 (slot 6)  
dlt-crs-t0::v3dp-1-184,dtdp-5-1-6-3; <--CH3 SPQ400 (slot 6)  
dlt-crs-t0::v3dp-1-185,dtdp-5-1-6-4; <--CH4 SPQ400 (slot 6)
```

3. Execute the CIT command **ed-dt** to change the mode of the NBSQ to the octet mode.

Example of changing mode (Figure 1):

ed-dt::aid=dt-5-1:dtype=nbs;line=24:mode=octet; <-- for NBSQ-B

4. Remove the channel units from the last three physical slots in the NBSQ being converted (slots 4, 5, and 6 for NBSQ-A or slots 10, 11, and 12 for NBSQ-B). Also, in the first three physical slots of the NBSQ being converted (slots 1, 2, and 3 for NBSQ-A or slots 7, 8, and 9 for NBSQ-B), remove the channel units that are going to be replaced.

In the example (Figure 1), where only the lower half of the NBS is being converted to the octet mode, the *SPQ400* channel units in logical slots 1, 4, 5, and 6 (physical slots 7, 10, 11, and 12) in NBSQ-B are removed.

5. Replace the units removed from physical slots 1 and/or 2 for NBSQ-A or slots 7 and/or 8 for NBSQ-B with *SPQ494* channel unit(s). Insert a replacement channel unit into physical slots 2 and 3 for NBSQ-A or slots 8 and 9 for NBSQ-B, if necessary.

In the example (Figure 1), the *SPQ400* channel unit in logical slot 1 (physical slot 7) is replaced with an *SPQ494* channel unit.

6. Execute the CIT command **ent-crs-t0** for each DSL to create t0 cross-connections between the virtual drops and the physical drops.

Example of creating cross-connections (Figure 1):



NOTE:

The slot numbers that appear in parentheses in the following example are the logical slot numbers shown in Figure 1.

For NBSQ-B:

```
ent-crs-t0::v3dp-1-162,dtdp-5-1-1-1; <--CH1 SPQ494 (slot 1)
ent-crs-t0::v3dp-1-163,dtdp-5-1-1-2; <--CH2 SPQ494 (slot 1)
ent-crs-t0::v3dp-1-164,dtdp-5-1-4-1; <--CH3 SPQ494 (slot 1)
                                   Virtual slot 4 in NBSQ-B
ent-crs-t0::v3dp-1-165,dtdp-5-1-4-2; <--CH4 SPQ494 (slot 1)
                                   Virtual slot 4 in NBSQ-B
ent-crs-t0::v3dp-1-166,dtdp-5-1-2-1; <--CH1 SPQ400 (slot 2)
ent-crs-t0::v3dp-1-167,dtdp-5-1-2-2; <--CH2 SPQ400 (slot 2)
ent-crs-t0::v3dp-1-168,dtdp-5-1-2-3; <--CH3 SPQ400 (slot 2)
ent-crs-t0::v3dp-1-169,dtdp-5-1-2-4; <--CH4 SPQ400 (slot 2)
ent-crs-t0::v3dp-1-170,dtdp-5-1-3-1; <--CH1 AUA94 (slot 3)
ent-crs-t0::v3dp-1-171,dtdp-5-1-3-2; <--CH2 AUA94 (slot 3)
```

STOP. YOU HAVE COMPLETED THIS PROCEDURE.

Convert FiberReach NBS Quadrant From Octet to Quad Mode

General: During the conversion of an NBSQ from octet to quad mode, it is necessary to perform procedures that require an understanding of the relationship between the NBS, octet mode, and actual or virtual NBS slots. The following description of octet mode provisioning and cross-connecting should be helpful in understanding this relationship.

Beginning with Software Release 4.4 (R4.4), you are allowed to provision each DSX-1 signal terminating on the FiberReach narrowband shelf (NBS) for either the quad or octet mode. When provisioned for the quad mode, each DSX-1 signal provides service to one of two 24-line V-DT shelves in the NBS. When provisioned for the octet mode, each DSX-1 signal provides service to one of four sets of three channel unit slots in the NBS. Each set of three channel unit slots is referred to as an NBS quadrant (NBSQ). A mix of quad and octet modes in a single NBS is also allowed.

When one of the NBSQs in an NBS is provisioned for the octet mode, the first two slots can contain *SPQ*[®] 494 channel units. The third slot can contain any of the other channel units available for the NBS. If the third slot contains an AUA94 channel unit, this will allow the NBSQ to support a total of ten ISDN lines, with each line offering 2B+D service.

 **NOTE:**
The *SPQ*494 channel unit can only be installed in an NBSQ provisioned for the octet mode.

The time slots associated with these ten ISDN lines must be correctly cross-connected to the actual channel units slots in the NBS. The system uses a *virtual channel unit slot* concept for the ISDN time slots to be correctly cross-connected to the actual slots in the NBS. Using the *virtual* concept as shown in Figure 1, the *SLC*[®]-2000 HDT software, when provisioning ISDN circuits, "thinks it sees" a six-slot V-DT instead of a three-slot V-DT. As Figure 1 shows, slots 4, 5, and 6 of the V-DT are *not* physically present. However, they are present in the software and are called *virtual slots*.

For a detailed description of the *virtual channel unit slot* concept, refer to **Channel Unit Installation: DLP-617** or document 363-208-000, *SLC-2000 Access System, Applications, Planning, and Ordering Guide*.

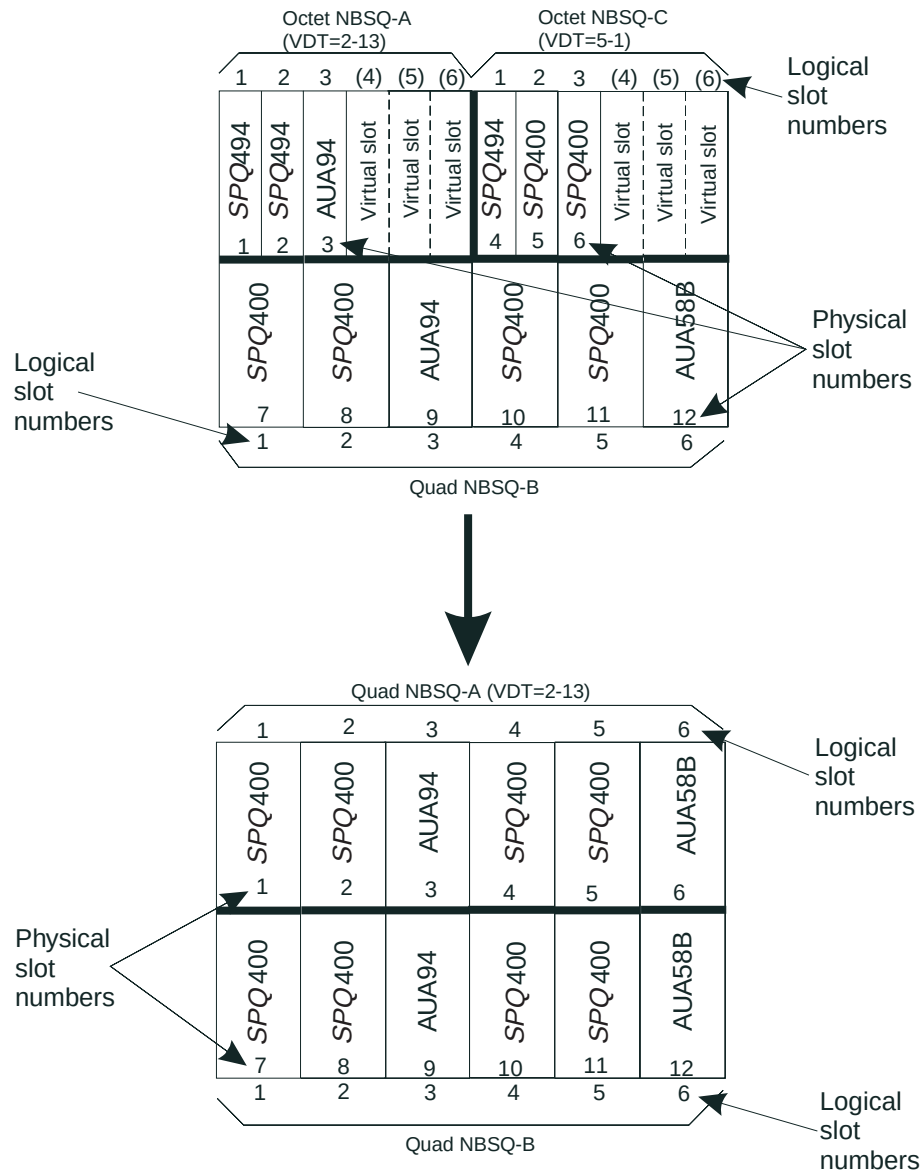


Figure 1 – NBS Octet Mode to Quad Mode Conversion

This procedure uses CIT commands in the following sequence to convert an NBSQ from octet mode to quad mode:

- Delete all ISDN T0 provisioning in both NBSQs that are being converted to the quad mode using the **dlt-t0** command.
- Delete the T0 cross-connections associated with the NBSQ being converted using the **dlt-crs-t0** command.
- Change the provisioning of the NBSQ being converted, either A or B, from the octet to the quad mode using the **ed-dt** command.
- After replacing appropriate channel unit(s), create T0 cross-connections for each digital subscriber line (DSL) using the **ent-crs-t0** command.

As an aid in understanding the correct entries required for the CIT commands used in this procedure, each step is provided with an example (refer to Figure 1).

The example assumes the following:

- MDS shelves 2 and 5 are configured as FITL.
- The DT Server in slot 13 on MDS shelf 2 is connected to NBSQ-A.
- The DT Server in slot 1 on MDS shelf 5 is connected to NBSQ-C.
- All ISDN lines are configured appropriately in LDS.

⇒ **NOTE:**
Refer to "Channel Unit Installation: Introduction-000" for slot restrictions that must be observed when installing the AUA94 channel unit in a FiberReach NBS. Refer to document 363-208-003, *SLC-2000 Access System, Commands and Messages*, for a detailed description of the CIT commands used in this procedure.

⇒ **NOTE:**
The AUA94 channel unit parameters are not provisioned using the CIT. Instead, the T0 and T1 cross-connections for B1 are provisioned from either the CIT or LDS followed by the LDS provisioning the unit parameters and remaining cross-connections.

1. Delete all ISDN T0 provisioning in NBSQ being converted using the **dlt-t0** command.

Example of deleting ISDN T0 provisioning in NBSQ-B (Figure 1):



NOTE:

The slot numbers that appear in parentheses in the following example are the logical slot numbers shown in Figure 1.

For NBSQ-A:

```
dlt-t0::dtdp-2-13-1-1;    <-- CH1 SPQ494 (slot 1)
dlt-t0::dtdp-2-13-1-2;    <-- CH2 SPQ494 (slot 1)
dlt-t0::dtdp-2-13-4-1;    <-- CH3 SPQ494 (slot 1)
                           Virtual slot 4 in NBSQ-A
dlt-t0::dtdp-2-13-4-2;    <-- CH4 SPQ494 (slot 1)
                           Virtual slot 4 in NBSQ-A
dlt-t0::dtdp-2-13-2-1;    <-- CH1 SPQ494 (slot 2)
dlt-t0::dtdp-2-13-2-2;    <-- CH2 SPQ494 (slot 2)
dlt-t0::dtdp-2-13-5-1;    <-- CH3 SPQ494 (slot 2)
                           Virtual slot 5 in NBSQ-A
dlt-t0::dtdp-2-13-5-2;    <-- CH4 SPQ494 (slot 2)
                           Virtual slot 5 in NBSQ-A
dlt-t0::dtdp-2-13-3-1;    <-- CH1 AUA94 (slot 3)
dlt-t0::dtdp-2-13-3-2;    <-- CH2 AUA94 (slot 3)
```

For NBSQ-C:

```
dlt-t0::dtdp-5-1-1-1;    <-- CH1 SPQ494 (slot 1)
dlt-t0::dtdp-5-1-1-2;    <-- CH2 SPQ494 (slot 1)
dlt-t0::dtdp-5-1-4-1;    <-- CH3 SPQ494 (slot 1)
                           Virtual slot 4 in NBSQ-C
dlt-t0::dtdp-5-1-4-2;    <-- CH4 SPQ494 (slot 1)
                           Virtual slot 4 in NBSQ-C
```

2. Use the CIT **dlt-crs-t0** command to delete the T0 cross-connections associated with the NBSQ being converted.

Example of deleting T0 cross-connections (Figure 1):



NOTE:

The slot numbers that appear in parentheses in the following example are the logical slot numbers shown in Figure 1.

For NBSQ-A:

dlt-crs-t0::v3dp-1-140,dtdp-2-13-1-1;	<--CH1 SPQ494 (slot 1)
dlt-crs-t0::v3dp-1-141,dtdp-2-13-1-2;	<--CH2 SPQ494 (slot 1)
dlt-crs-t0::v3dp-1-142,dtdp-2-13-4-1;	<--CH3 SPQ494 (slot 1)
	Virtual slot 4 in NBSQ-A
dlt-crs-t0::v3dp-1-143,dtdp-2-13-4-2;	<--CH4 SPQ494 (slot 1)
	Virtual slot 4 in NBSQ-A
dlt-crs-t0::v3dp-1-144,dtdp-2-13-2-1;	<--CH1 SPQ494 (slot 2)
dlt-crs-t0::v3dp-1-145,dtdp-2-13-2-2;	<--CH2 SPQ494 (slot 2)
dlt-crs-t0::v3dp-1-146,dtdp-2-13-5-1;	<--CH3 SPQ494 (slot 2)
	Virtual slot 5 in NBSQ-A
dlt-crs-t0::v3dp-1-147,dtdp-2-13-5-2;	<--CH4 SPQ494 (slot 2)
	Virtual slot 5 in NBSQ-A
dlt-crs-t0::v3dp-1-148,dtdp-2-13-3-1;	<--CH1 AUA94 (slot 3)
dlt-crs-t0::v3dp-1-149,dtdp-2-13-3-2;	<--CH2 AUA94 (slot 3)

For NBSQ-C:

dlt-crs-t0::v3dp-1-150,dtdp-5-1-1-1;	<--CH1 SPQ494 (slot 1)
dlt-crs-t0::v3dp-1-151,dtdp-5-1-1-2;	<--CH2 SPQ494 (slot 1)
dlt-crs-t0::v3dp-1-152,dtdp-5-1-4-1;	<--CH3 SPQ494 (slot 1)
	Virtual slot 4 in NBSQ-C
dlt-crs-t0::v3dp-1-153,dtdp-5-1-4-2;	<--CH4 SPQ494 (slot 1)
	Virtual slot 4 in NBSQ-C
dlt-crs-t0::v3dp-1-154,dtdp-5-1-2-1;	<--CH1 SPQ400 (slot 2)
dlt-crs-t0::v3dp-1-155,dtdp-5-1-2-2;	<--CH2 SPQ400 (slot 2)
dlt-crs-t0::v3dp-1-156,dtdp-5-1-2-3;	<--CH3 SPQ400 (slot 2)
dlt-crs-t0::v3dp-1-157,dtdp-5-1-2-4;	<--CH4 SPQ400 (slot 2)
dlt-crs-t0::v3dp-1-158,dtdp-5-1-3-1;	<--CH1 SPQ400 (slot 3)
dlt-crs-t0::v3dp-1-159,dtdp-5-1-3-2;	<--CH2 SPQ400 (slot 3)
dlt-crs-t0::v3dp-1-160,dtdp-5-1-3-3;	<--CH3 SPQ400 (slot 3)
dlt-crs-t0::v3dp-1-161,dtdp-5-1-3-4;	<--CH4 SPQ400 (slot 3)

3. Execute the CIT command **ed-dt** to change the mode of the NBSQ to the quad mode.

Example of changing mode (Figure 1):

```
ed-dt::aid=dt-5-1:dtype=nbs;line=0:mode=octet; <-- for NBSQ-C  
ed-dt::aid=dt-2-13:dtype=nbs;line=24:mode=quad; <-- for NBSQ-A
```

⇒ NOTE:

The DS1 connection to NBSQ-C can be removed at this time.

4. Remove the *SPQ494* channel units from the NBSQ(s) being converted and replace them with other channel units approved for use in the NBS. [In the example (Figure 1), the *SPQ494* channel units are removed from slots **1** and **2** of NBSQ-A and slot **1** of NBSQ-C and replaced with *SPQ400* channel units. Also note that a channel unit requiring only two time slots (an AUA58B dual POTS in this example) must be installed in slot **6** since the AUA94 unit in slot **3** uses two of the time slots from slot **6**.]
5. Execute the CIT **ent-crs-t0** command for each DSL to create to cross-connections between the virtual drops and the physical drops.

Example of creating cross-connections (Figure 1):

⇒ NOTE:

The slot numbers that appear in parentheses in the following example are the logical slot numbers shown in Figure 1.

For NBSQ-A:

```
ent-crs-t0::v3dp-1-140,dtdp-2-13-1-1; <--CH1 SPQ400 (slot 1)  
ent-crs-t0::v3dp-1-141,dtdp-2-13-1-2; <--CH2 SPQ400 (slot 1)  
ent-crs-t0::v3dp-1-142,dtdp-2-13-1-3; <--CH3 SPQ400 (slot 1)  
ent-crs-t0::v3dp-1-143,dtdp-2-13-1-4; <--CH4 SPQ400 (slot 1)  
ent-crs-t0::v3dp-1-144,dtdp-2-13-2-1; <--CH1 SPQ400 (slot 2)  
ent-crs-t0::v3dp-1-145,dtdp-2-13-2-2; <--CH2 SPQ400 (slot 2)  
ent-crs-t0::v3dp-1-146,dtdp-2-13-2-3; <--CH3 SPQ400 (slot 2)  
ent-crs-t0::v3dp-1-147,dtdp-2-13-2-4; <--CH4 SPQ400 (slot 2)  
ent-crs-t0::v3dp-1-148,dtdp-2-13-3-1; <--CH1 AUA94 (slot 3)(ISDN line)  
ent-crs-t0::v3dp-1-149,dtdp-2-13-3-2; <--CH2 AUA94 (slot 3)(ISDN line)  
ent-crs-t0::v3dp-1-150,dtdp-2-13-4-1; <--CH1 SPQ400 (slot 4)  
ent-crs-t0::v3dp-1-151,dtdp-2-13-4-2; <--CH2 SPQ400 (slot 4)  
ent-crs-t0::v3dp-1-152,dtdp-2-13-4-3; <--CH3 SPQ400 (slot 4)
```

ent-crs-t0::v3dp-1-153,dtdp-2-13-4-4; <--CH4 *SPQ*400 (slot 4)
ent-crs-t0::v3dp-1-154,dtdp-2-13-5-1; <--CH1 *SPQ*400 (slot 5)
ent-crs-t0::v3dp-1-155,dtdp-2-13-5-2; <--CH2 *SPQ*400 (slot 5)
ent-crs-t0::v3dp-1-156,dtdp-2-13-5-3; <--CH3 *SPQ*400 (slot 5)
ent-crs-t0::v3dp-1-157,dtdp-2-13-5-4; <--CH4 *SPQ*400 (slot 5)
ent-crs-t0::v3dp-1-158,dtdp-2-13-6-1; <--CH1 AUA58B (slot 6)
ent-crs-t0::v3dp-1-159,dtdp-2-13-6-2; <--CH2 AUA58B (slot 6)

STOP. YOU HAVE COMPLETED THIS PROCEDURE.

Install New SONET Generic Program In-Service System Remote Network Element Download

General: This procedure uses the CIT **cpy-prog** or **ins-prog** command to install a new software program in a *SLC*[®]-2000 Access System remote network element. It is assumed that the local network element shelf has already been upgraded, and the software is running normally or has been installed as a dormant copy. Procedures for downloading software to a local network element can be found in **DLP-538**.

1. Before beginning software installation, refer to the *Software Release Description* for the software being installed for a description of any special considerations required when installing this version of the software.
2. Verify that no data communications channel (DCC) failures or transmission failures (OC-3 LOS, flashing **OLI** **FAULT** LEDs, etc.) are present on the remote network element receiving the program.
3. Use the CIT **rtrv-fecom/set-fecom** command to verify/enable far-end communications (fecom).
- 4.



NOTE:

When the CIT **ins-prog:tid** or **cpy-prog:tid** command is used for SONET software upgrades from Release 9.0 to Release 11 or later, the software is loaded as a dormant copy in the **SYSCTL** receiving the software. At the end of the download, the **rtrv-alm** report will show a status message of **dormant/exec code mismatch**. The CIT **apply** command must be used to overwrite the original executing copy of software with the new dormant software version. Refer to document 363-208-003, *SLC-2000 Access System, Commands and Messages*, for a description of the CIT **apply** command.

- ⇒ **NOTE:**
If you want to load new software to a shelf in a remote network element (if allowed) directly from a PC, use the **ins-prog: tid** command where the TID entered is that of the remote shelf where you want to install the new software.
- ⇒ **NOTE:**
If remote software downloading is allowed and you want to load new software to a remote network element by means of the DCC from a local shelf which already contains the new software, log in (either locally or remotely) to the shelf containing the new software, and then enter the **cpy-prog: tid** command (where the TID is that of the shelf in which you want to install the software). [The tid is the name given to a shelf (network element) using the **set-ne:** command.] The **cpy-prog: tid** command will only copy software from a local controller to a remote controller; it is not used to download software from a PC.
- ⇒ **NOTE:**
The download time will be longer (even without excessive DCC traffic) when there are additional spans between the source and target network elements. To minimize the download time and reduce DCC traffic, it is recommended that multi-span software downloading be avoided by remotely logging into the nearest shelf of the same type and remotely downloading the new program from that shelf.

Obtain the following equipment:

- a. IBM^{*} compatible personal computer (PC) running an MS-DOS[†] computer program operating system, Release 3.0 or later.
- b. RS-232 cable to connect PC **COM1** port to user interface panel **CIT** port.
- c. Working copies of the new system generic program diskette(s).
- d. Software Release Description for software being installed.

Comment: In this procedure it is assumed you are familiar with the characteristics and operating procedures of your PC and the MS-DOS operating system. Refer to your PC documentation to make working and backup copies of the generic program diskette(s). Follow proper procedures in handling the diskette(s) (floppies).

5.



NOTE:

In this procedure it is assumed the installation will be done using the diskette(s). You can **copy** all files on the source diskette(s) to a directory (such as GEN_ ver where ver should be 345 for generic version 3.4.5) on a PC with a hard disk and load the generic from that hard drive directory.



CAUTION:

Unexpected problems can result when loading software from an MS-DOS window running under the Windows 95 platform. When loading software in the SLC-2000 Access System, run the CTRM program directly from DOS. Failure to follow this precaution can corrupt the memory in the SMU and a service outage may occur (if a spare SMU is not available).

Start MS-DOS operating system on the PC.

Response: PC displays the prompt (**A: \>**, **C: \>**, etc.) determined by the PC.

6.



NOTE:

The new generic program may be on many floppy disks. The PC will prompt you to insert disks as needed after the first disk is installed.

Insert the first (number 1) floppy disk into the PC drive (if not using a hard drive).

* Registered trademark of International Business Machines Corporation.

† Registered trademark of Microsoft Corporation.

7. Use the appropriate *MS-DOS* command (for example, **a:** or **b:**) to go to the drive with the floppy disk installed (or use the **cd** command to move to the appropriate hard drive directory).

Response: PC displays the appropriate prompt (**A>**, **B>**, **C>**, **C:\DOS>**, etc.) determined by the PC.

Comment: If you are using floppy disks and get a disk error message, verify that the drive latch is locked, and you have the proper diskette installed in the drive.

8. Execute the command **checkpgm** to check the version number of the program you are installing. This command may take up to 25 minutes to run and may require swapping diskettes in the disk drive if the software is on a floppy disk drive.

Response: **PC has DDM-2000 program version #.#.#** appears on the screen. **Checking files** is displayed on the screen followed by several periods.

Once the program has checked all of the files and all files are good, then **/* ALL FILES OK */** appears on the screen. If a problem is detected in the files, get new software and repeat this step.

9. Are you using **ins-prog** or **cpy-prog** command to download software to the remote network element shelf?

If **cpy-prog**, then continue with Step 10.

If **ins-prog**, then proceed to Step 19.

10.



CAUTION:

*Only one **cpy-prog** procedure at a time should be performed in the same maintenance subnetwork. Simultaneous **cpy-prog** procedures in the same network may fail.*

Connect the PC to the **CIT** port by connecting one end of an RS-232 cable to the **COM1** port of the PC (use a 9-pin to 25-pin converter, if necessary) and the other end of the cable to the UIP **CIT** port (see Figure 1). Press the cover of the UIP to gain access to the CIT port. Turn the PC power switch on.

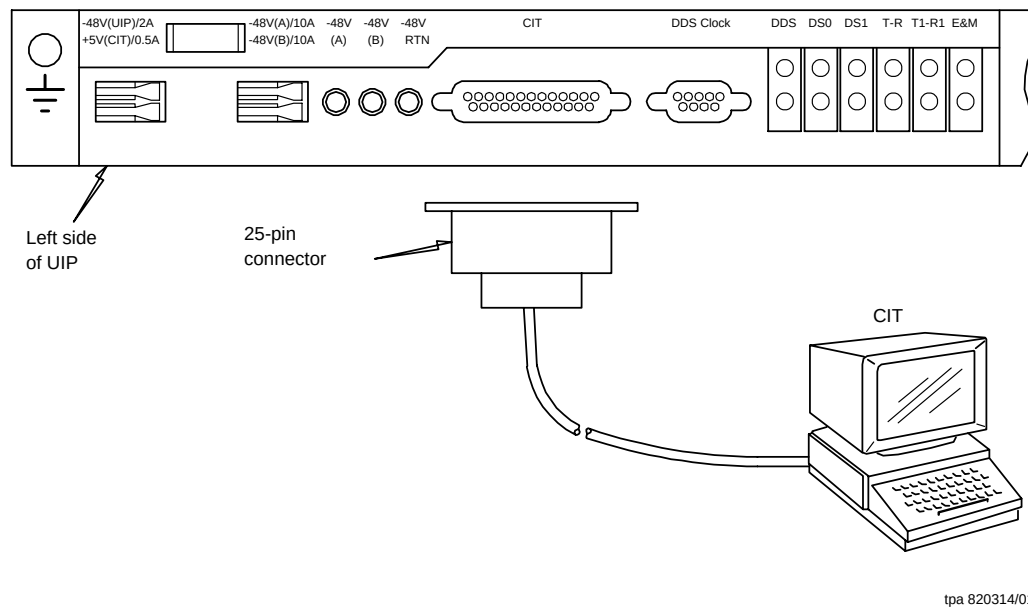


Figure 1 – Typical Craft Interface Terminal (CIT)

11.

⇒ **NOTE:**
To set baud rate automatically, enter two carriage returns (<cr>), two lowercase "a"s (aa), or two uppercase "A"s (AA). All other characters are ignored.

Enter two carriage returns.

Response: CIT prompts with:

```
/* Enter a shelf number from 1 to 8 */  
shelf [default] =
```

12.

⇒ **NOTE:**
Entering just a carriage RETURN at the shelf prompt will connect you to the default shelf physically connected to the CIT.

Enter the shelf number and/or carriage RETURN for the shelf being accessed.

Response: CIT prompts with **login <**

13.

⇒ **NOTE:**
Security is available to protect against unauthorized access to the system. System security requires the defaults for the privileged user logins/password to be changed and CIT and/or DCC port security to be enabled. If security is enabled on a port, users must enter a valid login and password to access the system through that port.

⇒ **NOTE:**
The system always has three privileged user logins to minimize the chance that both users will forget their passwords at the same time. You must be logged into the system as a *privileged user* to set security; add, change, or delete logins; and to execute some commands. The default *privileged user* logins for Releases 9.1 or later are LUC01 (uppercase LUC-zero-one), LUC02 (uppercase LUC-zero-two), and LUC03 (uppercase LUC-zero-three). The default *privileged user* logins for Release 9.0 or earlier are ATT01 (uppercase ATT-zero-one), ATT02 (uppercase ATT-zero-two), and ATT03 (uppercase ATT-zero-three). The default *privileged user* password is SLC-2000.

If security has been enabled, enter your login, and then enter your password when prompted.

If security has not been enabled, enter a carriage RETURN.

Response: The CIT will display an alarm summary generated by the
rtrv-alm: all command.

14. Enter the command **cpy-prog: tid**

Where tid = the target identifier (shelf name) for the remote shelf receiving the new program.

Response: **/* Testing For Program Installation... */**

After several seconds, the PC prints a **Caution!** message followed by the prompt:

Execute? y/n =

15. Was response correct?

If **YES**, then continue with Step 16.

If **NO**, then do **Trouble Clearing: TAP-108**.

16. Enter a "y" or "yes" and a carriage return to execute the program. Software download may take up to 20 minutes.

Response: **ABN** LED lights on User Panel. A "P." is displayed in **SYSCTL FE ID** display in the remote network element shelf receiving the program (for uncompressed executing copy download, not if dormant copy is being loaded). At shelves connected directly to the shelf receiving the program, **MJ** and **NE ACTY** LEDs light on User Panel and **FAULT** LED flashes on **OHCTL**. At other shelves in the same control system, **MJ** and **FE ACTY** LEDs light on UIP. Download begins and the following message is displayed:

In progress

The dots continue to print until program installation is complete. After installation is completed, the PC prints the following completion message:

ins-prog: TID COMPLD
/* Generic #.#.# is installed */

The LEDs go off on the UIP and **SYSCTL**.

17. Was response correct?

If **YES**, then proceed to Step **31**.

If **NO**, then continue with Step **18**.

18. Wait approximately 10 minutes for the network to stabilize then repeat this procedure from Step **10**. If the second attempt to download software fails, then do **Trouble Clearing: TAP-108**. You may have to go to the remote network element site.

STOP. YOU HAVE COMPLETED THIS PROCEDURE.

19.



NOTE:

The **FE ID** display on the remote **SYSCTL** must show one of the following preceding software installation. Other conditions represent failure conditions or conditions that will not allow a remote software download.

- A. The letter **(P.)** displayed in the **FE ID** display indicates that a previous software download has failed and you may be able to download software from another shelf, or locally. Try again to download software from same shelf. If there is no period after the **(P)**, the software can only be downloaded locally using the procedures of **DLP-538**.
- B. Nothing displayed in the **FE ID** display indicates that compatible software is installed in the **OHCTL** and **SYSCTL** and you may download software remotely if remote software downloading is permitted for this release.

Ensure PC is connected to the UIP **CIT** port. If floppies are being used, ensure the first (number 1) diskette is installed in floppy drive. If hard drive is being used, ensure you are in the correct directory.

20. Select a PC serial communication port by entering **term** to select the default COM1 port or **term COMn**, where $n = 2, 3, \text{ or } 4$, to select a PC serial communication port (COM2, COM3, or COM4) other than the COM1 port. If after starting the terminal emulator you see the message "**Can't find script <init>**", disregard it.

Response: Two brief messages are displayed and you are instructed to **Press any key to continue . . .** after the second message. After you press any key, the terminal emulator is loaded and the terminal responds as follows:
CTRM ready. (Type Alt-h for help.)
Communications established.

21.



NOTE:

The default shelf is the shelf physically connected to the PC. To set baud rate automatically, enter two carriage returns (<cr>), two lower case "a"s (**aa**), or two upper case "A"s (**AA**). All other characters are ignored.

Enter two carriage returns.

Response: PC prompts with:

```
/* Enter a shelf number from 1 to 8 */  
shelf [default] =
```

22. Was response correct?

If **YES**, then proceed to Step **24**.

If **NO**, then continue with Step **23**.

23. Check PC to **CIT** port connections. Make sure the cable is connected between the PC **COM()** port and the UIP **CIT** connector. Check term setup and make sure the **COM** port selected matches the port [**COM()**] on the PC that is connected to the UIP **CIT** port.

Exit term (Alt-F2) and repeat this procedure from Step **19**.

24. Enter the shelf number for the local shelf being used for new program download.

Response: PC responds with:

```
login <
```

25.



NOTE:

After the system prompt (<), the system will respond normally to commands entered.

Use **rtrv-map-network** command to retrieve the name (*tid*) of the remote shelf having new program installed.

26. Enter the command **ins-prog:tid**

Where tid = the target identifier (shelf name) for the far-end shelf having the new program installed.

Response: **/* Testing For Program Installation... */**

After several seconds, the PC displays a **Caution!** message followed by the prompt:

Execute? y/n =.

27. Was response correct?

If **YES**, then continue with Step 28.

If **NO**, then do **Trouble Clearing: TAP-108**.

28. Enter a "y" or "yes" and a carriage return to execute the program. Software download may take up to 45 minutes.

Response: **ABN** LED lights on UIP. A "P." is displayed in **SYSCTL FE ID** display in the far-end shelf receiving the program (for uncompressed executing copy download, not if dormant copy is being loaded). PC starts download and prints the following message:

**Searching for optimal transfer rate.
Handshake established at <baudrate> baud.**

In progress

The dots continue to print until program installation is complete. If floppy disks are being used, insert each diskette when prompted. After installation is completed, the PC prints the following completion message:

**ins-prog:tid COMPLD
/* Generic #.#.# is installed */**

The **SYSCTL** resets, and the terminal is logged off the system. The LEDs go off on the UIP and **SYSCTL**.

29. Was response correct?

If **YES**, then proceed to Step 31.

If **NO**, then continue with Step 30.

30. Wait approximately 10 minutes for the network to stabilize, exit **term**, then repeat this procedure from Step 19. If the second attempt to download software fails, do **Trouble Clearing: TAP-108**. You may have to go to the remote site.
31. Wait approximately 5 minutes then verify communications can be reestablished with far-end shelf using **rtrv-map-network** command. Verify that *Comm. Status* is good (not *FAILED*) as indicated by a blank in the report.
32. Is communication status good between local and remote shelf?

 If **YES**, then proceed to Step 34.
 If **NO**, then continue with Step 33.
33. Dispatch technician to remote site and perform local software download procedures.

Reference: **DLP-538**

STOP. YOU HAVE COMPLETED THIS PROCEDURE.

34. Use **rlgn: tid** command to remotely log in to far-end shelf.
- 35.



NOTE:

If a dormant copy was loaded into the far-end shelf and its release version is different than the currently executing version, a status alarm message of "*dormant/exec code mismatch*" will appear in the **rtrv-alm** report.

Use **rtrv-alm** command at far-end shelf to check for alarm status message of "*dormant/exec code mismatch*".

36. Does alarm report indicate "*dormant/exec code mismatch*"?

 If **YES**, then continue with **Step 37**.
 If **NO**, then **STOP. YOU HAVE COMPLETED THIS PROCEDURE.**

37.



NOTE:

The software you downloaded to the remote shelf has been loaded as a dormant copy. The original software is still the executing software. The "**apply**" command must be used at the remote shelf to install the dormant copy of software as an executing copy. When the "**apply**" command is executed during an upgrade from Release 9.1 to Release 11.0 or later, there is a 30-minute delay before the dormant copy installation begins. When the "**apply**" command is executed during an upgrade from Release 11.0 to later releases, if you do not specify a "*time*" and "*date*" parameter, there is a default 15-minute delay before the dormant copy installation begins. Once the installation begins, the dormant copy is installed in approximately 10 minutes. Refer to document 363-208-003, *SLC-2000 Access System, Commands and Messages*, for a description of the CIT **apply** command. The "**apply**" command allows you to coordinate the software download across the network.

Are you going to use the **apply** command at this time to load dormant version of software?

If **YES**, then continue with Step **38**.

If **NO**, then **STOP. YOU HAVE COMPLETED THIS PROCEDURE.**

38. Use the **r lgn: tid** command to log in again to the remote shelf, then execute the **apply** command.

Response: At the local shelf, a "**P**" appears in the **FE ID** display when the installation begins.

The **SYSCTL** resets after the software is installed.

SYSCTL FE ID display and UIP LEDs go off.

The remote log in session is terminated.

After approximately 10 minutes, you can remote login again to the remote shelf.

39. Was response correct?

If **YES**, then **STOP. YOU HAVE COMPLETED THIS PROCEDURE.**

If **NO**, then continue with Step **40**.

40. Dispatch technician to remote site to perform trouble-clearing procedures, and/or install software locally using the procedures of **DLP-538**.

STOP. YOU HAVE COMPLETED THIS PROCEDURE.

Install New SONET Generic Program In-Service System Local Network Element Download

General: This procedure is used to install a new software program in a *SLC*®-2000 Access System local network element. Procedures for downloading software to a remote network element using the **ins-prog** or **cpy-prog** command can be found in **DLP-537**. Procedures for downloading software in a new shelf (initial installation) can be found in **DLP-513**.

1. Before beginning software installation, refer to the *Software Release Description* for the software being installed for a description of any special considerations required when installing this version of the software.
2. Verify that no data communications channel (DCC) failures or transmission failures (OC-3 LOS, flashing **OLI** **FAULT** LEDs, etc.) are present on the network element or system receiving the program.

3.



NOTE:

If the CIT **ins-prog: tid** command is used for SONET software upgrades from Release 9.1 to Release 11 or later, the software is loaded as a dormant copy in the **SYSCTL** receiving the software. At the end of the download, the **rtrv-alm** report will show a status message of **dormant/exec code mismatch**. The CIT **apply** command must be used to overwrite the original executing copy of software with the new dormant software version. Refer to document 363-208-003, *SLC-2000 Access System, Commands and Messages*, for a description of the CIT **apply** command.

Obtain the following equipment:

- a. IBM* compatible personal computer (PC) running an MS-DOS† computer program operating system, Release 3.0 or later.
- b. RS-232 cable to connect PC **COM1** port to user interface panel **CIT** port.
- c. Working copies of the new system generic program diskette(s).
- d. Software Release Description for software being installed.

Comment: In this procedure it is assumed you are familiar with the characteristics and operating procedures of your PC and the MS-DOS operating system. Refer to your PC documentation to make working and backup copies of the generic program diskette(s). Follow proper procedures in handling the diskette(s) (floppies).

4.



NOTE:

In this procedure it is assumed the installation will be done using the diskette(s). You can **copy** all files on the source diskette(s) to a directory (such as GEN_ ver where ver should be 345 for generic version 3.4.5) on a PC with a hard disk and load the generic from that hard drive directory.



CAUTION:

Unexpected problems can result when loading software from an MS-DOS window running under the Windows 95 platform. When loading software in the SLC-2000 Access System, run the CTRM program directly from DOS. Failure to follow this precaution can corrupt the memory in the SMU and a service outage may occur (if a spare SMU is not available).

Start MS-DOS operating system on the PC.

Response: PC displays the prompt (**A: \>**, **C: \>**, etc.) determined by the PC.

5.



NOTE:

The new generic program may be on many floppy disks. The PC will prompt you to insert disks as needed after the first disk is installed.

Insert the first (number 1) floppy disk into the PC drive (if not using a hard drive).

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† Registered trademark of Microsoft Corporation.

6. Use the appropriate *MS-DOS* command (for example, **a:** or **b:**) to go to the drive with the floppy disk installed (or use the **cd** command to move to the appropriate hard drive directory).

Response: PC displays the appropriate prompt (**A>**, **B>**, **C>**, **C:\DOS>**, etc.) determined by the PC.

Comment: If you are using floppy disks and get a disk error message, verify that the drive latch is locked and you have the proper diskette installed in the drive.

7. Execute the command **checkpgm** to check the version number of the program you are installing. This command may take up to 25 minutes to run and may require swapping diskettes in the disk drive if the software is on a floppy disk drive.

Response: **PC has DDM-2000 program version #.#.#** appears on the screen. **Checking files** is displayed on the screen followed by several periods.

Once the program has checked all of the files and all files are good, then **/* ALL FILES OK */** appears on the screen. If a problem is detected in the files, get new software and repeat this step.

8. Connect the PC to the **CIT** port by connecting one end of an RS-232 cable to the **COM1** port of the PC (use a 9-pin to 25-pin converter, if necessary) and the other end of the cable to the UIP **CIT** port (see Figure 1). Press the cover of the UIP to gain access to the CIT port. Turn the PC power switch on.

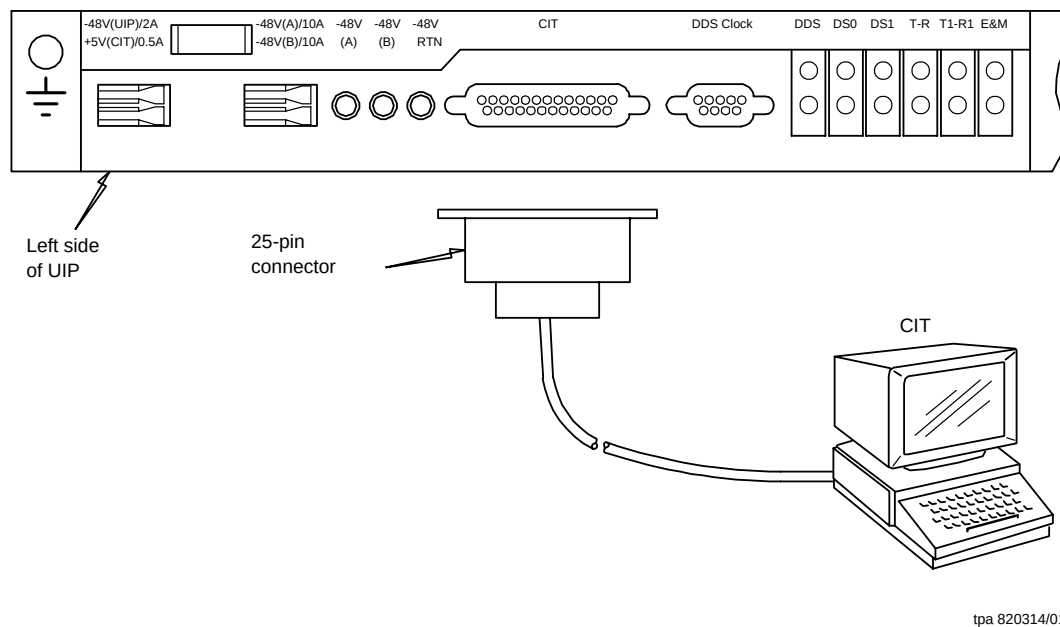


Figure 1 – Typical Craft Interface Terminal (CIT)

9. Observe one of the following indications on the **SYSCTL FE ID** display. Note the indication and follow the suggested procedure:
 - a. The letter **P** in the **FE ID** display indicates that the **SYSCTL** has no software. Software must be downloaded locally using these procedures.

Continue with **Step 10**.
 - b. The letter **P** followed by a period (**P.**) in the **FE ID** display indicates that a previous software download attempt has failed. New software must be downloaded locally using these procedures.

Proceed to **Step 23**.
 - c. Nothing displayed in the **FE ID** display. Indicates compatible software is installed in **OHCTL** and **SYSCTL**. This procedure assumes that the installed software version is not the correct version.

Proceed to **Step 13**.

- d. The letter **d** in the **FE ID** display indicates that the **OHCTL** has no software or that software in the **OHCTL** and **SYSCTL** is incompatible.

Proceed to **Step 23**.

- e. The letter **C** displayed in the **FE ID** display indicates that software is installed in the **OHCTL** and **SYSCTL**, but it will not support the current shelf transmission configuration.

Proceed to **Step 27**.

- f. The letter **U** in the **FE ID** display indicates **SYSCTL** switch **S1** is not set correctly for the type of shelf being equipped. Correct switch setting using **DLP-534**.
- g. The letter **E** in the **FE ID** display indicates that the **SYSCTL** must be replaced. Replace **SYSCTL** using **DLP-534**.
- h. The letter **F** in the **FE ID** display indicates that the **SYSCTL** faceplate latch is not fully latched. Unplug and reseal **SYSCTL** circuit pack ensuring that it is fully seated and the faceplate latch is engaged.
- i. A flashing letter **L** displayed in the **FE ID** display indicates a low-voltage condition (brownout) on the shelf.

Clear trouble using **Trouble Clearing: TAP-117**.

Letter "P" in FE ID Display

10.



CAUTION:

*If PC hard drive is being used, ensure you are in the correct directory. If floppies are being used, ensure the first (number 1) diskette is installed in floppy drive. Ensure PC is connected to the UIP **CIT** connector.*



NOTE:

After the terminal emulator (**term**) is started, the software download automatically begins. The download may take up to 45 minutes.

Enter **term** or **term COMn** command, where $n = 1$ or 2 . If **term** is entered without the **COMn** option, then **COM1** will be selected by default. Disregard message "**Can't find script <init>**" if you see it after starting the terminal emulator.

Response: Two brief messages are printed, and you are instructed to *Press any key to continue . . .* after the second message. After you press any key, the terminal emulator is loaded and the terminal responds as follows within 2 minutes:
Interface ready. (Type Alt-h for help.)
Communications established.

Searching for optimal transfer rate.
Handshake established at <baudrate> baud.

In progress

The dots continue to print until program installation is complete. If using floppies, insert each diskette when prompted. After installation is completed, the PC prints the following completion message:

```
ins-prog: tid COMPLD  
/* Generic #.#.# is installed */
```

The **SYSCTL** resets and the terminal is logged off the system.

11. Was response correct?

If **YES**, then continue with Step **12**.

If **NO**, then proceed to Step **30**.

12. Did the letter "C" appear in the **FE ID** display?

If **NO**, then **STOP. YOU HAVE COMPLETED THIS PROCEDURE.**
If **YES**, then proceed to Step 27.

FE ID Display Blank

13.  **CAUTION:**
If PC hard drive is being used, ensure you are in the correct directory. If floppies are being used, ensure the first (number 1) diskette is installed in floppy drive.

Enter **term** or **term COM n** command, where $n = 1$ or 2 . If **term** is entered without the **COM n** option, then **COM1** will be selected by default. Disregard message "**Can't find script <init>**" if you see it after starting the terminal emulator.

Response: Two brief messages are printed and you are instructed to **Press any key to continue . . .** after the second message. After you press any key, the terminal emulator is loaded and the terminal responds as follows:
Interface ready. (Type Alt-h for help.)
Communications established.

- 14.

 **NOTE:**
The default shelf is the shelf physically connected to the PC. To set baud rate automatically, enter two carriage returns (**<cr>**), two lower case "a"s (**aa**), or two upper case "A"s (**AA**). All other characters are ignored.

Enter two carriage returns.

Response: PC prompts with:
/* Enter a shelf number from 1 to 8 */
shelf [default] =

15. Was response correct?

If **YES**, then continue with Step 16.
If **NO**, then proceed to Step 31.

16. Enter the shelf number for the shelf being used for new program download.

Response: PC responds with: **login <**

- 17.



NOTE:

After the system prompt (<), the system will respond normally to commands entered. Refer to document 363-208-003, *SLC-2000 Access System, Commands and Messages*, for a description of the commands.

Use **rtrv-ne** command to retrieve the name (*tid*) of the shelf having new program installed or see *TID* in response above.

18. Enter the command **ins-prog:tid**

Where tid = the target identifier (shelf name) for the shelf having the new program installed.

Response: **/* Testing For Program Installation... */**

After several seconds, the PC prints a **Caution!** message followed by the prompt:

Execute? y/n =

19. Was response correct?

If **YES**, then continue with Step 20.

If **NO**, then do **Trouble Clearing: TAP-108**.

20. Enter a "y" or "yes" and a carriage return to execute the program. Software download may take up to 45 minutes.

Response: UIP **ABN** LED lights and a **P** is displayed in **SYSC TL FE ID** display in the shelf receiving the program. PC starts download and prints the following message:

Searching for optimal transfer rate.
Handshake established at <baudrate> baud.

In progress

The dots continue to print until program installation is complete. If floppy disks are being used, insert each diskette when prompted. After installation is completed, the PC prints the following completion message:

ins-prog:tid COMPLD
/* Generic #.#.# is installed */

21. Was response correct?

If **YES**, then continue with Step 22.

If **NO**, then do **Trouble Clearing: TAP-108**.

22. Did the letter "**C**" appear in the **FE ID** display?

If **NO**, then proceed to Step 34.

If **YES**, then proceed to Step 27.

Letter "d" or "P." in FE ID Display

23.



CAUTION:

*If PC hard drive is being used, ensure you are in the correct directory. If floppies are being used, ensure the first (number 1) diskette is installed in floppy drive. Ensure PC is connected to the UIP **CIT** connector.*

Enter **term** or **term COMn** command, where $n = 1$ or 2 . If **term** is entered without the **COMn** option, then **COM1** will be selected by default. Disregard message "**Can't find script <init>**" if you see it after starting the terminal emulator.

Response: Two brief messages are printed and you are instructed to **Press any key to continue . . .** after the second message. After you press any key, the terminal emulator is loaded and the terminal responds as follows:

**Interface ready. (Type Alt-h for help.)
Communications established.**

24. Unplug and reseal the **SYSCTL** and immediately push and hold the **FE SEL** and **UPD/INIT** buttons at the same time until a **P** appears in the **FE ID** display (takes approximately 15 seconds). The software download automatically begins and may take up to 45 minutes.

Response: PC starts download and prints the following message:

**Searching for optimal transfer rate.
Handshake established at <baudrate> baud.**

In progress

The dots continue to print until program installation is complete. If using the floppy disks, insert each diskette when prompted. After installation is completed, the PC prints the following completion message:

**ins-prog:tid COMPLD
/* Generic #.#.# is installed */**

The **SYSCTL** resets and the terminal is logged off the system.

25. Was response correct?

If **YES**, then continue with Step **26**.

If **NO**, then proceed to Step **30**.

26. Did the letter "C" appear in the **FE ID** display?

If **NO**, then proceed to Step **34**.

If **YES**, then continue with Step **27**.

Letter "C" in FE ID Display

27.



CAUTION:

*If the system is in service and is forced to run the current software that is displaying a **C**, service interruption may result.*



NOTE:

Indications are that there may be a problem with the version of software you are installing or you are trying to install a version of software that will not support the current shelf provisioning. If you are downloading an older version of software or upgrading to a new version of software which has major changes or is incompatible with the version that you have, this indication will occur. You can *force* the system to run the current software or back out of this procedure by loading another version of software. You must decide if you want the system to run this current version of software that has been loaded or if you want to download another version (original version or new version) of software.

Do you want to run the current version of software in the **SYSCTL**?

If **NO**, then continue with Step **28**.

If **YES**, then proceed to Step **29**.

28. Exit **TERM** (Alt-F2). Find new version of software and repeat this procedure from Step **23**.

29. To *force* the system to run the current software, perform the following:

- a. Ensure that a **TGS** circuit pack is installed in the **TGS-2** slot.
- b. Remove the **TGS-1** circuit pack.
- c. Reset (unplug and reseal) the **SYSCTL** to force it to run the current software.
- d. After the current software is up and running (no alarm LEDs lighted or you can log into the shelf), reinstall the **TGS-1** circuit pack.

STOP. YOU HAVE COMPLETED THIS PROCEDURE.

30. Did the download start as indicated by the **In progress** message and rows of dots?

If **NO**, then continue with Step 31.

If **YES**, then proceed to Step 32.

31. Perform the following:

- A. Check that the shelf is connected to the PC through the UIP **COM** port. If it is not, reconnect the PC to shelf using the UIP **COM** port and repeat this procedure.
- B. Ensure first (number 1) disk of program being installed is inserted, if using floppies.
- C. Ensure diskette is inserted in correct drive.
- D. Ensure the proper command was used to go to the drive with the diskette or to the proper directory containing the software.
- E. Check for invalid COM port. Exit TERM (Alt-F2), then restart TERM using **term COM1** or **term COM2**.
- F. If the download still does not start, as indicated by the **In progress** message and rows of dots, within 2 minutes after the **P** appears in the **FE ID** display, change the baud rate as follows and repeat this procedure: if the baud rate is currently set to 9,600, change it to 4,800 or if the baud rate is currently set to 4,800, change it to 9,600. The baud rate is changed by:
 - 1. Momentarily press the "Alt C" keys.
 - 2. Use the RETURN key to move to the "Speed" field.
 - 3. Press the "Space" bar until the desired rate appears.
 - 4. Momentarily press the "Escape/Esc" key to activate the new baud rate.
- G. If the download still does not start, refer to **Trouble Clearing: TAP-108**.

STOP. YOU HAVE COMPLETED THIS PROCEDURE.

32. If the download *starts and fails* during its progress, exit term (Alt-F2) and then restart a new term session.

33. Unplug and reseal the **SYCTL** and immediately press and hold the **FE SEL** and **UPD/INIT** buttons at the same time until a **P** appears in the **FE ID** display (takes approximately 15 seconds).

If the download still does not complete, refer to **Trouble Clearing: TAP-108**.

STOP. YOU HAVE COMPLETED THIS PROCEDURE.

34. Use the **rtrv-alm** command to display alarm and status information.
35. Does status message "**dormant/exec code mismatch**" appear in the report for this shelf?

If **NO**, then **STOP. YOU HAVE COMPLETED THIS PROCEDURE.**

If **YES**, then continue with Step 36.

36.



NOTE:

The software you downloaded has been loaded as a dormant copy in this shelf. The original software is still the executing software. The "**apply**" command must be used at this shelf to install the dormant copy of software as an executing copy. When the "**apply**" command is executed during an upgrade from Release 9.1 to Release 11 or later, there is a 30-minute delay before the dormant copy installation begins. When the "**apply**" command is executed during an upgrade from Release 11 to later releases, if you do not specify a "*time*" and "*date*" parameter, there is a default 15-minute delay before the dormant copy installation begins. Once the installation begins, the dormant copy is installed in approximately 10 minutes.

Refer to document 363-208-003, *SLC-2000 Access System, Commands and Messages*, for a description of the "**apply**" command. The "**apply**" command allows you to coordinate the software download across the network.

Are you going to use the **apply** command at this time to install the dormant version of software?

If **YES**, then continue with Step 37.

If **NO**, then **STOP. YOU HAVE COMPLETED THIS PROCEDURE.**

37. Execute the **apply** command at the shelf to receive the software.

Response: A "**P**" appears in the **FE ID** display when the installation begins.
The **SYSCTL** resets after the software is installed.
SYSCTL FE ID display and UIP LEDs go off.
You are logged off the system.
After approximately 5 minutes you can log back into the shelf and reestablish communications.

38. Was response correct?

If **YES**, then **STOP. YOU HAVE COMPLETED THIS PROCEDURE.**
If **NO**, then continue with Step 39.

39. Did the letter "**C**" appear in the **FE ID** display?

If **NO**, then do **Trouble Clearing: TAP-108.**
If **YES**, then proceed to Step 27.

Convert a Conventional *SLC*[®]-2000 FITL System (768 Lines) With HDOS to a DLC R4.5 or Later Enhanced FITL System (1,152 Lines)

General: This procedure can be used to convert a *SLC*-2000 fiber in the loop (FITL) system with high density optics shelves (HDOS) serving 768 POTS lines to a *SLC*-2000 FITL system serving 1,152 POTS lines. For the *SLC*-2000 multi-services distant terminal (MSDT), this procedure replaces existing cabling between the MDS and HDOS with new cabling between the MDS and a DSX-1 cross-connection and between the DSX-1 cross-connection and the HDOS.

This feature is supported by digital loop carrier (DLC) Software Release 4.5 (R4.5) or later and requires that R4.5 or later software be installed in the system as part of the conversion.



CAUTION:

This procedure will interrupt service for any SLC-2000 MSDT currently being served by DT Servers in the MDS being converted.



NOTE:

Since the HDOS does not have the capability to equalize long cables, the total length of all cabling between the MDS backplane and the HDOS backplane, including dangles, must not exceed 35 feet. To avoid exceeding this cabling limitation, it is suggested that the DSX-1 cross-connection and the HDOS be located in the same or adjacent bays.

1. Install DLC Software Release 4.5 (R4.5) or later in the *SLC*-2000 Access System being converted and allow sufficient time for the software to download to all distant terminals (DTs).

Reference: **NTP-074**

2. Install a DSX-1 cross-connection panel in the same bay with the current HDOS or in an adjacent bay.



NOTE:

If space to mount the DSX-1 panel is not available, a new HDOS and collocated DSX-1 panel would need to be added. The HDOS in the *SLC*-2000 Access System bay could also be used, but would result in longer service outage.

3. Run new MDS DS1 cables, ED-7C723-35, Group 19 (Comcode 601845472), between the MDS and DSX-1 panel.



NOTE:

Any of the cables listed in Table A can be used between the MDS and the DSX-1 panel instead of the ED-7C723-35, Group 19 cables. However, with the cabling limitation of 35 feet between the MDS and the HDOS, the use of these cables will require that the cables be shortened extensively to assure that the cabling limitation is not exceeded.

Table A – DSX-1 Interface Cable Lengths Available

Length (ft.)	Description	Comcode
50.0	ED-7C723-35, G20	601845480
100.0	ED-7C723-35, G21	601845498
200.0	ED-7C723-35, G22	601845506

4. Connect only the DSX-1 panel cable end to spare terminals for each MDS. Label the DSX-1 panel with the *SLC*-2000 Access System number, shelf number, and slot number.



NOTE:

To avoid exceeding the 35 feet total cabling limitation between the MDS and HDOS backplanes, the ED-7C723-35, Group 19 cables (30 feet long) must be shortened by cutting at the DSX-1 panel cable end.

5. Install new MDS/DSX-1 transmission cable assembly ED-7C723-35, Group 17 (601831043) by connecting the P191 and P192 connectors to the J191 and J192 connectors on the ends of the ED-7C723-35, Group 19 cables (refer to Figure 1). Do not connect the MDS ends of the Group 17 cable yet.
6. Install a new HDOS DS1 cable, ED-7C723-35, Group 18, terminating only the DSX-1 panel end. Label the DSX-1 panel with the appropriate HDOS and slot notations.

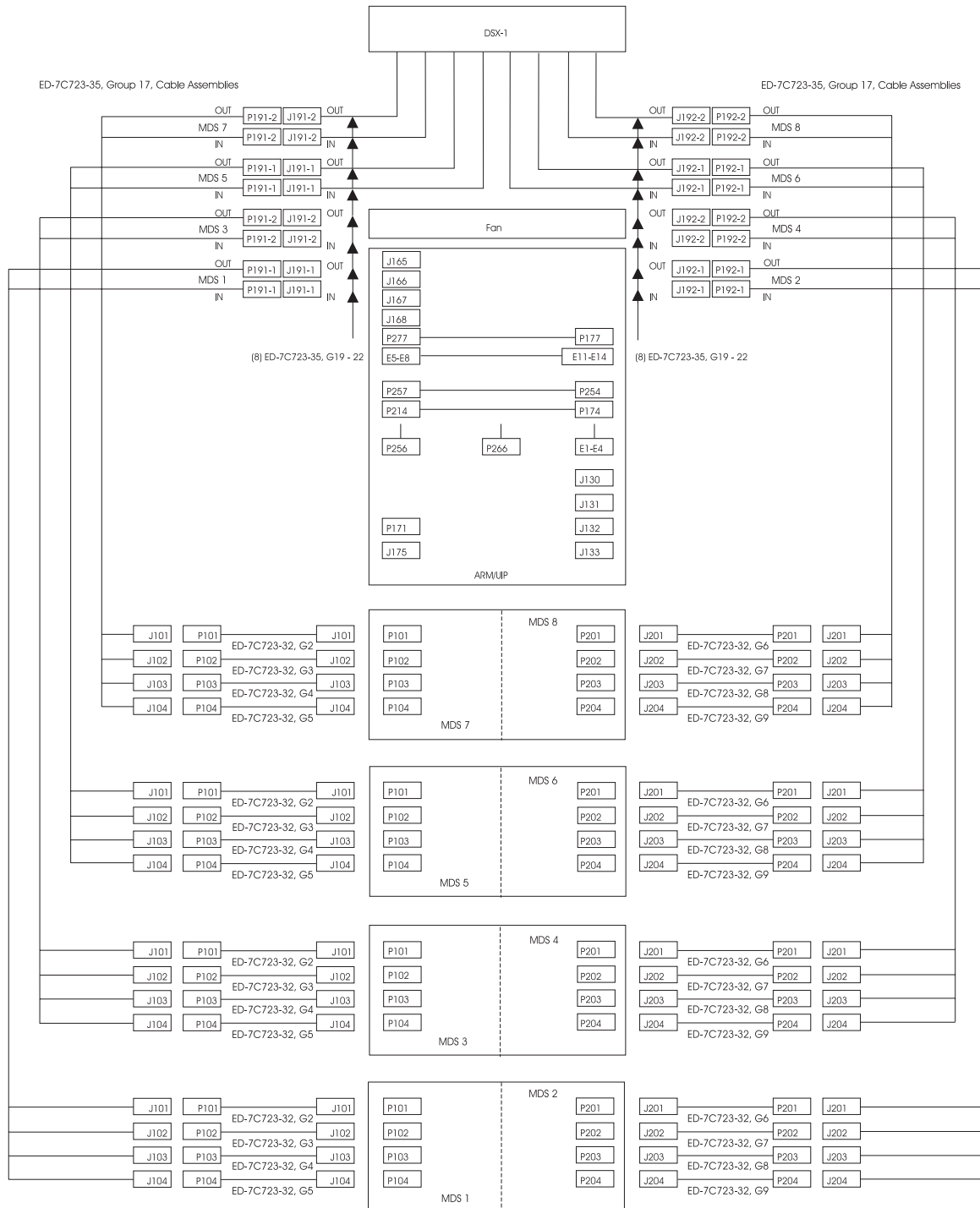


Figure 1 – MDS/DSX-1 Cabling Connections

7. Check for customer activity on all MSDTs in service on the *SLC-2000* system being converted. When an MSDT is found to have no active calls, use the CIT **ed-dt** command to reprovision service on the MSDT for zero lines of service. (Refer to document 363-208-003, *SLC-2000 Access System, Commands and Messages*, for the **ed-dt** command pages.) Repeat the procedure for all MSDTs on the system.



NOTE:

Customers served by the MSDTs will be without service for the remainder of this procedure, but no calls would have been dropped.

8. Remove all active DT Servers from the MDS, set equalization for the new distance to the DSX-1 panel, if necessary, and reinstall. A DT Server upgrade may be needed to support the MSDTs (for example, *SPQ*®808 Servers should be replaced with *SPQ*810 or *SPQ*811 Servers).
9. Cross-connect the transmit pairs and receive pairs in the DSX-1 panel for the existing server/HDOS connections. Test for continuity from the MDS Server connector pins on the ED-7C723-35, Group 17, cable to the HDOS connector pins on the ED-7C723-35, Group 18, cable for each of the working server/HDOS associations. Refer to Tables B and C for MDS DT Server slot and cable connectors association.

10.



NOTE:

There is one ED-7C723-34, Group 4, cable assembly per MDS shelf.

Disconnect the ED-7C723-34, Group 4, cable connections on both the MDS and HDOS ends.

11. Connect the new ED-7C723-35, Group 17, cable connectors J101 to J104 to the ED-7C723-32, Group 2 through 5, dangles (P101 through P104) from each MDS (refer to Figure 1) in matching increasing order.



NOTE:

The ED-7C723-32, Group 5, dangle (P104) was not used previously.

12. Connect the ED-7C723-35, Group 18, HDOS cable connectors P191-1, P191-2, P192-1, and P192-2 to the HDOS connectors J191-1, J191-2, J192-1, and J192-2, respectively (refer to Figure 2).
13. Reprovision the DT Servers for the appropriate "lines=" using the **ed-dt** CIT command. The choices are either 12 or 24 as previously optioned.
14. Verify that MSDTs are in service (for example, draw dial tone from an equipped channel with LDS connection).

STOP. YOU HAVE COMPLETED THIS PROCEDURE.

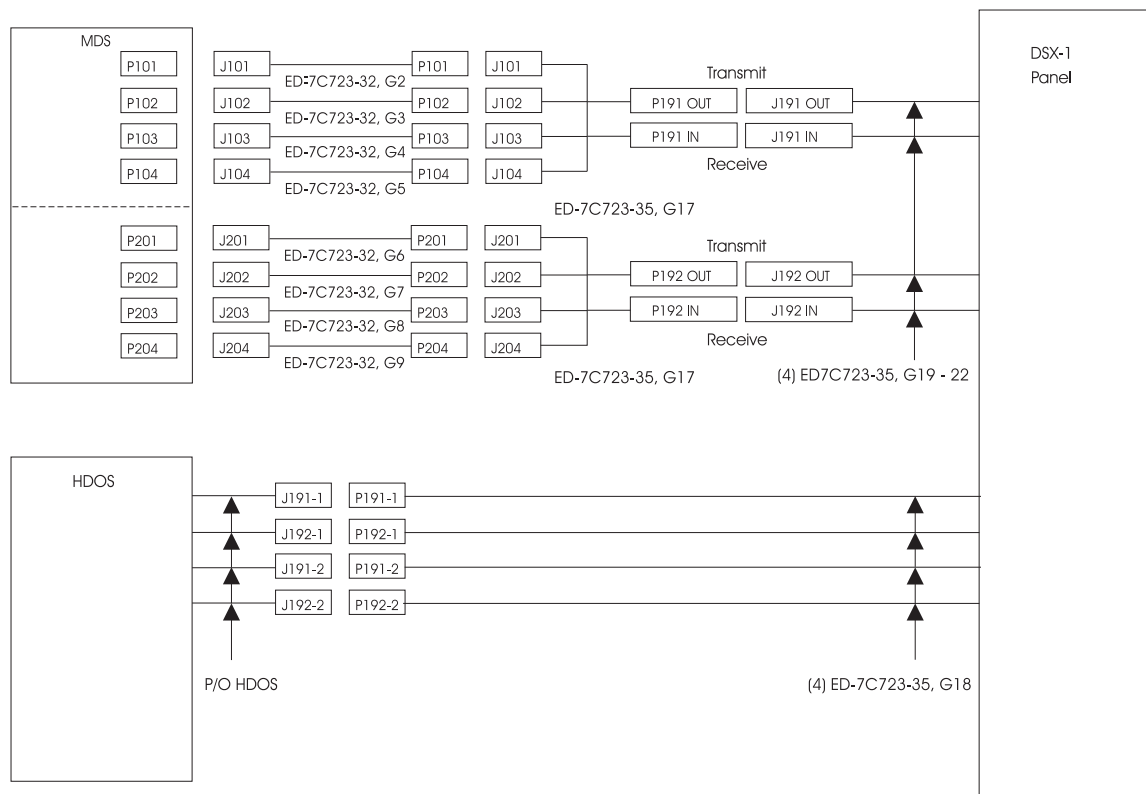


Figure 2 – DSX-1 Panel Cabling Connections

Table B – MDS Server Circuit Pack Slot Association (Odd Shelves)

Shelf No.	Shelf Conn.	Pins R,T	MDS Slot CU 0	P191/P192 ED-7C723-35, G17		DSX-1 Colors (Note)
				Connector	Pins R,T	
1 (Odd)	J101	1,26	1	OUT	1,26	BL-W, W-BL
		2,27		IN	1,26	BL-W, W-BL
		9,34	3	OUT	2,27	O-W, W-O
		10,35		IN	2,27	O-W, W-O
		17,42	5	OUT	3,28	G-W, W-G
		18,43		IN	3,28	G-W, W-G
		25,50	7	OUT	4,29	BR-W, W-BR
	J102	1,26		IN	4,29	BR-W, W-BR
		8,33	9	OUT	5,30	S-W, W-S
		9,34		IN	5,30	S-W, W-S
		16,41	11	OUT	6,31	BL-R, R-BL
		17,42		IN	6,31	BL-R, R-BL
		24,49	13	OUT	7,32	O-R, O-R
		25,50		IN	7,32	O-R, O-R
	J103	7,32	15	OUT	8,33	G-R, R-G
		8,33		IN	8,33	G-R, R-G
		15,40	17	OUT	9,34	BR-R, BR-R
		16,41		IN	9,34	BR-R, BR-R
		23,48	19	OUT	10,35	S-R, R-S
		24,49		IN	10,35	S-R, R-S
	J104	6,31	21	OUT	11,36	BL-BK, BK-BL
		7,32		IN	11,36	BL-BK, BK-BL
		14,39	23	OUT	12,37	O-BK, BK-O
		15,40		IN	12,37	O-BK, BK-O

Note: The colors specified in this cable are true only if the transmission cable uses color code 4.

Table C – MDS Server Circuit Pack Slot Association (Even Shelves)

Shelf No.	Shelf Conn.	Pins R,T	MDS Slot CU 0	P191/P192 ED-7C723-35, G17		DSX-1 Colors (Note)
				Connector	Pins R,T	
2 (Even)	J201	1,26	1	OUT	1,26	BL-W, W-BL
		2,27		IN	1,26	BL-W, W-BL
		9,34	3	OUT	2,27	O-W, W-O
		10,35		IN	2,27	O-W, W-O
		17,42	5	OUT	3,28	G-W, W-G
		18,43		IN	3,28	G-W, W-G
	J202	25,50	7	OUT	4,29	BR-W, W-BR
		1,26		IN	4,29	BR-W, W-BR
		8,33	9	OUT	5,30	S-W, W-S
		9,34		IN	5,30	S-W, W-S
		16,41	11	OUT	6,31	BL-R, R-BL
		17,42		IN	6,31	BL-R, R-BL
	J203	24,49	13	OUT	7,32	O-R, O-R
		25,50		IN	7,32	O-R, O-R
		7,32	15	OUT	8,33	G-R, R-G
		8,33		IN	8,33	G-R, R-G
		15,40	17	OUT	9,34	BR-R, BR-R
		16,41		IN	9,34	BR-R, BR-R
	J204	23,48	19	OUT	10,35	S-R, R-S
		24,49		IN	10,35	S-R, R-S
		6,31	21	OUT	11,36	BL-BK, BK-BL
		7,32		IN	11,36	BL-BK, BK-BL
		14,39	23	OUT	12,37	O-BK, BK-O
		15,40		IN	12,37	O-BK, BK-O

Note: The colors specified in this cable are true only if the transmission cable uses color code 4.

Convert a Conventional *SLC*[®]-2000 FITL System (768 Lines) With FiberReach NBS to a DLC R4.5 or Later Enhanced FITL System (1,152 Lines)

General: This procedure can be used to convert a *SLC*[®]-2000 fiber in the loop (FITL) system with FiberReach narrowband shelf (NBS) serving 768 POTS lines to a *SLC*-2000 FITL system serving 1,152 POTS lines. This procedure replaces existing cabling between the MDS and DSX-1 cross-connection panel and between the DSX-1 cross-connection panel and the DDM-2000 wideband shelf (WBS) with new cabling.

This feature is supported by digital loop carrier (DLC) Software Release 4.5 (R4.5) or later and requires that R4.5 or later software be installed in the system as part of the conversion.



CAUTION:

This procedure will interrupt service for any SLC-2000 FiberReach NBS currently being served by DT Servers in the MDS being converted.



NOTE:

Since the HDOS does not have the capability to equalize long cables, the DSX-1 cross-connection and the HDOS must be in the same or adjacent bays.

1. Install DLC Software Release 4.5 (R4.5) or later in the *SLC*-2000 Access System being converted, and allow sufficient time for the software to download to all distant terminals (DTs).

Reference: **NTP-074**

2. Install new MDS DS1 cables, ED-7C723-35, Group 19, to spare terminals on the DSX-1 panel from which operating FiberReach extensions are working. Connect only the DSX-1 panel end for each MDS. Label the DSX-1 panel with the *SLC*-2000 Access System number, shelf number, and slot number. If the HDOS is not located near the *SLC*-2000 terminal, a longer cable may be needed (refer to Table A). Separate transmit and receive cables, ED-7C723-35, Group 19, are needed per MDS.

Table A – DSX-1 Interface Cable Lengths Available

Length (ft.)	Description	Comcode
30.0	ED-7C723-35, G19	601845472
50.0	ED-7C723-35, G20	601845480
100.0	ED-7C723-35, G21	601845498
200.0	ED-7C723-35, G22	601845506

3. Install new MDS/DSX-1 transmission cable assembly ED-7C723-35, Group 17 (601831043), by connecting the P191 and P192 connectors to the J191 and J192 connectors on the ends of the ED-7C723-35, Group 19, cables (refer to Figure 1). Do not connect the MDS ends of the Group 17 cable yet.
4. Check for customer activity on all NBSs in service on the *SLC-2000* system being converted. When an NBS is found to have no active calls, use the CIT **ed-dt** command to reprovision service on the NBS for zero lines of service. (Refer to 363-208-003, *SLC-2000 Access System, Commands and Messages*, for the **ed-dt** command pages.) Repeat the procedure for all NBSs on the system.

 **NOTE:**
Customers served by the NBSs will be without service for the remainder of this procedure, but no calls would have been dropped.
5. Remove all active DT Servers from the MDS, set equalization for the new distance to the DSX-1 panel, if necessary, and reinstall.
6. Remove existing cross-connections in the DSX-1 panel for the MDS DT Server lines connected to the WBSs serving the NBSs.
7. Cross-connect the transmit pairs and receive pairs in the DSX-1 panel between the working DT Servers, which are on new DSX terminals, to the WBS DS1s with the same associations that existed prior to this conversion. The new ED-7C723-35, Group 19, terminations should have the same AIDs as before.

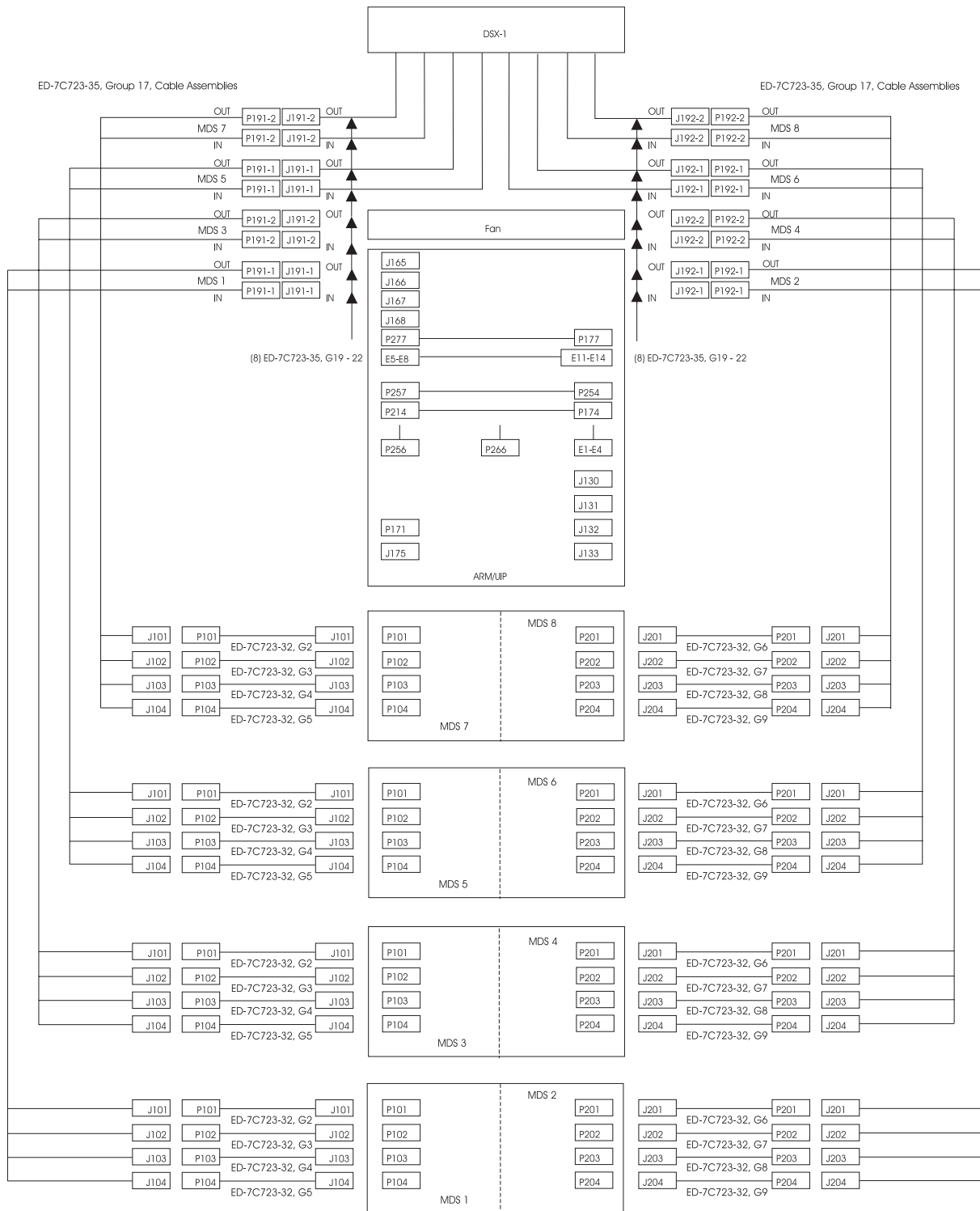


Figure 1 – MDS/DSX-1 Cabling Connections

8.



NOTE:

There is one ED-7C723-34, Group 6, cable assembly per MDS shelf.

Disconnect the ED-7C723-34, Group 6, cable connections on the MDS side.

9. Connect the new ED-7C723-35, Group 17, cable connectors J101 to J104 to the ED-7C723-32, Group 2 through 5, dangles (P101 through P104) from each MDS (refer to Figure 1) in matching increasing order.



NOTE:

The ED-7C723-32, Group 5, dangle from the MDS was not used previously.

10. Test for continuity from the MDS Server connector pins on the ED-7C723-35, Group 17, cable to the WBS DS1 side of the DSX panel for each server that was in service prior to performing this conversion. Refer to B and C for MDS DT Server slot and cable connectors association.
11. Reprovision the DT Servers for the appropriate "lines=" using the **ed-dt** CIT command. The choices are either 12 or 24 as previously optioned.
12. Verify that the NBSs are in service (for example, draw dial tone from an equipped channel with LDS connection).

STOP. YOU HAVE COMPLETED THIS PROCEDURE.

Table B – MDS Server Circuit Pack Slot Association (Odd Shelves)

Shelf No.	Shelf Conn.	Pins R,T	MDS Slot CU 0	P191/P192 ED-7C723-35, G17		DSX-1 Colors (Note)
				Connector	Pins R,T	
1 (Odd)	J101	1,26	1	OUT	1,26	BL-W, W-BL
		2,27		IN	1,26	BL-W, W-BL
		9,34	3	OUT	2,27	O-W, W-O
		10,35		IN	2,27	O-W, W-O
		17,42	5	OUT	3,28	G-W, W-G
		18,43		IN	3,28	G-W, W-G
	J102	25,50	7	OUT	4,29	BR-W, W-BR
		1,26		IN	4,29	BR-W, W-BR
		8,33	9	OUT	5,30	S-W, W-S
		9,34		IN	5,30	S-W, W-S
		16,41	11	OUT	6,31	BL-R, R-BL
		17,42		IN	6,31	BL-R, R-BL
	J103	24,49	13	OUT	7,32	O-R, O-R
		25,50		IN	7,32	O-R, O-R
		7,32	15	OUT	8,33	G-R, R-G
		8,33		IN	8,33	G-R, R-G
		15,40	17	OUT	9,34	BR-R, BR-R
		16,41		IN	9,34	BR-R, BR-R
	J104	23,48	19	OUT	10,35	S-R, R-S
		24,49		IN	10,35	S-R, R-S
		6,31	21	OUT	11,36	BL-BK, BK-BL
		7,32		IN	11,36	BL-BK, BK-BL
		14,39	23	OUT	12,37	O-BK, BK-O
		15,40		IN	12,37	O-BK, BK-O

Note: The colors specified in this cable are true only if the transmission cable uses color code 4.

Table C – MDS Server Circuit Pack Slot Association (Even Shelves)

Shelf No.	Shelf Conn.	Pins R,T	MDS Slot CU 0	P191/P192 ED-7C723-35, G17		DSX-1 Colors (Note)
				Connector	Pins R,T	
2 (Even)	J201	1,26	1	OUT	1,26	BL-W, W-BL
		2,27		IN	1,26	BL-W, W-BL
		9,34	3	OUT	2,27	O-W, W-O
		10,35		IN	2,27	O-W, W-O
		17,42	5	OUT	3,28	G-W, W-G
		18,43		IN	3,28	G-W, W-G
	J202	25,50	7	OUT	4,29	BR-W, W-BR
		1,26		IN	4,29	BR-W, W-BR
		8,33	9	OUT	5,30	S-W, W-S
		9,34		IN	5,30	S-W, W-S
		16,41	11	OUT	6,31	BL-R, R-BL
		17,42		IN	6,31	BL-R, R-BL
	J203	24,49	13	OUT	7,32	O-R, O-R
		25,50		IN	7,32	O-R, O-R
		7,32	15	OUT	8,33	G-R, R-G
		8,33		IN	8,33	G-R, R-G
		15,40	17	OUT	9,34	BR-R, BR-R
		16,41		IN	9,34	BR-R, BR-R
	J204	23,48	19	OUT	10,35	S-R, R-S
		24,49		IN	10,35	S-R, R-S
		6,31	21	OUT	11,36	BL-BK, BK-BL
		7,32		IN	11,36	BL-BK, BK-BL
		14,39	23	OUT	12,37	O-BK, BK-O
		15,40		IN	12,37	O-BK, BK-O

Note: The colors specified in this cable are true only if the transmission cable uses color code 4.

Condition and Connect Modems to Establish Communication From Remote CIT Location

General: This procedure may be used to connect modems and a craft interface terminal (CIT) to the *SLC*[®]-2000 Access System for use in provisioning the system and downloading software from a remote location. This procedure must be performed at both the *SLC*-2000 remote terminal (RT) location and remote CIT location to set the parameters of modems and terminal. Figure 1 is a diagram of the equipment and connections that are described in this procedure.

The CIT is connected remotely to the *SLC*-2000 access resource manager (ARM) shelf rear **CIT** port by means of modems, RS-232 cables, and telephone lines. The ARM shelf rear **CIT** port presents data terminal equipment (DTE) as defined in the Electronic Industries Association (EIA) data interchange standards. At the RT location, the **SET-BAUD** command can be used to select the communication baud rate at the user interface panel (UIP). The modems and the CIT must all be set to the same baud rate as the UIP. Modems supporting a large set of options and error detection capabilities may require other options to be set before using the modems to download generic software. Refer to manufacturer's manuals for instructions on setting modem parameters. The CIT communication parameters must be set for full duplex, 8 data bits, 1 start bit, 1 stop bit, and no flow control. If a personal computer (PC) is used for a CIT, a communication software package (such as *TERM* {ctrm} provided on disk 1 of # with the SONET generic software) must be run to provide a terminal emulator.

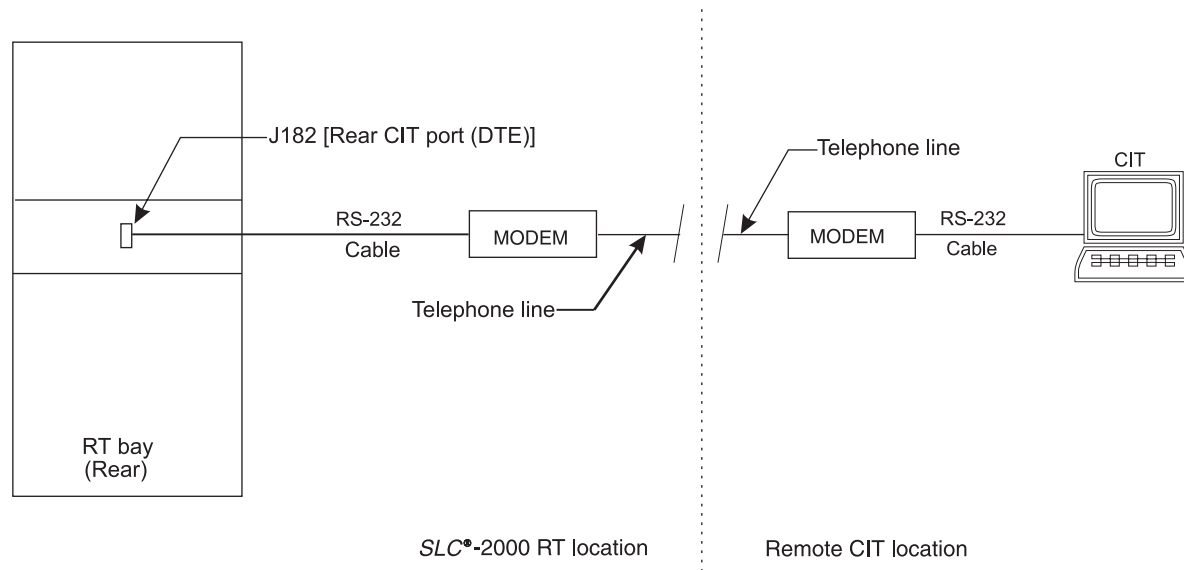


Figure 1 – Remote CIT Access Equipment Arrangement and Connection

1. Obtain the following equipment:
 - a. *IBM*^{*} compatible personal computer (PC) running terminal emulator software using *MS-DOS*[†] operating system, Release 3.0 or later, with a serial portor
an ASCII terminal.

Comment: Refer to the "Ordering" chapter in document 363-208-000, *SLC-2000 Access System, Applications, Planning, and Ordering Guide*, for a partial summary of compatible CIT terminals, PCs, and modems.

* Registered trademark of International Business Machines Corporation.

† Registered trademark of Microsoft Corporation.

- b. Two RS-232 cables to connect modems to PC **Serial** port and rear **CIT** port.

Comment: In this procedure it is assumed you are familiar with the characteristics and operating procedures of your terminal or PC and the MS-DOS operating system.

- c. Two modems that allow the following options to be set:
- The ability to connect only at a specific baud rate (for example, turn off autobaud)
 - The ability to disable error correction
 - The ability to disable data compression.

Comment: Most modems allow these settings to be programmed by means of AT commands. These commands are not standardized and vary between modem types and manufacturers. It may be necessary to consult the modem user manual or contact the manufacturer in order to configure these options.

2. Are you at the *SLC-2000* RT location or remote CIT location?

If **SLC-2000 RT LOCATION**, continue with Step 3.

If **REMOTE CIT LOCATION**, proceed to Step 9.

3. Is the RT ARM shelf equipped with a links to alarms and networks (LAN) circuit pack?

If **YES**, then proceed to Step 5.

If **NO**, then continue with Step 4.

4. Obtain a **BBF250 LAN** circuit pack and insert it into the **LAN** slot in the RT ARM shelf.
5. Press the user interface panel (UIP) **Escape** button and then the **Scroll Menu** down arrow button until **SET-BAUD: <ent>** is displayed. Press the user interface panel **Enter** button then the **Scroll Menu** down arrow button until the desired baud rate is displayed (9,600 or 19,200). Press **Enter** to set the CIT port baud rate (**DLP-500**).

6. Set the modem to answer incoming calls. For example, if you are using an Lucent Technologies 2224 CEO modem, do the following to program the modem:



NOTE:

It is assumed the PC and modem ("AT" command compatible) are powered and the PC is loaded with communications software.

- a. Program the modem to the same baud rate as the UIP and set error correction and data compression to disabled. Write these settings into the modems non-volatile random access memory (RAM) so that these conditions will be available at power up.
- b. Set all front panel switches to DOWN (factory default) for AT command mode.
- c. Connect the modem to a PC and enter the following "AT" commands at the PC.

PC	Response	Comment
ATH	OK	#hang-up (on-hook)
AT&F	OK	#resets to factory defaults
AT&C1	OK	#data carrier is present when on
ATS0=2	OK	answer on 2 rings
AT&W	OK	wait for second dial tone

- d. Disable the autobaud, error correction, and data compression options according to instructions provided in the modem user manual.
7. Connect the modem RS-232C port to the rear CIT port on the SLC-2000 RT shelf using the modem cables. Dialup access to the network element by means of the modem is now ready.
 8. Verify that the telephone line is plugged into the modem.

STOP. YOU HAVE COMPLETED THIS PROCEDURE.

9. At the remote CIT location, set the terminal parameters to match those set at the SLC-2000 RT location. Refer to manufacturer's manual for instructions on setting modem parameters.

10. Connect the remote modem to the **COM1** port of the CIT using a standard RS-232 cable (use a 9-pin to 25-pin converter, if necessary).

11. Verify that the telephone line is plugged into the modem.

12.

⇒ **NOTE:**
Security is available to protect against unauthorized access to the system. If security is enabled, users must enter a valid login and password to access the system.

⇒ **NOTE:**
When a PC with a communication software package (CTRM) is used as a CIT to access a *SLC-2000* port and the baud rate for the **COM1** port is different from the baud rate of the modem, use the CIT to enter and change the baud rate of CTRM to the correct speed.

At the CIT, enter "**ATDT**" followed by the telephone number of the destination modem.

Response: The message "**Connected at 9600**" or "**Connected at 19,200**" will appear on the CIT display confirming that the modems are connected.

13. At the CIT, enter a "**1**" to enter the SONET subsystem.

14. If security is enabled on the SONET subsystem, the CIT will respond with "**login <**". Press the CIT keyboard ENTER/RETURN key or enter login and the password.

Response: The CIT will display a SONET alarm summary generated by the **rtrv-alm:all** command. The CIT will then ask if you want to see the DLC alarm report.

- **If you want to see the DLC alarm report**, type **y** and RETURN.
- **If you DO NOT want to see the DLC alarm report**, type **n** and RETURN.

The CIT will then display a prompt.

15. You are ready to enter commands.

- **To change to the DLC subsystem after logging in**, enter **DLC** at the prompt.
- **To change back to the SONET subsystem at any time**, enter **SON** at the prompt.

Refer to document 363-208-003, *SLC-2000 Access System, Commands and Messages*, for available commands. To end a CIT session, enter **logout** and disconnect the CIT.

STOP. YOU HAVE COMPLETED THIS PROCEDURE.

Command Syntax

Most commands used by the *SLC-2000 Access System* require an address parameter of a circuit and possibly parameter values. Some commands do not require either. If an address is required, the circuit's access identifier (AID) is the address.

These commands can be executed in two ways, "*expert*" or "*prompted*". The *expert*, or "*command*" mode, syntax allows you to enter all parameters with a one-line command. All provisionable parameters not entered in this one-line command retain their current values or are initialized to the default values. The syntax of an *expert* command is as follows:

command-name : *address* : *parm=value*, . . . ;

Where:

address is the AID of the circuit.

parm=value are provisionable parameters for the particular circuit selected.

As the name *expert* implies, this command entry syntax should be used with caution and only by experienced craft personnel.

The *prompted* command entry method is started by entering only the **command-name** at the prompt. A menu will prompt you to select a circuit *address*. Subsequent menus will prompt for provisioning parameter values as required. At any time you can enter "?" for help. Entering "?" at the login prompt starts the prompted menu mode.

Introduction to Installing *SLC*®-2000 Channel Units

Metallic Distribution

This section covers the installation and testing of channel units and servers in the *SLC*-2000 Access System. These procedures test from the RT channel unit to the originating end. For example, in a POTS circuit, these tests verify the circuit from the RT channel unit to the switch that supplies dial tone to that circuit.

In these procedures, the following is assumed:

- The acceptance and turnup procedures in this manual have been completed and there are no alarms present on the system.
- All T1 and T0 cross-connections are installed. Refer to the *MDS Assembly Turnup* tab in this manual to install these cross-connections.
- The channel being installed is wired or conditioned for service at the central office.

During certain tests, the user interface panel (UIP) provides Bantam-type test access jacks to align circuits. These jacks are located on the left side of the user display panel behind the front cover. A channel unit test cord (RTG16L2H15A or Ci TP-5^{*}) provides tip and ring access (if equipped) from channel unit faceplate jacks. Some channel units require special test cords to gain tip and ring access from the channel unit faceplate jack. Please refer to the appropriate channel unit data sheet for specific details. A listing of the channel unit data sheets can be found in Chapter 2, "Product Description."

To add or establish channel service, channel units must be installed in the *SLC*-2000 RT and, if applicable, *SLC*-2000 or *SLC*-96 COT or D4 INA bank. They must also be provisioned (if necessary) and tested. Channel service may be added without interrupting preexisting channel service on the system.

* Available from Ci Network Products (Tel. 1-708-806-6300).

The system may be configured in a *universal* configuration using a COT at the central office or an *integrated* configuration using a digital switch at the central office. In the integrated configuration, the nail-up or hairpin features of some switches permit channels from the *SLC-2000* RT to be connected digitally to a DACS II or a D-type channel bank. Because of the variety of possible central office equipment configurations, these procedures and the associated channel testing detailed-level procedures (DLPs) are concerned primarily with the *SLC-2000* RT. General guidance is provided when possible for actions that must be performed and for potential error conditions that may occur in the central office equipment.

Fiber Distribution

For fiber distribution (FITL), DT Servers are installed in the MDS assemblies instead of channel units. In these procedures it is assumed that the *SLC-2000* Multi-Services Distant Terminal (MSDT) acceptance and turnup procedures in document 363-205-004 or DDM-2000 FiberReach Multiplexer narrowband shelf (NBS) acceptance and turnup procedures in document 363-206-301 have been completed.

When the metallic distribution shelf is configured for fiber distribution, channel units are placed in the MSDT or FiberReach NBS instead of the MDS shelf. The MSDT or FiberReach NBS is connected to the RT with a fiber/metallic link between the MSDT or FiberReach NBS and the DT Server in the MDS.

The MSDT can be electronically provisioned to support either 12 or 24 circuits through 3 or 6 MSDT channel unit slots, respectively. The FiberReach NBS can support up to 12 provisionable channel unit slots for a total of 48 POTS circuits or 40 integrated services digital network (ISDN) circuits. In Software Release 4.4, the use of the DDM-2000 FiberReach NBS allows multiple virtual MSDTs (V-MSDTs). Each V-MSDT can serve up to 12 or 24 channels, as determined by the DT server configuration. Refer to document 363-208-000, *SLC-2000 Access System, Applications, Planning, and Ordering Guide*, for additional information on the V-MSDT concept.

Software Release 4.4 also provides the ability to provision the DSX-1 signals terminating on the FiberReach NBS for either the quad or octet mode. When the quad mode of operation is selected, a DT Server at the HDT feeds a six-slot virtual-distant terminal (V-DT) in the FiberReach NBS (single NBS shelf). When the octet mode of operation is selected, a DT Server at the HDT feeds a three-slot V-DT in the FiberReach NBS (one-half NBS shelf).

In the quad mode, each shelf of the FiberReach NBS (upper and lower) is a separate V-DT connected to a DSX-1 feeder. Feeder DSX-1 A feeds the upper V-DT and feeder DSX-1B feeds the lower V-DT.

In the octet mode, each six-slot shelf in the FiberReach NBS can be divided into two three-slot V-DTs. This allows the NBS to contain a maximum of four three-slot V-DTs with each V-DT connected to a DSX-1 feeder (DSX-1 A — DSX-1 D). Feeders DSX-1 A and DSX-1 C feed the two V-DTs in the upper shelf while feeders DSX-1 B and DSX-1 D feed the two V-DTs in the lower shelf.

The DSX-1 signals feeding the FiberReach NBS can be provisioned for the quad mode, octet mode, or a combination of these two using the guidelines provided in Table A.

Some channel unit slot and provisioning restrictions exist when using ISDN type channel units AUA90, AUA93, AUA293, AUA94, and *SPQ*® 494 in the MSDT or FiberReach NBS. Refer to the section entitled "ISDN Channel Units," located later in the chapter, for details concerning the slot and provisioning restrictions.

See document 363-205-004, *SLC-2000 MSDT Feature, User/Service Manual* or document 363-206-301, *DDM-2000 FiberReach Multiplexer, Narrowband/Wideband Shelf, User/Service Manual*, for more information about FITL services.

Table A – Possible DSX-1 Provisioning Combinations for Each V-DT (R4.4 or Later)

Provisioning Combination Number	Provisioned Mode of Each DSX-1 Feeding a V-DT in the NBS (Upper Shelf — Slots 1-6 Lower Shelf — Slots 7-12)	Comments
1	DSX-1 A — Quad DSX-1 B — Quad	Typically used for POTS or special services. Upper and Lower Shelves — Each channel unit slot can operate in the quad mode. Typically, the NBS can serve up to 48 customer lines.
2	DSX-1 A — Quad DSX-1 B — Octet; DSX-1 D — Octet	Typically used for a combination of POTS, special services, and ISDN services. You can easily grow ISDN services in the future. Upper Shelf — Each channel unit slot fed by DSX-1 A can typically offer up to 4 customer lines for a total of 24 lines (Quad mode). Lower Shelf — A typical use for these slots fed by DSX-1 B and D is ISDN service (Octet mode). Each DSX-1 can serve up to 10 ISDN lines for a total of 20 ISDN lines (2B+D service).
3	DSX-1 A — Octet; DSX-1 C — Octet DSX-1 B — Quad	Typically used for a combination of POTS, special services, and ISDN services. You can easily grow ISDN services in the future. Upper Shelf — A typical use for these slots fed by DSX-1 A and C is ISDN service (Octet mode). Each DSX-1 can serve up to 10 ISDN lines for a total of 20 ISDN lines (2B+D service). Lower Shelf — Each channel unit slot fed by DSX-1 B can typically offer up to 4 customer lines for a total of 24 lines (Quad mode).
4	DSX-1 A — Octet; DSX-1 C — Octet DSX-1 B — Octet; DSX-1 D — Octet	Typically used for ISDN service. Upper and Lower Shelves — A typical use for this combination will allow the NBS to offer up to 40 ISDN lines (2B+D service).

Channel Unit Options

The *SLC-2000* quad POTS and *SPOTS*® channel units and the *SLC* Series 5 coin, multiparty, POTS, and *SPOTS* channel units do *not* have options. Refer to Chapter 5, "Administration and Provisioning", for a list of channel units with options that are selected by means of physical switches or by using a CIT or remote controller. Refer to document 363-208-000, *SLC-2000 Access System, Applications, Planning, and Ordering Guide*, for more information on channel unit options.

The Program channel unit (*PGM*[†]-2000) has physical switches for selecting its bandwidth and is also to be electronically provisioned (Release 4.2 and later) for proper bandwidth (DS0) assignment by selecting one of four function codes.



CAUTION:

Never install a channel unit into an RT, FiberReach NBS, or MSDT that is not compatible with the channel unit at the COT. Once a channel test is performed with the integral test head (ITH) on a channel that has incompatible channel units, the system will lock out the test system from future test sessions.

[†] Trademark of Tollgrade Communications, Inc.

Electronic Provisioning

The *SPQ456* quad DPT DID channel unit; the *AUA41*(), *AUA141*, *AUA44*(), *SPQ444*, *AUA54*(), and *SPQ454* 4-wire special service channel units; the *AUA42*(), *AUA142*, *SPQ442*, *AUA43*(), and *SPQ443* E *SPOTS* channel units; and the *AUA52*, *AUA152*, *AUA52B*, *AUA252*(), and *SPQ452* OCU dataport channel units must be provisioned before they are placed in service. A craft interface terminal (CIT) or suitable remote provisioning operations system (OS) is required to enter the provisioning data.

Provisioning information for each DS0 is stored in memory that is associated with that particular DS0 channel. When a provisionable channel unit is installed, the provisioning data is transferred to the channel unit. The channel unit uses this information to determine what service function to provide and what adjustments to use. Because provisioning data is stored in memory in the ARM shelf, it is possible to provision channels even though the channel unit may not be installed. Also, it is not necessary to reprovision a channel after replacing a failed channel unit.

ISDN Channel Units

The *AUA90* T-BRITE, *AUA93* BRITE II , and *AUA293* BRITE III channel units provide ISDN capabilities in an INA configuration in a *SLC-2000* RT. Only the first channel of the physical slot of these units is available when using the T0 cross-connections at the RT.

The *AUA94* dual and the *SPQ494* quad channel units provide ISDN capabilities in a TR-303 RT. Only the first two channels of the *AUA94* physical slot are available when using the default T0 cross-connections at the RT. When using the *AUA94* channel unit at an ONU, the following restrictions must be observed depending on the ONU type and the HDT software release:

- **SLC-2000 MSDT** — This channel unit may be used in any MSDT hosted by a *SLC-2000* HDT running Software Release 4.0 or later. However, you must observe the MSDT channel unit slot restrictions shown in Table B.

- **DDM-2000 FiberReach Narrowband Shelf:**

- Release 4.4 (Quad Mode): The AUA94 channel unit can be used in any virtual DT (V-DT) shelf of the FiberReach NBS hosted by a *SLC-2000* HDT. However, the channel unit slot restrictions shown in Table C must be observed.
- Release 4.4 (Octet Mode): Observe the slot restrictions shown in Table D.

Table B – ISDN AUA94 Channel Unit Locations for the MSDT

MSDT Line Size Configuration	MSDT Channel Unit Slot Number (Note)					
	Slot 1	Slot 2	Slot 3	Slot 4	Slot 5	Slot 6
12-line MSDT	P	P	I/P	n/a	n/a	n/a
24-line MSDT	I/P	I/P	I/P	I/P	P	P*

Note: The following list shows the meaning of the symbols in the body of the table:

- **P:** This slot supports up to four POTS lines with a quad POTS-type channel unit. Single or dual POTS-type channel units can also be used in this slot.
- **I:** This slot supports the AUA94() dual ISDN BRI 2B+D channel unit. The *SPQ494* quad ISDN unit is not allowed in the MSDT.
- **n/a:** This slot is not available when the MSDT Server is optioned for lines = 12.

* **Slot 6:** This slot supports up to four POTS lines unless the ISDN feature is being used. If the ISDN feature is being used, observe the following restrictions when using slot 6 in the MSDT:

If any ISDN BRI service is provided from the MSDT, this slot can provide POTS lines to the first two channels (or lines) of the slot. This will allow this slot to contain either a single or dual channel unit. The second two channels of this slot are unavailable, since the system uses these channels to support ISDN D channels. Therefore, quad channel units are not allowed in slot 6.

If the MSDT provides ISDN service in slots 1 through 4, quad channel units, T-BRITE (AUA90) channel units, BRITE II (AUA93) channel units, BRITE III (AUA293) channel units, and dual OCU dataport (*SPQ*[®]452) channel units are not allowed in slot 6.

If there is a T-BRITE (AUA90), BRITE II (AUA93), BRITE III (AUA293), dual OCU dataport (*SPQ*452), or any quad channel unit in slot 6, ISDN channel units are not allowed in any other slot of the MSDT.

**Table C – ISDN AUA94() Channel Unit Locations for the DDM-2000
FiberReach NBS (Quad Mode)**

Line Size Configuration	Channel Unit Slot Number (Note)					
	Slot 1 or Slot 7	Slot 2 or Slot 8	Slot 3 or Slot 9	Slot 4 or Slot 10	Slot 5 or Slot 11	Slot 6 or Slot 12
12-line V-MSDT or V-DT	P	P	I/P	n/a	n/a	n/a
24-line V-MSDT or V-DT	I/P	I/P	I/P	I/P	P	P*

Note: The symbols are defined as follows:

- **P:** These slots support up to four POTS lines with a quad POTS-type channel unit. Single or dual POTS-type channel units can also be used in these slots.
- **I:** These slots support the AUA94() dual ISDN BRI 2B+D channel unit. The *SPQ494* quad ISDN channel unit is not allowed in the NBS V-MSDT or V-DT when provisioned in the quad mode.
- **n/a:** These slots are not available when the Server is optioned for lines = 12.

* **Slots 6 and 12:** These slots support up to four POTS lines unless the ISDN feature is being used in the V-MSDT or V-DT containing the slot. If the ISDN feature is being used in the V-MSDT or V-DT, observe the following restrictions when using slots 6 and 12:

- **If any ISDN BRI service is provided from the V-MSDT or V-DT**, these slots can provide POTS lines to the first two channels (or lines) of the slot. This will allow these slots to contain a single or dual channel unit. The second two channels of each of these slots are unavailable, since they are used to support ISDN D channels. Therefore, quad channel units are not allowed in slots 6 or 12.
- **If the V-MSDT or V-DT provides ISDN service in slots 1 through 4 or slots 7 through 10**, quad channel units, BRITE II (AUA93) channel units, BRITE III (AUA293) channel units, or dual OCU dataport (*SPQ*®452) channel units are not allowed in the last slot of the V-MSDT or V-DT (slot 6 or 12).
- **If there is a quad channel unit, BRITE II (AUA93), BRITE III (AUA293), or dual OCU dataport (*SPQ*452) channel unit in the last slot of the V-MSDT or V-DT (slot 6 or 12)**, ISDN channel units are not allowed in any other slot of the V-MSDT or V-DT.

Table D – Channel Unit Slot Restrictions When Using an AUA94/SPQ®494 in a Three-Slot V-DT (NBS in Octet Mode)

Slot 1 can contain a ...	Slot 2 can contain a ..	Slot 3 can contain a ...
• SPQ494 or • AUA94() or • Any other channel unit supported by the NBS	• SPQ494 or • AUA94() or • Any other channel unit supported by the NBS	• AUA94() or • Any other channel unit supported by the NBS (except the SPQ494 channel unit)

The SPQ494 quad ISDN channel unit can be used in any TR-303 virtual remote terminal (VRT) providing the SLC-2000 Software Release is 4.1 or later. The SPQ494 can be installed in any, or all, physical channel slots in the metallic distribution shelf (MDS) assemblies as long as it is provisioned for TR-303. However, when using the SPQ494 channel unit at an DT, the following restrictions must be observed depending on the DT type and the HDT software release:

- **SLC-2000 MSDT:** This channel unit is not supported in any Software Release (use the AUA94 for BRI 2B+D service).
- **DDM-2000 FiberReach Narrowband Shelf (Release 4.4 or Later):** The SPQ494 channel unit can be installed in any V-DT served by a DS1 provisioned for the *octet* mode. However, the SPQ494 channel unit can only be installed in slots 1 and 2 of a three-slot V-DT. Refer to Table D for slot restrictions when using the SPQ494 in the three-slot V-DT operating in the octet mode.

Single and Dual Channel Units

When a dual channel unit is installed in a SLC-2000 Access System, it will access the first two tip and ring pairs of the slot in which it is installed. Four-wire channel units access the first tip and ring pair for transmit and the second tip and ring pair for receive but require only one time slot in the feeder.

A single channel unit will access the first tip and ring pair of the slot. When using single or dual channel units in the SLC-2000 Access System, the proper line and/or time slot assignments must be made on the equipment at the other end of the feeder facility.

When using a dual channel unit at the RT in universal system applications using a SLC-2000 or SLC-96 COT, only the first two channels of a channel unit slot are available when using the default T0 cross-connections at the RT. If the RT channel unit is a single channel unit, only the first channel in the slot is available at the RT. However, using the time slot interchange feature, the unused channels can be shed; therefore, eliminating unused bandwidth in the OC-3 or metallic feeder.

Quad Channel Units

SLC-2000 Quad channel units *SPQ300*, *SPQ400*, and *SPQ909* POTS; *SPQ340*, *SPQ440*(), and *SPQ450* SPOTS; *SPQ442* and *SPQ443* E SPOTS; *SPQ318* and *SPQ419* coin; *SPQ336* and *SPQ456* DID; and *SPQ328* and *SPQ429* P-Phone channel units access four DS0 time slots.



NOTE:

If using a *SLC-96* COT, *5ESS*® DCLU, or *5ESS* IDCU, the central office equipment must be equipped/assigned with two dual channel units to access all four available channels. For example, a quad channel unit in slot 1-4 at the *SLC-2000* RT, FiberReach NBS, or MSDT requires COT slots 1/2 and 3/4 to be equipped or assigned. The *SPQ494* is a quad channel unit that connects to four tip/ring pairs but accesses nine DS0 time slots in the feeder.

Program Channel Unit (*PGM-2000*)

PGM-2000 channel units must be installed in pairs, one at each end of the service channel, and both must be configured to the same bandwidth using physical option switches located on the circuit board. A *PGM-2000* channel unit occupies varying number of DS0s as shown in Table E. For the proper assignment of DS0s, the function code (electronically provisioned from a CIT, in R4.2 or later, using the **ent - t0** command) and the bandwidth selected by physical switch settings must match.

Table E – *PGM-2000 Channel Unit DS0 Channel Possibilities**

<i>PGM-2000</i> Function Code	Bandwidth Selected (Physical Switch)	Number of DS0s	Number of Dedicated Physical CU Slots
<i>PGM5</i>	5 kHz	2	1
<i>PGM8</i>	8 kHz	3	1
<i>PGM15</i>	15 kHz	6	2
<i>PGM20</i>	20 kHz	8	2

* Trademark of Tollgrade Communications, Inc.

The *PGM-2000* channel unit set for 15 kHz (*PGM15*) or 20 kHz (*PGM20*) occupies DS0s equivalent to two physical channel unit slots in an MDC shelf; therefore, make sure the right side adjacent CU slot for a *PGM-2000* CU set for *PGM15* and *PGM20* is physically unoccupied. For the same reason, a *PGM-2000* CU set for *PGM15* or *PGM20* cannot be plugged into MDC CU slots 4, 8, 12, 16, 20, or 24.

Because all the program DS0s must be carried in the same feeder DS1, the *PGM-2000* CU, set to *PGM15* or *PGM20*, should not be plugged into slot 6 or 18. For additional instructions concerning *PGM-2000* CU placement in stereo service, refer to the *PGM-2000* CU data sheet (Tollgrade Practice TLGD-2000).

DT Servers (Channel Unit Slot Compatibility)

Some DT Servers have option switches for selecting the number of lines provided to the distant terminal (DT). However, in the *SLC-2000* Access System the number of lines provided at the DT (either MSDT or FiberReach NBS) is electronically provisioned from the CIT or X.25 OSS and the switch settings are ignored. All DT Servers have option switches that select the server's electrical output signal format and must be set to connect to either an optical unit (OU) or a DSX cross-connection. Refer to **DLP-600** for DT Server installation and option switch settings.

The DT Servers allow electronically provisionable channel units to be installed at the *SLC-2000* MSDT or FiberReach NBS. Refer to Chapter 5, "Administration and Provisioning", for channel unit provisioning information.



CAUTION:

If a DT Server is removed from its slot in the MDS once it has been placed in service, all customers being served from the associated MSDT or FiberReach NBS will experience service interruption.

The AUA57, AUA232, and MCU5405 may be used in a DT Server slot in a fiber configured metallic distribution shelf. This feature is primarily used to provide local dial tone or order-wire service(s) through faceplate tip and ring jacks. Refer to document 363-205-004, *SLC-2000 Multi-Services Distant Terminal Feature, User/Service and Ordering Manual*, for details.

Channel Units

The channel units supported by the *SLC-2000* system are shown in Table F.

Table F – *SLC*®-2000 Access System Channel Units

Code	Description	Data Sheet	Terminal	#Ch	Range	Rel.	Inven.
Nonprovisionable							
<i>SPQ</i> ®300()	POTS CS + OHT/ <i>CLASS</i> [*] + LSAS	363-005-380	COT/RT/MSDT/ NBS	4	—		Yes
<i>SPQ</i> 318	Quad Coin CS	363-005-330	COT	4	—	3.3	Yes
<i>SPQ</i> 328	Quad EBS (P-Phone)	363-005-397	COT	4	—	3.3	Yes
<i>SPQ</i> 333	Dual Coin CS	363-005-331	COT	2	—	3.3	Yes
<i>SPQ</i> 336	Quad DID	363-005-334	COT	4	—	3.3	Yes
<i>SPQ</i> 340	POTS/ <i>SPOTS</i> ® CU CS + OHT/ <i>CLASS</i> + LSAS	363-005-381	COT/RT/MSDT/ NBS	4	—		Yes
<i>SPQ</i> 400	ALC POTS CF + OHT/ <i>CLASS</i>	363-005-368	COT/RT/MSDT/ NBS	4	900Ω		Yes
<i>SPQ</i> 400B	ALC POTS CF + OHT/ <i>CLASS</i>	363-005-368	COT/RT/MSDT/ NBS	4	1200Ω [†]		Yes
<i>XSPQ</i> 400	ALC POTS CF + OHT/ <i>CLASS</i>	363-208-345	COT/RT/MSDT/ NBS	4	1200Ω [†]		Yes
<i>SPQ</i> 401()	ALC POTS CF + OHT/ <i>CLASS</i> , VFDE (<i>SPQ</i> 401B)	363-005-344	COT/RT/MSDT/ NBS	4	1400Ω		Yes
<i>SPQ</i> 419	Quad Coin CF	363-005-340	RT/MSDT/NBS	4	900Ω	4.2	Yes
<i>SPQ</i> 429	Quad EBS (P-Phone)	363-005-398	RT/MSDT/NBS	4	750/200 [‡]	4.2	Yes
<i>SPQ</i> 440(B)	ALC POTS/ <i>SPOTS</i> CU CF + OHT/ <i>CLASS</i> +LSAS	363-005-369	COT/RT/MSDT/ NBS	4	900Ω/ CSA		Yes

Legend:

ALC - automatic level compensation; ALIC5 - analog line to integrated *SLC* carrier at *5ESS*® switch cutover

CF - current feed, CS - current sink; CSA - carrier serving area; CU - channel unit

LSAS - line side answer supervision, also carrier line side supervision; NBS - Narrowband Shelf (R4.4 and later)

OHT - on-hook transmission; wo OSIP - without open switching interval protection

SPOTS CU - channel unit provides locally switched loop- and ground-start service

* Service mark of Bellcore.

† On the *SPQ*400B and the *XSPQ*400, range can be increased to 1450 ohms if full power is available.

‡ The range for this channel unit depends on the type of EBS telephone set: Basic EBS Telephone Set – 750 ohms; Enhanced EBS Telephone Set – 200 ohms.

Continued on next page

Table F – SLC®-2000 Access System Channel Units (Continued)

Code	Description	Data Sheet	Terminal	#Ch	Range	Rel.	Inven.
Nonprovisionable							
SPQ440(C,D)	Quad Extended Range SPOTS, VFDE (SPQ440D)	363-005-369	COT/RT/MSDT/ NBS	4	1500	*	Yes
SPQ450	ALC POTS/SPOTS CU CF + OHT/CLASS ALIC5 +LSAS	363-005-384	RT/MSDT/NBS	4	900Ω/CSA		Yes
SPQ453	Dual Coin CF	363-005-342	RT/MSDT/NBS	2	900	4.2	Yes
SPQ478	ALC C-POTS CF OHT/CLASS	363-005-377	RT/MSDT/NBS	4	900		Yes
SPQ909()	Low-Power POTS CF + OHT/CLASS	363-005-295	MSDT/NBS	4	20Ω 170Ω (B)	3.2	Yes
SPQ494†	Quad ISDN ANSI-U	363-005-388	RT/NBS	4	CSA	4.1/4.2‡	Yes
AUA25(B)	POTS/M SPOTS CU CF	363-005-124	RT/MSDT/NBS§	2	6 dB		No
AUA26	POTS CS + OHT (VerSus feature not avail.)	363-005-127	COT	2	—		No
AUA27	POTS CF + OHT (VerSus feature not avail.)	363-005-128	RT/MSDT/NBS	2	900Ω		No

Legend:

ALC - automatic level compensation; ALIC5 - analog line to integrated SLC carrier at 5ESS switch cutover

CF - current feed, CS - current sink; CSA - carrier serving area; CU - channel unit

LSAS - line side answer supervision, also carrier line side supervision; NBS - Narrowband Shelf (R4.4 and later)

OHT - on-hook transmission; wo OSIP - without open switching interval protection

SPOTS CU - channel unit provides locally switched loop- and ground-start service

* Channel unit is supported by Software Releases 3.3, 4.1, and 4.2 and later. SPQ440D is supported by R4.6.

† In Release 4.4 or earlier, the SPQ494 is recent change provisionable from the LDS. It is *not* provisionable from the SLC-2000 CIT. In Release 4.5 or later, the SPQ494 can be provisioned from the CIT.

‡ Lucent Technologies recommends the use of Software Release 4.2 or later if you are equipping more than 200 ISDN lines.

§ The NBS can contain the AUA25B. It does not support the AUA25.

Continued on next page

Table F – SLC®-2000 Access System Channel Units (Continued)

Code	Description	Data Sheet	Terminal	#Ch	Range	Rel.	Inven.
Nonprovisionable							
AUA31	POTS CS	363-005-101	COT	2	—		No
AUA32	POTS/ <i>SPOTS</i> CU CS	363-005-102	COT/RT/MSDT	2	—		No
AUA33()	Coin CS	363-005-103	COT	1	—	3.3*	*
AUA35	Multiparty	363-005-109	COT	2	—		No
AUA36()	DID	363-005-114	COT	2	—		Yes†
AUA37	FSR CS	363-005-121	COT	1	—		No
AUA38()	POTS CS +OHT/ <i>CLASS</i> + LSAS	363-005-118	COT	2	—		No
AUA39‡	POTS/ <i>SPOTS</i> CU CS +OHT/ <i>CLASS</i>	363-005-120	COT/RT/MSDT/NBS	2	—		No
AUA39B‡	POTS/ <i>SPOTS</i> CU CS+ OHT/ <i>CLASS</i> + LSAS	363-005-120	COT/RT/MSDT	2	—	R3.2 only	Yes
AUA51	POTS/ <i>SPOTS</i> CU CF	363-005-110	RT/MSDT	2	1500Ω/CSA		No
AUA53	COIN CF	363-005-112	RT/MSDT/NBS	1	1500Ω		No
AUA53B	Single Coin CF	363-005-112	RT/MSDT/NBS	1	900Ω		Yes
AUA55(B)	Multiparty CF	363-005-116	RT/MSDT/NBS	2	1500Ω		No
AUA56	DID (DPT)	363-005-115	RT/MSDT/NBS	2	CSA		No
AUA58()	POTS CF +OHT/ <i>CLASS</i>	363-005-117	RT/MSDT/NBS	2	900Ω		No

Legend:

ALC - automatic level compensation; ALIC5 - analog line to integrated *SLC* carrier at *5ESS* switch cutover

CF - current feed, CS - current sink; CSA - carrier serving area; CU - channel unit

LSAS - line side answer supervision, also carrier line side supervision; NBS - Narrowband Shelf (R4.4 and later)

OHT - on-hook transmission; wo OSIP - without open switching interval protection

SPOTS CU - channel unit provides locally switched loop- and ground-start service

* AUA33B is available with Software Releases 3.3 and later. Inventory: AUA33 — No, AUA33B — Yes.

† Inventory information available for the AUA36B only.

‡ BUSY light emitting diode (LED) is on continuously.

Continued on next page

Table F – SLC®-2000 Access System Channel Units (Continued)

Code	Description	Data Sheet	Terminal	#Ch	Range	Rel.	Inven.
Nonprovisionable							
AUA59	SPOTS CU CF +OHT/CLASS	363-005-119	RT/MSDT / NBS	2	1500Ω/CSA		No
AUA90	ISDN T-BRITE	363-005-129	COT/RT/ MSDT/NBS	1	1 km		No
AUA94() *	ISDN Dual ANSI-U	363-005-135	RT/MSDT/ NBS	2	AUA94 CSA AUA94B 18kf	4.0	AUA94: No AUA94B: Yes
AUA150	POTS/SPOTS CU CF +OHT/CLASS	363-005-133	COT/RT/ MSDT/NBS	2	1500Ω/CSA		No
AUA150C	Dual POTS/SPOTS CF+OHT/CLASS+ALC	363-005-133	COT/RT/ MSDT/NBS	2	1500Ω	†	Yes
AUA151	POTS/SPOTS CU CF wo OSIP +OHT/CLASS	363-005-134	RT/MSDT	2	1500Ω/CSA		No
AUA158(B,C)	ALC POTS CF +OHT/CLASS	363-005-303	RT/MSDT /NBS‡	2	900Ω		Yes
AUA158D	ALC POTS CF +OHT/CLASS	363-005-303	RT/MSDT / NBS	2	1400Ω		Yes
AUA159(B,C)	ALC POTS/SPOTS CU +OHT/CLASS	363-005-304	RT/MSDT /NBS‡	2	900Ω/CSA		Yes
AUA178()	ALC C-POTS CF OHT/CLASS	363-005-314	RT/MSDT/ NBS	2	900Ω		Yes
AUA179	ALC POTS/SPOTS CU +ALIC5 +OHT/CLASS	363-005-311	RT/MSDT / NBS	2	900Ω/CSA		Yes

Legend:

ALC - automatic level compensation; ALIC5 - analog line to integrated SLC carrier at 5ESS switch cutover

CF - current feed, CS - current sink; CSA - carrier serving area; CU - channel unit

LSAS - line side answer supervision, also carrier line side supervision; NBS - Narrowband Shelf (R4.4 and later)

OHT - on-hook transmission; wo OSIP - without open switching interval protection

SPOTS CU - channel unit provides locally switched loop- and ground-start service

* In Release 4.4 or earlier, the AUA94() is recent change provisionable from the LDS. It is *not* provisionable from the SLC-2000 CIT. In Release 4.5 or later, the AUA94() can be provisioned from the CIT

† Inventory feature is supported by Software Releases 3.3, 4.1, and 4.2, and later.

‡ The AUA158B and AUA159B are not supported in Software Release 4.4 or later when installed in the NBS.

Continued on next page

Table F– SLC®-2000 Access System Channel Units (Continued)

Code	Description	Data Sheet	Terminal	#Ch	Range	Rel.	Inven.
Manually Provisionable							
AUA45(B)	Dual Ringing Repeater (Manual Ring)	363-005-123	COT/RT/MSDT/ NBS*	2	10 dB		No
AUA56B	Dual DID (DPT)	363-005-115	RT/MSDT/NBS	2	750 (CSA)		Yes
AUA57	FSR CF	363-005-122	RT/MSDT /NBS	1	900Ω		No
AUA75	Private Line Automatic Ring (PLAR)	363-005-132	COT/RT/MSDT/ NBS	2	10 dB		No
AUA92	ISDN BRITE II ANSI-U	363-005-130	COT	1	—		No
AUA93 †	ISDN BRITE II ANSI-U	363-005-131	RT/MSDT /NBS	1	CSA		No
AUA200	2-wire Switched 56-kb/s DPX	363-005-313	RT/MSDT /NBS	1	42 dB	3.2	No
AUA232	RS-232 DSU Dataport	363-005-312	COT/RT/MSDT/ NBS	1	RS-232	3.2	No
AUA293†	ISDN BRITE II ANS-U	363-005-347	COT/RT/MSDT/ NBS	1	18kf	3.1	Yes

Legend:

ALC - automatic level compensation; ALIC5 - analog line to integrated SLC carrier at 5ESS switch cutover

CF - current feed, CS - current sink; CSA - carrier serving area; CU - channel unit

LSAS - line side answer supervision, also carrier line side supervision; NBS - Narrowband Shelf (R4.4 and later)

OHT - on-hook transmission; wo OSIP - without open switching interval protection

SPOTS CU - channel unit provides locally switched loop- and ground-start service

* The NBS can contain the AUA45B. It does not support the AUA45.

† When used in the MSDT, the AUA93/AUA293 is manually provisionable for software releases earlier than Release 4.2 and electronically provisionable in Software Releases 4.2 and later.

Continued on next page

Table F— *SLC*[®]-2000 Access System Channel Units (Continued)

Code	Description	Data Sheet	Terminal	#Ch	Range	Rel.	Inven.
Manually Provisionable							
<i>MCU</i> [†] -5205	Metallic Channel Unit (Tollgrade)	TLGD5205 [†]	COT/RT/MSDT/NBS	1	‡		No
<i>MCU</i> -5405	Digital Bypass Pair (Tollgrade)	TLGD5405 [†]	COT/RT	1	‡	3.2	No
<i>PGM</i> [*] -2000 [§]	Program Channel Unit	TLGD2000 [†]	COT/RT	1	‡	3.3/ 4.2	No
Electronically Provisionable							
<i>SPQ</i> 334	Dual DS0 Dataport	363-005-332	COT	2	—	3.3	Yes
<i>SPQ</i> 442	E <i>SPOTS</i> CU CS	363-005-382	COT/RT/MSDT/NBS	4	CSA	3.2	Yes
<i>SPQ</i> 443	E <i>SPOTS</i> CU CF	363-005-383	COT/RT/MSDT/NBS	4	CSA	3.2	Yes
<i>SPQ</i> 444	4-Wire CS (FXO/TDM)	363-005-385	COT/RT	4	2800Ω	3.2	Yes
<i>SPQ</i> 452	Dual OCU Dataport	363-005-341	COT/RT/MSDT/NBS	2	45 dB	3.3/ 4.2	Yes

Legend:

ALC - automatic level compensation; ALIC5 - analog line to integrated *SLC* carrier at *5ESS* switch cutover

CF - current feed, CS - current sink; CSA - carrier serving area; CU - channel unit

LSAS - line side answer supervision, also carrier line side supervision; NBS - Narrowband Shelf (R4.4 and later)

OHT - on-hook transmission; wo OSIP - without open switching interval protection

SPOTS CU - channel unit provides locally switched loop- and ground-start service

* Trademark of Tollgrade Communications, Inc.

† Obtain data sheet from Tollgrade Communications, Inc.

‡ See the data sheet for range.

§ The bandwidth capability of the *PGM*-2000 channel unit is set by printed wiring board (PWB)-mounted switches.

Release 4.2: The function code of the channel unit is provisioned electronically to allow the remote terminal (RT) software to configure the system bandwidth to match the bandwidth setting on the *PGM*-2000 unit.

Release 3.3: The central office terminal (COT) software treats the *PGM*-2000 channel unit as a POTS unit and does not prompt for the function code. This is because the bandwidth setting is communicated to the system automatically upon channel unit installation.

Continued on next page

Table F – SLC®-2000 Access System Channel Units (Continued)

Code	Description	Data Sheet	Terminal	#Ch	Range	Rel.	Inven.
Electronically Provisionable							
SPQ454	4-Wire E&M/PLR	363-005-386	COT/RT	2	500Ω	3.2	Yes
SPQ456	Quad DID	363-005-343	RT/MSDT/NBS	4	750 (CSA)	4.2	Yes
AUA34	DS0 Dataport	363-005-104	COT	1	—		No
AUA34B	DS0 Dataport (All-rate)	363-005-104	COT	1	—		Yes
AUA41()	4-wire CF (FXS/ETO/DX)	363-005-105	COT/RT/MSDT/ NBS	1	15 dB		*
AUA42()	E SPOTS CU CS	363-005-106	COT/RT/MSDT/ NBS	2	CSA	3.2	*
AUA43()	E SPOTS CU CF	363-005-107	COT/RT/MSDT/ NBS	2	CSA	3.2	*
AUA44()	4-Wire VF CS (Includes TDM signaling)	363-005-108	MSDT/NBS	1	15 dB		No
AUA52	OCU Dataport	363-005-111	COT/RT/MSDT/ NBS	1	34 dB		No
AUA52B	OCU Dataport (All-rate)	363-005-111	COT/RT/MSDT [†] / NBS	1	34 dB		Yes

Legend:

ALC - automatic level compensation; ALIC5 - analog line to integrated SLC carrier at 5ESS switch cutover

CF - current feed, CS - current sink; CSA - carrier serving area; CU - channel unit

LSAS - line side answer supervision, also carrier line side supervision; NBS - Narrowband Shelf (R4.4 and later)

OHT - on-hook transmission; wo OSIP - without open switching interval protection

SPOTS CU - channel unit provides locally switched loop- and ground-start service

* Inventory:

YES = AUA41B, AUA42B, and AUA43B

NO = AUA41, AUA42, and AUA43.

† MSDT AUA52B application requires switch settings (Software Release 4.1 and earlier).

Continued on next page

Table F – SLC®-2000 Access System Channel Units (Continued)

Code	Description	Data Sheet	Terminal	#Ch	Range	Rel.	Inven.
Electronically Provisionable							
AUA54()	4-Wire VF Types I & II E&M/PLR	363-005-113	MSDT/NBS	1	500Ω		No
AUA93 *	ISDN BRITE II ANSI-U	363-005-131	RT/MSDT/NBS	1	CSA		No
AUA141	4-Wire VF CF (GTE)	363-005-300	COT/RT/MSDT	1	15 dB		No
AUA142	E <i>SPOTS CU CS (GTE)</i>	363-005-301	COT/RT/MSDT	2	CSA		No
AUA152	OCU Dataport (GTE)	363-005-302	COT/RT/MSDT/ NBS	1	34 dB		No
AUA252() [†]	OCU Dataport	363-005-212	COT/RT/MSDT/ NBS	1	34 dB		No
AUA293*	ISDN BRITE II ANS-U	363-005-347	COT/RT/MSDT/ NBS	1	18kf	3.1	Yes

Legend:

ALC - automatic level compensation; ALIC5 - analog line to integrated SLC carrier at 5ESS switch cutover

CF - current feed, CS - current sink; CSA - carrier serving area; CU - channel unit

LSAS - line side answer supervision, also carrier line side supervision; NBS - Narrowband Shelf (R4.4 and later)

OHT - on-hook transmission; wo OSIP - without open switching interval protection

SPOTS CU - channel unit provides locally switched loop- and ground-start service

* When used in the MSDT, the AUA93/AUA293 is manually provisionable for software releases earlier than Release 4.2 and electronically provisionable in Software Releases 4.2 and later.

† Switched 56-kb/s services must be manually provisioned for all terminal applications.

Contents of This Tab

-  **CAUTION:**
Take care to avoid damaging the LEDs that protrude through the openings in the faceplate of the circuit packs during handling and circuit pack installation.
-  **CAUTION:**
When handling circuit packs, always wear an electrostatic discharge wrist strap connected to an ESD ground jack on the user interface panel (UIP).
-  **CAUTION:**
In dusty areas (for example, near construction sites), tent the RT cabinet to protect electronic equipment whenever cabinet doors are open for extended periods.

Install and Test SLC®-2000 Channel Units for FITL and Metallic Distribution	NTP-080
Establish SLC-2000 for Fiber-in-the-Loop (FITL) Distribution (DT Servers) — MSDT	NTP-081
Establish SLC-2000 for Fiber-in-the-Loop (FITL) Distribution (DT Servers) — FiberReach Narrowband Shelf	NTP-082
Set Option Switches on AUA57, AUA41B, AUA45(), AUA56B, AUA75, SPQ® 808/809/810/811, AUA52B, AUA252(), AUA93, AUA293, or PGM-2000 Channel Units	DLP-600
Provision Channel Units	DLP-601
Test Single-Party, or SPOTS® Loop-Start/Ground-Start Channel (SPOTS Channel Unit)	DLP-602
Test Coin Channel End-to-End on Universal SLC Carrier System.	DLP-603
Test Multiparty (2-Party ANI) Channel on Integrated System (DCLU or IDCU to SLC-2000 RT)	DLP-604
Test Multiparty (2-Party ANI) Channel COT-to-RT on Universal SLC Carrier System	DLP-605
Test FSR Channel	DLP-606

Test DID Channel at <i>SLC</i> -2000 RT	DLP-607
Test AUA45() Manual Ringdown Channel at <i>SLC</i> -2000 RT.	DLP-608
Test AUA75 Private Line Auto Ring (PLAR) Channel at <i>SLC</i> -2000 RT . . .	DLP-609
Perform OCU and Channel Loopback Test at RT	DLP-610
Adjust Gain of 2-Wire Special Services Channel Unit	DLP-611
Adjust Gain of 4-Wire Special Services Channel Unit	DLP-612
Measure Signal Level End-to-End on Single-Party Channel (ALC Channel Unit Inserting Maximum Loss)	DLP-613
Measure Signal Level from Central Office to Network Interface (NIF) on Single-Party Channel (ALC Channel Unit Inserting Expected Loss). . . .	DLP-614
Verify Voice Frequency Special Service Channel Unit Settings	DLP-615
Provision and Install DT Server	DLP-616
Install AUA94 and/or <i>SPQ</i> 494 Channel Units in FiberReach NBS	DLP-617

Install and Test *SLC*[®]-2000 Channel Units for FITL and Metallic Distribution

DO ITEMS BELOW IN ORDER LISTED FOR DETAILS, GO TO

A list of the channel units available in the *SLC*-2000 Access System is provided in **Channel Unit Installation: Introduction-000**.

1.



CAUTION:

When handling circuit packs, always wear an electrostatic discharge wrist strap connected to an ESD ground jack on the user interface panel (UIP) or fan assembly.

For a *universal* system configuration, install channel units in the *SLC*-2000 Access System COT or the *SLC* 96 carrier system COT as required for the channels to be added or established.

Refer to document 363-205-402, *SLC Series 5 Carrier System, Channel Units Installation and Testing, Task Oriented Practice (TOP)*, for option settings for COT channel units.

For an *integrated* system with nail-up or hairpin, install channel units in the distant D-type channel bank (if possible) as required for the channels to be added or established. Refer to the appropriate *5ESS*[®] Switch documentation to establish nail-up or hairpin cross-connections.

For an *INA* system with nail-up or hairpin configurations, install channel units in the distant D-type channel bank or *SLC*-2000 terminal as required in the work order. Refer to the appropriate *5ESS* Switch documentation to establish nail-up or hairpin cross-connections.

DO ITEMS BELOW IN ORDER LISTED FOR DETAILS, GO TO

2. At the *SLC-2000* remote terminal, verify that no fault or alarm conditions exist on the system. All UIP LEDs, except the green **Power** LED, should be extinguished. If not, refer to **TAP-101** for trouble isolation.
 3. From work order, determine the channel unit slot in the metallic distribution shelf (MDS) assembly or multi-services distant terminal (MSDT) to install the channel unit. Refer to **Channel Unit Installation: Introduction-000** for channel units supported by the *SLC-2000* Access System. For a list of channel units that can be installed in the MSDT, refer to Chapter 2, "Product Description".
-
4. If you have one of the channel units listed below, set the options as required. Otherwise, continue with Step 5. DLP-600
 - AUA41B** 4-wire special service CF channel unit
 - AUA45**() dual ringing repeater channel unit
 - AUA52B** OCU dataport channel unit
 - AUA56B** Direct-Inward-Dial (DID) channel unit
 - AUA57** frequency selective ringing (FSR) channel unit
 - AUA75** dual private line automatic ring (PLAR) channel unit
 - AUA93** BRITE II ISDN channel unit
 - AUA293** BRITE III ISDN channel unit
 - AUA252**() OCU dataport channel unit
 - PGM-2000** program channel unit
 - SPQ808** DT Server channel unit
 - SPQ809** DT Server channel unit
 - SPQ810** DT Server channel unit
 - SPQ811** DT Server channel unit.

DO ITEMS BELOW IN ORDER LISTED FOR DETAILS, GO TO

⇒ **NOTE:**
If an **AUA56**, **AUA56B**, or **SPQ456** DPT type channel unit is being installed for service in a TR303 integrated configuration, the local digital switch (LDS) uses the function code RVT and requires the RT to host a DPT type channel unit with its DS0s provisioned for the same RVT function code. If the LDS is a *5ESS* or *GTD-5*^{*} switch, the LDS will automatically command the RT to provision the channel unit time slots (DS0s) for the RVT function code. But if the LDS is not a *5ESS* or *GTD-5* switch (for example, *DMS-100*[†]), the DS0s must be provisioned for the RVT function code using the CIT since the default function code for these CUs is DFLT.

⇒ **NOTE:**
AUA45 and **AUA75** channel units are compatible with TR-08 Mode 1 operation, INA, TR-303 nail-up and hairpin configurations.

⇒ **NOTE:**
The **AUA52B**, **AUA252**(), **AUA41B**, **AUA93**, and **AUA293** channel units have options that must be set when they are installed in a *SLC-2000* MSDT or *DDM-2000* FiberReach NBS.

5.

⇒ **NOTE:**
The special service channels may be electronically provisioned before or after the channel units are installed. In TR-08 Mode 2 (concentrated) systems, the central office equipment may restrict special service channel units and the **AUA53**() and **SPQ453** coin channel units to channel slots 17-20, 21-24, 41-44, 45-48, 65-68, 69-72, 89-92, and 93-96. *SLC-96* COTs and *5ESS* switch generics earlier than 5E8 restrict special service channel units and coin channel units to these slots for Mode 2 operation. The *SLC-2000* system does not restrict special service channel unit placement in any mode.

* Registered trademark of GTE Corporation.

† Trademark of Northern Telecom, Ltd.

DO ITEMS BELOW IN ORDER LISTED FOR DETAILS, GO TO

If you have one of the channel units listed in the Apparatus Code column in Table A, refer to **DLP-601** for provisioning details. These channel units have parameters provisioned from the craft interface terminal (CIT). Table B provides the function codes that correlate to the *COMMON LANGUAGE*[‡] *CLEI* Codes found in Table A. Refer to 363-208-003, *SLC-2000 Access System, Commands and Messages*, **ENT - T0** command for detailed provisioning information. If your channel unit is type Other with Function Code DFLT, you may continue with Step 6.

The **AUA52B** and **AUA252**() have option switches that must be set to allow provisioning with the CIT when installed in an MSDT or FiberReach NBS, and the host *SLC-2000* RT is equipped with Release 4.1 or earlier. Beginning with *SLC-2000* Release 4.2, provisioning of the **AUA52B** and **AUA252** (except SW56 options) is accomplished by means of the CIT and the physical option switches are ignored.

-
6. Is channel unit being installed in an MDS or MSDT?
If **MDS**, then continue with Step 7.
If **MSDT**, then proceed to Step 8.
-

7.

⇒ **NOTE:**
The RETRIEVE-FAULTS UIP command can be used to help identify alarms caused by channel unit troubles (see **TAP-104**).

Install the channel unit in the appropriate channel unit slot.

‡ *COMMON LANGUAGE* is a registered trademark and *CLEI*, *CLLI*, *CLCI*, and *CLFI* are trademarks of Bell Communications Research, Inc.

DO ITEMS BELOW IN ORDER LISTED FOR DETAILS, GO TO

Response: Normally, there will be no alarms. But if the **NE Activity** LED on the user interface panel (UIP) is illuminated after the channel unit is installed, the following trouble-clearing steps should be performed:

- a. If both UIP **NE Activity** and **INCOMP** on the **MDC** in the same metallic distribution shelf side (1 or 2) that the channel unit is being installed in are illuminated, the channel unit just installed is not compatible with the system configuration. Remove the incompatible channel unit and verify the channel unit assignment with the work order.
- b. Press the **PTU RESET** button on the **PTU** in the same metallic distribution shelf side (1 or 2) in which the channel unit was installed.
- c. Verify that ringing power is supplied to the MDS assembly and that no MDS fuses are blown. The **AUA55** multiparty channel unit requires a positive ringing voltage supply if the number of parties exceeds two.
- d. If only the UIP **NE Activity** remains lighted, replace the defective channel unit just installed.

Proceed to Step 9.

8.



NOTE:

The RETRIEVE-FAULTS UIP command can be used to help identify alarms caused by channel unit troubles (see **TAP-104**).

Install the channel unit in the appropriate MSDT channel unit slot.

DO ITEMS BELOW IN ORDER LISTED FOR DETAILS, GO TO

Response: Normally, there will be no alarms. But if the **NE** LED on the backplane interface unit (**BIU**) is lighted after the channel unit is installed, the following trouble-clearing steps should be performed:

- a. If the MSDT **BIU NE** and **CONFIG** LEDs are lighted, the channel unit just installed is not compatible with the system configuration. Remove the incompatible channel unit and verify the channel unit assignment with the work order.
- b. Verify that the ringing generator unit (**RGU**) is providing ringing power to the MSDT assembly and that no MSDT fuses are blown. The **AUA55** multiparty channel unit requires a positive ringing voltage supply if the number of parties exceeds two.
- c. If only the **BIU NE** remains lighted, replace the defective channel unit just installed.

-
9. For an *integrated* system configuration, assign service to the channel via the *5ESS* switch terminal. For switched service, assign a telephone number to the channel. For non-switched service, enter the nail-up or hairpin assignment.

DO ITEMS BELOW IN ORDER LISTED FOR DETAILS, GO TO

10. Perform channel tests as required:

a.	Test single party or <i>SPOTS</i> loop start/ground start channel.	DLP-602
b.	Test coin channel end-to-end [AUA33(), AUA53(), <i>SPQ318</i> , <i>SPQ333</i> , <i>SPQ419</i> , and <i>SPQ453</i>].	DLP-603
c.	Test multiparty (2-party ANI) channel:	
1.	For <i>integrated</i> system configurations.	DLP-604
2.	For <i>universal</i> system configurations.	DLP-605
d.	Test FSR channel.	DLP-606
e.	Test DID channel [AUA36, AUA56(), <i>SPQ336</i> , and <i>SPQ456</i>].	DLP-607
f.	Test AUA45(B) manual ringdown channel.	DLP-608
g.	Test AUA75 PLAR channel units.	DLP-609
h.	Perform OCU and channel loop back.	DLP-610

11. Adjust gain of special services channel unit:

1.	2-wire (AUA42/AUA142/ <i>SPQ442</i> , AUA43/ <i>SPQ443</i>).	DLP-611
2.	4-wire (AUA41/AUA41B, <i>SPQ444</i> , <i>SPQ454</i>).	DLP-612

12. Verify voice frequency special service channel unit settings. DLP-615

13. Measure signal level end-to-end on ALC [AUA150C, AUA158(),
AUA159(), *SPQ400*, and *SPQ440*()] channel units:

a.	From central office to <i>SLC</i> -2000 RT.	DLP-613
b.	From central office to network interface.	DLP-614

DO ITEMS BELOW IN ORDER LISTED FOR DETAILS, GO TO

14. Install ISDN channel units (AUA90 T-BRITE or AUA93 BRITE II/ AUA293 BRITE III installation and maintenance procedures can be found in Document 363-205-106 or 363-205-107, respectively).

Comment: The MSDT has channel slot restrictions for ISDN channel units. The AUA90 cannot be installed in MSDT channel unit slot 2 or 5. The AUA93 or AUA293 cannot be installed in slot 2 or 5 when optioned for 2B+D ISDN service.

The AUA93 and AUA293 has option switches which must be set to provide service when installed in an MSDT, and the host *SLC-2000* RT is equipped with R4.1 or earlier. Beginning with *SLC-2000* R4.2, provisioning is accomplished by means of the CIT and the physical option switches are ignored.

-
15. Are AUA94 or *SPQ494* channel units being installed in FiberReach NBS?

If **YES**, then proceed to **DLP-617**.

If **NO**, then continue with Step **16**.

-
16. Install AUA94 U-DSL channel unit(s) in RT or MSDT.

Comment: The AUA94 channel unit can be installed in an R4.0 or later RT or MSDT.

-
17. Install *SPQ494* U-DSL channel unit(s) in RT.

Comment: The *SPQ494* channel unit can be installed in an R4.1 or later RT only.

-
18. Update records per local practice.
-

Table A – Channel Units with Parameters Provisionable by a CIT

Functional CLEI* Code	Apparatus Codes	Software Release (Note)
Other	AUA25	4.0 and later
Other	AUA25B	4.0 and later
Other	AUA27	4.0 and later
Other	AUA33B	3.3
5SCU38	AUA34 [†]	3.1, 3.2, 3.3
5SC133	AUA34B [†]	3.1, 3.2, 3.3
Other	AUA36B	3.3
5SCU7D	AUA41	3.1 and later
5SCUCD	AUA41B	3.1, 3.2, 3.3, 4.0
5SC3HJ	AUA41B	4.2 and later
5SCU69	AUA42	3.1 and later
5SCU6E	AUA42B	3.1 and later
5SCU6A	AUA43	3.1 and later
5SCU6F	AUA43B	3.1 and later
5SCU7C	AUA44	3.1, 3.2, 4.0 and later
5SCU7C	AUA44B	4.2 and later
Other	AUA45	4.0 and later
Other	AUA45B	4.0 and later
Other	AUA51	4.0 and later
5SCU48	AUA52	3.1 and later
5SC143	AUA52B	3.1 and later
Other	AUA53	4.0 and later
Other	AUA53B	4.2 and later
5SCU7B	AUA54	3.1, 3.2, 4.0 and later
5SCU7B	AUA54B	4.2 and later
Other	AUA55	4.0 and later
Other	AUA55B	4.2 and later
Other	AUA56	4.0 and later

See note and footnotes at end of table.

Continued on next page

Table A – Channel Units with Parameters Provisionable by a CIT (Continued)

Functional CLEI* Code	Apparatus Codes	Software Release (Note)
Other	AUA56B	4.0 and later
Other	AUA57	4.0 and later
Other	AUA58	4.0 and later
Other	AUA58B	4.0 and later
Other	AUA58C	4.0 and later
Other	AUA59	4.0 and later
Other	AUA59B	4.2 and later
Other	AUA75	4.0 and later
5SC1JE	AUA92	3.1, 3.2, 3.3
5SC1HE	AUA93	3.1, 3.2, 4.0 and later
5SC18E	AUA94()	4.0 and later (RT and MSDT) 4.3 and later (NBS)
5SCU7D	AUA141	4.0 and later
5SCU69	AUA142	4.0 and later
Other	AUA150	4.0 and later
Other	AUA150C	4.2 and later
Other	AUA151	4.0 and later
5SCU48	AUA152	4.0 and later
Other	AUA158	4.0 and later
Other	AUA158B	4.0 and later
Other	AUA158C	4.2 and later
Other	AUA159	4.0 and later
Other	AUA159B	4.0 and later
Other	AUA159C	4.2 and later
Other	AUA178	4.0 and later
Other	AUA179	4.0 and later
5SC143	AUA252	3.3, 4.2 and later

See note and footnotes at end of table.

Continued on next page

Table A – Channel Units with Parameters Provisionable by a CIT (Continued)

Functional CLEI* Code	Apparatus Codes	Software Release (Note)
5SC143	AUA252B	3.3, 4.2 and later
5SC1HE	AUA293	3.1, 3.2, 4.0 and later
5SC1JE	AUA293	3.1, 3.2, 3.3
Other	MCU [†] 5205	4.0 and later
Other	MCU5405	4.0 and later
SAC1CS	PGM [‡] -2000	4.2 and later
Other	PGM-2000 [§]	3.3
Other	SPQ [®] 318	3.3
Other	SPQ328	3.3
Other	SPQ333	3.3
5SC324	SPQ334	3.3
Other	SPQ336	3.3
Other	SPQ400()	3.1, 3.2, 4.0 and later
Other	XSPQ400	
Other	SPQ419	4.2 and later
Other	SPQ429	4.2 and later
Other	SPQ440	4.0 and later
Other	SPQ440B	4.0 and later
Other	SPQ440C	4.2 and later
SAC1AH	SPQ442	3.1, 3.2, 4.0 and later
SAC1AE	SPQ443	3.1, 3.2, 4.0 and later
SAC1BF	SPQ444	3.1 and later
Other	SPQ450	4.0 and later

See note and footnotes at end of table.

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Table A – Channel Units with Parameters Provisionable by a CIT (Continued)

Functional CLEI* Code	Apparatus Codes	Software Release (Note)
5SCTFF	SPQ452	3.3, 4.2 and later
Other	SPQ453	4.2 and later
SAC1BG	SPQ454	3.1 and later
SACPDC	SPQ456	4.2 and later
Other	SPQ478	4.0 and later
5SC212	SPQ494†	4.2 and later (RT) 4.4 and later (NBS)
Other	SPQ809	4.0 and later
Other	SPQ810	4.4
Other	SPQ909	4.0 and later

Note: The Software Release(s) listed for a particular channel unit is the only Software Release(s) that allows the channel unit to be provisioned by the CIT although the channel unit may be compatible with other Software Releases. Refer to Chapter 2, "Product Description," for a complete description of software release compatibility of these channel units.

- * COMMON LANGUAGE is a registered trademark and CLEI, CLLI, CLCI, and CLFI are trademarks of Bell Communications Research, Inc.
- † The CLEI codes 5SCU38 and 5SC133 are intended for COT applications.
- ‡ Trademark of Tollgrade Communications, Inc.
- § The craft interface terminal (CIT) cannot be used to provision the PGM-2000 for R3.3.
- ¶ The integrated services digital network (ISDN) function code is supported by the system and can appear in reports resulting from the DLC subsystem command, **RTRV-T0**. However, prior to Software Release 4.5 you cannot provision the ISDN function code using the CIT (DLC subsystem commands, **ED-T0** and **ENT-T0**). You must provision ISDN lines through the local digital switch (LDS) using the TR-303 embedded operations channel (EOC).

Table B – Valid Function Codes for Each Functional CLEI* Code

Functional CLEI Codes	Function Codes (Note)	Software Release
5SCU48, 5SC143, and 5SCTFF	OCU	3.3
5SCTFF	OCU and SW56	4.2 and later
5SCU69, 5SCU6E, and SAC1AH	DPT, FXO , and TO	3.1 and later
5SCU6A, 5SCU6F, and SAC1AE	DPO, FXS , and TO	3.1 and later
5SCU7D and 5SCUCD	DX4[N,R], ETO4, FX[S,T][1,2,3,5] , and TO4	3.1, 3.2, 3.3, 4.0
5SC3HJ and 5SCU7D	DX4[N,R], ETO4, FX[S,T][1,2,3,5] , and TO4	4.2 and later
5SCU7C	FX[O,P][1,2,3,5] and TD[O,S][A,B,C,D]	3.1, 3.2, 4.0 and later
SAC1BF	FX[O,P][1,2,3,5] and TD[O,S][A,B,C,D]	3.1 and later
5SCU7B	EM4[C,H] and PLR[1,2]	3.1, 3.2, 4.0 and later
SAC1BG	EM4[C,H] and PLR[1,2]	3.1 and later
5SCU48 and 5SC143	OCU	3.1 and later
5SCU38 and 5SC133	DS0A and DS0B	3.1, 3.2, 3.3
5SC1JE	BRI	3.1, 3.2, 3.3, 4.2 and later
5SC1HE	BRI	3.1, 3.2, 4.0 and later
5SC324	DS0A , DS0B, and SW56	3.3
SACPDC	DFLT and RVT	4.2 and later
SAC1CS	PG5 , PG8, PG15, and PG20	4.2 and later
5SC18E and 5SC212	ISDN	4.5 and later
Other	DFLT	3.1, 3.2
Other	DFLT and EBS	3.3
Other	AC, DATA, DFLT , GO, GS, LO, LR, LS, NO, and RVT	4.0
Other	AC, DATA, DFLT , EBS, GO, GS, LO, LR, LS, NO, and RVT	4.2 and later

Note: The default function code for each CLEI code listed appears in bold print.

* *COMMON LANGUAGE* is a registered trademark and CLEI, CLLI, CLCI, and CLFI are trademarks of Bell Communications Research, Inc.

Establish *SLC*[®]-2000 for Fiber in the Loop (FITL) Distribution (DT Servers) — MSDT

DO ITEMS BELOW IN ORDER LISTED FOR DETAILS, GO TO

Prerequisite: Before starting this procedure, you must perform the acceptance procedures to install the fuses in the high density optics shelf (HDOS) and verify the following:

- The SONET subsystem has been turned up and connected end-to-end
- The DLC subsystem shelf has been provisioned for fiber in the loop (FITL)
- The DLC shelf has been turned up end-to-end
- The MSDT has been properly installed and equipped (refer to document 363-205-004).

1. Verify that the SONET subsystem has been turned up and tested end-to-end using the *ARM Shelf Turnup* tab procedures.

2. Use the **SET-DISTRIBUTION** user interface panel (UIP) command (see **DLP-500**) or the **ED-DISTN** command from the CIT to verify that the metallic distribution shelf (MDS) has been provisioned for FITL. Also verify that the MDS shelf has been turned up end-to-end [central office (CO) to *SLC*-2000 Access System remote terminal (RT)] using the *MDS Assembly Turnup* tab procedures. If the MDS shelf is set for metallic (MET), remove both **MDC** packs in the MDS shelf and change the distribution mode to FITL using the **SET-DISTRIBUTION** UIP command. Then replace the **MDC** packs.

3. Verify that the fuses have been installed in the high density optics shelf (HDOS) (**Acceptance: NTP-005**).

DO ITEMS BELOW IN ORDER LISTED FOR DETAILS, GO TO

4. Install and verify the *SLC-2000* DT Server for FITL distribution. DLP-616
For details, see document 363-205-004, *SLC-2000*
Multi-Services Distant Terminal (MSDT) Feature, User/Service
and Ordering Manual.

Comment: The MSDT has channel slot restrictions for ISDN
channel units that are explained in *Channel Unit*
Installation: Introduction-000.



CAUTION:

*Once the DT Server is installed and placed in service, if it is removed from the MDS, service to all customers being served from the associated MSDT will be interrupted. If an in-service DT Server is removed from the MDS, the UIP will display one of the following messages: **MJ:dt-m-n is missing** or **MN:dt-m-n is missing**.*

Establish *SLC*[®]-2000 for Fiber in the Loop (FITL) Distribution (DT Servers) — FiberReach NBS

DO ITEMS BELOW IN ORDER LISTED FOR DETAILS, GO TO

Prerequisite: Before starting this procedure, you must verify the following:

- The SONET subsystem has been turned up and connected end-to-end
- The DLC subsystem shelf has been provisioned for fiber in the loop (FITL)
- The DLC shelf has been turned up end-to-end
- The FiberReach NBS has been properly installed and equipped (refer to document 363-206-301).

-
1. Verify that the SONET subsystem has been turned up and tested end-to-end using the *ARM Shelf Turnup* tab procedures.
-
2. Use the **SET-DISTRIBUTION** user interface panel (UIP) command (see **DLP-500**) or the **ED-DISTN** command from the CIT to verify that the metallic distribution shelf (MDS) has been provisioned for FITL. Also verify that the MDS shelf has been turned up end-to-end [central office (CO) to *SLC*-2000 Access System remote terminal (RT)] using the *MDS Assembly Turnup* tab procedures. If the MDS shelf is set for metallic (MET), remove both **MDC** packs in the MDS shelf and change the distribution mode to FITL using the **SET-DISTRIBUTION** UIP command. Then replace the **MDC** packs.

DO ITEMS BELOW IN ORDER LISTED FOR DETAILS, GO TO

3. Install and verify the *SLC-2000* DT Server for FITL distribution. DLP-616
For details, see document 363-206-301, *DDM-2000 FiberReach Multiplexer, Wideband/Narrowband Shelf, User/Service Manual*

Comment: The FiberReach narrowband shelf has channel slot restrictions for ISDN channel units that are explained in *Channel Unit Installation: Introduction-000*.



CAUTION:

Once the DT Server is installed and placed in service, if it is removed from the MDS, service to all customers being served from the associated FiberReach NBS will be interrupted. If an in-service DT Server is removed from the MDS, the UIP will display one of the following messages:
MJ:dt-m-n is missing or MN:dt-m-n is missing.

Set Option Switches on AUA57, AUA41B, AUA45(), AUA56B, AUA75, SPQ®808/809/810/811, AUA52B, AUA252(), AUA93, AUA293, or PGM-2000 Channel Units

General: The **AUA57**, **AUA45()**, **AUA75**, **AUA56B**, **AUA252()**, **SPQ808**, **SPQ809**, **SPQ810**, **SPQ811**, and **PGM-2000** channel units have physical option switches that need to be set when used in a *SLC-2000* metallic distribution shelf (MDS).

The **AUA41B**, **AUA56B**, **AUA57**, **AUA45()**, **AUA75**, **AUA52B**, **AUA93**, and **AUA293** channel units have physical option switches that need to be set when used in an RT, Multi-Services Distant Terminal (MSDT), or FiberReach narrowband shelf (NBS).

Comment: The **AUA93** channel unit has physical option switches which must be set to provide service when used in a *SLC-2000* System equipped with Release 4.1 or earlier. Beginning with *SLC-2000* Release 4.2, provisioning of the **AUA93** channel units is accomplished by means of the CIT and the physical option switches are ignored.

The **AUA52B** and **AUA252()** have option switches that must be set to allow provisioning with the CIT when installed in an MSDT and the host *SLC-2000* RT is equipped with Release 4.1 or earlier. Beginning with *SLC-2000* Release 4.2, provisioning of the **AUA52B** and **AUA252()** is accomplished by means of the CIT and the physical option switches are ignored.

The **AUA252()** has option switches which must be set when installed in the *SLC-2000* RT, MSDT, or FiberReach NBS for the provision of Switched 56 service.

1. Inspect channel unit for possible damage.

2. What type channel unit do you have?

If **AUA57**, then continue with Step **3**.
If **AUA45** or **AUA45B**, then proceed to Step **5**.
If **AUA75**, then proceed to Step **8**.
If **SPQ808**, then proceed to Step **12**.
If **SPQ809**, then proceed to Step **12**.
If **SPQ810**, then proceed to Step **12**.
If **SPQ811**, then proceed to Step **12**.
If **PGM-2000**, then proceed to Step **35**.
If **AUA56B**, then proceed to Step **42**.

At the MSDT or FiberReach NBS:
If **AUA52B**, then proceed to Step **18**.
If **AUA93**, then proceed to Step **23**.
If **AUA41B**, then proceed to Step **32**.
If **AUA252()**, then proceed to Step **45**.
If **AUA293**, then proceed to Step **57**.

3.



CAUTION:

*If the FSR options are set for an invalid selection (for example, more than one frequency group switch set to **ON**), the **BUSY** light on the faceplate will flash when the FSR channel unit is installed.*

From records on the work order, set the **AUA57** frequency group switch (Figure 1); set *only one* option switch **D**, **H**, or **S** to the **ON** position according to the ringing scheme used at the central office (see Table A). The other two switches must be set to off (pressed away from **ON**).

Table A – Ringing Options

Decimonic Option D	Harmonic Option H	Synchromonic Option S
20 Hz	16.6 Hz	20 Hz
30 Hz	25 Hz	30 Hz
40 Hz	33.3 Hz	42 Hz
50 Hz	50 Hz	54 Hz
60 Hz*	66.6 Hz*	66 Hz*

* Only usable when the CO source is an **AUA37** CU.



NOTE:

Only one option switch can be in the **ON** position.

4. Install the **AUA57** channel unit.

STOP. YOU HAVE COMPLETED THIS PROCEDURE.

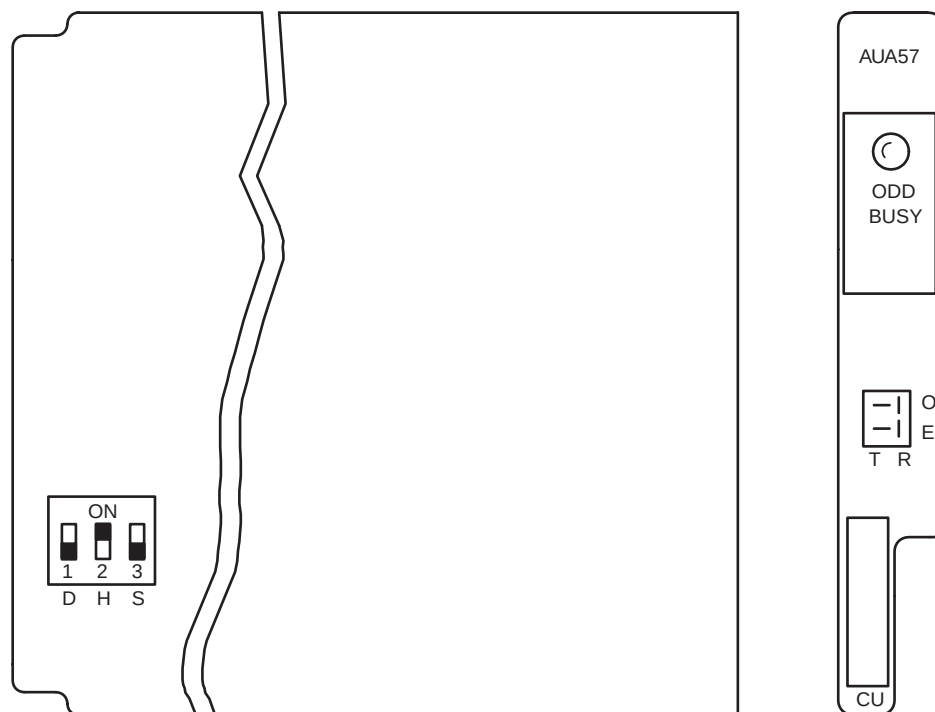


Figure 1 – AUA57 RT FSR Channel Unit Option Switches

5. From records on the work order, set the **AUA45()** option switch **COT/RT** (Figure 2) to the **RT** position.



NOTE:

Set this switch in the **RT** position when installing the channel unit in an MSDT or FiberReach NBS.

- 6.



NOTE:

If only one of the channels on the **AUA45()** is being placed in service, the loss switches for the unterminated channel on the RT unit must be set to the **-3 dB** position. This will prevent the unterminated channel from singing.

From records on the work order, set the **AUA45()** channel unit option switch **ODD** (Figure 2) to **0DB** or **-3DB**. Set option switch **EVEN** (Figure 2) to **0DB** or **-3DB**.

7. Install the **AUA45()** channel unit.

STOP. YOU HAVE COMPLETED THIS PROCEDURE.

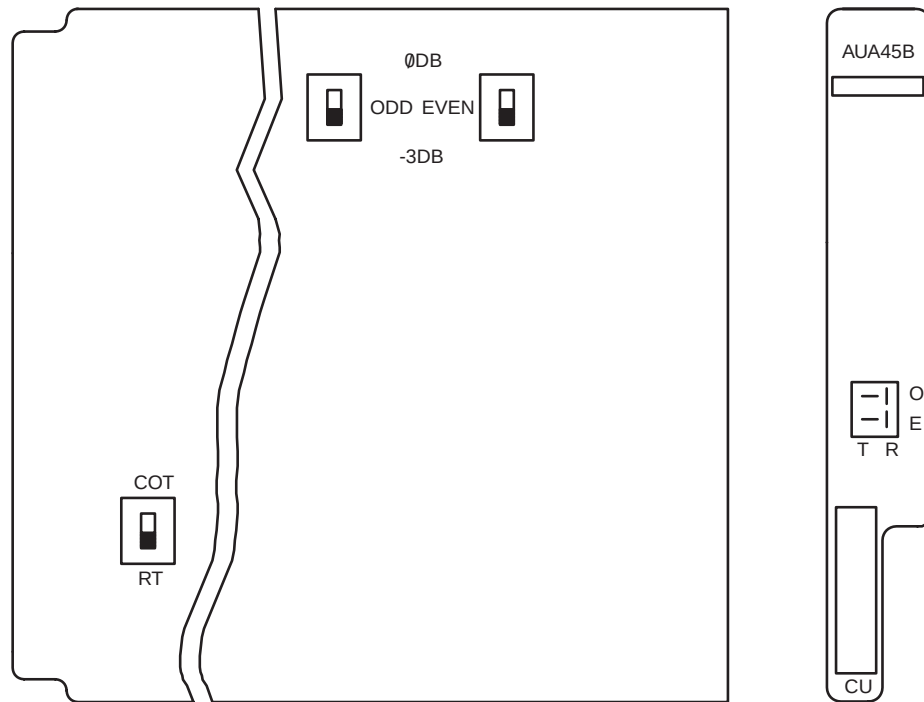


Figure 2 – AUA45 Dual Ringing Repeater Channel Unit Option Switches

8. From records on the work order, set the dual **AUA75** channel unit option switch **COT/RT** (Figure 3) to the **RT** position.



NOTE:

Set this switch in the **RT** position when installing the channel unit in an MSDT or FiberReach NBS.

9. From records on the work order, set the dual **AUA75** channel unit option switch **D3/D4** (Figure 3) to the **D4** position unless the channel unit will be terminated on a D3 PLAR CU in a D3-type bank at the far end. Then set option switch **D3/D4** to **D3**.
10. From records on the work order, set the dual **AUA75** channel unit option switch **ODD** (Figure 3) to **0DB** or **-3DB** to agree with the work order record detail (WORD) document or the facility record for the odd channel. Set option switch **EVEN** (Figure 3) to **0DB** or **-3DB** to agree with the WORD document or the facility record for the even channel.
11. Install the dual **AUA75** channel unit.

STOP. YOU HAVE COMPLETED THIS PROCEDURE.

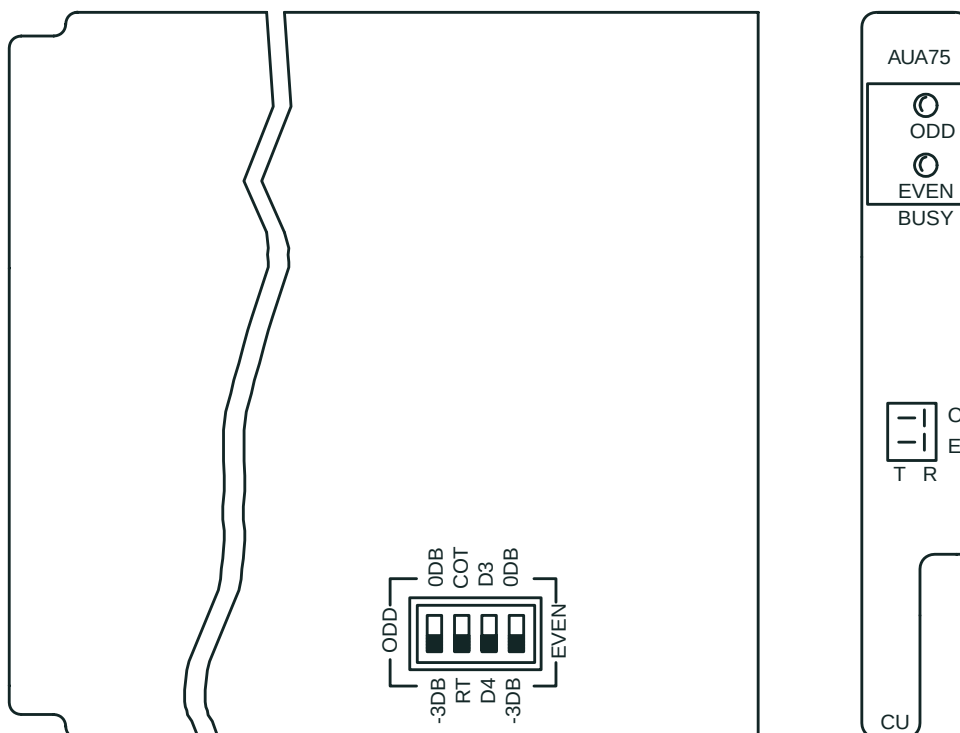


Figure 3 – AUA75 2W PLAR Channel Unit Faceplate and Option Switches

12. Is the DT Server connected to an optical facility through an optical unit in the high density optics shelf (HDOS) serving an MSDT?

If **YES**, then continue with Step **13**.

If **NO**, then proceed to Step **14**.

13. On the DT Server printed circuit board (see Figure 4), set the **OU-DSX** switch toward **OU**.

Comment: All other options on the printed circuit board are ignored and applicable options are electronically provisioned by means of a craft interface terminal (CIT) command.

STOP. YOU HAVE COMPLETED THIS PROCEDURE.

14. Is the DT Server connected to a FiberReach NBS?

If **YES**, then refer to document 363-206-301 for option settings.

If **NO**, then proceed to Step **15**.

15. On the DT Server printed circuit board (see Figure 4), set the **OU/DSX** switch toward **DSX**.

16. Set the **B/Z** switch toward **Z** unless the RT uses B8ZS line coding format.

17. Set the DSX equalization **TRANS-0,1,2** option switches as required (see Table B)

Table B – Equalization Option Settings

Equalization Switch (TRANS)			Distance to DSX-1 (Note)
2	1	0	(in Feet)
OFF	OFF	ON	0 to 132
OFF	ON	OFF	133 to 265
OFF	ON	ON	266 to 398
ON	OFF	OFF	399 to 532
ON	OFF	ON	533 to 655

Note: These distances are for ABAM cable used in the central office. Refer to document 915-710-115 for calculations for other types of cable used for collocated RT and T1 extension applications.

STOP. YOU HAVE COMPLETED THIS PROCEDURE.

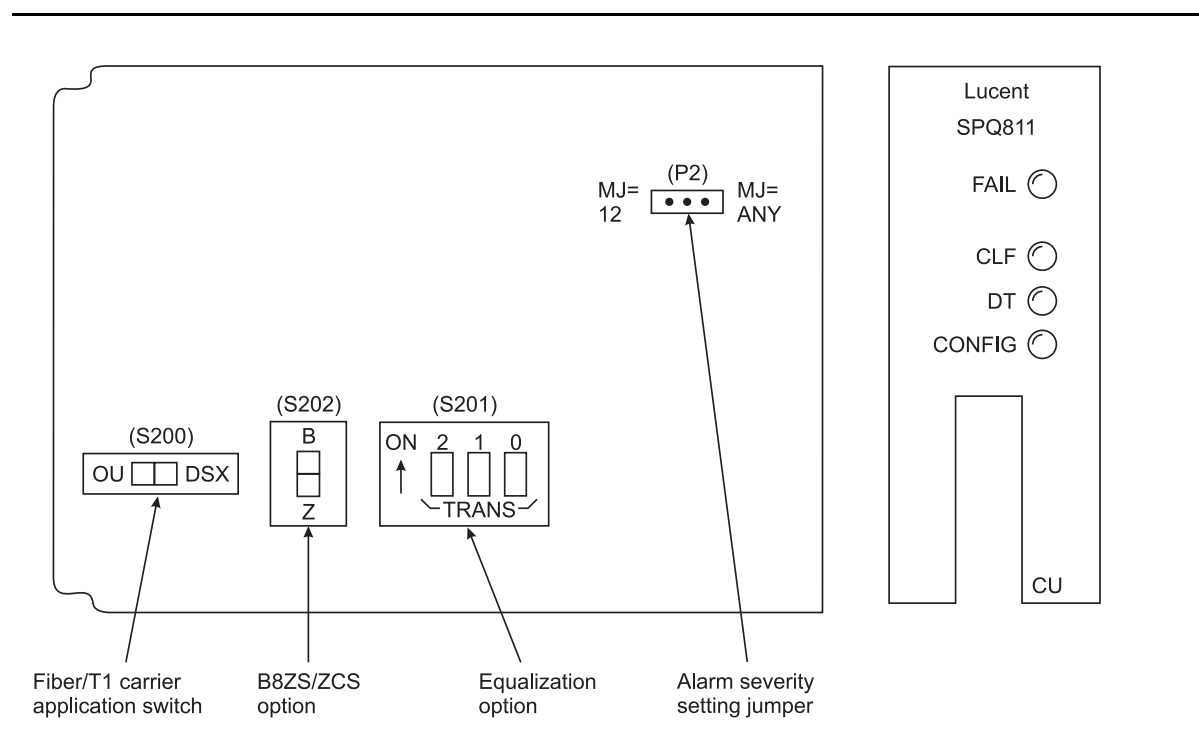


Figure 4 – SPQ[®]808, SPQ809, SPQ810, and SPQ811 Option Switches

18. Obtain one **AUA52B** office channel unit (OCU) dataport and inspect it for possible damage.

19. Is the host *SLC-2000* RT equipped with R4.2 or later?

Comment: Refer to document 363-208-003, *SLC-2000 Access System, Commands and Messages*, for details of the **RTRV-EQPT::SMU** command to retrieve the *SLC-2000* program version information.

If **YES**, then **STOP. YOU HAVE COMPLETED THIS PROCEDURE.**

If **NO**, then continue with Step 20.

Comment: The **AUA52B** data circuit must be provisioned from the CO or RT (see **DLP-601**) per circuit order (for example, *subscriber data rate* or *error correction* must be assigned).

20. On the **AUA52B** unit, set option switch **19.2** (Figure 5) to **ENABLE** to provide the 19.2-kb/s data rate. (This switch setting overrides the subscriber data rate selected when provisioning the **AUA52B**.) Otherwise, set option switch **19.2** to **DISABLE**.

21. Set option switch **CC** (Figure 5) to **ENABLE** to allow the 64-kb/s clear channel operation. Otherwise, set option switch **CC** to **DISABLE**.
22. Install the OCU dataport in the MSDT or FiberReach NBS as specified on the work order record detail (WORD) document.

Response: If option switch **19.2** is set to **ENABLE**, the green **19.2/LB** indicator will be lighted.

Comment: The **AUA52B** data circuit must be provisioned from the CO or RT (see **DLP-601**) per circuit order (for example, *subscriber data rate* or *error correction* must be assigned).

STOP. YOU HAVE COMPLETED THIS PROCEDURE.

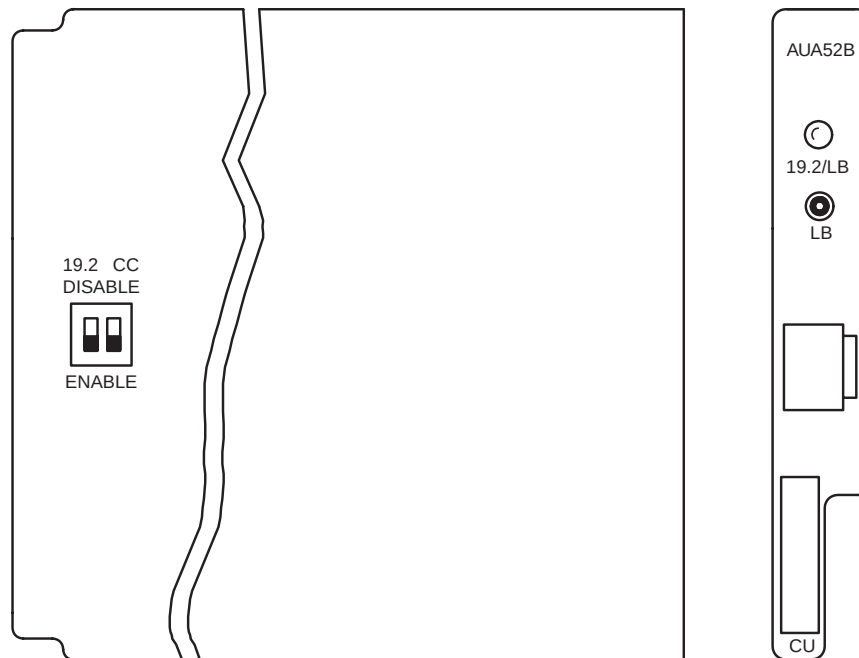


Figure 5 – AUA52B OCU Dataport Faceplate and Switch Location

23. Obtain **AUA93** BRITE II channel unit for each ISDN service specified in the circuit/service order or WORD document.

24. Is the host *SLC-2000* RT equipped with R4.2 or later?

Comment: Refer to document 363-208-003, *SLC-2000 Access System, Commands and Messages*, for details of the **RTRV-EQPT: :SMU** command to retrieve the *SLC-2000* program version information.

If **YES**, then **STOP. YOU HAVE COMPLETED THIS PROCEDURE.**

If **NO**, then continue with Step 25.

Comment: The **AUA93** BRITE II ISDN circuit must be provisioned from the CO or RT (see **DLP-601**) per circuit order to provide service (for example, *D*, *B1+D*, *B2+D*, or *2B+D* must be assigned).

25. Set **SERVICE** option switch (Figure 6) to **D**, **B1+D**, **B2+D**, or **2B+D** as specified on the WORD document.



NOTE:

DT applications for Software Release 4.2 and later require provisioning of the AUA93 using the CIT along with the on-board option switches being set to match the parameter settings provisioned using the CIT. For Software Release 4.0 and earlier, the AUA93 is provisioned using only the on-board switches.

26. Verify that channel slot number specified on circuit/service order or WORD document conforms to the placement rules (2B+D ISDN service in MSDT CU slot 1, 3, 4, or 6 only).

27. Install the **AUA93** channel unit into the specified channel slot.

Response: Channel unit **FAIL** indicator lights for about 2 seconds (channel unit self test), then goes off.

28. Did the channel unit **FAIL** indicator light and go off as specified in the response?

If **YES**, then **STOP. YOU HAVE COMPLETED THIS PROCEDURE.**

If **NO**, then continue with Step 29.

29.



NOTE:

The purpose of the light-emitting diode (LED) test is to verify the **FAIL** indication. If the **BIU CONFIG** LED is lighted, the MSDT slot restriction (slot 1, 3, 4, or 6 for 2B+D service) may be violated.

On the **BIU**, press the **LED TEST** push button and hold it down. If the **AUA93 FAIL** indication goes off (and **BIU CONFIG** is lighted), there is a placement violation.

Does the LED indicator show placement violation?

If **YES**, then continue with Step **30**.

If **NO**, then proceed to Step **31**.

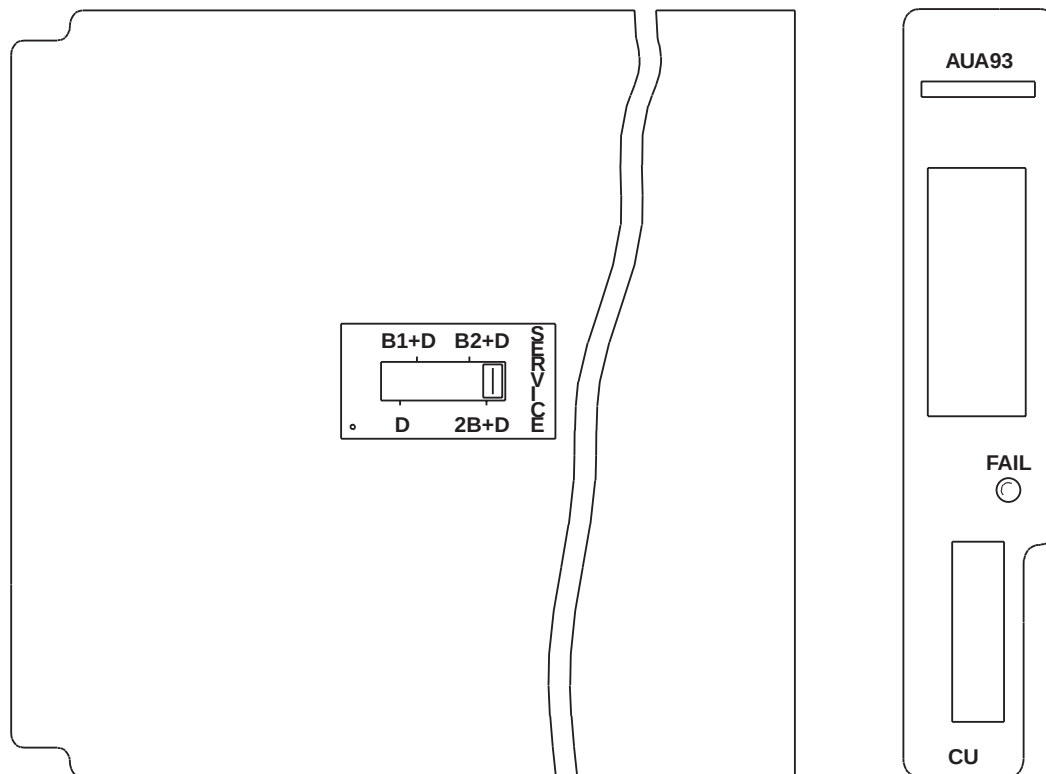


Figure 6 – AUA93 Channel Unit Option Switch Location

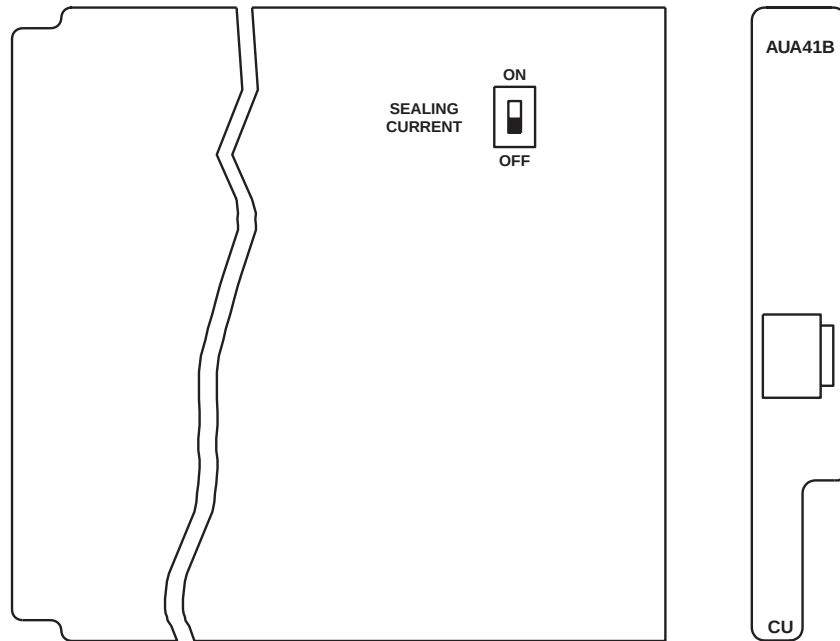
30. Channel unit placement is incorrect according to placement rules (the **AUA93** cannot be installed in slot **2** or **5** and optioned for **2B+D**). Make sure channel unit is optioned correctly and is installed in channel slot specified on circuit/service order or WORD document. If channel unit is installed in specified slot, refer trouble to installation and maintenance or to the circuit provisioning center. If channel unit is not installed as specified, remove it and return to Step **27**.
31. Channel unit is failed. Replace channel unit; if **FAIL** indicator remains lighted, refer trouble to installation and maintenance.

STOP. YOU HAVE COMPLETED THIS PROCEDURE.

32. Get one AUA41B 4-wire voice-frequency (VF) channel unit and inspect it for possible damage.
33. On the AUA41B unit, set option switch **SEALING CURRENT (S1)** (Figure 7) to **OFF** to disable the sealing current. (During provisioning, the system software, R3.2 or later, overrides the sealing current option selected by the option switch on the **AUA41B**.) Otherwise, set option switch **SEALING CURRENT** to **ON**.
34. Install the 4-wire VF channel unit in the MSDT or FiberReach NBS as specified on the work order record detail (WORD) document.

Comment: The **AUA41B** 4-wire VF channel unit must be provisioned from the CO or RT (see **DLP-601**) per circuit order for special services.

STOP. YOU HAVE COMPLETED THIS PROCEDURE.



aua41b.ps

Figure 7 – AUA41B 4-Wire Channel Unit Faceplate and Switch Location

35. Verify that the slot number specified on the circuit service order conforms to the following placement rules:

Bandwidth (Function Code)	Valid MDC CU Slot
5 kHz (PGM5)	Any CU slot
8 kHz (PGM8)	Any CU slot
15 kHz (PGM15)	1,2,3,5,7,9,10,11,13,14,15,17,19,21,22,23
20 kHz (PGM20)	1,2,3,5,7,9,10,11,13,14,15,17,19,21,22,23



NOTE:

Whenever a **PGM-2000** unit with 15-kHz (PGM15) or a 20-kHz (PGM20) function code is installed in its valid channel unit (CU) slot, no other channel unit except a blank channel unit may be plugged into its right adjacent CU slot. Violation of this placement rule will cause contention on the backplane and neither CU will operate properly.

36. Select the desired bandwidth (5 kHz, 8 kHz, 15 kHz, or 20 kHz) by setting one of the four switches on the band selection switch (**SW13**), if not already selected (refer to Figure 8).
37. Verify that the **PGM-2000** channel unit is properly set for impedance (**SW14**) and that equalization and gain settings (**SW1—SW12**) equal zero (refer to Figure 8).
38. Install the **PGM-2000** channel unit in the correct slot in the COT or RT as specified in the WORD document.

Response: The seven faceplate LEDs will light in rapid sequence for 10 seconds. Unless the unit function code (R4.2) and the system cross-connects for this program service have already been provisioned by means of the CIT, and the distant **PGM-2000** CU has been properly installed in a terminal with necessary cross-connections, the red **ERR** LED and green bandwidth LEDs will then light.

39. If the **PGM-2000** CU FAIL LED remains lighted, replace the **PGM-2000** CU.

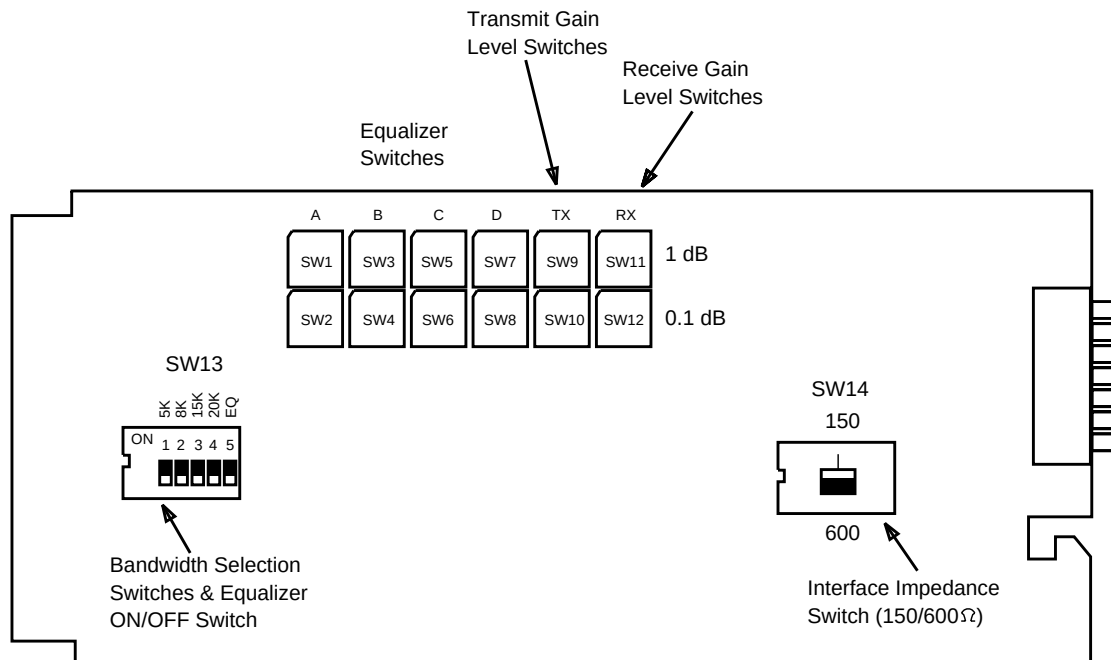
40. Have this channel unit function code (R4.2) and the system cross-connections for this program service already been provisioned by of the CIT, and has the distant **PGM-2000** CU been properly installed in a terminal with necessary cross-connections and the connecting facility made operational?

If **YES**, then continue with Step **41**.

If **NO**, then **STOP. YOU HAVE COMPLETED THIS PROCEDURE.**

41. Refer to the **PGM-2000** channel unit data sheet (Tollgrade Practice TLGD-2000) for instructions on channel unit alignment and to extinguish any faceplate LEDs.

STOP. YOU HAVE COMPLETED THIS PROCEDURE.



tpa 849976/01

Figure 8 – PGM-2000 Program Channel Unit Option Switches

42. Obtain one **AUA56B** dual DID channel unit and inspect it for possible damage.
43. Locate the **ODD/EVEN** rocker switches located on the side of the channel unit printed wiring board (refer to Figure 9). Refer to the work order records for correct switch settings and set the **ODD** rocker switch to either **0 DB** or **-2.5 DB** for the odd channel. Set the **EVEN** rocker switch to either **0 DB** or **-2.5 DB** for the even channel
44. Install the AUA56B channel unit.

STOP. YOU HAVE COMPLETED THIS PROCEDURE.

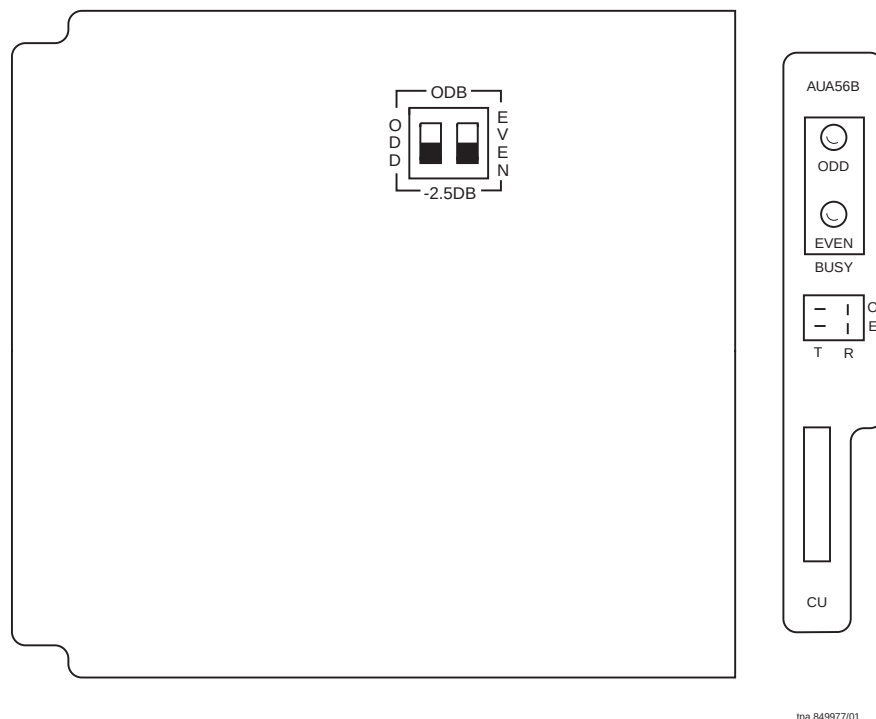


Figure 9 – AUA56B Channel Unit Option Switches

45. Obtain one **AUA252()** OCU dataport channel unit and inspect it for possible damage.

46. Is the **AUA252**() data circuit to provide switched 56-kb/s service per the work order record detail (WORD) document?

If **YES**, then proceed to Step **53** (RT or MSDT/NBS).

If **NO**, then continue with Step **47**.

47. Is the **AUA252**() data circuit to be installed in the *SLC-2000* RT or COT per the WORD document?

If **YES**, then proceed to Step **51**.

If **NO**, then continue with Step **48** (MSDT/NBS).

48. Is the host *SLC-2000* RT equipped with R4.2 or later?



NOTE:

Refer to document 363-208-003, *SLC-2000 Access System, Commands and Messages*, for details of the **RTRV-EQPT : :SMU** command to retrieve the *SLC-2000* program version information.

If **YES**, then proceed to Step **51**.

If **NO**, then continue with Step **49**.



NOTE:

When the **AUA252**() is equipped in *SLC-2000* MSDT or FiberReach NBS applications, the 19.2- and 64- (CLEAR) kb/s data rates must be set by means of the option switches located on the **AUA252**() OCU (Figure 10) when the host *SLC-2000* RT is equipped with R4.1 or earlier. Beginning with an MSDT or FiberReach NBS hosted on a *SLC-2000* R4.2 RT, provisioning of the **AUA252**() 19.2- and 64- (CLEAR) kb/s data rates is accomplished by means of the CIT and these physical option switches are ignored.

Provisioning of the **AUA252**() options **SW56**, **ENH56**, **AB SIG**, **QMON**, and/or **38.4** kb/s must always be accomplished with physical switches located on the **AUA252**() unit (Figure 10).

49. On the **AUA252()** unit, set option switch **19.2** to **ON** to provide the 19.2-kb/s data rate. [This switch setting overrides the subscriber data rate selected when provisioning the **AUA252()**.] Otherwise, set option switch **19.2** to the position opposite the **ON** position (off).
50. Set option switch **64** to **ON** to provide the 64-kb/s clear channel data rate. [This switch setting overrides the subscriber data rate selected when provisioning the **AUA252()**.] Otherwise, set option switch **64** to the position opposite the **ON** position (off).
51. Set option switch **38.4** to **ON** to provide the 38.4-kb/s data rate. [This switch setting overrides the subscriber data rate selected when provisioning the **AUA252()**.] Otherwise, set option switch **38.4** to the position opposite the **ON** position (off).
52. Set option switch **SW56** to **ON** to select switched 56-kb/s service. [This switch setting overrides the subscriber data rate selected when provisioning the **AUA252()**.] Otherwise, set option switch **SW56** to the position opposite the **ON** position (off).



NOTE:

Refer to document 363-005-212, *AUA252() Office Channel Unit — 5SCTFFE/5SCTFFF Data Sheet*, for details concerning switched 56-kb/s service.

53. Set option switch **ENH56** to **ON** to select enhanced switched 56-kb/s service. (This option can only be selected if the **SW56** option switch is also set to the **ON** position.) Otherwise, set option **ENH56** to the position opposite the **ON** position (off).



NOTE:

When the **ENH56** option is selected, transmission of call progress tones to the customer premises equipment (CPE) is supported in accordance with US Sprint Technical Specification TS-0046, Issue 4, April 1989.

54. Set option switch **AB SIG** to **ON** to select the hardware versus software signaling option from the network for switched 56-kb/s service. (This option can only be selected if the **SW56** option switch is also set to the **ON** position.) Otherwise, set option **AB SIG** to the position opposite the **ON** position (off).



NOTE:

The **AB SIG** option should not be selected for any universal configurations using the MSDT or FiberReach NBS, integrated TR-303 configurations, and configurations where the switched 56-kb/s service is tandemed through standard DS0 DP units.

55. Set option switch **QMON** to **ON** to select the customer loop quality monitoring option. Otherwise, set option switch **QMON** to the position opposite the **ON** position (off).



NOTE:

When the **QMON** option is selected, the **AUA252()** unit will monitor the customer's loop for excessive errors or disconnection from the DDS network.

56. Install the OCU dataport unit into the COT, RT, MSDT, or FiberReach NBS as specified on the WORD document.

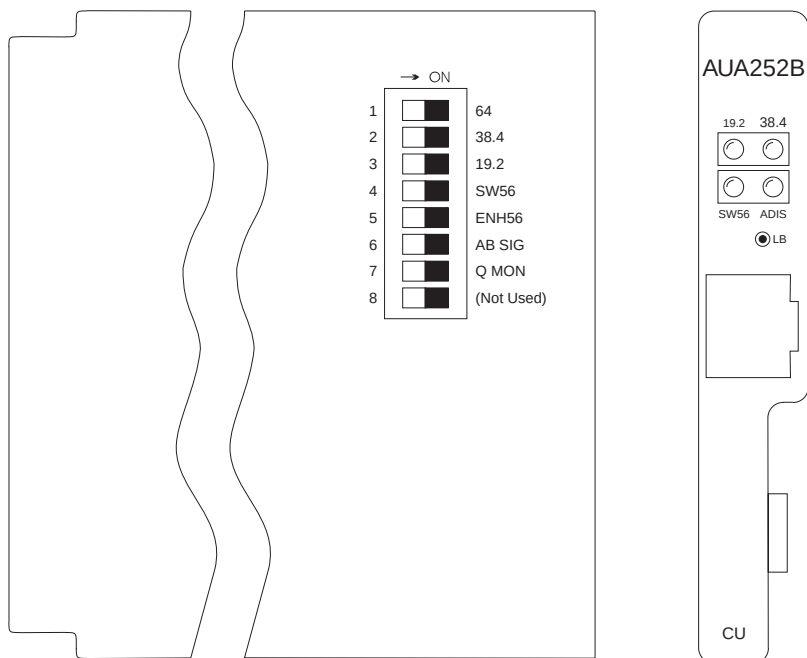
Response: If option switch **19.2** is set to **ON**, the green **19.2** faceplate LED indicator will light.

Response: If option switch **38.4** is set to **ON**, the green **38.4** faceplate LED indicator will light.

Response: If option switch **SW56** is set to **ON** (RT or MSDT/NBS), the green **SW56** faceplate LED indicator will light.

Response: If option switch **QMON** is set to **ON**, the red **ADIS** faceplate LED indicator will light whenever excessive errors on the customer's loop are detected or the loop has been disconnected from the DDS network.

STOP. YOU HAVE COMPLETED THIS PROCEDURE.



AUA252f.cdr

Figure 10 – AUA252B Channel Unit Option Switches

57. Obtain **AUA293** BRITE III channel unit for each ISDN service specified in the circuit/service order or WORD document.
58. Set option switches (Figure 11) located on **S1** as specified on the WORD document. Refer to Table C for a list of option switch settings.

Table C – AUA293 Channel Unit Option Switch (S1) Settings

Switch (S1) Position Number	Switch Label	CU Operation When Switch Position Off	CU Operation When Switch Position On (Default Position)
1	UD	Universal Digital Channel selected (EOC processing disabled)	Normal EOC processing selected
2	PI	POTS ID selected (NULL CU operation)	ISDN ID selected
3	SC	Sealing current off	Sealing current on
4	LB	Compatible with the Lucent AUA92, AUA93, AHG18, AHG28, BRITE II CUs	Compatible with BELLCORE TR-397
5	ZB	ZBS off	ZBS on
6	B2	B2 channel disabled	B2 channel enabled
7	B1	B1 channel disabled	B1 channel enabled
8	NL	LUNT mode selected	LULT mode selected



NOTE:

DT applications for Software Release 4.2 and later require provisioning of the AUA293 using the CIT along with the on-board option switches being set to match the parameter settings provisioned using the CIT. For Software Release 4.0 and earlier, the AUA293 is provisioned using only the on-board switches.

Comment: The **AUA293** BRITE III ISDN circuit must be provisioned from the CO or RT (see **DLP-601**) per circuit order to provide service (for example, *D*, *B1+D*, *B2+D*, or *2B+D* must be assigned).

59. Verify that channel slot number specified on circuit/service order or WORD document conforms to the placement rules (2B+D ISDN service in MSDT CU slot 1, 3, 4, or 6 only).

60. Install the **AUA293** channel unit into the specified channel slot.

Response: Channel unit **FAIL** indicator lights for about 2 seconds (channel unit self test), then goes off.

61. Did the channel unit **FAIL** indicator light and go off as specified in the response?

If **YES**, then **STOP. YOU HAVE COMPLETED THIS PROCEDURE.**

If **NO**, then continue with Step **62**.

62.



NOTE:

The purpose of the light-emitting diode (LED) test is to verify the **FAIL** indication. If the **BIU CONFIG** LED is lighted, the MSDT slot restriction (slot 1, 3, 4, or 6 for 2B+D service) may be violated.

On the **BIU**, press the **LED TEST** push button and hold it down. If the **AUA293 FAIL** indication goes off (and **BIU CONFIG** is lighted), there is a placement violation.

Does the LED indicator show placement violation?

If **YES**, then continue with Step **63**.

If **NO**, then proceed to Step **64**.

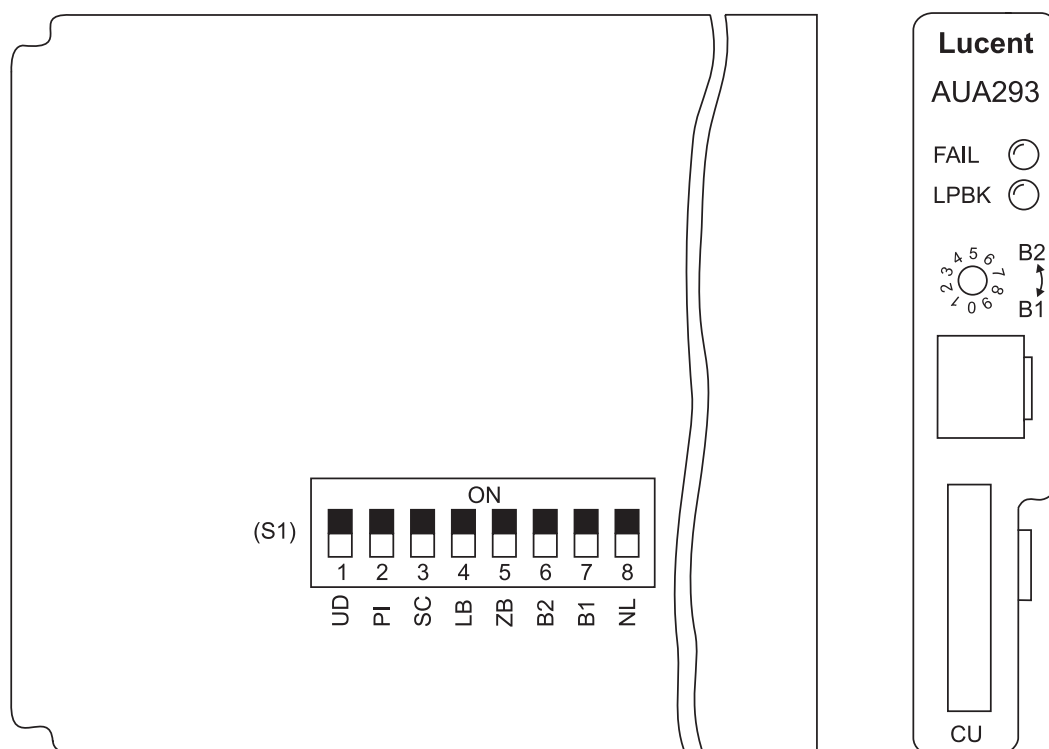


Figure 11 – AUA293 Channel Unit Option Switch Location

63. Channel unit placement is incorrect according to placement rules (the **AUA293** cannot be installed in slot **2** or **5** and optioned for **2B+D**). Make sure channel unit is optioned correctly and is installed in channel slot specified on circuit/service order or WORD document. If channel unit is installed in specified slot, refer trouble to installation and maintenance or to the circuit provisioning center. If channel unit is not installed as specified, remove it and return to Step **27**.
64. Channel unit is failed. Replace channel unit; if **FAIL** indicator remains lighted, refer trouble to installation and maintenance.

STOP. YOU HAVE COMPLETED THIS PROCEDURE.

Provision Channel Units



CAUTION:

Nonlocally switched special service circuits carried by an integrated configuration are provided through nail-up/hairpin applications. In the TR-303 RT/HDT, special services are not provisionable from the 5ESS® switch. Refer to the appropriate 5ESS switch documentation for proper growth of nail-up/hairpin applications for special services.

General: Special service channel units can be provisioned using the **ED-T0**, **ENT-T0**, or **CPY-T0** commands specifying the AID address of the channel unit. You can electronically provision a channel's option settings before or after the channel unit is installed. The provisioning data in memory is used by the channel unit to determine what circuit function to provide and what parameter values to use. The **RTRV-T0** command is used to review the provisioning parameters for a channel. You should verify the drop address before setting or copying provisioning information. Verifying provisioning will not change an in-service circuit.

All of the *-t0* commands for metallic drops use channel addresses in the form of

drop-{metallic distribution shelf number}-{channel unit number}- {DS0 number of the channel unit}

Where *drop-{1-8}-{1-24}-{1-4}* indicates a metallic line (drop) that is being addressed in the digital loop carrier (DLC) system. {1-8}=Metallic distribution shelf number, {1-24}=channel unit slot number, {1-4}=line number served by the channel unit. The values of the slot number and line number are derived from the channel number using the following two steps:

1. Subtract 1 from the channel number, divide the result by 4, note the integer part of the quotient, Q_i , and remainder, R .
2. Slot number = $Q_i + 1$; Line number = $R + 1$.

Example (for channel 44 in metallic distribution shelf number 3):
 $(44-1) \div 4 \rightarrow Q_i=10, R=3$; resulting in AID address=**drop-3-11-4**.

For Fiber in the Loop (FITL) distribution, the channel address used in the command line is as follows:

dt dp-{metallic distribution shelf number}-{DT Server slot}- {MSDT channel unit slot number}-{DS0 of the channel unit}; where "DT Server slot" is the MDS channel unit slot number where the DT Server is installed. Any channel (DS0) can be provisioned by using the **ED-T0**, **COPY-T0**, or **ENT-T0** commands (refer to document 363-208-003, *SLC-2000 Access System, Commands and Messages*, for details on these commands). The channel units listed under CU Code in Table A have specific provisionable parameters that may require provisioning before their circuits will be activated.



CAUTION:

For systems equipped with Software Release 4.4 and earlier, the 5SC18E [AUA94()] and 5SC212 (SPQ®494) ISDN channel units cannot be provisioned by the CIT. These channel units are provisioned by the local digital switch (LDS) over the embedded operations channel (EOC).

Copying Provisioning Parameters

The **CPY-T0** command is used to copy the provisioning parameters from one address (*fromaddress*) to another address (*toaddress*) and has the following syntax:

CPY-T0: [*fromaddress*], *toaddress*

where the default *fromaddress* is the last *address* used during the current session. If no previous *address* has been entered during this session, you must enter the *fromaddress*. This command requires a confirmation/review request as follows:

```
/* Caution! Execution of this command may affect service. */  
/* You have selected the cpy-t0 command with these parameters: */
```

```
fromaddress=address  
toaddress=address
```

Execute? (y/n or CANCEL/DELETE to quit) =

If this command is entered while the *toaddress* line is being tested, the following will be displayed first.

```
/* Caution! Execution of this command may affect a test  
in progress. */
```

The **CPY-T0** command should be used to provision more than one channel with the same provisioning parameters.

When a provisionable voiceband channel unit (**AUA41**, **AUA41B**, **AUA141**, **AUA42**, **AUA142**, or **AUA43**) is installed, and the DS0 memory address for the channel has

never been provisioned, or the channel address provisioning data does not match the channel type installed in the slot, the channel unit will be set to its maximum loss and its signaling function will be disabled. When a dataport channel unit [**AUA52**, **AUA152**, **AUA52B**, **AUA252**(), or **SPQ452**] is installed, and the DS0 memory address has never been provisioned, or the provisioning data does not match the channel type, the channel unit will be set for 56-kb/s operation. Electronic provisioning of channel unit options does not affect the function of "nonprovisionable" channel units.

The use of the **ED-T0** or **ENT-T0** command (or any command) is possible by means of remote provisioning where a craft interface terminal (CIT) is connected to the user interface panel (UIP) CIT jack at the remote terminal (RT). Remote provisioning also allows the commands to be executed from a craft interface terminal (CIT) connected to a DDM-2000 at the central office.

Once a CIT is connected to the UIP, you must log in to the DLC subsystem to execute the **ED-T0** or **ENT-T0** command*. The **ED-T0** or **ENT-T0** (and most other CIT commands) can be executed in two ways, "*expert*" or "*prompted*". The *expert*, or command mode, syntax allows you to provision channel provisionable parameters (all or some) with a one-line command. All provisionable parameters not entered in this one-line command retain their current values or are initialized to the default values.

ED-T0 or **ENT-T0** command is as follows:

```
ED-T0 :: address :: clei,functioncode : param1=val1,param2=val2,...;  
ENT-T0 :: address :: clei,functioncode : param1=val1,param2=val2,...;
```

where *address* is the channel *address*,
clei and *functioncode* determine the channel function.
param=value are provisionable parameters for the particular channel unit function selected, for example:

```
ED-T0 :: drop-1-1-1 :: 5scu7d,to4:trmt=8.5,rcv=6.5,r ls=n;
```

* This is also true for the **CPY-T0**, **RTRV-T0**, **CONN-TACC**, and **CONN-TAP** commands.

As the name *expert* implies, this command syntax should be used with caution only by experienced craft personnel. Refer to the **ENT - T0** DLC subsystem command in 363-208-003, *SLC-2000 Access System, Commands and Messages*, for a list of the functional *COMMON LANGUAGE** *channel unit*.

The steps in this procedure cover the *prompted* command entry method. The *prompted* command entry method is started by entering only **ED - T0** or **ENT - T0** at the prompt. A menu will prompt you to select a channel *address*. Subsequent menus will prompt for *COMMON LANGUAGE CLEI* code, function code, and provisioned parameter values. At any time you can enter "?" for help.



CAUTION:

*If you are provisioning an **AUA93** or **AUA293** channel unit in a universal system with a SLC96 COT, refer to Table B and C for time slot provisioning information for the RT and MSDT/FiberReach narrowband shelf V-MSDT or V-DT, respectively.*

* *COMMON LANGUAGE* is a registered trademark and CLEI, CLLI, CLCI, and CLFI are trademarks of Bell Communications Research, Inc.
Functional *COMMON LANGUAGE CLEI* codes are the first six characters/digits of the channel unit *COMMON LANGUAGE CLEI* code and are used in the **ED - T0** or **ENT - T0** command.

Table A – Channel Units with Provisionable Parameters

Function Code	CU Code	Functional CLEI* Code[†]
FXO, DPT, TO	AUA42/142	5SCU69
	AUA42B	5SCU6E
	SPQ® 442	SAC1AH
FXS, DPO, TO	AUA43	5SCU6A
	AUA43B	5SCU6F
	SPQ443	SAC1AE
EM4C/H, PLR1/2	AUA54	5SCU7B
	AUA54B	5SC27D
	SPQ454	SAC1BG
FXO/P, TDO, TDS	AUA44	5SCU7C
	AUA44B	5SC27C
	SPQ444	SAC1BF
FX[S,T][1,2,3,5], DX4[N,R], TO4, ETO4	AUA41/141	5SCU7D
	AUA41B	5SC3HJ
OCU	AUA52	5SCU48
	AUA152	
OCU	AUA52B	5SC143
	AUA252	5SCTFFE
	AUA252B	5SCTFFF
BRI	AUA93/293	5SC1HE
	AUA92/293	5SC1JE
ISDN	AUA94/AUA94B	5SC18E
	SPQ494	5SC212
See footnotes at end of table.		

Continued on the next page

Table A – Channel Units with Provisionable Parameters (Continued)

Function Code	CU Code	Functional <i>CLEI</i> * Code†
OCU, SW56	SPQ452	5SCTFF‡
DFLT, RVT	SPQ456	SACPDC‡
PG5, PG8, PG15§, PG20§	PGM¶-2000	SAC1CS‡

* COMMON LANGUAGE is a registered trademark and CLEI, CLLI, CLCI, and CLFI are trademarks of Bell Communications Research, Inc.

† Any type of channel unit not listed in the table has a functional *COMMON LANGUAGE CLEI* code of "Other" with the appropriate function code listed below:

DFLT
AC
DATA
GO
GS
LO
LR
LS
NO
RVT
EBS **

‡ Available in Software Release 4.2 and later

§ These settings require the bandwidth of the right adjacent slot. Therefore, when using these settings the *PGM-2000* CU cannot be installed in slots 4, 8, 12, 16, 20, or 24 of the MDS.

¶ Trademark of Tollgrade Communications, Inc.

** Available in software release 4.1 and later.

Table B – AUA93 BRITE II and AUA293 BRITE III in SLC®-2000 RT, Provisioning and Time Slot Allocation

Physical Slot A,B,C,D Digroups	Service (Note)	Universal Configuration (AHG13 in SLC 96 COT)		Time Slots per TR-08 Digroup on the DS1 Feeder
		Physical Slot/Digroup	Switches S1, 1-4	
1, 7, 13, 19	D-Only	1	OC CC	1 (D)
	B1+D		OC CO	1 (B1), 3 (D)
	B2+D		OC OC	1 (B2), 3 (D)
	2B+D		OC OO	1 (B1), 3 (D), 5 (B2)
2, 8, 14, 20	D-Only	3	OC CC	9 (D)
	B1+D		OC CO	9 (B1), 11 (D)
	B2+D		OC OC	9 (B2), 11 (D)
	2B+D		OC OO	9 (B1), 11 (D), 13 (B2)
3, 9, 15, 21	D-Only	5	OC CC	17 (D)
	B1+D		OC CO	17 (B1), 19 (D)
	B2+D		OC OC	17 (B2), 19 (D)
	2B+D		OC OO	19 (B1), 21 (D), 23 (B2)
4, 10, 16, 22	D-Only	7	OC CC	2 (D)
	B1+D		OC CO	2 (B1), 4 (D)
	B2+D		OC OC	2 (B2), 4 (D)
	2B+D		OC OO	2 (B1), 4 (D), 6 (B2)
5, 11, 17, 23	D-Only	9	OC CC	10 (D)
	B1+D		OC CO	10 (B1), 12 (D)
	B2+D		OC OC	10 (B2), 12 (D)
	2B+D		OC OO	10 (B1), 12 (D), 14 (B2)
6, 12, 18, 24	D-Only	11	OC CC	18 (D)
	B1+D		OC CO	18 (B1), 20 (D)
	B2+D		OC OC	18 (B2), 20 (D)
	2B+D		OC OO	20 (B1), 22 (D), 24 (B2)

Note: Service choices for the AUA93 BRITE II and AUA293 BRITE III channel units in a SLC-2000 Access System RT are provisioned using the CIT. The switches on the channel unit are ignored.

**Table C – AUA93 BRITE II and AUA293 BRITE III in SLC®-2000
MSDT/V-MSDT/V-DT, Provisioning and Time Slot Allocation**

Physical Slot in MSDT/V-MSDT/ V-DT (Note1)	Service (Note 2)	Universal Configuration (AHG13 in SLC 96 COT)		Time Slots per TR-08 Digroup on the DS1 Feeder
		Physical Slot/Digroup	Switches S1, 1-4	
1	D-Only	1	OC CC	1 (D)
	B1+D		OC CO	1 (B1), 3 (D)
	B2+D		OC OC	1 (B2), 3 (D)
	2B+D		OC OO	1 (B1), 3 (D), 5 (B2)
2	D-Only	3	OC CC	9 (D)
	B1+D		OC CO	9 (B1), 11 (D)
	B2+D		OC OC	9 (B2), 11 (D)
	2B+D		Not Supported	
3	D-Only	5	OC CC	17 (D)
	B1+D		OC CO	17 (B1), 19 (D)
	B2+D		OC OC	17 (B2), 19 (D)
	2B+D		OC OO	19 (B1), 21 (D), 23 (B2)
4	D-Only	7	OC CC	2 (D)
	B1+D		OC CO	2 (B1), 4 (D)
	B2+D		OC OC	2 (B2), 4 (D)
	2B+D		OC OO	2 (B1), 4 (D), 6 (B2)
5	D-Only	9	OC CC	10 (D)
	B1+D		OC CO	10 (B1), 12 (D)
	B2+D		OC OC	10 (B2), 12 (D)
	2B+D		Not Supported	
6	D-Only	11	OC CC	18 (D)
	B1+D		OC CO	18 (B1), 20 (D)
	B2+D		OC OC	18 (B2), 20 (D)
	2B+D		OC OO	20 (B1), 22 (D), 24 (B2)

Notes:

1. The 24-line MSDT/V-MSDT/V-DT is shown. For a 12-line MSDT/V-MSDT/V-DT, use slots 1, 2, and 3.
2. Service choices for the AUA93 BRITE II and AUA293 BRITE III channel units in a SLC-2000 Access System RT are provisioned using the CIT. The switches on the channel unit are ignored.

Provision Channel Units

1.



NOTE:

This procedure does not provide information to determine parameter values. It assumes a work order record detail (WORD), or equivalent document will provide all parameter values needed to provision the circuit.

Log in to the DLC subsystem using a craft interface terminal (CIT) at one of the following locations:

- SLC-2000 RT user interface panel (UIP) CIT port (**DLP-521** or **DLP-525**)
- SLC-2000 RT rear CIT port by means of remote CIT access (**DLP-541**)
- DDM-2000 located at the central office.

2. From the WORD document, determine the circuit AID address, functional *CLEI* code, and what channel unit circuit function code is to be provisioned.

The circuit AID address metallic drop syntax:

:*drop-m-s-c* (metallic)

where *m* = the MDS shelf number {1-8}

where *s* = the channel unit slot number {1-24} in the MDS shelf

where *c* = the DS0 of the channel unit {1-4} to be provisioned.

A fiber distribution syntax:

:*ddp-m-ms-s-c* (FITL)

where *m* = the MDS shelf number {1-8}

where *ms* = the DT Server channel slot number (in MDS shelf) {1, 3, 5, 7, 13, 15, 17, and 19 for R4.4 and earlier or 1, 3, 5, 7, 9, 11, 13, 15, 17, 19, 21, and 23 for R4.5 and later}

where *s* = the MSDT channel unit slot number (in MSDT) {1-6}

where *c* = the DS0 of the channel unit (in MSDT) {1-4}.

3. Enter the **RTRV-T0:drop- {1-8} - {1-24} - {1-4}** (metallic) or **RTRV-T0:ddp- {1-8} - {1, 3, 5, 7, 9, 11, 13, 15, 17, 19, 21, 23} - {1-6} - {1-4}** (FITL) command for the channel address you plan to provision.

Response: If the *COMMON LANGUAGE CLEI* code is other than "DFLT", verify that you actually want to change the provisioning data for this circuit. Contact your supervisor, if necessary.

4. At the prompt, enter **ED-T0**. If there were no provisioning parameters retrieved in Step 3, use the **ENT-T0** command.

5.



NOTE:

For help, type "?" for acceptable input parameters.

At the **address=** prompt, enter the channel access identifier address in the syntax as determined in Step 2.

6.



NOTE:

Whenever you are given a **"/*Select from */** list, you can make the choice by entering the item number or entering the associated text or any portion of the text (uppercase or lowercase) that is discernible from other entries (for example, you can enter "1" or "5scu69" to choose the *COMMON LANGUAGE CLEI* code 5SCU69). You can also select the [default] (enclosed in brackets) by pressing ENTER or RETURN.

At the **CLEI=** prompt, enter the *COMMON LANGUAGE CLEI* code (see Table A).

7. At the **FunctionCode=** prompt, enter the circuit function code.

8.



NOTE:

For help, type "?" for acceptable input parameter values.

From the WORD document, enter the required parameter values when prompted. See Table D to determine what WORD document (WORD Abbreviation column) value is being requested at the prompt (CIT Prompt column).

9. After all parameters have been entered, you will see a confirmation or error message.

Confirmation prelude: One or more caution messages will precede the confirmation message. See document 363-208-003, *SLC-2000 Access System, Commands and Messages*, for more information.

The channel provisioning settings will be listed. Then the following will appear.

Execute? (y/n or CAnCel/DElete to quit) =

If you enter "y", the provisioning data just entered will be applied. If you enter "n", you will be brought back to the **ENT-T0 address=** prompt and the provisioning data just entered will be ignored. If you press "CAnCel/DElete" keys, you will be dropped out of the **ENT-T0** command back to the system prompt and the provisioning data just entered will be ignored.

Error message: If the channel slot cannot be provisioned as requested (for example, because of channel unit limitations), the following message will be displayed. Report this trouble to your supervisor.

**IDNV /* Input, data not valid
Cannot support CLEI code XXXXXX for line address */**

XXXXXX is the functional *CLEI* code entered, and *address* is the metallic distribution shelf and channel number selected.

10. Enter "y" to provision the channel.

STOP. YOU HAVE COMPLETED THIS PROCEDURE.

Table D – WORD and CIT Terminology

Parameter Name	WORD Abbreviation	CIT Prompt	CIT Expert String
-7 dB (J3)	-7DB(J3)	-7 dB(J3)	dBJ3
-7 dB Receive	-7DB RCV	-7 dB Receive	dBr
-7 dB Transmit	-7DB TRMT	-7 dB Transmit	dBt
A/B Signaling	AB	A/BSignaling	ab
All-Zero-Code Allowed	ZC	AllZeroCodeAllowed	zc
Balance	BAL	Balance	bal
Clear Channel	CC	ClearChannel	cc
Enhanced Switched 56	EH56	EnhancedSW56	eh56
Equalizer Bandwidth	BW	Bandwidth	bw
Equalizer Height	HT	Height	ht
Equalizer Nonloaded/Loaded	L-N	Nonloaded/Loaded	ln
Equalizer Slope	SL	Slope	sl
Error Correction	EC	ErrorCorrection	ec
Impedance	IMP	Impedance	imp
ISDN Channel Service	SVC	SVC	svc
On-Hook Transmission	OHT	OnHookTransmission	oht
Quality Monitoring	QM	QualityMonitoring	qm
Receive Attenuator	RCV	RCV Attenuator	rcv
Receive Gain	RCV(GN)	ReceiveGain	rcvgn
Red-Lined Status	RLS	Redlined	rls
Sealing Current	SC	SealingCurrent	sc
Service	SVC	ISDN Channel Service	SVC
Signaling Type	LS-GS	SignalingType	lsgs
Secondary Channel Used	SCC	SecondaryChannelUsed	scc
Subscriber Data Rate	RATE	SubscriberDataRate	rate
Toll Diversion	TD	TollDiversion	td
Transmission Loss	LS	TransmissionLoss	ls
Transmit and Receive Impedance	TRMT&RCV(IMP)	TRMT & RCV Impedance	imp
Transmit Attenuator	TRMT	TRMT Attenuator	trmt
Transmit Gain	XMT(GN)	TransmitGain	xmtgn

Test Single-Party or *SPOTS*[®] Loop-Start/Ground-Start Channel (*SPOTS* Channel Unit)

Summary: This procedure tests POTS and *SPOTS* loop-start or ground-start function of channel units. At the central office, verify the channel service and telephone number assignments for the channel being tested. At the remote terminal (RT), determine the corresponding channel. Connect a test telephone set with the ringer connected for bridged ringing to the channel being tested. Make talking, dialing, ringing, and ring-trip tests on each channel.

For universal configurations, have a craftsperson at the central office terminal (COT) verify the channel unit is wired correctly and dial tone is present.

1. Establish communication between the central office and the RT.
- 2.



CAUTION:

The channel should be out-of-service before testing; otherwise, service will be interrupted.

At the central office, select the channel for testing and inform the RT of the channel selected.

3. Verify the channel service and telephone number assignments for the channel being tested.

4.

⇒ **NOTE:**
In an integrated system, channels may be tested using a local test desk or the mechanized loop testing (MLT) system to initiate tests with the 5ESS® switch software. The 5ESS switch software emulates the pair gain test controller (PGTC) test sequence and is connected to the DC test pair by means of the test bus control unit (TBCU).

⇒ **NOTE:**
The TBCU cannot be used to verify ground-start operation of *SPOTS* channel units.

Is the PGTC or TBCU available to test channels?

If **NO**, then proceed to Step 10.

If **YES**, then continue with Step 5.

5.

⇒ **NOTE:**
Document 662-505-507 provides procedures for using the TBCU to test channels. The PGTC or TBCU can only verify operation to the RT channel unit. To verify operation to the cross-connect field, a test telephone must be used at each channel location on the cross-connect field.

Request the repair service bureau or local test desk to test the channel. Did tests pass?

If **YES**, then proceed to Step 9.

If **NO**, then continue with Step 6.

6. Check the test connections and correct them, if needed. Replace the RT channel unit and repeat the channel tests. Did the tests pass?

If **YES**, then proceed to Step 9.

If **NO**, then continue with Step 7.

7. Make sure that the PGTC or TBCU is working properly and that you are using the proper procedures. Repeat the channel tests. Did the tests pass?

If **YES**, then proceed to Step **9**.

If **NO**, then continue with Step **8**.

8. Use office drawings to check wiring. Look for a tip and ring reversal between the RT and cross-connect terminal. Verify the central office channel and number assignments. Correct the problem before continuing with the next step.
9. Repeat the channel tests with the PGTC or TBCU as required on the remaining channel units.

10.



NOTE:

The test telephone set should be connected for bridged ringing. To verify correct wiring from the RT, connect the test telephone at the cross-connect field.

At the RT, temporarily connect a test telephone set to the channel selected for test.

11. At the RT, get a volt-ohm-meter (VOM) and condition it to measure DC volts.
12. Connect the (+) red lead of the VOM to the tip conductor and the (–) black lead to the ring conductor of the test telephone. The meter should read about 48 V DC for POTS or loop-start *SPOTS*, or 0 V DC for *SPOTS* ground-start.

Does the meter indicate correct DC voltage?

If **YES**, then proceed to Step **15**.

If **NO**, then continue with Step **13**.

13. Check the test connections; verify you are doing the test correctly (ground-start is different from loop-start). Correct the connections, if necessary. If the indication is not 48 (loop-start or POTS) or 0 (ground-start) V DC, replace the RT channel unit.

Does the meter indicate correct DC voltage?

If **YES**, then proceed to Step **15**.

If **NO**, then continue with Step **14**.

14. Use office drawings to check wiring. Look for a tip and ring reversal between the RT and cross-connect terminal. Verify the central office channel and number assignments. Correct the problem before continuing with the next step.

15. At the RT, lift the handset off the hook.

Comment: For ground-start circuits, connect ring lead to frame ground for approximately 3 to 5 seconds.

Does the meter indicate between 4 and 15 V DC?

If **YES**, then proceed to Step **18**.

If **NO**, then continue with Step **16**.

16. Check the test connections and correct them, if needed. If the indication is not 4 to 15 V DC, replace the RT channel unit and repeat from Step **12**. Does the meter indicate between 4 and 15 V DC now?

If **YES**, then proceed to Step **18**.

If **NO**, then continue with Step **17**.

17. Use office drawings to check wiring. Look for a tip and ring reversal between the RT and cross-connect terminal. Verify the central office channel and number assignments. Correct the problem before continuing with the next step.

18. At the RT, check for dial tone. Is dial tone present?

If **YES**, then proceed to Step **21**.

If **NO**, then continue with Step **19**.

19. Check test connections and correct them, if needed. If no dial tone is present, replace the RT channel unit and repeat from Step **12**. Is dial tone present at the RT now?

If **YES**, then proceed to Step **21**.

If **NO**, then continue with Step **20**.

20. Use office drawings to check wiring. Look for a tip and ring reversal between the RT and cross-connect terminal. Verify the central office channel and number assignments. Correct the problem before continuing with the next step.
21. At the RT, dial the local main distributing frame (MDF) or central office number and make normal talk tests.
22. Was the call completed with normal transmission quality in both directions?

 If **YES**, then proceed to Step **25**.
 If **NO**, then continue with Step **23**.
23. Replace the RT channel unit and repeat from Step **12**. Is the talk quality normal now?

 If **YES**, then proceed to Step **25**.
 If **NO**, then continue with Step **24**.
24. Use the RT schematic drawings to check wiring. Look for a tip and ring reversal between the RT and cross-connect terminal. Correct the problem before continuing with the next step.
25. At the RT, put the handset on the hook. Does the meter indicate 0 volts after 3 seconds?

 If **YES**, then proceed to Step **28**.
 If **NO**, then continue with Step **26**.
26. Replace the RT channel unit and repeat from Step **12**. Does the meter indicate 0 V DC now?

 If **YES**, then proceed to Step **28**.
 If **NO**, then continue with Step **27**.
27. Look for a tip and ring reversal between the RT and cross-connect terminal. Correct the problem before continuing with the next step.
28. At the central office, dial the telephone number to ring the telephone at the RT.

29. At the RT does the test telephone ring normally?

If **YES**, then proceed to Step **31**.

If **NO**, then continue with Step **30**.

30. Look for a tip and ring reversal between the RT and cross-connect terminal. If the telephone does not ring, replace the RT channel unit and repeat from Step **12**.

31. At the RT, lift the telephone handset during ringing. Does the ringing trip normally?

If **YES**, then proceed to Step **33**.

If **NO**, then continue with Step **32**.

32. Replace the RT channel unit and repeat from Step **12**.

33. Is this the last channel to be tested on this system?

If **YES**, then proceed to Step **36**.

If **NO**, then continue with Step **34**.

34. At the central office, select the next channel to be tested and inform the RT of channel selected.

35. Verify the channel service and telephone number assignments for the channel being tested and repeat from Step **10**.

36. At the RT, disconnect the test telephone.

STOP. YOU HAVE COMPLETED THIS PROCEDURE.

Test Coin Channel End-to-End on Universal *SLC*[®] Carrier System

Summary: Before performing this procedure, the coin phone set must be correctly wired for service desired: coin first (CF) or dial tone first (DTF), and must be operating correctly. The following channel units provide two-wire coin service: AUA33(), AUA53(), *SPQ*[®]318, *SPQ*333, *SPQ*419, and *SPQ*453. This procedure does not verify correct operation of coin phone set, only channel unit functions. Document 506-900-503 describes coin maintenance procedures. In step-by-step (SXS) central offices, coin trunk circuit SD-31592-02 must be modified per option YK. Coin trunk circuit SD-31592-01 must be modified per option YK and option ZZ, or BT relay function inhibited as indicated in Note 112 on the SD.

1. Establish communication between central office (CO) and remote terminal (RT).
2. At CO, select channel for testing and inform RT of channel selected. Verify channel units are installed.

Comment: The AUA33() and AUA53() channel units provide one line of coin service.

3. Verify channel service and telephone number assignment for the channel being tested.

Comment: For *universal* configurations, at selected channel appearance on main distributing frame (MDF), connect a temporary call number and coin line circuit test line and verify the central office terminal (COT) is equipped with an appropriate channel unit.

4. At RT, temporarily connect jumpers from cross-connect terminals associated with selected channel to coin phone set.

5. Is channel service CF or DTF?

If **CF**, then continue with Step **6**.

If **DTF**, then proceed to Step **21**.

6. At RT, lift coin phone handset off-hook, deposit coins less than the initial rate required, and check for dial tone. Is dial tone present?

If **YES**, then continue with Step **7**.

If **NO**, then proceed to Step **8**.

7. Replace RT channel unit and repeat from Step **6**.

8. Deposit additional coins to initial rate and check for dial tone. Is dial tone present?

If **YES**, then proceed to Step **11**.

If **NO**, then continue with Step **9**.

9. Verify central office channel service assignment. Replace RT channel unit and repeat from Step **6**.

Comment: For *universal* configurations, replace COT channel unit and repeat from Step **6**. If no dial tone, replace RT channel unit and repeat from Step **6**.

Is dial tone present now?

If **YES**, then proceed to Step **11**.

If **NO**, then continue with Step **10**.

10. Use RT (and COT for *universal* configurations) schematic drawings to check wiring. Check for tip and ring reversal at RT (and COT for *universal* configurations). Correct wiring until dial tone is present at RT.

11. At RT, dial any digit except "0" or "1". Does dial tone break?

If **YES**, then proceed to Step **13**.
If **NO**, then continue with Step **12**.

12. Verify central office channel service assignment. Replace RT channel unit and repeat from Step **6**.

Comment: For *universal* configurations, replace COT channel unit and repeat from Step **6**. If no dial tone breaks, replace RT channel unit and repeat from Step **6**.

13. For *integrated* configurations, proceed to Step **15**.

For *universal* configurations, do coins return?

If **YES**, then continue with Step **14**.
If **NO**, then proceed to Step **15**.

14. If system being tested has *SLC 96* Carrier System COT, replace *SLC 96* Carrier System COT special service unit (**SSU**) and repeat from Step **6**.

15. At RT, put handset on hook. Do coins return?

If **YES**, then proceed to Step **17**.
If **NO**, then continue with Step **16**.

16. Replace RT channel unit and repeat from Step **6**.

Comment: If system being tested has *SLC 96* Carrier System COT, replace COT **SSU** and repeat from Step **6**. If coins are not returned, replace COT channel unit and repeat from Step **6**. If coins are still not returned, replace RT channel unit and repeat from Step **6**.

17.



NOTE:

If deposit is not automatically refunded when operator answers, request operator to return coins.

Lift handset, deposit initial rate, call operator, and make normal talk tests.

18. Was call completed with normal transmission quality in both directions?

If **YES**, then proceed to Step **20**.

If **NO**, then continue with Step **19**.

19. Replace RT channel unit and repeat from Step **6**.

Comment: For *universal* configurations, replace COT channel unit and repeat from Step **6**. If talk quality not normal, replace RT channel unit and repeat from Step **6**.

20. Deposit nickel, dime, and quarter in sequence and request operator to identify coins, and proceed to Step **36**.

21. At RT, lift coin handset and check for dial tone. Is dial tone present?

If **YES**, then proceed to Step **24**.

If **NO**, then continue with Step **22**.

22. Verify central office channel service assignment. Replace RT channel unit and repeat from Step **21**.

Comment: For *universal* configurations, replace COT channel unit. If no dial tone, replace RT channel unit.

Is dial tone present now?

If **YES**, then proceed to Step **24**.

If **NO**, then continue with Step **23**.

23. Use RT (and COT for *universal* configurations) schematic drawings to check wiring. Check for tip and ring reversal at RT (and COT for *universal* configurations). Correct wiring until dial tone is present at RT.

24. At RT, deposit nickel and dial number that requires initial deposit.

25. Does dial tone break and is "insufficient deposit" recorded message played?

If **YES**, then proceed to Step **27**.

If **NO**, then continue with Step **26**.

26. Verify central office channel service assignment. Replace RT channel unit and repeat from Step **21**.

Comment: For *universal* configurations, replace COT channel unit and repeat from Step **6**. If no dial tone breaks, replace RT channel unit and repeat from Step **21**.

27. At RT, put handset on hook. Does nickel return?

If **YES**, then continue with Step **28**.

If **NO**, then go to Step **21**. If system being tested has *SLC 96* Carrier System COT, replace **SSU** and go to Step **21**.

28.



NOTE:

Make sure that called number will not be answered.

Lift handset, deposit initial rate, and dial a number that requires initial deposit.

29. Is ringing tone present in coin phone handset?

If **YES**, then proceed to Step **31**.

If **NO**, then continue with Step **30**.

30. Verify central office channel service assignment. Replace RT channel unit and repeat from Step **21**.

Comment: For *universal* configurations, replace COT channel unit and repeat from Step **21**. If no dial tone, replace RT channel unit and repeat from Step **21**.

31. At RT, put handset on hook. Do coins return?

If **YES**, then continue with Step **32**.

If **NO**, then repeat from Step **21**. If system being tested has *SLC 96* Carrier System COT, replace **SSU** and repeat from Step **21**.

32. At RT, lift handset, call operator, and make normal talk tests.

33. Was call completed with normal transmission quality in both directions?

If **YES**, then proceed to Step **35**.

If **NO**, then continue with Step **34**.

34. Verify central office channel service assignment. Replace RT channel unit and repeat from Step **21**.

Comment: For *universal* configurations, replace COT channel unit and repeat from Step **21**. If poor transmission quality, replace RT channel unit and repeat from Step **21**.

35. At RT, deposit nickel, dime, and quarter in sequence and request operator to identify coins.

36. Did operator identify coins?

If **YES**, then proceed to Step **38**.

If **NO**, then continue with Step **37**.

37. Verify central office channel service assignment. Replace RT channel unit and repeat from Step **5**.

Comment: For *universal* configurations, replace COT channel unit and repeat from Step **5**. If operator still cannot identify coins, replace RT channel unit and repeat from Step **5**.

38. Ask operator to return coins. Do coins return?

If **YES**, then continue with Step **39**.

If **NO**, then repeat from Step **5**. If system being tested has *SLC 96* Carrier System COT, replace **SSU** and repeat from Step **5**.

39. Ask operator to call back, then put handset on hook. Does coin phone ring normally?

If **YES**, then proceed to Step **41**.

If **NO**, then continue with Step **40**.

40. Verify central office channel service assignment. Replace RT channel unit and repeat from Step **5**.

Comment: For *universal* configurations, replace COT channel unit and repeat from Step **5**. If no ringing, replace RT channel unit and repeat from Step **5**.

41. At RT, lift handset and make normal talk tests.

42. Was call completed with normal transmission quality in both directions?

If **YES**, then proceed to Step **44**.

If **NO**, then continue with Step **43**.

43. Replace RT channel unit and repeat from Step **5**.

Comment: For *universal* configurations, replace COT channel unit and repeat from Step **5**. If talk quality is not normal, replace RT channel unit and repeat from Step **5**.

44. At RT, put handset on hook.

45. Is this the last coin channel to be tested in this system?

If **YES**, then continue with Step **46**.

If **NO**, then repeat from Step **2**.

46. At RT, disconnect coin phone; at CO, remove test line from channel.

STOP. YOU HAVE COMPLETED THIS PROCEDURE.

Test Multiparty (2-Party ANI) Channel on Integrated System (DCLU or IDCU to *SLC*®-2000 RT)

Summary: This procedure tests the multiparty automatic number identification (ANI) channels. At the central office, verify channel service and telephone number assignments for the channel being tested. Channels may be tested using a local test desk or the mechanized loop testing (MLT) system. Otherwise, at the remote terminal (RT) determine the corresponding channel. Connect the test telephone sets (tip party wired for ANI) to the channel being tested: ring party wired for negative ringing, tip party wired for negative ringing, and tip party ground. Make talking, dialing, and ringing tests (tip party and ring party) on each multiparty channel. To test ANI: using recent change, set up a test line and turn on the call trace attribute (54. TRC). Call the test line from tip party and from ring party. Make sure the telephone number for each party appears in the call trace output. Select one channel and make reverting call tests.

1.



NOTE:

In an integrated system, channels may be tested using a local test desk or the MLT system to initiate tests with *5ESS*® switch software. The *5ESS* switch software emulates the pair gain test controller (PGTC) test sequence and is connected to the DC test pair by means of the test bus control unit (TBCU).

Is the TBCU available to use in testing channels?

If **NO**, then proceed to Step 4.

If **YES**, then continue with Step 2.

2.



NOTE:

Document 662-505-507 provides TBCU testing procedures. The TBCU can only verify operation to the RT channel unit.

Request repair service bureau or local test desk test channel. Did tests pass?

If **YES**, then proceed to Step 23.

If **NO**, then continue with Step 3.

3. The following items may be used to clear trouble. When test passes, proceed to Step **23**.
 - a. Check test connections and correct them, if needed.
 - b. Replace the RT channel unit.
 - c. Make sure the TBCU is working properly and that you are using the proper procedures.
 - d. Use the office drawings to check wiring. Look for tip and ring reversal between the RT and cross-connect terminal. Verify central office channel and number assignments.

4. At the central office, select the channel for testing and inform the RT of the channel selected.

5.



NOTE:

Assign the first call number for ring party ANI and the second call number for tip party ANI.

Verify channel service and telephone number assignments for the channel being tested.

6. Establish communication between the central office and RT.

7.



NOTE:

One test telephone set must be wired for ring party; the other test telephone must be wired for tip party. The tip party set should be wired for ANI. Ringer connections for various types of ringers and service may be found in document 500-114-100.

At the RT, temporarily connect both test telephone sets to the channel being tested.

8. At the RT, lift the handset of each test telephone (one at a time) and check for dial tone. Is dial tone present at each phone?

If **YES**, then proceed to Step **10**.

If **NO**, then continue with Step **9**.

9. The following items may be used to clear trouble. Check for dial tone after each item. When dial tone is present, proceed to Step **10**.
 - a. Check the test connections and correct them, if needed.
 - b. Replace the RT channel unit.
 - c. Use the office drawings to check wiring. Look for shorted or open pairs. Verify central office channel and number assignments.
10. At the RT, use the ring party test telephone to dial the local test desk or central office number and make normal talk tests.
11. Was the call completed with normal transmission quality in both directions?

If **YES**, then proceed to Step **13**.
If **NO**, then continue with Step **12**.
12. The following items may be used to clear trouble. Repeat from Step **8** after each item until the call is completed normally, then continue with Step **13**.
 - a. Replace the RT channel unit.
 - b. Use the office drawings to check wiring. Look for shorted or open pairs. Verify central office channel and number assignments.
13. At the RT, request the test position to apply ringing to the ring party, then go on-hook.
14. Does the test telephone (ring party only) ring normally?

If **YES**, then proceed to Step **16**.
If **NO**, then continue with Step **15**.

15. The following items may be used to clear trouble. If the first item does not clear the trouble, try the remaining items in sequence until the test telephone (ring party only) rings normally, then continue with Step **16**.
 - a. At the RT, check the test connections and ensure that the test telephones are wired correctly. One test telephone set must be wired for ring party; the other test telephone must be wired for tip party. The tip party set should be wired for ANI. Repeat from Step **13**.
 - b. Replace the RT channel unit and repeat from Step **8**.
 - c. Use the office drawings to check the wiring. Look for tip and ring reversal between the RT and the cross-connect terminal. Verify central office channel and number assignments.
16. Lift the handset during ringing. Does the ringing trip normally?

If **YES**, then proceed to Step **18**.
If **NO**, then continue with Step **17**.
17. Replace the RT channel unit and repeat from Step **8**.
18. At the RT, request the test position to apply ringing to the tip party, then go on-hook.
19. Does the test telephone (tip party only) ring normally?

If **YES**, then proceed to Step **21**.
If **NO**, then continue with Step **20**.
20. The following items may be used to clear trouble. If the first item does not clear the trouble, try the remaining items in sequence until the test telephone (tip party only) rings normally, then continue with Step **21**.
 - a. At the RT, check the test connections and ensure that the test telephones are wired correctly. One test telephone set must be wired for ring party; the other test telephone must be wired for tip party. The tip party set should be wired for ANI. Repeat from Step **18**.
 - b. Replace the RT channel unit and repeat from Step **8**.
 - c. Use the office drawings to check the wiring. Look for tip and ring reversal between the RT and the cross-connect terminal. Verify central office channel and number assignments.

21. Lift the handset during ringing. Does the ringing trip normally?

If **YES**, then proceed to Step **23**.

If **NO**, then continue with Step **22**.

22. Replace the RT channel unit and repeat from Step **8**.

23.



NOTE:

In this procedure, a call trace on a test line is used to test the ANI function of the channel unit. If the office already has a test line assigned, use the recent change (RC) system (change mode) to turn on the call trace for the test line. If no test line is assigned, use RC (insert mode) to assign a temporary test line (with call trace turned on). A POTS (single party) line (View 1.1, Generic 5E4) may be used for the test line. The private branch exchange - direct inward dialing (PBX-DID) line (View 1.5, Generic 5E4), which has fewer attributes to assign, may also be used.

At the central office, turn on the call trace for the test line. (Move the cursor to **54. TRC** attribute and enter "Y" for yes.) Stand by to monitor the call trace output.

24.



NOTE:

Step **7** gives the connections for the test phones at the RT for the ANI test.

At the RT, use the tip party phone to call the test line number.

25. At the central office, does the tip party number appear in the call trace output?

If **YES**, then proceed to Step **27**.

If **NO**, then continue with Step **26**.

26. The following items may be used to clear trouble. If the first item does not clear the trouble, try the remaining items in sequence until the tip party number appears in the output at the central office, then continue with Step **27**.
- a. At the RT, check the test connections and ensure that test telephones are wired correctly. One test telephone set must be wired for ring party; the other test telephone must be wired for tip party. The tip party set should be wired for ANI. Repeat from Step **24**.
 - b. Replace the RT channel unit and repeat from Step **1**.
 - c. Use the office drawings to check the wiring. Look for the tip and ring reversal between the RT and cross-connect terminal. Verify the central office channel and number assignments.
27. At the RT, use the ring party phone to call the test line number.
28. At the central office, does the ring party number appear in the call trace output?
- If **YES**, then proceed to Step **30**.
If **NO**, then continue with Step **29**.
29. The following items may be used to clear the trouble. If the first item does not clear the trouble, try the remaining items in sequence until the ring party number appears in the output at the central office, then continue with Step **30**.
- a. At the RT, check the test connections and ensure that the test telephones are wired correctly. One test telephone set must be wired for ring party; the other test telephone must be wired for tip party. The tip party set should be wired for ANI. Repeat from Step **27**.
 - b. Replace the RT channel unit and repeat from Step **1**.
 - c. Use the office drawings to check the wiring. Look for tip and ring reversal between the RT and cross-connect terminal. Verify central office channel and number assignments.
30. Is this the last multiparty (ANI) channel to be tested on this system?
- If **YES**, then continue with Step **31**.
If **NO**, then repeat from Step **1**.

31. At the central office, use local procedures for your type of office and make reverting call tests on any one channel to one of the test telephones at the RT.
32. At the RT, does the test telephone ring normally and ringing trip when the handset is lifted off hook?

If **YES**, then proceed to Step **33**.

If **NO**, then there is trouble in the central office reverting call circuits.

Have the central office personnel locate and repair the trouble.

33. At the RT, remove the test telephones. At the central office, remove the call trace. If the test line assignment was temporary, delete the assignment in the RC.

STOP. YOU HAVE COMPLETED THIS PROCEDURE.

Test Multiparty (2-Party ANI) Channel COT-to-RT on Universal SLC[®] Carrier System

Summary: This procedure tests the multiparty automatic number identification (ANI) channels. At the central office terminal (COT), connect the test line to the unassigned subscriber line and call numbers to the channel being tested. The pair gain test controller (PGTC) or extended test controller (XTC) may be used to test the channels. Otherwise, at the remote terminal (RT) determine the corresponding channel. Connect the test telephone sets (tip party wired for ANI) to the channel being tested: one telephone wired for ring party (negative ringing) and one telephone wired for tip party (negative ringing and tip party ground). Make talking, dialing, and ringing tests (tip party and ring party) on each multiparty channel. Ring party: off-hook resistance to ground (tip side) = less than 3 V DC (100 V or 120 V scale) at the local test desk (LTD) [or greater than 10K ohms on the volt-ohm-multimeter (VOM)]. Tip party: off-hook resistance to ground (tip side) = at least 95 V DC at the LTD (or less than 3K ohms on the VOM). (If using a VOM to verify ANI: with both phones on-hook at the RT, tip-to-ground resistance should be greater than 10K ohms.) Select one channel and make reverting call tests.

1. Is the PGTC or XTC available to test the channels?

If **NO**, then proceed to Step 4.

If **YES**, then continue with Step 2.

- 2.



NOTE:

Document 662-505-507 provides procedures for using the PGTC to test the channels. The XTC procedures are given in Document 363-205-300. The PGTC or XTC can only verify operation to the RT channel unit. To verify operation to the cross-connect field, a test telephone must be used at each channel location on the cross-connect field.

Request the repair service bureau or local test desk personnel to perform PGTC or XTC channel tests. Did tests pass?

If **YES**, then proceed to Step 27.

If **NO**, then continue with Step 3.

3. The following items may be used to clear the trouble. Repeat the channel tests after each item until the tests pass, then proceed to Step **27**.
 - a. Check the test connections and correct them, if needed.
 - b. Replace the RT channel unit.
 - c. Replace the COT channel unit.
 - d. Make sure the PGTC or XTC is working properly and that you are using the proper procedures. If the XTC is optioned to test 4-party lines, the RTs with 2-party lines and no **AUG1** positive ringing unit (PRU) will test "bad." In order for 2-party lines to test "good," an AUG1 PRU must be installed in those RTs.
 - e. Use the office drawings and schematic drawings for the COT to check the wiring. Look for tip and ring reversal between the COT channel appearance and office equipment and between the RT and cross-connect terminal. Correct wiring problem.
4. Establish communication between the central office and the RT.
- 5.



CAUTION:

The channel must be out-of-service before testing; otherwise, service will be interrupted.

At the COT, select the channel for testing and inform the RT of the channel selected.

6.



NOTE:

Connect the first call number for the ring party and the second call number for the tip party.

At the selected channel appearance on the main distributing frame (MDF), connect the temporary call numbers and the subscriber line circuit test lines.

7.



NOTE:

One test telephone set must be wired for ring party; the other test telephone must be wired for tip party with ANI. Ringer connections for various types of ringers and service may be found in document 500-114-100.

At the RT, temporarily connect both test telephone sets to the channel being tested.

8. At the RT, lift the handset of each test telephone (one at a time) and check for dial tone. Is dial tone present at each phone?

If **YES**, then proceed to Step **10**.

If **NO**, then continue with Step **9**.

9. The following items may be used to clear trouble. Check for dial tone after each item. When dial tone is present at each phone, continue with Step **10**.

- a. Check the test connections and correct them, if needed.
 - b. Replace the RT channel unit.
 - c. Replace the COT channel unit.
 - d. Use the office drawings and schematic drawings for the COT to check wiring. Look for a short circuit between pairs or tip-ground/ring-ground. Correct wiring problem.
10. At the RT, use the ring party test telephone to dial the local test desk or the central office number and make normal talk tests.

11. Was the call completed with normal transmission quality in both directions?

If **YES**, then proceed to Step **13**.

If **NO**, then continue with Step **12**.

12. The following items may be used to clear trouble. Repeat from Step **8** after each item until the call is completed normally, then continue with Step **13**.
 - a. Replace the RT channel unit.
 - b. Replace the COT channel unit.
 - c. Use the COT and RT schematic drawings to check the channel bank wiring. Look for wiring trouble between the COT channel appearance and office equipment and between the RT and cross-connect terminal. Correct wiring problem.
13. At the RT, request the test position to apply ringing to the ring party, then go on-hook.
14. Does the test telephone (ring party only) ring normally?

If **YES**, then proceed to Step **16**.
If **NO**, then continue with Step **15**.
15. The following items may be used to clear trouble. If the first item does not clear the trouble, try the remaining items in sequence until the test telephone (ring party only) rings normally, then continue with Step **16**.
 - a. At the RT, check the test connections and ensure that the test telephones are wired correctly. One test telephone set must be wired for ring party; the other test telephone must be wired for tip party with ANI. Repeat from Step **13**.
 - b. Replace the RT channel unit and repeat from Step **8**.
 - c. Replace the COT channel unit and repeat from Step **8**.
 - d. Use the office drawings and schematic drawings for the COT to check wiring. Look for tip and ring reversal between the COT channel appearance and office equipment and between the RT and cross-connect terminal. Correct wiring problem.
16. Lift the handset during ringing. Does ringing trip normally?

If **YES**, then proceed to Step **18**.
If **NO**, then continue with Step **17**.

17. The following items may be used to clear trouble. If the first item does not clear the trouble, try the remaining item until ringing trips normally, then continue with Step **18**.
 - a. Replace the RT channel unit and repeat from Step **8**.
 - b. Replace the COT channel unit and repeat from Step **8**.
18. Request the test position to measure the resistance to ground on the tip side of the line (with the ring party off-hook at the RT)." (Or, at At the central office, does the meter indicate less than 3 V on the 100 V or 120 V scale (or resistance greater than 10K ohms on the VOM)?

If **YES**, then proceed to Step **20**.
If **NO**, then continue with Step **19**.
19. The following items may be used to clear trouble. If the first item does not clear the trouble, try the remaining items in sequence until the meter indicates less than 3 V at the central office (or greater than 10K ohms on the VOM), then continue with Step **20**.
 - a. At the RT, check the test connections and ensure that test telephones are wired correctly. One test telephone set must be wired for ring party; the other test telephone must be wired for tip party with ANI. Repeat from Step **18**.
 - b. Replace the RT channel unit and repeat from Step **8**.
 - c. Replace the COT channel unit and repeat from Step **8**.
 - d. Use the office drawings and schematic drawings for the COT to check the wiring. Look for tip and ring reversal between the COT channel appearance and office equipment and between the RT and cross-connect terminal. Correct wiring problem.
20. At the RT, request the test position to apply ringing to tip party, then go on-hook.
21. Does the test telephone (tip party only) ring normally?

If **YES**, then proceed to Step **23**.
If **NO**, then continue with Step **22**.

22. The following items may be used to clear trouble. If the first item does not clear the trouble, try the remaining items in sequence until the test telephone (tip party only) rings normally, then continue with Step **23**.
- a. At the RT, check the test connections and ensure that the test telephones are wired correctly. One test telephone set must be wired for ring party; the other test telephone must be wired for tip party with ANI. Repeat from Step **20**.
 - b. Replace the RT channel unit and repeat from Step **8**.
 - c. Replace the COT channel unit and repeat from Step **8**.
 - d. Use the office drawings and schematic drawings for the COT to check wiring. Look for tip and ring reversal between the COT channel appearance and office equipment; also between the RT and cross-connect terminal. Correct wiring problem.
23. Lift the handset during ringing. Does ringing trip normally?
- If **YES**, then proceed to Step **25**.
If **NO**, then continue with Step **24**.
24. The following items may be used to clear trouble. If the first item does not clear the trouble, try the remaining item until ringing trips normally, then continue with Step **25**.
- a. Replace the RT channel unit and repeat from Step **8**.
 - b. Replace the COT channel unit and repeat from Step **8**.
25. Request the test position to measure the resistance to ground on the tip side of the line (with tip party off-hook at the RT). At the central office, does the meter indicate at least 95 V (or resistance less than 3K ohms on the VOM)?
- If **YES**, then proceed to Step **27**.
If **NO**, then continue with Step **26**.

26. The following items may be used to clear trouble. If the first item does not clear the trouble, try the remaining items in sequence until the meter indicates at least 95 V at the central office (or less than 3K ohms on the VOM), then continue with Step 27.
- a. At the RT, check the test connections and ensure that the test telephones are wired correctly. One test telephone set must be wired for ring party; the other test telephone must be wired for tip party with ANI. Repeat from Step 25.
 - b. Replace the RT channel unit and repeat from Step 8.
 - c. Replace the COT channel unit and repeat from Step 8.
 - d. Use the office drawings and schematic drawings for the COT to check wiring. Look for tip and ring reversal between the COT channel appearance and office equipment and between the RT and cross-connect terminal. Correct wiring problem.
27. Is this the last multiparty (ANI) channel to be tested on this system?
- If **YES**, then continue with Step 28.
If **NO**, then repeat from Step 1.

28.



NOTE:

In step-by-step offices, the revertive call selectors (such as SD-31762-01 and SD-31831-01) may have to be modified to prevent simultaneous ringing on both tip and ring conductors. In step-by-step offices with SD-31831-01 revertive call selectors, option Q is recommended instead of option N to prevent false tripping. Reverting call trunk circuits SD-26068-01 in No. 5 crossbar offices and SD-26068-05 in No. 5A crossbar offices requires option S to ground the called party side of the line while the calling party is being rung. Revertive call trunk circuit SD-25703 in No. 5 crossbar offices must be wired with both the T and S options.

At the central office, use the local procedures for your type of office and make reverting call tests on any one channel to one of the test telephones at the RT.

29. At the RT, does the test telephone ring normally and ringing trip when the handset is lifted off hook?

If **YES**, then proceed to Step **30**.

If **NO**, then there is trouble in the central office reverting call circuits.
Have the central office personnel locate and repair the trouble.

30. At the RT, remove the test telephones. At the COT, remove the test line connections.

STOP. YOU HAVE COMPLETED THIS PROCEDURE.

Test FSR Channel

Summary: This procedure tests the frequency selective ringing (FSR) channels for transmission quality and proper ringing. At the central office, verify the channel service and telephone number assignments for the channel being tested. Channels may be tested using a local test desk or the mechanized loop testing (MLT) system. Otherwise, at the remote terminal (RT) connect test telephone sets for bridged ringing with the ringers tuned to the proper ringing frequencies. Make talking, dialing, ringing, and ring trip tests at each central office frequency on each FSR channel.

1. Verify that the RT FSR channel unit switch options are set to the ringing scheme used by the serving central office (Table A).

Reference: DLP-600

Table A – Ringing Options

Decimonic Option D	Harmonic Option H	Synchromonic Option S
20 Hz	16.6 Hz	20 Hz
30 Hz	25 Hz	30 Hz
40 Hz	33.3 Hz	42 Hz
50 Hz	50 Hz	54 Hz
60 Hz	66.6 Hz	66 Hz

- 2.



NOTE:

In an integrated system, channels may be tested using a local test desk or the mechanized loop testing (MLT) system to initiate tests with the *5ESS® switch software*. The *5ESS* switch software emulates the pair gain test controller (PGTC) test sequence and is connected to the DC test pair by means of the test bus control unit (TBCU).

Is the TBCU available to use in testing the channels?

If **NO**, then proceed to Step 5.

If **YES**, then continue with Step 3.

3.



NOTE:

Document 662-505-507 provides procedures for TBCU testing. The TBCU can only verify operation of the RT channel unit.



NOTE:

The local test desk tests only one ringing frequency of the FSR channel unit (the one used for single-party lines).

Request the repair service bureau or the local test desk to test the channel.
Did the tests pass?

If **YES**, then proceed to Step **19**.

If **NO**, then continue with Step **4**.

4. The following items may be used to clear trouble. Repeat the channel tests after each item until the tests pass, then proceed to Step **19**.
- a. Check the test connections and correct them, if needed. Verify that the RT FSR channel unit switch options are set to the ringing scheme used by the central office (Table A).
 - b. Replace the RT channel unit.
 - c. Make sure the TBCU is working properly and that you are using the proper procedures.
 - d. Use the office drawings to check wiring. Verify the central office channel and number assignments. Correct the problem until the channel tests pass.

5.



CAUTION:

The channel must be out-of-service before testing; otherwise, service will be interrupted.

At the central office, select the channel for testing and inform the RT of the channel selected.

6. Make sure the channel unit and telephone numbers have been assigned to the channel being tested.

7.



NOTE:

Test telephone sets should be connected for bridged ringing with the ringers tuned to the proper ringing frequency (Table A). If a ringer box is available with the ringers tuned to each frequency of the FSR channel unit, one telephone may be used to check supervision and transmission and the box used to check each ringing frequency.



NOTE:

The 52A channel unit test extender may be used to access the channel unit tip and ring. However, to verify correct wiring from the RT to the cross-connection, the test telephone should be connected at the cross-connect field.

At the RT, temporarily connect the test telephone sets to the channel being tested.

8. At the RT, lift the handset and check for dial tone. Is dial tone present?

If **YES**, then proceed to Step **10**.

If **NO**, then continue with Step **9**.

9. The following items may be used to clear trouble. Check for dial tone after each item. When dial tone is present at each phone, continue with Step **10**.
 - a. At RT, check test connections and correct them, if needed.
 - b. Replace the RT channel unit.
 - c. At the central office, make sure channel assignments are correct.
 - d. At the central office, use the office drawings to check wiring. Correct wiring problem.

10. At the RT, dial local test desk or central office number and make normal talk tests.

11. Was call completed with normal transmission quality in both directions?

If **YES**, then proceed to Step **13**.

If **NO**, then continue with Step **12**.

12. The following items may be used to clear trouble. If the first item does not clear the trouble, try the remaining item until the call is completed normally, then continue with Step **13**.

a. Replace the RT channel unit and repeat from Step **8**.

b. Use the RT schematic drawings to check the channel bank wiring and wiring between the RT and the cross-connect terminal. Correct wiring problem.

13.



NOTE:

The central office rings only the frequencies shown in **one** of the groups (decimonic, harmonic, or synchromonic) in Table A.

At the central office, dial the test line number to ring the RT test telephone at the first frequency of the group.

14. Does the test telephone ring normally?

If **YES**, then proceed to Step **16**.

If **NO**, then continue with Step **15**.

15. The following items may be used to clear trouble. If the first item does not clear the trouble, try the remaining items in sequence until the test telephone rings normally, then continue with Step **16**.

- a. At the RT, check the test connections, and ensure that the test telephone ringers are tuned to the proper ringing frequency (Table A). Verify that the RT FSR channel unit switch options are set properly.
- b. Verify that the RT FSR channel unit switch options are set to the ringing scheme used by the central office.
- c. At the central office, use the office drawings to check the wiring. Use the RT schematic drawings to check the channel bank wiring and wiring between the RT and the cross-connect terminal. Correct the wiring problem and repeat from Step **13**.
- d. Replace the RT channel unit and repeat from Step **8**.

16. Lift the handset during ringing. Does ringing trip normally?

If **YES**, then continue with Step **17**.

If **NO**, then replace the RT channel unit and repeat from Step **8**.

17. Have all frequencies in the group been checked?

If **YES**, then proceed to Step **19**.

If **NO**, then continue with Step **18**.

18.



NOTE:

The central office rings only the frequencies shown in **one** of the groups (decimonic, harmonic, or synchromonic) in Table A.

At the central office, dial the test line number to ring the RT test telephone at the next frequency of the group and proceed to Step **14**.

19. Is this the last FSR channel to be tested?

If **YES**, then continue with Step **20**.

If **NO**, then repeat from Step **1**.

20. At the central office, use the local procedures for your type of office and make reverting call tests on any one channel between the test phones at the RT.

21. At the RT, does the test telephone ring normally and ringing trip when the handset is lifted off hook?

If **YES**, then continue with Step **22**.

If **NO**, then there is trouble in the central office reverting call circuits.

Have the central office personnel locate and repair trouble.

22. At the RT, remove the test telephones. On the RT FSR channel unit, verify option switch settings or reset the option switch to the proper setting. At the central office, remove the test line connection.

STOP. YOU HAVE COMPLETED THIS PROCEDURE.

Test DID Channel at *SLC*[®]-2000 RT

Summary: This procedure tests direct inward dial (DID) channel units between the RT and a DLC terminal in the serving central office. The DLC terminal is typically a *SLC*96 COT equipped with a WP42 *SPOTS*[®] DPO channel unit or D4 DPO channel unit, or a *SLC*-2000 COT equipped with an AUA36() or *SPQ*[®]336 channel unit. A 52A test extender is required at the RT to emulate the line-feed function of a PBX. Since the 52A test extender supports only two channels, using the *SPQ*456 with the extender allows testing of channels A and B only.

1. Establish communication between the CO and RT site.
2. At the CO, select the channel for testing and inform the RT technician of the channel selected.
3. At the CO, connect a test telephone to the derived pair to be tested.
4. At the RT, install a 52A test extender into the channel slot. Set the **BATTERY FEED/HOLD FUNCTION** switch to **OFF**.
5. Connect a test telephone to the **CU I/O** jack of the 52A test extender (**2W ODD** for the lowest-numbered channel or **2W EVEN** for the second channel of the circuit pack).
6. Install the **AUA56**() or **SPQ456** channel unit in the 52A test extender.



NOTE:

If installing an **AUA56B** DID channel unit, verify that the switch options for transmission loss are set to 0 dB or -2.5 dB for each channel before installing the channel unit.

Reference: **DLP-600**



NOTE:

The **SPQ456** channel unit has CIT provisionable transmission loss parameters of 0 dB or 2.5 dB for each channel.

Reference: **DLP-601**

7. Set the switches on the 52A test extender as follows:
 - **FEED/HOLD** to **FEED**
 - **FEED NORM/FEED REV** to **FEED NORM**
 - **BATTERY FEED/HOLD FUNCTION** to **2W ODD** or **2W EVEN**, as appropriate.
8. At the CO and RT, take both phones off hook to verify loop closure is sent and detected. Is the **BUSY** indicator lighted on the **AUA56**() or **SPQ456*** channel unit (and on the COT channel unit, if applicable)?

If **YES**, then proceed to Step **10**.
If **NO**, then continue with Step **9**.
9. The following items may be used to clear trouble. Repeat from the previous step until the **BUSY** indicator lights on the **AUA56**() or **SPQ456*** channel unit (and on the COT channel unit, if applicable).
 - a. Check test connections and correct them, if needed.
 - b. Replace the RT channel unit.
 - c. Replace the CO channel unit.
10. Lift the handset at the CO and RT and make normal talk tests. Is normal transmission quality provided in both directions?

If **YES**, then proceed to Step **12**.
If **NO**, continue with Step **11**.
11. The following items may be used to clear trouble. Repeat from Step **10** until normal talk quality is provided in both directions.
 - a. Check test connections and correct them, if needed.
 - b. Replace the RT channel unit.
 - c. Replace the CO channel unit.
12. Place both handsets on hook.

Response: The **BUSY** indicator(s) are extinguished.

* The **SPQ456** channel unit has a **BUSY** indicator for each of the four channels.

13. At the CO, obtain a volt-ohm-multimeter (VOM) and condition it to measure DC volts.
14. At the CO, connect the (+) red lead of the VOM to Tip and the (-) black lead of the VOM to Ring of the channel being tested.
15. Does the meter indicate between 30 and 56 V DC?

If **YES**, then proceed to Step **17**.

If **NO**, then continue with Step **16**.

16. The following items may be used to clear trouble. Try these items in sequence until the meter indicates between 30 and 56 V DC.
 - a. Check test connections and correct them, if needed.
 - b. Replace the RT channel unit.
 - c. Replace the CO channel unit.
17. At the COT, take the test telephone off hook.
18. At the RT, set the **FEED NORM/FEED REV** switch of the 52A test extender to **FEED REV**.
19. At the COT, reverse the (+) red and (-) black leads of the VOM and read reverse battery. Does the meter indicate between 4 and 30 V DC?

If **YES**, then proceed to Step **21**.

If **NO**, continue with Step **20**.

20. The following items may be used to clear trouble. Try these items in sequence until the meter indicates between 4 and 30 V DC.
 - a. Check test connections and correct them, if needed.
 - b. Replace the RT channel unit.
 - c. Replace the CO channel unit.
21. At the RT, set the **BATTERY FEED/HOLD FUNCTION** on the 52A test extender to **OFF**.
22. Remove the test connections and the 52A test extender. Install the **AUA56()** DID channel unit.

STOP. YOU HAVE COMPLETED THIS PROCEDURE.

Test AUA45() Manual Ringdown Channel at SLC[®]-2000 RT

Summary: This procedure tests the AUA45() manual ringdown channel unit from the RT to the serving CO terminal. The CO terminal may be a DLC COT or a distant D-type channel bank. Ringing and transmission tests will be performed; however, talking tests are not supported.

1. Establish communication between the terminating central office and the RT site.
2. Connect a temporary switched test line to the T/R appearance of the circuit being tested at the terminating CO.
3. At the RT, connect a test telephone to T/R of the **AUA45()** channel being tested. See Figure 1, *RT RINGING Test Arrangement*.
4. Call the test line. Does the test telephone ring normally?

 If **YES**, then proceed to Step 6.
 If **NO**, continue with Step 5.
5. The following items may be used to clear trouble. Try the steps in sequence until the telephone rings normally.
 - a. Check for ringing at the faceplate of the channel unit connected to the test line in the terminating CO. If ringing is not present, check that the test line is properly connected to the channel under test. Check the wiring between the channel unit and the mainframe. Correct wiring problems and repeat the test.
 - b. Check the test telephone connections at the RT. Check the wiring to the RT shelf. Correct wiring problems and repeat the test.
 - c. Replace the CO channel unit. Provision the new unit to match the unit being replaced. Repeat the test.
 - d. Replace the RT channel unit. Provision the new unit to match the unit being replaced. Repeat the test.

6. Remove the test connections.
7. Is a switched test line available at the RT? (An unassigned POTS or *SPOTS*® derived channel is acceptable.)

 If **YES**, then continue with Step **8**.
 If **NO**, proceed to Step **13**. (The COT ringing test cannot be performed.)
8. At the RT, connect the test line to the **AUA45**() channel under test.
9. At the terminating CO, connect a test telephone to the T/R appearance of the circuit being tested. See Figure 1, *COT Ringing Test Arrangement*.
10. From a local telephone, call the test line. Does the telephone ring normally?

 If **YES**, then proceed to Step **12**.
 If **NO**, continue with Step **11**.

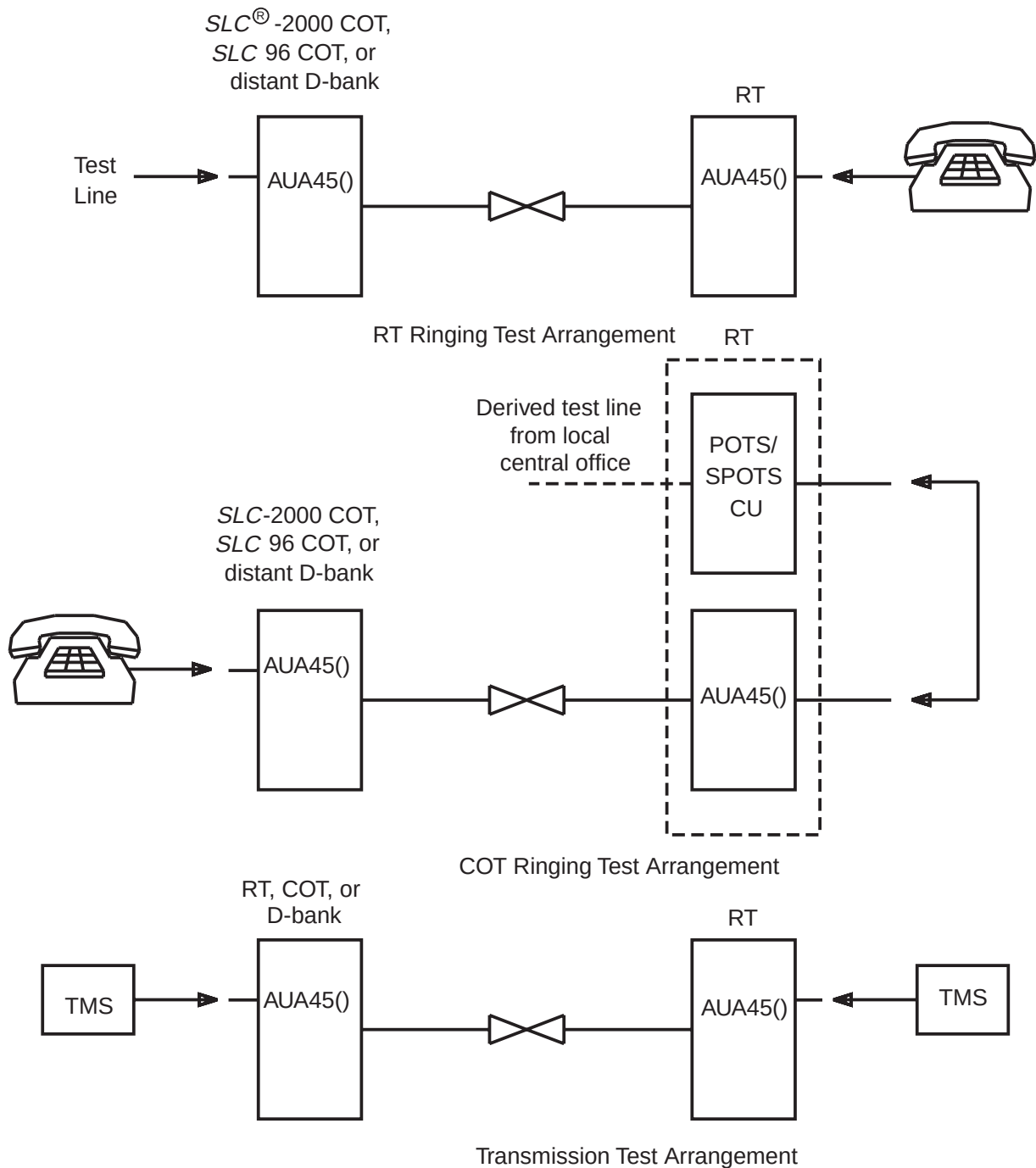


Figure 1 – AUA45() Test Connections

11. The following items may be used to clear trouble. Try the steps in sequence until the telephone rings normally.
 - a. Confirm that the test line works.
 - b. Check for ringing at the faceplate of the **AUA45()** channel unit in the RT. If ringing is not present, check that the test line is properly connected to the **AUA45()**. Check the wiring to the RT shelf. Correct wiring problems and repeat the test.
 - c. Check the test telephone connections at the terminating CO. Check the wiring between the channel unit and the mainframe. Correct wiring problems and repeat the test.
 - d. Replace the CO channel unit. Provision the new unit to match the unit being replaced. Repeat the test.
 - e. Replace the RT channel unit. Provision the new unit to match the unit being replaced. Repeat the test.
12. Remove all test connections.
13. At the RT and at the CO, connect a transmission measuring set (TMS) to T/R of the circuit being turned up. See Figure 1, *TRANSMISSION Test Arrangement*.
14. At the CO, condition the TMS to send -TRMT (GN) dBm level at 1 kHz as follows:
 - Set impedance to 900 ohms.
 - Set the TRMT LEVEL to -TRMT (GN) value from the WORD document.
15. At the RT, condition the TMS to measure the gain from the CO to the RT as follows:
 - Set impedance to 900 ohms.
 - Set to read the RCV LEVEL from the TMS at the CO.

16. Send the tone through the COT and RT channel units and measure the level at the RT. Does the TMS indicate the RT level specified on the WORD document ± 1.0 dB?

If **YES**, then proceed to Step **18**.

If **NO**, continue with Step **17**.

17. The following items may be used to clear trouble. Try the items in sequence until the correct level is obtained.
- Verify channel unit provisioning at the RT and COT and adjust, if required.
 - Replace the CO channel unit. Provision the new unit to match the unit being replaced.
 - Replace the RT channel unit. Provision the new unit to match the unit being replaced.
18. At the RT, condition the TMS to send -TRMT (GN) dBm level at 1 kHz as follows:
- Set impedance to 900 ohms.
 - Set the TRMT LEVEL to -TRMT (GN) value from the WORD document.
19. At the CO, condition the TMS to measure the gain from the CO to the RT as follows:
- Set impedance to 900 ohms.
 - Set to read the RCV LEVEL from the TMS at the RT.
20. Send the tone through the RT and CO channel units and measure the level at the RT. Does the TMS indicate the CO level specified on the WORD document ± 1.0 dB?

If **YES**, then proceed to Step **22**.

If **NO**, continue with Step **21**.

21. The following items may be used to clear trouble. Try the items in sequence until the correct level is obtained.
 - a. Verify channel unit provisioning at the RT and COT and adjust, if required.
 - b. Replace the CO channel unit. Provision the new unit to match the unit being replaced.
 - c. Replace the RT channel unit. Provision the new unit to match the unit being replaced.
22. From customer location to customer location, verify the test level points (TLPs) specified in the WORD document. If the correct levels are not obtained, check the cable pair from the RT to the customer location, then check the cable pair from the CO to the customer location. The TMS should be set for 900 ohms for these measurements.

STOP. YOU HAVE COMPLETED THIS PROCEDURE.

Test AUA75 Private Line Auto Ring (PLAR) Channel at *SLC*[®]-2000 RT

Summary: This procedure tests the **AUA75** PLAR channel for transmission performance and ringing operation between the RT and the terminating CO. The CO terminal may be a DLC channel bank or a distant D-type bank.

1. Establish communication between the terminating central office and the RT site.
2. Verify that the CO and RT channel units are provisioned and installed. If necessary, provision the **AUA75** channel unit.
Reference: Reference: **DLP-600**.
3. At the CO and at the RT, connect test telephones to the T/R of the circuit being tested.
4. Perform the following substeps in sequence to test the auto ring and talk performance of the circuit.

If all substeps are completed in sequence with **YES**, then proceed to Step 6.

If any substep is completed with **NO**, continue with Step 5.

- a. Pick up the CO phone. Does the RT phone ring normally (2 seconds on/4 seconds off)?
- b. Is audible ringback tone heard in the CO phone?
- c. Answer the RT phone. Is the talk quality between the CO and RT phones acceptable?
- d. Hang up the CO phone (do *not* hang up the RT phone). Does the CO phone remain silent?
- e. Lift the CO phone after about 30 seconds. Is talking reestablished between the CO and RT, and is talk quality acceptable?
- f. Hang up only the RT phone (do *not* hang up the CO phone). Does the RT phone remain silent?

- g. Lift the RT phone after about 30 seconds. Is talking reestablished between the CO and RT, and is talk quality acceptable?
 - h. Hang up both phones.
 - i. Lift the RT phone. Does the CO phone ring normally (2 seconds on/4 seconds off)?
 - j. Is audible ringback tone heard in the RT phone?
 - k. Answer the CO phone. Is talk quality between the CO and RT phones acceptable?
 - l. Hang up both phones.
- 5. The following substeps may be used to clear trouble. Try the steps in sequence until the substeps of Step 4 are completed in sequence, then proceed to Step 6.
 - a. Make sure the test telephones are connected properly to the CO and RT channel units. Correct wiring problems and repeat the tests.
 - b. Check provisioning of both CO and RT channel units. Correct provisioning and repeat the tests.
 - c. Check that the ringing supply is properly connected and operating in the CO terminal. Correct the ringing supply and repeat the tests.
 - d. Check that the ringing supply is properly connected and operating in the RT. Correct the ringing supply and repeat the tests.
 - e. Replace the CO channel unit. Provision the new unit to match the unit being replaced.
 - f. Replace the RT channel unit. Provision the new unit to match the unit being replaced.
- 6. Remove all test connections.
- 7. At the RT and at the CO, connect a transmission measuring set (TMS) to T/R of the circuit being turned up.

8. At the CO, condition the TMS to send -TRMT (GN) dBm level at 1 kHz as follows:
 - Set impedance to 900 ohms.
 - Set the TRMT LEVEL to -TRMT (GN) value from the WORD document.
9. At the RT, condition the TMS to measure the gain from the CO to the RT as follows:
 - Set impedance to 900 ohms.
 - Set to read the RCV LEVEL from the TMS at the CO.
10. Send the tone through the COT and RT channel units and measure the level at the RT. Does the TMS indicate the RT level specified on the WORD document ± 1.0 dB?

If **YES**, then proceed to Step **12**.
If **NO**, continue with Step **11**.
11. The following substeps may be used to clear trouble. Try the substeps in sequence until the correct level is obtained.
 - a. Verify channel unit provisioning at the RT and COT and adjust it, if required.
 - b. Replace the CO channel unit. Provision the new unit to match the unit being replaced.
 - c. Replace the RT channel unit. Provision the new unit to match the unit being replaced.
12. At the RT, condition the TMS to send -TRMT (GN) dBm level at 1 kHz as follows:
 - Set impedance to 900 ohms.
 - Set the TRMT LEVEL to -TRMT (GN) value from the WORD document.
13. At the CO, condition the TMS to measure the gain from the CO to the RT as follows:
 - Set impedance to 900 ohms.
 - Set to read the RCV LEVEL from the TMS at the RT.

14. Send the tone through the RT and CO channel units and measure the level at the RT. Does the TMS indicate the CO level specified on the WORD document ± 1.0 dB?

If **YES**, then proceed to Step **16**.

If **NO**, continue with Step **15**.

15. The following substeps may be used to clear trouble. Try the substeps in sequence until the correct level is obtained.
 - a. Verify channel unit provisioning at the RT and COT and adjust it, if required.
 - b. Replace the CO channel unit. Provision the new unit to match the unit being replaced.
 - c. Replace the RT channel unit. Provision the new unit to match the unit being replaced.
16. From customer location to customer location, verify the TLPs specified on the WORD document. If the correct levels are not obtained, check the cable pair from the RT to the customer location, then check the cable pair from the CO to the customer location. The TMS should be set for 900 ohms for these measurements.

STOP. YOU HAVE COMPLETED THIS PROCEDURE.

Perform OCU and Channel Loopback Test at RT

Summary: This procedure tests the **AUA52()**, **AUA152**, **AUA252()**, or **SPQ®452** OCU dataport channel unit and the customer loop part of a Digital Data System (DDS) circuit from the **SLC®-2000** Access System RT. Digital test access is obtained at the RT. A craft interface terminal (CIT) is required. With the DDS test set connected through the user interface panel (UIP), loop back the channel at the network interface at the customer location. If no data service unit (DSU) is connected at the network interface, loop back the OCU dataport channel unit at the RT.

1. Arrange for channel tests to the network interface at the customer location. At the network interface, terminate the loop with a channel service unit (CSU) or equivalent test set, or verify that the data service unit (DSU) is connected.

2. Make sure the channel is out-of-service.

3. Connect the CIT and establish a session with the DLC subsystem.

Reference: **DLP-521**, **DLP-525**, or **DLP-541**

4. If the OCU dataport is provisioned for error correction, reprovision it for NONE for this test.

Reference: **DLP-601**

5. Access the DLC with the CIT, and establish digital test access toward the customer location. Enter the **CONN-TACC** command on the CIT.

- When prompted, enter the channel address to be tested (drop-{1-8}-{1-24}-{1-4} or dtdp-{1-8}-{1, 3, 5, 7, 13, 15, 17, or 19 for R4.4 and earlier or 1, 3, 5, 7, 9, 11, 13, 15, 17, 19, 21, or 23 for R4.5 and later}-{1-6}-{1-4}).
- When prompted, select **none** for metallic access.
- When prompted, select **split** for digital access.

6. Did the CIT display the **COMPLD** response with no warnings?

If **YES**, then proceed to Step 8.

If **NO**, continue with Step 7.

7. The following items may be used to clear trouble. Perform the items in sequence. After each item, repeat Step 5 until near-end digital test access is established.
 - a. If the CIT displayed a warning to check the equipage before testing, inspect for missing or faulty common circuit packs (MDC, PTU, T8U) on the serving distribution shelf. Insert the necessary packs.
 - b. Use the **RTRV-T0** command to confirm that the specified address is equipped with an OCU dataport and that it is correctly provisioned. Install the channel unit or correct the provisioning.

Reference: **DLP-601**

- c. Verify that a craft access unit (CAU) is equipped in the integral test head section of the ARM shelf.
 - d. Use the **RETRIEVE-FAULTS** command on the UIP to locate system fault conditions. Correct any reported faults.
8. Connect the test equipment to the DDS clock and data test jacks of the UIP. Refer to Figure 1 for the TPI 108/109 DTU. Refer to Figure 2 for the KS-20908 receiver and the KS-20909 transmitter.
9. Activate the POWER switch on the test set(s).
10. Is the CLOCK indicator lighted on the test set(s)?

If **YES**, then proceed to Step 12.

If **NO**, continue with Step 11.

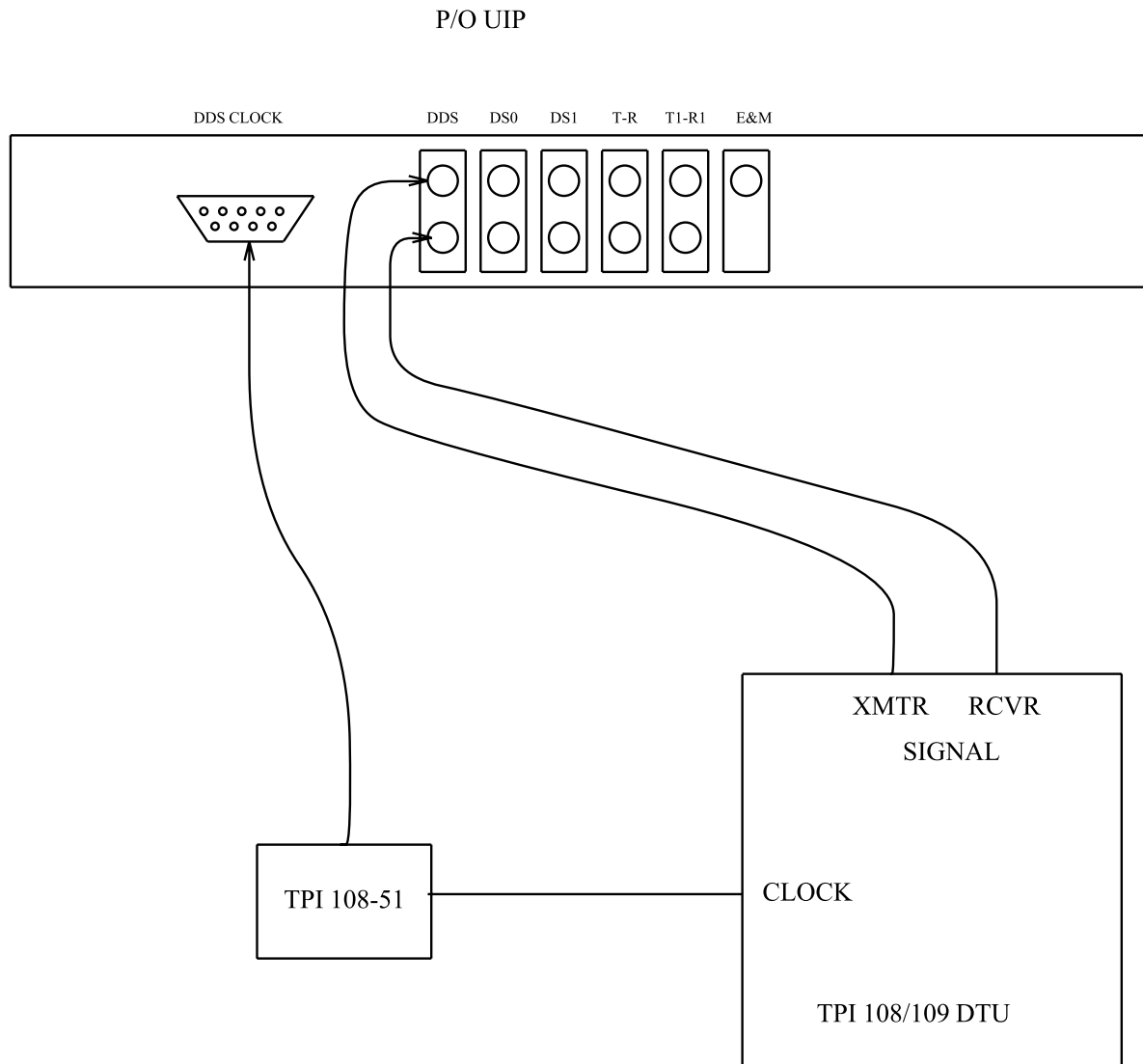


Figure 1 – Test Connections for OCU Loopback Test Using TPI 108/109 DTU

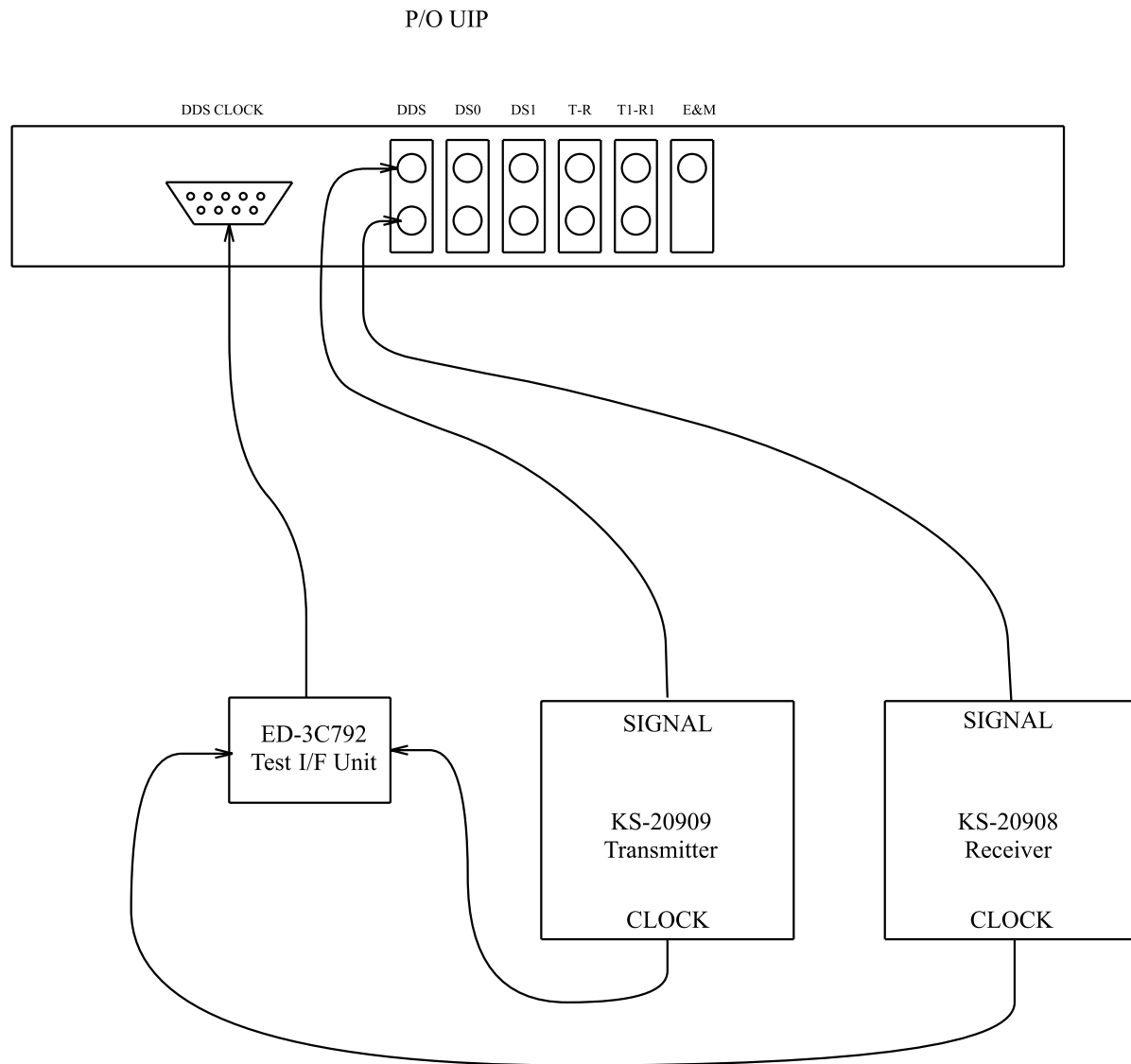


**Figure 2 – Test Connections for OCU Loopback Test Using
KS-20908/KS-20909 Test Sets**

11. Verify the clock connection from the UIP to the test set(s). Correct the clock connection until the CLOCK indicator is illuminated. If the problem cannot be cleared by correcting the connectors, obtain another test set. If the second test set also indicates a problem, replace the following units in sequence: the CAU circuit pack, the user interface panel (**DLP-518**).
12. Set the following switches on the test set(s):
 - **MODE** to **REPEAT**
 - **FUNCTION** to **LOOPBACK TEST**
 - **DATA RATE** to the customer data rate
 - **OUTPUT** to **LOGIC-NEAR END**
 - **SUBRATE CHANNEL** to **SINGLE**
 - **TEST WORD** to **LOOPED** (on KS-20908 receiver only)
 - **COUNTER** to **BIT ERRORS**.
13. If the KS-20908 receiver is equipped with a **TERMINATE** switch, press it.
Response: **TERMINATED** indicator illuminates.



NOTE:

The customer location equipment must be installed for the channel or DSU loopback test; otherwise, the circuit may be looped back only at the OCU dataport.

14. At the network interface at the customer location, is the loop terminated with a CSU or equivalent test set, or is the DSU connected?

If **YES**, then continue with Step **15**.
If **NO**, then proceed to Step **18**.

15. Press the transmitter **RESET** button, then press the **CHAN LOOPBACK** or **DSU LOOPBACK** button.
16. Operate the receiver **COUNTER MODE** to **RESET**, causing the counter to indicate 000.

Comment: The **19.2/LB** LED on an **AUA52B** will blink during an OCU loopback.
The **ADIS** LED on an **AUA252()** will blink during an OCU loopback.

17. After 60 seconds, operate the receiver **COUNTER MODE** to **HOLD**. Does the counter indicate 000?

If **YES**, then the channel/DSU loopback test passed; continue with Step **18**.

If **NO**, then the channel/DSU loopback test failed; perform the OCU loopback test to isolate the problem. Continue with Step **18**.

18. Press the transmitter **RESET** button, then press the OCU **LOOPBACK** button.

19. Operate the receiver **COUNTER MODE** to **RESET**, causing the counter to indicate 000.

20. After 60 seconds, operate the receiver **COUNTER MODE** to **HOLD**. Does the counter indicate 000?

If **YES**, then the OCU loopback test passed; if the channel/DSU loopback failed, then a problem exists between the OCU dataport and the customer equipment. Refer the problem to the appropriate repair forces. If no customer equipment was available for the channel/DSU loopback, then the OCU dataport test passed. Continue with Step **21**.

If **NO**, then the OCU loopback test failed; replace the OCU dataport and repeat from Step **9**.

21. If the OCU dataport was originally provisioned for error correction, reprovision it for the proper error correction.

22. Enter the **DISC - TACC** command by means of the CIT.

23. Disconnect the test set connections to the UIP.

STOP. YOU HAVE COMPLETED THIS PROCEDURE.

Adjust Gain of 2-Wire Special Services Channel Unit

General: This procedure applies to the **AUA42()**, **AUA43()**, **AUA142**, **SPQ®442**, and **SPQ443** **ESPOTS®** channel units. Adjustments to the provisioned channel unit gain are performed by means of the **ED-T0** CIT command, which is also used for initial provisioning.

1. Connect a craft interface terminal (CIT) to the **CIT** jack of the user interface panel (UIP). Refer to **DLP-521**, **DLP-525**, or **DLP-541**.
2. Enter the **ED-T0** command and press **RETURN**.
3. At the **address =** prompt, enter the address of the line to be adjusted.

Example: **address = drop-3-24-3** or **dt dp-1-1-5-3**

4. The CIT will display **CLEI =**, **FunctionCode =**, **Impedance =**, and **Balance =** prompts. Press **RETURN** to accept the default values which the CIT offers (the default values are the currently provisioned selections).

Comment: If the CIT does not provide the expected prompts, the channel is not correctly provisioned for the expected channel unit. See **DLP-601**. In a single CIT session, the latest adjusted provisioning parameter is displayed first.

5. Is TRANSMIT GAIN to be adjusted?

If **YES**, enter the new value when the CIT displays the **TransmitGain =** prompt. Enter ; and proceed to Step 8.
If **NO**, press **RETURN** to accept the default transmit gain value.

6. Is RECEIVE GAIN to be adjusted?

If **YES**, enter the new value when the CIT displays the **ReceiveGain =** prompt. Enter ; and proceed to Step 8.
If **No**, press **RETURN** to accept the default receive gain value.

7. Press **RETURN** to accept the remaining default values which the CIT offers, or enter ; to skip directly to the confirmation message.
8. The CIT displays the following message.

Confirmation message:

```
/* Caution! Execution of this command may affect service. */  
/* You have selected the ed-t0 command with these parameters: */  
/* Review of Parameter Responses... */
```

The channel provisioning settings will be listed. Then the following will be displayed:

Execute: (y/n or CAnceL/DELeTe to quit) =

Enter **y** to store the changed provisioning values in the channel unit, then continue with Step 9.

Enter **n** to repeat the parameter entry dialog beginning with the **address =** prompt and repeat from Step 3.

Comment: You must respond **y** to the confirmation message to cause the new values to be transferred to the channel unit. The channel gain will not change until this step has been completed by responding with **y**.

9. Are the measured gain values correct?

If **NO**, repeat from Step 2.

If **YES**, **STOP. YOU HAVE COMPLETED THIS PROCEDURE.**

Adjust Gain of 4-Wire Special Services Channel Unit

General: This procedure applies to the **AUA41/AUA41B**, **AUA44()**, **AUA54()**, **SPQ®444**, and **SPQ454** channel unit. Adjustments to the provisioned channel unit attenuation are performed via the **ED-T0** CIT command, which is also used for initial provisioning.

1. Connect a craft interface terminal to the CIT jack of the user interface panel (UIP). Refer to **DLP-521**, **DLP-525**, or **DLP-541**.

Comment: This procedure may be performed using the expert-mode CIT dialog or the prompt-mode CIT dialog. The prompt-mode CIT dialog is given first.

2. Enter the **ED-T0** command and press **RETURN**.
3. At the **address =** prompt, enter the address of the line to be adjusted.

Example: **address = drop-3-14-1** or **dt dp-1-1-5-1**

- 4.



NOTE:

If the CIT does not provide the expected prompts, the channel is not correctly provisioned for the expected channel unit. Enter **DELe** or **CAN**cel to quit the **ED-T0** command. See **DLP-520**.

The CIT will display the **CLEI =** and **FunctionCode =** prompts. Press **RETURN** to accept the default values which the CIT offers (the default values are the currently provisioned selections).

5. Is TRMT attenuator to be adjusted?

If **YES**, enter the new value when the CIT displays the **TRMT Attenuator =** prompt. Enter ; and proceed to Step 10.

If **NO**, press **RETURN** to accept the default TRMT attenuator value.

6. Is RCV attenuator to be adjusted?

If **YES**, enter the new value when the CIT displays the
RCV Attenuator = prompt. Enter ; and proceed to Step 14.
If **NO**, press **RETURN** to accept the default RCV attenuator value.

7. Press **RETURN** to accept the remaining default values which the CIT offers, or enter ; to skip directly to the confirmation message.
8. The CIT displays the following message.

Confirmation message:

```
/* Caution! Execution of this command may affect service. */  
/* You have selected the ed-t0 command with these parameters: */
```

The channel provisioning settings will be listed. Then the following will be displayed:

Execute? (y/n or CANCEL/DELETE to quit) =

Enter **y** to store the changed provisioning values in the channel unit, then continue with Step 9.

Enter **n** to repeat the parameter entry dialog beginning with the **address =** prompt and repeat from Step 3.

Comment: You must respond **y** to the confirmation message to cause the new values to be transferred to the channel unit. The channel attenuator values will not change until this step has been completed by responding with **y**.

9. Are the measured test results correct?
- If **NO**, repeat from Step 2.
- If **YES**, **STOP. YOU HAVE COMPLETED THIS PROCEDURE.**

10. The transmit and receive gain can be adjusted using the expert-mode CIT dialog. To change the TRMT attenuator, enter the following command as a single line:

ED-T0::address::::trmt=value;

where *address* is the line circuit address [example: *drop-3-14-1* or *dtdp-1-1-5-1*] and *value* is the new TRMT attenuator value.

The CIT will respond with a confirmation message. Enter **y** if the displayed values are correct.

11. Is the measured test result correct?

If **YES**, then proceed to Step **14**.

If **NO**, then continue with Step **12**.

12. Enter the following command as a single line:

ED-T0:::::trmt=value;

13. Repeat Step **12** until the test result is correct.

14. To change the RCV attenuator, enter the following command as a single line:

ED-T0::address::::rcv=value;

where *address* is the line circuit address [example: *drop-3-14-1* or *dtdp-1-1-5-1*] and *value* is the new RCV attenuator value.

The CIT will respond with a confirmation message. Enter **y** if the displayed values are correct.

15. Is the measured test result correct?

If **YES**, **STOP. YOU HAVE COMPLETED THIS PROCEDURE.**

If **NO**, then continue with Step **16**.

16. Enter the following command as a single line:

ED-T0:::::rcv=value;

17. Repeat Step **16** until the test result is correct.

STOP. YOU HAVE COMPLETED THIS PROCEDURE.

Measure Signal Level End-to-End on Single-Party Channel (ALC Channel Unit Inserting Maximum Loss)

Summary: This procedure measures the loss between the central office and the remote terminal (RT) on a channel that uses an automatic loss compensation (ALC) channel unit. Condition the circuit so that the ALC channel unit inserts maximum loss. Using the office milliwatt source or a transmission measuring set with signaling unit (TMS/SU) at the central office, send tone to the RT. The signal level measured at the RT should be within limits listed in Table A for the ALC channel unit in the circuit. If the TMS/SU is used at the central office, send tone from the RT. The signal level measured at the central office should be within limits listed in Table A for the ALC channel unit in the circuit.

1. Is this an office milliwatt measurement?

If **YES**, then continue with Step 2.

If **NO**, then proceed to Step 10.

2. At the RT, connect the transmission measuring set with signaling unit (TMS/SU) **RECEIVE** jack to the tip and ring of the channel to be tested.
3. Set the impedance level of the TMS to **900** ohms for the **AUA158()** or **SPQ®400** channel unit; or **600** ohms for the **AUA179**, **AUA150C**, **AUA159()**, **SPQ440()**, or **SPQ450** channel unit. Set the signaling unit (SU) for **LOOP/ORIGINATE** signaling, on-hook.
4. Connect a telephone set (or butt set) across the tip and ring of the same channel.
- 5.



NOTE:

A jumper wire can be used as the low resistance.

Connect a resistance of less than 200 ohms across the tip and ring of the channel and wait for the channel unit **BUSY** indicator to light.

Comment: This low resistance takes the channel unit off-hook and serves as the shortest possible loop (resulting in the maximum loss insertion).

6. Lift the telephone handset off-hook (or set the switch to off-hook for the butt set) and remove the low resistance.
7. Verify dial tone and dial the office milliwatt.
8. When the tone is received, set the SU to off-hook and put the telephone handset on hook (or set the switch to on-hook for the butt set).
9. Measure the receive level and frequency. The level should fall within the range given in Table A for the appropriate channel unit. The frequency should be 1,004 Hz.

STOP. YOU HAVE COMPLETED THIS PROCEDURE.

**Table A – 1,004-Hz Signal Levels for Automatic Loss Compensation
(ALC) Channel Units (Measured Between the Network
Interface and the Central Office)**

RT CU	Universal COT CU	Integrated 5ESS® Switch Code for CU	Signal Level (dBm)
AUA150C	WP10(C/D)	SP (POTS)	–7 to –5
	SPQ® 300	SP (POTS)	–7 to –5
	AUA38()	SP (POTS)	–7 to –5
AUA158()	WP10(C/D)	SP (POTS)	–7 to –5
	SPQ300	SP (POTS)	–7 to –5
	AUA38()	SP (POTS)	–7 to –5
SPQ400	WP10(C/D)	SP (POTS)	–7 to –5
	SPQ300	SP (POTS)	–7 to –5
	AUA38()	SP (POTS)	–7 to –5
AUA159()	WP10(C/D)	SP (POTS)	–7 to –5
	SPQ300	SP (POTS)	–7 to –5
	AUA38()	SP (POTS)	–7 to –5
SPQ440()	WP10(C/D)	SP (POTS)	–7 to –5
	SPQ300	SP (POTS)	–7 to –5
	AUA38()	SP (POTS)	–7 to –5
SPQ450	WP10(C/D)	SP (POTS)	–7 to –5
	SPQ300	SP (POTS)	–7 to –5
	AUA38()	SP (POTS)	–7 to –5
AUA179	WP10(C/D)	SP (POTS)	–7 to –5
	SPQ300	SP (POTS)	–7 to –5
	AUA38()	SP (POTS)	–7 to –5
AUA159()	WP36	SPOTS®	–4.4 to –2.4
	SPQ340	SPOTS	–4.4 to –2.4
	AUA39()	SPOTS	–4.4 to –2.4
SPQ440()	WP36	SPOTS	–4.4 to –2.4
	SPQ340	SPOTS	–4.4 to –2.4
	AUA39()	SPOTS	–4.4 to –2.4
SPQ450	WP36	SPOTS	–4.4 to –2.4
	SPQ340	SPOTS	–4.4 to –2.4
	AUA39()	SPOTS	–4.4 to –2.4
AUA179	WP36	SPOTS	–4.4 to –2.4
	SPQ340	SPOTS	–4.4 to –2.4
	AUA39()	SPOTS	–4.4 to –2.4

10. At the central office, connect the TMS **TRANSMIT** jack and the SU to the tip and ring of channel to be tested. Set the switches on the TMS/SU as follows:
 - Set the TMS for 1,004 Hz, 0.0 dBm, **TRANSMIT** impedance to **900** ohms, and **RECEIVE** impedance to **900** ohms.
 - Set the SU for **LOOP/TERMINATE** signaling.
11. At the RT, connect the TMS **RECEIVE** jack to the tip and ring of the channel to be tested.
12. Set the TMS **TRANSMIT** and **RECEIVE** impedance levels to **900** ohms for the **AUA158()** or **SPQ400** channel unit; or **600** ohms for the **AUA150C**, **AUA159()**, **SPQ440()**, **AUA179**, or **SPQ450** channel unit. Set the SU for **LOOP/ORIGINATE** signaling, on-hook.

13.



NOTE:

A jumper wire can be used as the low resistance.

Connect a resistance of less than 200 ohms across the tip and ring of the channel and wait for the channel unit **BUSY** indicator to light.

Comment: This low resistance takes the channel unit off-hook and serves as the shortest possible loop (resulting in the maximum loss insertion).

14. Set the SU to off-hook and remove the low resistance.
15. Measure the received signal level and frequency. The level should fall within the range given in Table A for the appropriate channel unit. The frequency should be 1,004 Hz.
16. At the central office and RT, press the **REVERSE** push button to reverse the transmit and receive functions of the TMS (*do not change* the signaling settings) and continue with Step **17**. If the TMS does not have this push button, reverse the connections to the **TRANSMIT** and **RECEIVE** jacks on the TMS and continue with Step **17**. If the jack connections are reversed at the RT, repeat Steps **12**, **13**, and **14** to recondition the circuit for maximum loss, then continue with Step **17**.

17. At the RT, set the TMS to transmit 1,004 Hz at 0.0 dBm.
18. At the central office, measure the received signal level and frequency. The level should fall within the range given in Table A for the appropriate channel unit. The frequency should be 1,004 Hz.

STOP. YOU HAVE COMPLETED THIS PROCEDURE.

Measure Signal Level from Central Office to Network Interface (NIF) on Single-Party Channel (ALC Channel Unit Inserting Expected Loss)

Summary: This procedure measures the loss between the central office and the network interface (NIF) on a channel that uses an automatic loss compensation (ALC) channel unit. Condition the circuit so that the ALC channel unit inserts expected loss (equivalent to the actual operation). Using the office milliwatt source or a transmission measuring set with a signaling unit (TMS/SU) at the central office, send a tone to the NIF. The signal level measured at the NIF should be within the limits listed in Table A for the ALC channel unit in the circuit. If the TMS/SU is used at the central office, send a tone from the NIF. The signal level measured at the central office should be within the limits listed in Table A for the ALC channel unit in the circuit.

1. Is this an office milliwatt measurement?

If **YES**, then continue with Step 2.
If **NO**, then proceed to Step 9.
2. At the NIF, connect the TMS/SU **RECEIVE** jack to the tip and ring of the channel to be tested.
3. Set the impedance level of the TMS to **900** ohms for the **AUA158()** or **SPQ®400** channel unit; or **600** ohms for the **AUA179**, **AUA150C**, **AUA159()**, **SPQ440()**, or **SPQ450** channel unit. Set the signaling unit (SU) for **LOOP/ORIGINATE** signaling, on-hook.
4. Connect a telephone set (or butt set) across the tip and ring of the same channel.

5.



NOTE:

A loop circuit should be terminated with customer equipment, if possible, or with a resistance similar to the real termination in the off-hook state. A telephone set (or butt set) at the NIF may be used to terminate the circuit; however, then the channel unit will provide only an approximate loss.

If a termination (other than a telephone) is used, take it off-hook for about 2 seconds (to condition the channel unit to insert the proper loss). Then, take the telephone set (or butt set) off-hook and remove the termination.

If a telephone is used to terminate the circuit, take the telephone set off-hook and wait about 2 seconds.

6. Verify dial tone and dial the office milliwatt.
7. When the tone is received, set the SU to off-hook and put the telephone set (or butt set) on-hook.
8. Measure the received level and frequency. The level should fall within the range given in Table A for the appropriate channel unit. The frequency should be 1,004 Hz.

STOP. YOU HAVE COMPLETED THIS PROCEDURE.

**Table A – 1,004-Hz Signal Levels for Automatic Loss Compensation
(ALC) Channel Units (Measured Between the Central Office and
the RT)**

RT CU	Universal COT CU	Integrated 5ESS® Switch Code for CU	Signal Level (dBm)
AUA150C	WP10(C/D)	SP (POTS)	–8.5 to –4
	SPQ®300	SP (POTS)	–8.5 to –4
	AUA38()	SP (POTS)	–8.5 to –4
AUA158()	WP10(C/D)	SP (POTS)	–8.5 to –4
	SPQ300	SP (POTS)	–8.5 to –4
	AUA38()	SP (POTS)	–8.5 to –4
SPQ400	WP10(C/D)	SP (POTS)	–8.5 to –4
	SPQ300	SP (POTS)	–8.5 to –4
	AUA38()	SP (POTS)	–8.5 to –4
AUA159()	WP10(C/D)	SP (POTS)	–8.5 to –4
	SPQ300	SP (POTS)	–8.5 to –4
	AUA38()	SP (POTS)	–8.5 to –4
SPQ440()	WP10(C/D)	SP (POTS)	–8.5 to –4
	SPQ300	SP (POTS)	–8.5 to –4
	AUA38()	SP (POTS)	–8.5 to –4
SPQ450	WP10(C/D)	SP (POTS)	–8.5 to –4
	SPQ300	SP (POTS)	–8.5 to –4
	AUA38()	SP (POTS)	–8.5 to –4
AUA179	WP10(C/D)	SP (POTS)	–8.5 to –4
	SPQ300	SP (POTS)	–8.5 to –4
	AUA38()	SP (POTS)	–8.5 to –4
AUA159()	WP36	SPOTS®	–5.5 to –2.0
	SPQ340	SPOTS	–5.5 to –2.0
	AUA39()	SPOTS	–5.5 to –2.0
SPQ440()	WP36	SPOTS	–5.5 to –2.0
	SPQ340	SPOTS	–5.5 to –2.0
	AUA39()	SPOTS	–5.5 to –2.0
SPQ450	WP36	SPOTS	–5.5 to –2.0
	SPQ340	SPOTS	–5.5 to –2.0
	AUA39()	SPOTS	–5.5 to –2.0
AUA179	WP36	SPOTS	–5.5 to –2.0
	SPQ340	SPOTS	–5.5 to –2.0
	AUA39()	SPOTS	–5.5 to –2.0

9. At the central office, connect the TMS **TRANSMIT** jack and the SU to the tip and ring of the channel to be tested. Set the switches on the TMS/SU as follows:
 - Set the TMS for 1,004 Hz, 0.0 dBm, **TRANSMIT** impedance to **900** ohms, and **RECEIVE** impedance to **900** ohms.
 - Set the SU for **LOOP/TERMINATE** signaling.
10. At the NIF, connect the TMS **RECEIVE** jack to the tip and ring of the channel to be tested.
11. Set the TMS **TRANSMIT** and **RECEIVE** impedance levels to **900** ohms for the **AUA158()** or **SPQ400** channel unit; or **600** ohms for the **AUA150C**, **AUA159()**, **SPQ440()**, **AUA179**, or **SPQ450** channel unit. Set the SU for **LOOP/ORIGINATE** signaling, on-hook.

12.



NOTE:

A loop circuit should be terminated with customer equipment, if possible, or with a resistance similar to the real termination in the off-hook state. A telephone set (or butt set) at the NIF may be used to terminate the circuit; however, then the channel unit will provide only an approximate loss.

If a termination (other than a telephone) is used, take it off-hook for about 2 seconds (to condition the channel unit to insert the proper loss). Then, take the telephone set (or butt set) off-hook and remove the termination.

If the telephone at the NIF is used to terminate the circuit, take the telephone set off-hook and wait about 2 seconds.

13. At the NIF, measure the received level and frequency. The level should fall within the range given in Table A for the appropriate channel units. The frequency should be 1,004 Hz.
14. At the central office and the NIF, press the **REVERSE** push button to reverse the transmit and receive functions of the TMS (*do not change* the signaling settings) and continue with Step **15**. If the TMS does not have this push button, reverse the connections to the **TRANSMIT** and **RECEIVE** jacks on the TMS. If the jacks are reversed at the NIF, repeat Steps **11** and **12** to recondition the circuit for expected loss, then continue with Step **15**.

15. At the NIF, set the TMS to transmit 1,004 Hz at 0.0 dBm.
16. At the central office, measure the received level and frequency. The level should fall within the range given in Table A for the appropriate channel unit. The frequency should be 1,004 Hz.

STOP. YOU HAVE COMPLETED THIS PROCEDURE.

Verify Voice-Frequency Special Service Channel Unit Settings

Summary: This procedure measures the loss between the *SLC*[®]-2000 **DS0** BIT-STREAM test point and the customer network interface (NIF) [through network channel terminating equipment (NCTE), if present].

For typical voice-frequency (VF) service, a 1,004-Hz **DS0 TRMT** 0-dBm signal transmitted toward the customer should measure between -3.5 and -4 dBm at the customer NIF; a 1,004-Hz 0-dBm signal transmitted toward the *SLC*-2000 should measure 0 ± 0.6 dBm at the **DS0 RCV** test point.

For typical modem service, a 1,004-Hz **DS0 TRMT** -13 dBm signal transmitted toward the customer should measure between -15.5 and -16.5 dBm at the customer NIF; a 1,004-Hz 0-dBm signal transmitted toward the *SLC*-2000 should measure -13.0 ± 0.5 dBm at the **DS0 RCV** test point. These test point levels (TPLs) are standard levels. The actual circuit TPLs may be different as specified in the work order record detail (WORD) document.

Measurements at 404 Hz and 2,800 Hz are used to determine low-end slope [-0.5 to $+1.5$ (PBX) or $+2.5$ (Modem/telset) (measure 1,000 Hz - measure 404 Hz)], and high-end slope [-0.5 to $+2.2$ (PBX) or $+3.8$ (Modem/telset) (measure 1,000 Hz - measure 2,800 Hz)]. Typical noise levels (at the NIF and *SLC*-2000) should be less than 23 dBnc.

For 2-wire circuits, the singing return loss (SRL) should be $\text{SRL} > 14$ dB for proper balance.

User Interface Panel Test Jacks

The user interface panel (UIP) provides maintenance and testing jacks. These jacks are connected to a circuit using the **CONN-TACC** craft interface terminal (CIT) command for the DLC subsystem. Once connected to a circuit, these jacks (see Figure 1) provide the following functions:

DDS: For digital data services:

- **DDS Clock** provides a local DDS clock source for dataport channel unit test sets.
- **DDS** jacks provide DS0 access for dataport circuits.

VF: For voice-frequency services:

- **DS0** jacks provide split access to bit-stream voice-frequency levels, looking toward the drop.
- **T/R, T1/R1, E/M** jacks provide metallic access to the drop side of the channel units (CHAN connects into the channel unit, DROP connects out on the drop). T1/R1 and E/M jacks only apply to 4-wire channel units. The DROP and CHAN jacks are not available for FITL configurations.

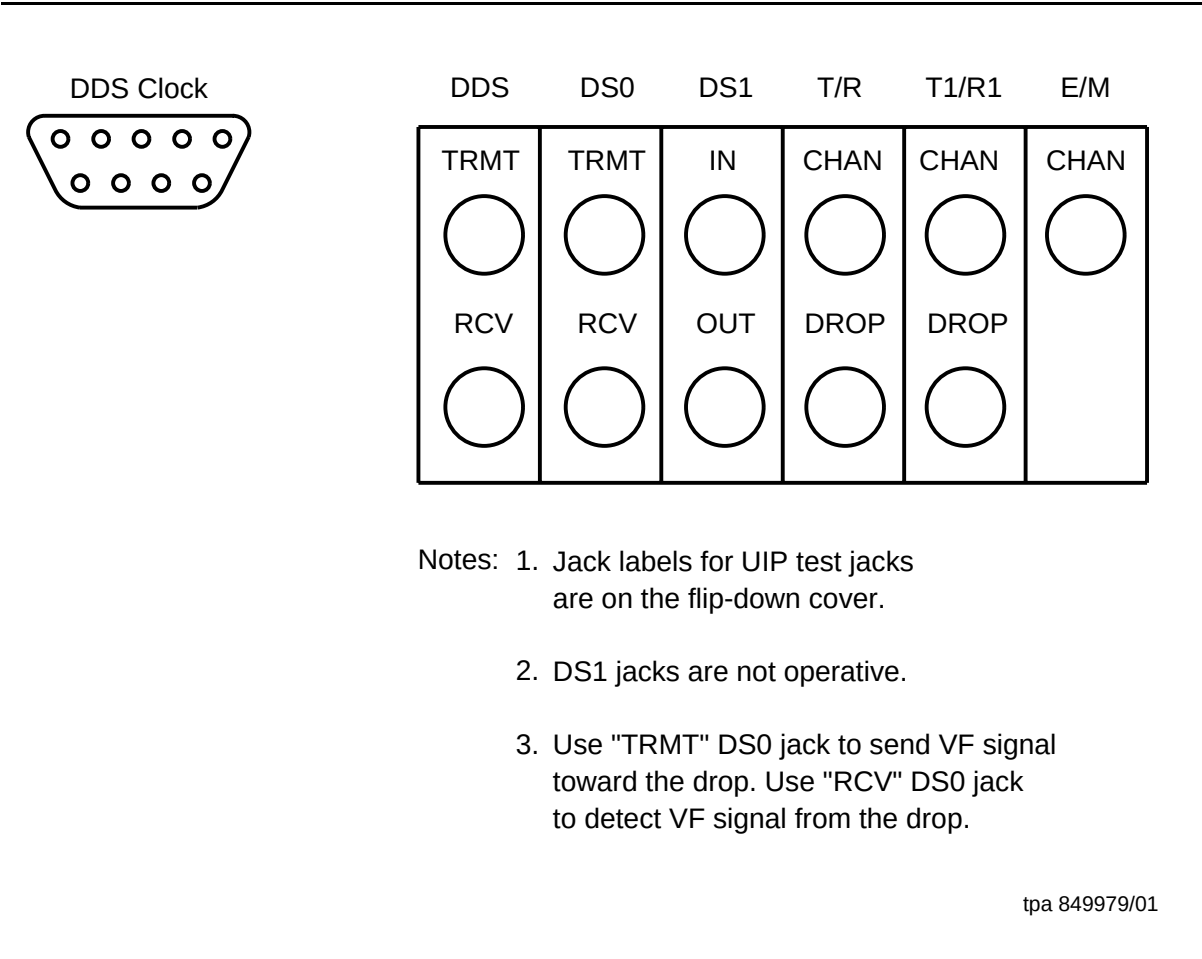


Figure 1 – UIP Jacks

CIT Test Access Commands

There are several DLC subsystem CIT commands associated with channel unit test access. To use these commands, you must connect a CIT to the UIP and log into the DLC subsystem (see **DLP-521**, **DLP-525**, or **DLP-541**). The following is a list of how test access commands are used for channel tests:

- **CONN-TACC**: : *drop* - {1-8} - {1-24} - {1-4}::: **met=split**,
digl=split

This command is used to connect a channel; (drop-{1-8}-{1-24}-{1-4} or dtdp-{1-8}-{1, 3, 5, 7, 13, 15, 17, or 19 for R4.4 and earlier or 1, 3, 5, 7, 9, 11, 13, 15, 17, 19, 21, or 23 for R4.5 and later}-{1-6}-{1-4}) to the test access jacks on the UIP and allows testing toward the customer.

- **SET-SIG**: **sigbit=XXXX**

This command is used to send signaling bits XXXX to the channel selected with the **CONN-TACC** command. This command can be used after a **CONN-TACC** command. Table A lists these signaling bits and the corresponding circuit state.

- **DISC-TACC**;

This command is used to tear down **CONN-TACC** and **CONN-TAP** test connections.

- **CONN-TAP**: : *drop* - {1-8} - {1-24} - {1-4}::: **term={open, loop}**

Use this command when you suspect trouble with the test access bus and you want to perform diagnostic tests. Before using this command, clear any system alarms (see **TAP-102**), review the **RETRIEVE-FAULTS** UIP command fault list (see **TAP-104**), and press the **RESET** button on all the **PTUs** in all the MDS assemblies.

Use **term=open** option first and verify <0.1 volts AC and DC at the T/R, T1/R1, and E/M jacks. Then verify >500K ohms tip-to-ground and ring-to-ground. If there is foreign voltage or low resistance, try replacing the channel unit and disconnecting DC test pairs; replace the **PTU** associated with the *drop* addressed channel unit. The **CAU** may also cause test access trouble.

Use **term=loop** option to loop the **CHAN** and **DROP** jack test points. After they are looped, you should see continuity between the T/R (less than 90 ohms) or T1/R1 (less than 10 ohms) **DROP** and **CHAN** jacks, tip-to-tip and ring-to-ring. If there is no continuity, replace the associated **PTU**, then replace the **CAU**.

Table A – Special Service Signaling Bits, Sent to Channel Unit

Channel Unit Function	Signaling Bits (<i>sigbit</i> =)						
	0000	0001	0100	0101	1010	1111	0110
AUA41/41B/141 FXS[1,2,3,5]	TG,RNG	na	na	TG,RNGn (LS Idle/Busy GS Busy)	na	TGn,RNGn (GS Idle)	
FXT[1,2,3,5]	na	TG,RNG	RB,RNGn (Toll Diversion)	TG,RNGn (LS Idle/Busy GS Busy)	na	TGn,RNGn (GS Idle)	
DX4[N,R]	Idle	na	na	na	na	Busy*	
TO4	na	na	na	na	na	na*	
AUA42()/142/42B/ SPQ®442 FXO	RG,LCn	na	na	LCn,RGn (Idle)	LC,RG	LC,RGn* (Busy)	
DPT	LCn (Idle)	na	na	na	na	LC* (Busy)	
TO	na	na	na	na	na	na*	
AUA43()/43B/ SPQ443 FXS	TG,RNG	TG,RNG	RB,RNGn (Toll Diversion)	TG,RNGn (LS Idle/Busy GS Busy)	Channel Test	TGn,RNGn (GS Idle)	RB,RNGn (AUA43B, SPQ443)
DPO	NB	na	na	na	na	RB*	
TO	na	na	na	na	na	na*	
SPQ444 FXO	RG,LCn	na	na	LCn,RGn	na	LC,RGn*	
SPQ454 E&M	Idle	na	na	na	na	Busy	

Abbreviations

na — Not
Applicable

LC — Loop Closure **LCn** — no Loop Closure

RG — Ring Ground **RGn** — no Ring Ground

RNG — Ringing **RNGn** — no Ringing

TG — Tip Ground **TGn** — no Tip Ground

NB — Normal Battery

RB — Reverse Battery

TD — Toll Diversion **TDn** — no Toll Diversion

* Use this bit pattern for the **SET-SIG:sigbit=** option.

Confirmation Messages: Some commands may affect service and require confirmation before executing. For example:

```
/* Caution! Execution of this command may affect service. */
```

```
/* You have selected the command-name command with these  
parameters: */
```

The selected command options will print

Execute? (y/n or CANCEL/DELETE to quit) =

Error Messages: Will print if the test access bus is busy or the system is not equipped to do the requested test.

Completion Messages: May print if the requested test causes a previous test connection to be torn down.

1.



NOTE:

If the function code = FXS or DPO, the channel unit at the RT must be conditioned for AC measurement; the customer location must have the equivalent of a test set with the HOLD feature in the send and receive modes.

Arrange for channel alignment tests to the customer location.

2. Figure 2 shows the channel layout for the tests that follow. Refer to the circuit layout information or work order record detail (WORD) document for circuit details.
3. Connect the CIT to the **UIP** CIT jack and log in to the DLC subsystem.

4. Verify that the appropriate type channel unit is installed and the channel has been provisioned per requirements on the WORD (work order) document. Use the **rtrv-chan:drop - {1-8} - {1-24} - {1-4}** (or **dt dp - {1-8} - {1, 3, 5, 7, 13, 15, 17, or 19 for R4.4 and earlier or 1, 3, 5, 7, 9, 11, 13, 15, 17, 19, 21, or 23 for R4.5 and later} - {1-6} - {1-4}**) command to review the provisioning data. If necessary, provision the channel unit using **DLP-601**.

Comment: The AID (access identifier) is used as the address of the circuit pack being accessed and has the following syntax:

drop-MDS#-CHAN# or dt dp-MDS#-MSDT
Server#-MSDTCHAN#

Where

MDS# = the metallic distribution shelf number

CHAN# = the channel number in the metallic distribution shelf number

MSDT Server# = the slot number associated with the MSDT Server channel unit

MSDTCHAN# = the channel number out at the MSDT.

5. Enter

CONN-TACC:drop - {1-8} - {1-24} - {1-4}:met=split,digl=split

where **drop - {1-8} - {1-24} - {1-4}** (or **dt dp - {1-8} - {1, 3, 5, 7, 13, 15, 17 or 19 for R4.4 and earlier or 1, 3, 5, 7, 9, 11, 13, 15, 17, 19, 21, or 23 for R4.5 and later} - {1-6} - {1-4}**) is the address of the channel being tested.

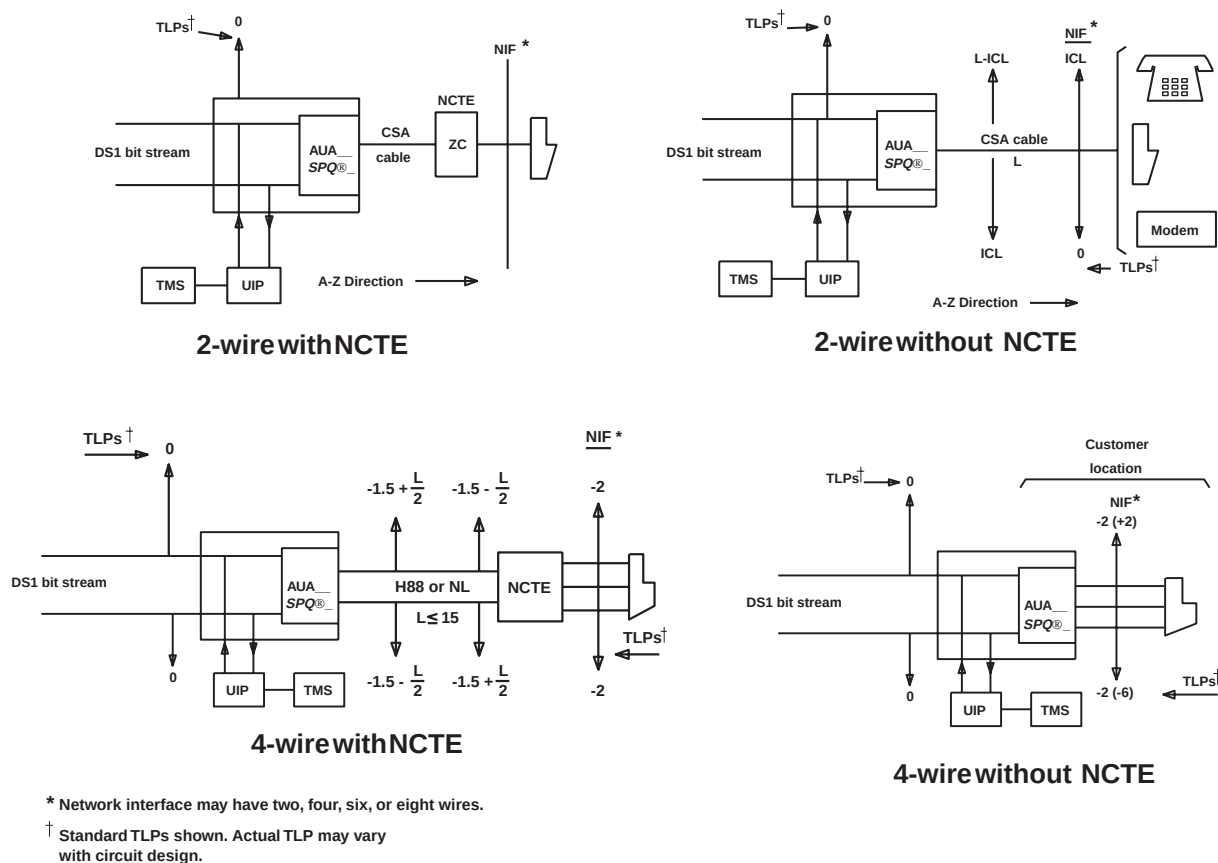


Figure 2 – 2-Wire and 4-Wire Loop With or Without NCTE

6. Refer to Table A and find the channel unit function and the signaling bits column with an "*". Use the signaling bits for that column (for example, 1111) when entering the following command. "1111" is used for all channel unit functions except "FXS[]", "FXT[]", or "FXS"; for those functions, "0101" is used.

Enter: **SET-SIG:sigbit=XXXX**

where XXXX = 1111 or 0101 per Table A.

7. This procedure is based on A-Z direction being from the RT toward the NIF. If the WORD document defines this direction as Z-A, read A-Z as Z-A (and the reverse) in the following steps.

8.



NOTE:

Unless the channel unit function code=TO, the bit stream TLP is assumed to be 0.0-dB TLP. For circuits with a bit stream TLP other than zero, the test levels given must be modified. These levels are shown in parentheses after the normal test levels.

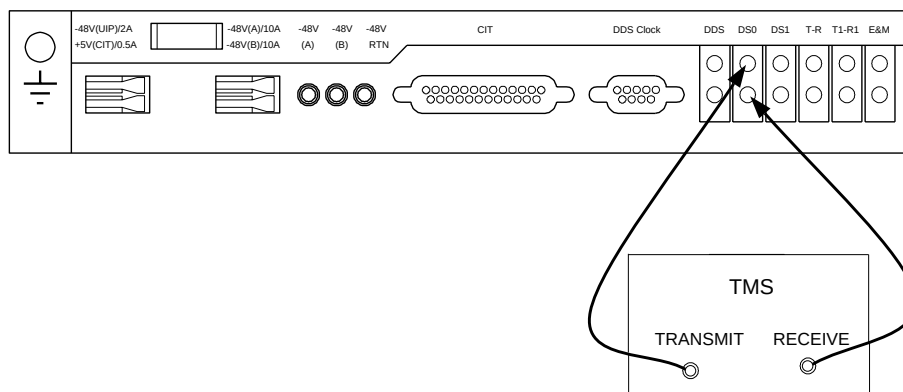


NOTE:

The bit stream access **DS0** jacks on the UIP are 600-ohm unbalanced test points. Most test sets will provide the correct measurements when set for 600-ohm operation. However, the **600-ohm unbalanced** setting should be used if it is available.

At the RT, connect the test equipment to send 1-kHz tone at 0.0 (or TLP A-Z) dBm toward the NIF (Figure 3):

- Connect the transmission measuring set (TMS) **TRANSMIT** jack to the UIP upper **DS0** jack marked **TRMT** on the cover.
- Set the TMS **TRMT** frequency to **1004**, **LEVEL** to 0.0 (or TLP A-Z) dBm, and impedance to **600**.
- Connect the transmission measuring set (TMS) **RECEIVE** jack to the UIP lower **DS0** jack.



To measure receive levels for a 2-wire circuit, you should remove the TRANSMIT lead from the TMS. The hybrid network in 2-wire circuits will alter receive level measurements if a signal is being transmitted.

Figure 3 – TMS Test Connections for Testing RT Channel Units

9. At the NIF at the customer location, measure the gain in the receive (RT channel unit) direction. Is the receive level between [(TLP A-Z) -0.6] and [(TLP A-Z) +0.6] (± 0.7 with NCTE)?

If **YES**, then proceed to Step **19**.
If **NO** with NCTE, then note the receive level at the NIF and continue with Step **10**.
If **NO** without NCTE, then note the receive level at the NIF and continue with Step **11**.
10. Measure the receive level at the loop interface of the NCTE. On the WORD document, find the value of TLP A-Z listed for the NCTE, loop side. At the loop interface of the NCTE, is the receive level between [(TLP A-Z) -0.6] dBm and [(TLP A-Z) +0.6] dBm?

If **YES**, then the NCTE is causing trouble; adjust or replace it and proceed to Step **19**.
If **NO**, then note the result and continue with Step **11**.

11. Verify that the RT channel unit RECEIVE GAIN is set to the WORD document value. Adjust the RT channel unit RECEIVE GAIN no more than 1 dB. At the NIF or loop interface of the NCTE, if present, is the receive level between [(TLP A-Z) -0.6] dBm and [(TLP A-Z) +0.6] dBm?

Reference: For AUA42()/142 or AUA43() (2-wire) **DLP-611**
For AUA41()/141 or SPQ®444/454 (4-wire) **DLP-612**

If **YES** with NCTE, then proceed to Step 17.

If **YES** without NCTE, then proceed to Step 19.

If **NO**, then reset the RECEIVE GAIN to the WORD document value and continue with Step 12.

12. Verify that the TMS impedance is 600 ohms. Use the TMS to measure channel unit transmit gain at the RT, as follows.
13. At the NIF or loop interface of the NCTE, if present, send TLP Z-A dBm tone toward the RT.
- 14.



NOTE:

For a 4-wire circuit with NCTE, loaded cable, and the customer test set impedance is 600 ohms, the level must be corrected; add 0.7 dB to the test indication. To measure transmit levels for a 2-wire circuit, you should remove the TRANSMIT lead from the TMS. The hybrid network in 2-wire circuits will alter transmit level measurements if a signal is being transmitted onto the bit stream.

At the RT, measure the gain in the transmit direction of the RT channel unit. Is the **RCV** level between -0.6 dBm and +0.6 dBm (or within 0.6 dB of TLP Z-A)?

If **YES**, then continue with Step 15.

If **NO**, refer trouble to the circuit provisioning center.

15. Ask the circuit provisioning center to validate the WORD document. If the WORD document is valid, continue; otherwise, wait for the new WORD document.
16. Replace the RT channel unit and repeat from Step 8.

17. Remeasure the receive level at the NIF (send tone from RT towards NIF). Is the receive level between [(TLP A-Z) -0.6] dBm and [(TLP A-Z) +0.6] dBm (± 0.7 with NCTE)?

If **YES**, then proceed to Step **19**.

If **NO**, then continue with Step **18**.

18. Replace or adjust the NCTE until the receive level is within limits.
19. Write down the receive level (bit stream-to-NIF gain) for later use.
20. At the RT, use the TMS to measure channel unit transmit gain, as follows.
21. At the NIF, send 1-kHz tone at 0 dBm [TLP Z-A dBm] toward the RT.
- 22.



NOTE:

To measure transmit levels for a 2-wire circuit, you should remove the TRANSMIT lead from the TMS. The hybrid network in 2-wire circuits will alter transmit level measurements if a signal is being transmitted onto the bit stream.

At the RT, measure the **RCV** level (the gain in the transmit direction of the RT channel unit). Does the TMS indicate between -0.6 dBm and +0.6 dBm (or within 0.6 dB of TLP Z-A) (± 0.7 with NCTE)?

If **YES**, then proceed to Step **30**.

If **NO** with NCTE, then continue with Step **23**.

If **NO** without NCTE, then proceed with Step **25**.

23. At the loop interface of the NCTE, send a tone at TLP Z-A dBm toward the RT.
24. At the RT, measure the **RCV** level without the NCTE in the circuit. Does the TMS indicate between -0.4 dBm and +0.4 dBm (or within 0.4 dB of TLP Z-A)?

If **YES**, then the NCTE is causing trouble; adjust or replace the NCTE and proceed to Step **30**.

If **NO**, then continue with Step **25**.

25. Verify that the RT channel unit TRANSMIT GAIN is set to the WORD document value. Adjust the TRANSMIT GAIN no more than 1 dB. Does the TMS indicate between -0.6 and $+0.6$ dBm (or within 0.6 dB of TLP Z-A)?

Reference: For AUA42()/142 or AUA43()/SPQ442/SPQ443 (2-wire)

DLP-611

For AUA41/141/SPQ444/SPQ454 (4-wire) **DLP-612**

If **YES** with NCTE, then proceed to Step **28**.

If **YES** without NCTE, then proceed to Step **30**.

If **NO**, then continue with Step **26**.

26. Reset the TRANSMIT GAIN to the WORD document value. Ask the circuit provisioning center to validate the WORD document. If the WORD document is valid, continue; otherwise, wait for new WORD document.

27. Replace the RT channel unit and repeat from Step **21**.

28. Remeasure the **RCV** level from the NIF. At the NIF, send 1-kHz tone at 0 dBm toward the RT. At the RT, does the TMS indicate between -0.7 dBm and $+0.7$ dBm (or within 0.7 dB of TLP Z-A)?

If **YES**, then proceed to Step **30**.

If **NO**, then continue with Step **29**.

29. Replace or adjust the NCTE or central office (CO) repeater until the TMS indicates between -0.7 and $+0.7$ (or within 0.7 dB of TLP Z-A) at RT.

30. Write down the transmit level (1-kHz gain from the NIF to the bit stream) for later use.

31. On the TMS, set the **TRANSMIT** frequency to **404** and **LEVEL** to 0.0 (or TLP A-Z) dBm.

32.



NOTE:

The slope limits depend on whether the customer equipment is a PBX or other customer premises switching equipment, or a modem/telset or other nonswitched termination.

Note the measurement at the NIF. Calculate the low-end slope using this measurement (at 404 Hz) and the measurement from the receive direction noted in Step 19.

Response: $\text{Slope} = \text{Meas}(\text{Step 19}) - \text{Meas}(404 \text{ Hz})$

33. Is the low-end slope between -0.5 and $+1.5$ (PBX) or $+2.5$ (modem/telset); in other words, is the 404-Hz measured level between 0.5 dB hot and 1.5 dB or 2.5 dB long relative to the 1-kHz level?

If **YES**, then continue with Step 34.

If **NO**, then **note the result for later referral to the circuit provisioning center.**

34. On the TMS, set the **TRMT** frequency to **2804**.

35. Note the measurement at the NIF. Calculate the high-end slope as done in Step 32.

Response: $\text{Slope} = \text{Meas}(\text{Step 19}) - \text{Meas}(2804 \text{ Hz})$

36. Is the high-end slope between -0.5 and $+2.2$ (PBX) or $+3.7$ (modem/telset)?

If **YES**, then continue with Step 37.

If **NO**, then **note the result for later referral to the circuit provisioning center.**

37. At the RT, use the TMS to measure gain.

38. At the NIF, send a 0.4-kHz tone at 0 dBm toward the RT.

39. At the RT, note the TMS indication. Calculate the low-end slope using this measurement (at 0.4 kHz) and the measurement from the transmit direction noted in Step 30.

Response: $\text{Slope} = \text{Meas}(\text{Step 30}) - \text{Meas}(0.4 \text{ kHz})$

40. Is the low-end slope between -0.5 and $+1.5$ (PBX) or $+2.5$ (modem/telset)?

If **YES**, then continue with Step **41**.

If **NO**, then **note the result for later referral to the circuit provisioning center.**

41. At the customer location, send a 2.8-kHz tone toward the RT.

42. At the RT, note the TMS indication and calculate the high-end slope as done in Step **39**.

Response: $\text{Slope} = \text{Meas}(\text{Step } 30) - \text{Meas}(2.8 \text{ kHz})$

43. Is the high-end slope between -0.5 and $+2.2$ (PBX) or $+3.7$ (modem/telset)?

If **YES**, then continue with Step **44** for 2-wire circuits or proceed to Step **47** for 4-wire circuits (AUA41/141).

If **NO**, then **note the result for later referral to the circuit provisioning center.**

- 44.



NOTE:

If the function code = FXS or DPO, termination must include the HOLD feature.

At the NIF, terminate the loop with 600 ohms.

45. At the RT, connect the return loss measuring set to the bit stream access **DS0** jacks on the UIP. Measure the return loss. Is SRL-HI > 13 , SRL > 14 , and ERL > 15 ?

If **YES**, then proceed to Step **47**.

If **NO**, then continue with Step **46**.

46. At RT, is SRL-HI > 9 , SRL > 10 , and ERL > 11 ?

If **YES**, then note the result for later referral to the circuit provisioning center and continue with Step **47**.

If **NO**, then **refer the trouble to the circuit provisioning center and wait for the new WORD document.**

47. Disconnect the TMS from the UIP. Insert the 600-ohm terminating plug into the UIP upper **DS0** (TRMT) jack.

48.



NOTE:

If the function code = FXS or DPO, the noise measuring set must have the HOLD feature.

At the NIF, measure noise. Is the noise less than $[(\text{TLP A-Z} + 23)] \text{ dBrc}$?

If **YES**, then proceed to Step 52.

If **NO** with NCTE, then continue with Step 49.

If **NO** without NCTE, then proceed to Step 51.

49. At the loop interface of the NCTE, measure noise. Is the noise less than $[(\text{TLP A-Z}) + 20] \text{ dBrc}$?

If **YES**, then proceed to Step 52.

If **NO**, then continue with Step 50.

50. At the loop interface of the NCTE, terminate the loop with 600 ohms.

51. At the RT, reconnect the TMS to the UIP (see Figure 3). Is the noise at the TMS less than 23 (or $23 + \text{TLP Z-A}$) dBrc?

If **YES**, then replace the noisy RT channel unit and repeat from Step 47.

If **NO**, then **refer the trouble (possible noisy cable) to the appropriate repair forces.**

52.



NOTE:

For 4-wire circuit with NCTE, terminate with 900 or 1,200 ohms during noise tests.

At the NIF, terminate the loop with either 600 or 900 ohms.

53. At the RT, reconnect the TMS to the UIP (see Figure 3). Is the noise at the TMS less than 25 (or $25 + \text{TLP Z-A}$) dBrc?

If **YES**, then proceed to Step 56.

If **NO**, then continue with Step 54.

54. At the NIF or loop interface of the NCTE, if present, terminate the loop with 600 ohms.

55. At the RT, is the noise less than 23 (or 23 + TLP Z-A) dBrnc?

If **YES**, then replace the NCTE and repeat from Step 47.

If **NO**, then replace the noisy RT channel unit and repeat from Step 47.

56. Was the RT channel unit replaced in the noise test?

If **YES**, then repeat the RT channel alignment tests except for noise (Step 4 through Step 46).

If **NO**, then continue with Step 57.

57. Are any more channels of this type to be tested in this system?

If **YES**, then disconnect the TMS, address the next channel unit to be tested, and return to Step 4.

If **NO**, then continue with Step 58.

58. On the CIT, enter **DISC-TACC**. Enter **logout** and disconnect the CIT from the UIP.

STOP. YOU HAVE COMPLETED THIS PROCEDURE.

Provision and Install DT Server



CAUTION:

In a SLC-2000 host digital terminal MDS, only DT Servers should be installed in CU slots provisioned for FITL distribution. If channel units other than DT Servers are installed in these slots, service to the associated MSDT or FiberReach NBS could be adversely affected.

1. Use a craft interface terminal (CIT) and log in to the DLC subsystem. See **DLP-525** or **DLP-541** for more information.
2. Determine the access identifier (AID) of the distant terminal (DT) Server in the MDS slot. The AID has the following syntax:
dt-Shelf#-CU# or **cu-Shelf#-CU#**

where:

shelf#: Digital loop carrier (DLC) system or shelf number {1-8}

cu#: First slot label number in the left most slot that the DT Server unit is installed in {1, 3, 5, 7, 13, 15, 17, or 19 for R4.4 and earlier or 1, 3, 5, 7, 9, 11, 13, 15, 17, 19, 21, or 23 for R4.5 and later}.

example: *dt-1-1*

If 12 time slots are to be used, 2 DT Server slots (in a group of 24 time slots) must be provisioned for 12 time slots. The default number of time slots allocated is 24. The following shows how 24-time slot groups are allocated for systems equipped with R4.4 and earlier:

DT Server slots for 24-line MSDTs

1
5
13
17

DT Server paired slots for 12-line MSDTs

First 12 lines *	Second 12 lines *
1	3
5	7
13	15
17	19

- * Note that 12-line DT Servers are installed in pairs, with 24 lines per pair. Also note that the first server of the pair is installed in one of the slots that is also used for 24-line DT Servers (default provisioning). When installing 12-line DT Servers, first provision the first (left) DT Server of the pair to 12 lines, then provision the second (right) DT Server to 12 lines. It is permissible to have two 12-line DT Servers in one group and one 24-line DT Server in the other group of an MDC.

The following shows how 24-time slot groups are allocated for systems equipped with R4.5 and later

DT Server slots for 24-line MSDTs

1
5
9
13
17
21

:

DT Server paired slots for 12-line MSDTs

First 12 lines*	Second 12 lines*
1	3
5	7
9	11
13	15
17	19
21	23

- * Note that 12-line DT Servers are installed in pairs, with 24 lines per pair. Also note that the first server of the pair is installed in one of the slots that is also used for 24-line DT Servers (default provisioning). When installing 12-line DT Servers, first provision the first (left) DT Server of the pair to 12 lines, then provision the second (right) DT Server to 12 lines. It is permissible to have two 12-line DT Servers in one group and one 24-line DT Server in the other group of an MDC.

If DT Servers are to be provisioned for 12-line service, use either the **"ed-dt::AID:::lines=12;"** (R4.3 or earlier) or **"ed-dt::AID:::dttype=msdt/nbs; lines=12/24, dtmode=quad/octet;"** (R4.4 or later) CIT command to provision both DT Servers of the 24-line group. You can use the **"rtrv-dt::AID"** command to review the current circuit allocation to a DT Server serving an MSDT or NBS. Refer to the previous page for AIDs of DT Servers.

⇒ NOTE:
The **ed-dt** command is not valid if there are DS0 cross-connections active for these AIDs. Before changing the line states of the MSDT or FiberReach NBS, remove the DS0 cross-connections.

3. On the CIT, enter **rtrv-dt** to review the time slot allocation of an **SPQ® 810** or **SPQ811** DT Server serving an MSDT or NBS.

4. At the *address=* prompt, enter the AID determined in Step 2.

Response: The CIT will print a message indicating the *Lines Provisioned Value, DT Mode, DT Type, DT Address, Available Bandwidth, and CLEI Code* for the DT Server slot whose AID you entered.

If the DT Server slot has the correct provisioned value for the number of lines, proceed to Step 8. Otherwise, continue with Step 5.

5. Press DELEte or CANcel key. Then enter **ed-dt**.
6. At the *address=* prompt, enter the AID determined in Step 2.
7. If the DT Server is intended for use with an MSDT, at the *dttype=* prompt, enter msdt.

At the *lines=* prompt, enter the number of time slots to be allocated, 12 or 24.

At the *dtmode=* prompt, enter quad.

If prompted for an *Execute?* enter "y".

For systems equipped with Release 4.4 or later serving a FiberReach NBS, at the *dttype=* prompt, enter nbs.

At the *lines=* prompt, enter 24.

At the *dtmode=* prompt, enter the mode of the DT, quad, or octet.

If prompted for an *Execute?* enter "y".

 NOTE:

The DSX-1 signals feeding the NBS can be provisioned for one of four possible operating modes (quad mode, octet mode, or a combination of these two) using the guidelines and CIT commands listed in Table A.

Response: You will see a completion message for a valid command entry or an error message.

Comment: If groups of 12 time slots are to be allocated, you must use the **ed-dt** command to provision both DT Servers in the 24-time slot group.

8. Is the **SPQ810** or **SPQ811** DT Server being installed at this time?

If **YES**, then proceed to Step **10**.

If **NO**, then continue with Step **9**.

9. Press **DELe**te or **CAN**cel key. Then enter **logoff** and disconnect the CIT.

STOP. YOU HAVE COMPLETED THIS PROCEDURE.

10. Verify that the metallic distribution shelf has been configured for fiber in the loop (FITL) with the SET-DISTN user interface panel (UIP) command.

11. Verify that the DT Server has been provisioned for the correct number of time slots using the **RTRV-DT** craft interface terminal (CIT) command.

12. Verify that the options have been selected on the DT Server.

Reference: **DLP-600**

13. Verify that the **SLC**®-2000 FiberReach NBS has been turned up.

14. Install the DT Server in the appropriate channel unit slot in the appropriate metallic distribution shelf (see Table B if the DT Server is connected directly to an optical facility in an R4.4 or earlier system).

Response: All alarms clear within 3 minutes.



NOTE:

If a software download to the DSXBIU was initiated, a message will be displayed on the UIP indicating that a software download is in progress. The **ABN** LED will be lighted on the UIP panel and the DT Server **DT** LED will flash.

15. Press the UIP **LED Test** button.

16. Are any DT Server LEDs lighted?

If **YES**, then continue with Step **17**.

If **NO**, then replace the DT Server followed by the associated **MDC**.
Proceed to Step **18**.

17. Are all DT Server LEDs lighted?

If **YES**, then **STOP. YOU HAVE COMPLETED THIS PROCEDURE.**

If **NO**, then replace the DT Server.

18. Did all alarms clear?

If **YES**, then **STOP. YOU HAVE COMPLETED THIS PROCEDURE.**
If **NO**, then continue with Step 19.

19. Clear alarms using **TAP-104**.

Table A – Possible DSX-1 Provisioning Combinations and CIT Commands for NBS (R4.4 and Later)

Provisioning Combination Number	Provisioned Mode of Each DSX-1 Feeding a V-DT in the NBS (Upper Shelf — Slots 1-6 Lower Shelf — Slots 7-12) (Note)	
		CIT Commands
1 [*]	DSX-1 A — Quad, 12 lines DSX-1 B — Quad, 24 lines	ed-dt::dt-1-3::nbs:lines=12,dtm=quad; ed-dt::dt-1-5::nbs:lines=24,dtm=quad;
2 [†]	DSX-1 A — Quad, 24 lines DSX-1 B — Octet, 24 lines DSX-1 D — Octet, 24 lines	ed-dt::dt-1-1::nbs:lines=24,dtm=quad; ed-dt::dt-1-5::nbs:lines=24,dtm=octet; ed-dt::dt-2-13::nbs:lines=24,dtm=octet;
3 [‡]	DSX-1 A — Octet, 24 lines DSX-1 C — Octet, 24 lines DSX-1 B — Quad, 24 lines	ed-dt::dt-1-5::nbs:lines=24,dtm=octet; ed-dt::dt-2-13::nbs:lines=24,dtm=octet; ed-dt::dt-1-1::nbs:lines=24,dtm=quad;
4	DSX-1 A — Octet, 24 lines DSX-1 C — Octet, 24 lines DSX-1 B — Octet, 24 lines DSX-1 D — Octet, 24 lines	ed-dt::dt-1-5::nbs:lines=24,dtm=octet; ed-dt::dt-2-13::nbs:lines=24,dtm=octet; ed-dt::dt-3-7::nbs:lines=24,dtm=octet; ed-dt::dt-2-1::nbs:lines=24,dtm=octet;

Note: For the octet mode of operation, DS1-A is paired with DS1-C and DS1-B is paired with DS1-D.

* DS1-C and DS1-D are not used in this configuration.

† DS1-C is not used in this configuration.

‡ DS1-D is not used in this configuration.

Table B – SLC®-2000 MDS to HDOS Circuit Configuration for R4.4 and Earlier (Notes)

MDS, Shelf First HDOS	MSDT Server Slot	MSDT Server AID	HDOS PCU Slot and Fuse	HDOS OU Slot	Fiber Label at LGX® Frame
MDS 1, shelf 1	CU 1	dt-1-1	1, F1	OU 1	SH-1-1
	CU 3 *	dt-1-3	1, F1	OU 3 *	SH-1-3
	CU 5	dt-1-5	1, F1	OU 5	SH-1-5
	CU 7 *	dt-1-7	1, F1	OU 7 *	SH-1-7
	CU 13	dt-1-13	2, F2	OU 13	SH-1-13
	CU 15 *	dt-1-15	2, F2	OU 15 *	SH-1-15
	CU 17	dt-1-17	2, F2	OU 17	SH-1-17
	CU 19 *	dt-1-19	2, F2	OU 19 *	SH-1-19
MDS 1, shelf 2	CU 1	dt-2-1	3, F3	OU 1	SH-2-1
	CU 3 *	dt-2-3	3, F3	OU 3 *	SH-2-3
	CU 5	dt-2-5	3, F3	OU 5	SH-2-5
	CU 7 *	dt-2-7	3, F3	OU 7 *	SH-2-7
	CU 13	dt-2-13	4, F4	OU 13	SH-2-13
	CU 15 *	dt-2-15	4, F4	OU 15 *	SH-2-15
	CU 17	dt-2-17	4, F4	OU 17	SH-2-17
	CU 19 *	dt-2-19	4, F4	OU 19 *	SH-2-19
MDS 2, shelf 3	CU 1	dt-3-1	5, F5	OU 1	SH-3-1
	CU 3 *	dt-3-3	5, F5	OU 3 *	SH-3-3
	CU 5	dt-3-5	5, F5	OU 5	SH-3-5
	CU 7 *	dt-3-7	5, F5	OU 7 *	SH-3-7
	CU 13	dt-3-13	6, F6	OU 13	SH-3-13
	CU 15 *	dt-3-15	6, F6	OU 15 *	SH-3-15
	CU 17	dt-3-17	6, F6	OU 17	SH-3-17
	CU 19 *	dt-3-19	6, F6	OU 19 *	SH-3-19
MDS 2, shelf 4	CU 1	dt-4-1	7, F7	OU 1	SH-4-1
	CU 3 *	dt-4-3	7, F7	OU 3 *	SH-4-3
	CU 5	dt-4-5	7, F7	OU 5	SH-4-5
	CU 7 *	dt-4-7	7, F7	OU 7 *	SH-4-7
	CU 13	dt-4-13	8, F8	OU 13	SH-4-13
	CU 15 *	dt-4-15	8, F8	OU 15 *	SH-4-15
	CU 17	dt-4-17	8, F8	OU 17	SH-4-17
	CU 19 *	dt-4-19	8, F8	OU 19 *	SH-4-19

See notes and footnote at end of table.

Continued on next page

Table B – SLC®-2000 MDS to HDOS Circuit Configuration for R4.4 and Earlier (Notes) (Continued)

MDS, Shelf First HDOS	MSDT Server Slot	MSDT Server AID	HDOS PCU Slot and Fuse	HDOS OU Slot	Fiber Label at LGX® Frame
MDS 3, shelf 5	CU 1	dt-5-1	1, F1	OU 1	SH-5-1
	CU 3 *	dt-5-3	1, F1	OU 3 *	SH-5-3
	CU 5	dt-5-5	1, F1	OU 5	SH-5-5
	CU 7 *	dt-5-7	1, F1	OU 7 *	SH-5-7
	CU 13	dt-5-13	2, F2	OU 13	SH-5-13
	CU 15 *	dt-5-15	2, F2	OU 15 *	SH-5-15
	CU 17	dt-5-17	2, F2	OU 17	SH-5-17
	CU 19 *	dt-5-19	2, F2	OU 19 *	SH-5-19
MDS 3, shelf 6	CU 1	dt-6-1	3, F3	OU 1	SH-6-1
	CU 3 *	dt-6-3	3, F3	OU 3 *	SH-6-3
	CU 5	dt-6-5	3, F3	OU 5	SH-6-5
	CU 7 *	dt-6-7	3, F3	OU 7 *	SH-6-7
	CU 13	dt-6-13	4, F4	OU 13	SH-6-13
	CU 15 *	dt-6-15	4, F4	OU 15 *	SH-6-15
	CU 17	dt-6-17	4, F4	OU 17	SH-6-17
	CU 19 *	dt-6-19	4, F4	OU 19 *	SH-6-19
MDS 4, shelf 7	CU 1	dt-7-1	5, F5	OU 1	SH-7-1
	CU 3 *	dt-7-3	5, F5	OU 3 *	SH-7-3
	CU 5	dt-7-5	5, F5	OU 5	SH-7-5
	CU 7 *	dt-7-7	5, F5	OU 7 *	SH-7-7
	CU 13	dt-7-13	6, F6	OU 13	SH-7-13
	CU 15 *	dt-7-15	6, F6	OU 15 *	SH-7-15
	CU 17	dt-7-17	6, F6	OU 17	SH-7-17
	CU 19 *	dt-7-19	6, F6	OU 19 *	SH-7-19
MDS 4, shelf 8	CU 1	dt-8-1	7, F7	OU 1	SH-8-1
	CU 3 *	dt-8-3	7, F7	OU 3 *	SH-8-3
	CU 5	dt-8-5	7, F7	OU 5	SH-8-5
	CU 7 *	dt-8-7	7, F7	OU 7 *	SH-8-7
	CU 13	dt-8-13	8, F8	OU 13	SH-8-13
	CU 15 *	dt-8-15	8, F8	OU 15 *	SH-8-15
	CU 17	dt-8-17	8, F8	OU 17	SH-8-17
	CU 19 *	dt-8-19	8, F8	OU 19 *	SH-8-19

Notes:

1. The DT Servers must be installed in the slots listed. The circuits served do not necessarily correspond with the slot label that the DT Server is installed in.
2. The access identifier (AID) has the syntax of: **dt-shelf#-physical slot # in HDT** where:
shelf# is the digital loop carrier (DLC) system or shelf number {1-8}
physical slot # in HDT is the slot for the MSDT Server {1,3,5,7,13,15,17,19}.
3. The PCU powers four optical units to the left.
4. For a second HDOS, the shelf labels **SH-1** through **SH-4** refer to VRT shelves 5 through 8.

* These slots can only be used when the DT Servers are provisioned for 12 channels.

Install AUA94 and/or SPQ[®]494 Channel Units in FiberReach NBS

General: The **AUA94** dual ISDN channel unit can be installed in a FiberReach narrowband shelf (NBS) beginning with Software Release 4.3 (R4.3). With R4.3, the NBS is divided into two 24-line virtual MSDT (V-MSDT) shelves. Each 24-line V-MSDT shelf is fed by a separate DSX-1 signal and has its own dedicated DT Server at the HDT.

For R4.4 and later, you are allowed to provision each DSX-1 signal terminating on the NBS for either the quad or octet mode. When provisioned for the quad mode, each DSX-1 signal provides service to one of two 24-line V-DT shelves in the NBS. When provisioned for the octet mode, each DSX-1 signal provides service to one of four sets of three channel unit slots in the NBS. Each set of three channel unit slots is referred to as an NBS quadrant (NBSQ). A mix of quad and octet modes in a single NBS is also allowed. The **SPQ494** quad ISDN channel unit can *only* be installed in a FiberReach NBS provisioned for the octet mode. Refer to document 363-208-000, *SLC[®]-2000 Access System, Applications, Planning, and Ordering Guide*, for a detailed description of the V-MSDT and V-DT concepts and quad/octet modes for R4.3 and R4.4.

After installing the **AUA94** and/or **SPQ494** channel units in the NBS, the DSX-1 signals providing service to the NBSQs must be provisioned for either the quad or octet mode, as appropriate, using the CIT **ed-dt** command.

 **NOTE:**
The **AUA94** channel unit can be installed in an NBSQ provisioned for either the quad or octet mode, whereas the **SPQ494** channel unit can only be installed in an NBSQ provisioned for the octet mode.

When one of the NBSQs in an NBS is provisioned for the octet mode, the first two slots can contain **SPQ494** channel units. The third slot can contain any of the other channel units available for the NBS. If the third slot contains an **AUA94** channel unit, this will allow the NBSQ to support a total of ten ISDN lines, with each line offering 2B+D service.

The time slots associated with these ten ISDN lines must be correctly cross-connected to the actual channel units slots in the NBS using the CIT **ent-crs-t0** command. The system uses a *virtual channel unit slot* concept for the ISDN time slots to be correctly cross-connected to the actual slots in the NBS. Using the *virtual* concept as shown in Figure 1, the SLC-2000 HDT software, when provisioning ISDN circuits, "thinks it sees" a six-slot V-DT instead of a three-slot V-DT. As Figure 1 shows, slots 4, 5, and 6 of the V-DT are *not* physically present. However, they are present in the software and are called *virtual slots*.

When installing and cross-connecting ISDN circuits in an NBS with DS1 feeders provisioned for the octet mode, you must understand the relationship between the NBS, octet mode, and actual or virtual slots. For a detailed description of the *virtual channel unit slot* concept, refer to 363-208-000, *SLC-2000 Access System, Applications, Planning, and Ordering Guide*.

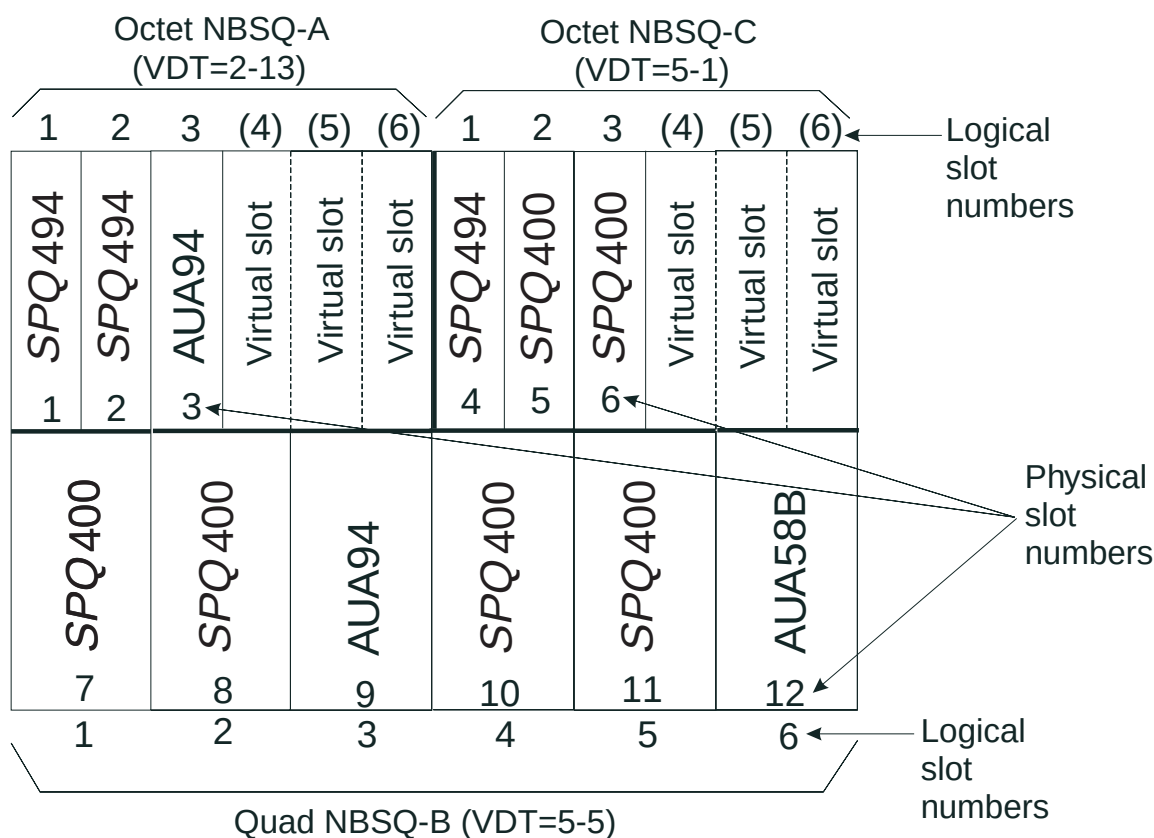


Figure 1 – Equipping NBSQ-A and NBSQ-C in Octet Mode and NBSQ-B in Quad Mode

This procedure uses CIT commands in the following sequence to configure an NBS that has not been previously configured for either the quad and or octet mode(s) in order to support the **AUA94** and/or **SPQ494** channel unit(s):

- Delete all ISDN T0 provisioning in the NBSQ using the **dlt-t0** command.
- Delete the T0 cross-connections for each digital subscriber line (DSL) using the **dlt-crs-t0** command.
- Provision the NBSQ for either quad or octet mode using the **ed-dt** command.
- Create T0 cross-connections for each DSL using the **ent-crs-t0** command.

As as aid in understanding the correct entries required for the CIT commands used in this procedure, each step is provided with two examples.

Example 1 assumes the following:

- MDS shelves 2 and 5 are configured as FITL.
- The DT Server in slot 13 on MDS shelf 2 is connected to NBSQ-A.
- The DT Server in slot 1 on MDS shelf 5 is connected to NBSQ-C.
- The DT Server in slot 5 on MDS shelf 5 is connected to NBSQ-B.
- All ISDN lines are configured appropriately in LDS.
- All channel unit circuit packs are located in NBS slots as shown in Figure 1.

Example 2 assumes the following:

- MDS shelves 3 and 6 are configured as FITL.
- The DT Server in slot 1 on MDS shelf 3 is connected to NBSQ-A.
- The DT Server in slot 13 on MDS shelf 6 is connected to NBSQ-B.
- The DT Server in slot 17 on MDS shelf 6 is connected to NBSQ-D.
- All ISDN lines are configured appropriately in LDS.
- All channel unit circuit packs are located in NBS slots as shown in Figure 2.

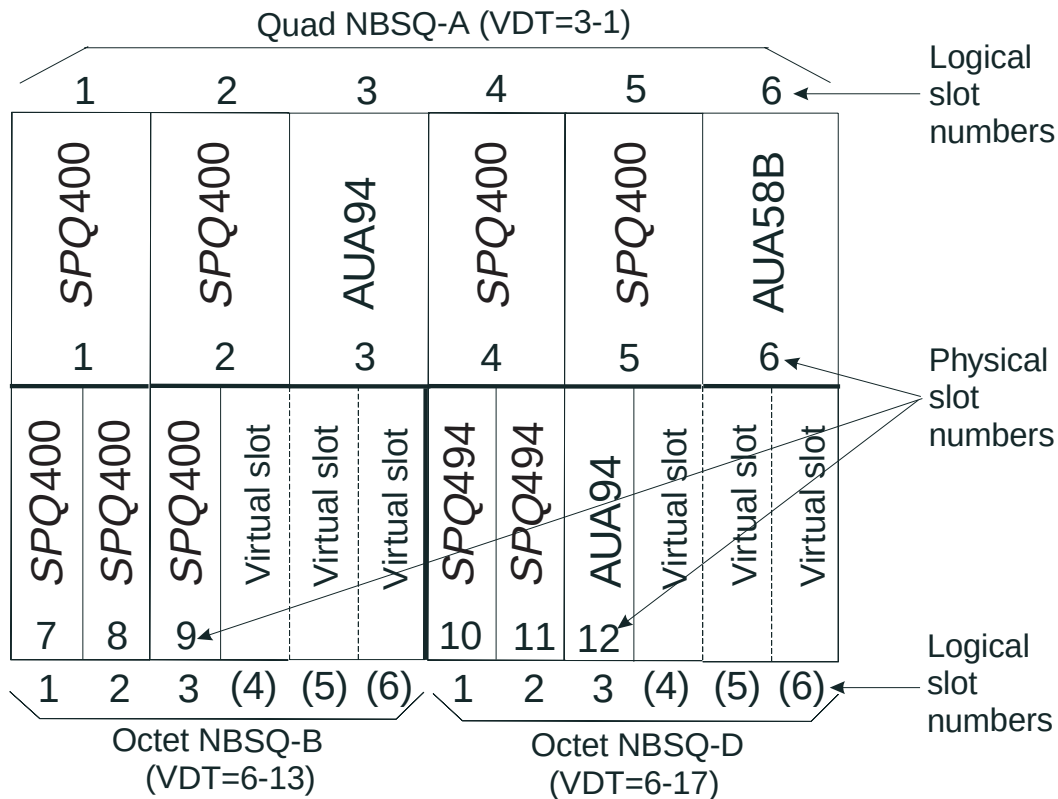


Figure 2 – Equipping NBSQ-A in Quad Mode and NBSQ-B and NBSQ-D in Octet Mode

NOTE:
The **AUA94** channel unit can be installed in an R4.3 or later FiberReach NBS.
The **SPQ494** channel unit can be installed in an R4.4 or later FiberReach NBS and is supported in the octet mode only.

NOTE:
Refer to "Channel Unit Installation: Introduction-000" for slot restrictions that must be observed when installing the **AUA94** and **SPQ494** channel units in a FiberReach NBS.
Refer to document 363-208-003, *SLC-2000 Access System, Commands and Messages*, for a detailed description of the CIT commands used in this procedure.



NOTE:

The **AUA94** and **SPQ494** channel unit parameters are not provisioned using the CIT. Instead, the T0 and T1 cross-connections for B1 are provisioned from either the CIT or LDS followed by the LDS provisioning the unit parameters and remaining cross-connections.

1. Execute the CIT command **dlt-t0** to delete all ISDN T0 provisioning for the channel unit slots being equipped.
2. Execute the CIT command **dlt-crs-t0** to delete all ISDN T0 cross-connections for the channel unit slots being equipped.
3. Execute the CIT command **ed-dt** to set the mode of the FiberReach narrowband shelf quadrant (NBSQ) to either quad or octet, as required.

Example 1 of setting mode (Figure 1):

```
ed-dt::dt-2-13::nbs:lines=24,dtm=octet; <-- for NBSQ-A
ed-dt::dt-5-1::nbs:lines=24,dtm=octet; <-- for NBSQ-C
ed-dt::dt-5-5::nbs:lines=24,dtm=quad; <-- for NBSQ-B
```

Example 2 of setting mode (Figure 2):

```
ed-dt::dt-3-1::nbs:lines=24,dtm=quad; <-- for NBSQ-A
ed-dt::dt-6-13::nbs:lines=24,dtm=octet; <-- for NBSQ-B
ed-dt::dt-6-17::nbs:lines=24,dtm=octet; <-- for NBSQ-D
```

4. Execute the CIT command **ent-crs-t0** for each DSL to create t0 cross-connections between the virtual drops and the physical drops.

Example 1 of creating cross-connections (Figure 1):



NOTE:

The slot numbers that appear in parentheses in the following example are the logical slot numbers shown in Figure 1.

For NBSQ-A:

```
ent-crs-t0::v3dp-1-140,dtdp-2-13-1-1;    <--CH1 SPQ494 (slot 1)
ent-crs-t0::v3dp-1-141,dtdp-2-13-1-2;    <--CH2 SPQ494 (slot 1)
ent-crs-t0::v3dp-1-142,dtdp-2-13-4-1;    <--CH3 SPQ494 (slot 1)
                                           Virtual Slot 4 in NBSQ-A
ent-crs-t0::v3dp-1-143,dtdp-2-13-4-2;    <--CH4 SPQ494 (slot 1)
                                           Virtual Slot 4 in NBSQ-A
ent-crs-t0::v3dp-1-144,dtdp-2-13-2-1;    <--CH1 SPQ494 (slot 2)
ent-crs-t0::v3dp-1-145,dtdp-2-13-2-2;    <--CH2 SPQ494 (slot 2)
ent-crs-t0::v3dp-1-146,dtdp-2-13-5-1;    <--CH3 SPQ494 (slot 2)
                                           Virtual Slot 5 in NBSQ-A
ent-crs-t0::v3dp-1-147,dtdp-2-13-5-2;    <--CH4 SPQ494 (slot 2)
                                           Virtual Slot 5 in NBSQ-A
ent-crs-t0::v3dp-1-148,dtdp-2-13-3-1;    <--CH1 AUA94 (slot 3)
ent-crs-t0::v3dp-1-149,dtdp-2-13-3-2;    <--CH2 AUA94 (slot 3)
```

For NBSQ-C:

```
ent-crs-t0::v3dp-1-150,dtdp-5-1-1-1;    <--CH1 SPQ494 (slot 1)
ent-crs-t0::v3dp-1-151,dtdp-5-1-1-2;    <--CH2 SPQ494 (slot 1)
ent-crs-t0::v3dp-1-152,dtdp-5-1-4-1;    <--CH3 SPQ494 (slot 1)
                                           Virtual Slot 4 in NBSQ-C
ent-crs-t0::v3dp-1-153,dtdp-5-1-4-2;    <--CH4 SPQ494 (slot 1)
                                           Virtual Slot 4 in NBSQ-C
ent-crs-t0::v3dp-1-154,dtdp-5-1-2-1;    <--CH1 SPQ400 (slot 2)
ent-crs-t0::v3dp-1-155,dtdp-5-1-2-2;    <--CH2 SPQ400 (slot 2)
```

ent-crs-t0::v3dp-1-156,dt dp-5-1-2-3;	<--CH3 <i>SPQ</i> 400 (slot 2)
ent-crs-t0::v3dp-1-157,dt dp-5-1-2-4;	<--CH4 <i>SPQ</i> 400 (slot 2)
ent-crs-t0::v3dp-1-158,dt dp-5-1-3-1;	<--CH1 <i>SPQ</i> 400 (slot 3)
ent-crs-t0::v3dp-1-159,dt dp-5-1-3-2;	<--CH2 <i>SPQ</i> 400 (slot 3)
ent-crs-t0::v3dp-1-160,dt dp-5-1-3-3;	<--CH3 <i>SPQ</i> 400 (slot 3)
ent-crs-t0::v3dp-1-161,dt dp-5-1-3-4;	<--CH4 <i>SPQ</i> 400 (slot 3)

For NBSQ-B:

ent-crs-t0::v3dp-1-162,dt dp-5-5-1-1;	<--CH1 <i>SPQ</i> 400 (slot 1)
ent-crs-t0::v3dp-1-163,dt dp-5-5-1-2;	<--CH2 <i>SPQ</i> 400 (slot 1)
ent-crs-t0::v3dp-1-164,dt dp-5-5-1-3;	<--CH3 <i>SPQ</i> 400 (slot 1)
ent-crs-t0::v3dp-1-165,dt dp-5-5-1-4;	<--CH4 <i>SPQ</i> 400 (slot 1)
ent-crs-t0::v3dp-1-166,dt dp-5-5-2-1;	<--CH1 <i>SPQ</i> 400 (slot 2)
ent-crs-t0::v3dp-1-167,dt dp-5-5-2-2;	<--CH2 <i>SPQ</i> 400 (slot 2)
ent-crs-t0::v3dp-1-168,dt dp-5-5-2-3;	<--CH3 <i>SPQ</i> 400 (slot 2)
ent-crs-t0::v3dp-1-169,dt dp-5-5-2-4;	<--CH4 <i>SPQ</i> 400 (slot 2)
ent-crs-t0::v3dp-1-170,dt dp-5-5-3-1;	<--CH1 AUA94 (slot 3) (ISDN line)
ent-crs-t0::v3dp-1-171,dt dp-5-5-3-2;	<--CH2 AUA94 (slot 3) (ISDN line)
ent-crs-t0::v3dp-1-174,dt dp-5-5-4-1;	<--CH1 <i>SPQ</i> 400 (slot 4)
ent-crs-t0::v3dp-1-175,dt dp-5-5-4-2;	<--CH2 <i>SPQ</i> 400 (slot 4)
ent-crs-t0::v3dp-1-176,dt dp-5-5-4-3;	<--CH3 <i>SPQ</i> 400 (slot 4)
ent-crs-t0::v3dp-1-177,dt dp-5-5-4-4;	<--CH4 <i>SPQ</i> 400 (slot 4)
ent-crs-t0::v3dp-1-178,dt dp-5-5-5-1;	<--CH1 <i>SPQ</i> 400 (slot 5)
ent-crs-t0::v3dp-1-179,dt dp-5-5-5-2;	<--CH2 <i>SPQ</i> 400 (slot 5)
ent-crs-t0::v3dp-1-180,dt dp-5-5-5-3;	<--CH3 <i>SPQ</i> 400 (slot 5)
ent-crs-t0::v3dp-1-181,dt dp-5-5-5-4;	<--CH4 <i>SPQ</i> 400 (slot 5)
ent-crs-t0::v3dp-1-182,dt dp-5-5-6-1;	<--CH1 AUA58B (slot 6)
ent-crs-t0::v3dp-1-183,dt dp-5-5-6-2;	<--CH2 AUA58B (slot 6)

Example 2 of creating cross-connections (Figure 2):



NOTE:

The slot numbers that appear in parentheses in the following example are the logical slot numbers shown in Figure 2.

For NBSQ-A:

ent-crs-t0::v3dp-1-140,dt dp-3-1-1-1;	<--CH1 SPQ400 (slot 1)
ent-crs-t0::v3dp-1-141,dt dp-3-1-1-2;	<--CH2 SPQ400 (slot 1)
ent-crs-t0::v3dp-1-142,dt dp-3-1-1-3;	<--CH3 SPQ400 (slot 1)
ent-crs-t0::v3dp-1-143,dt dp-3-1-1-4;	<--CH4 SPQ400 (slot 1)
ent-crs-t0::v3dp-1-144,dt dp-3-1-2-1;	<--CH1 SPQ400 (slot 2)
ent-crs-t0::v3dp-1-145,dt dp-3-1-2-2;	<--CH2 SPQ400 (slot 2)
ent-crs-t0::v3dp-1-146,dt dp-3-1-2-3;	<--CH3 SPQ400 (slot 2)
ent-crs-t0::v3dp-1-147,dt dp-3-1-2-4;	<--CH4 SPQ400 (slot 2)
ent-crs-t0::v3dp-1-148,dt dp-3-1-3-1;	<--CH1 AUA94 (slot 3) (ISDN line)
ent-crs-t0::v3dp-1-149,dt dp-3-1-3-2;	<--CH2 AUA94 (slot 3) (ISDN line)
ent-crs-t0::v3dp-1-150,dt dp-3-1-4-1;	<--CH1 SPQ400 (slot 4)
ent-crs-t0::v3dp-1-151,dt dp-3-1-4-2;	<--CH2 SPQ400 (slot 4)
ent-crs-t0::v3dp-1-152,dt dp-3-1-4-3;	<--CH3 SPQ400 (slot 4)
ent-crs-t0::v3dp-1-153,dt dp-3-1-4-4;	<--CH4 SPQ400 (slot 4)
ent-crs-t0::v3dp-1-154,dt dp-3-1-5-1;	<--CH1 SPQ400 (slot 5)
ent-crs-t0::v3dp-1-155,dt dp-3-1-5-2;	<--CH2 SPQ400 (slot 5)
ent-crs-t0::v3dp-1-156,dt dp-3-1-5-3;	<--CH3 SPQ400 (slot 5)
ent-crs-t0::v3dp-1-157,dt dp-3-1-5-4;	<--CH4 SPQ400 (slot 5)
ent-crs-t0::v3dp-1-158,dt dp-3-1-6-1;	<--CH1 AUA58B (slot 6)
ent-crs-t0::v3dp-1-159,dt dp-3-1-6-2;	<--CH2 AUA58B (slot 6)

For NBSQ-B:

ent-crs-t0::v3dp-1-170,dtdp-6-17-1-1; <--CH1 *SPQ494* (slot 1)
ent-crs-t0::v3dp-1-171,dtdp-6-17-1-2; <--CH2 *SPQ494* (slot 1)
ent-crs-t0::v3dp-1-172,dtdp-6-17-4-1; <--CH3 *SPQ494* (slot 1)
Virtual Slot 4 in NBSQ-B
ent-crs-t0::v3dp-1-173,dtdp-6-17-4-2; <--CH4 *SPQ494* (slot 1)
Virtual Slot 4 in NBSQ-B
ent-crs-t0::v3dp-1-174,dtdp-6-17-2-1; <--CH1 *SPQ400* (slot 2)
ent-crs-t0::v3dp-1-175,dtdp-6-17-2-2; <--CH2 *SPQ400* (slot 2)
ent-crs-t0::v3dp-1-176,dtdp-6-17-2-3; <--CH3 *SPQ400* (slot 2)
ent-crs-t0::v3dp-1-177,dtdp-6-17-2-4; <--CH4 *SPQ400* (slot 2)
ent-crs-t0::v3dp-1-178,dtdp-6-17-3-1; <--CH1 *SPQ400* (slot 3)
ent-crs-t0::v3dp-1-179,dtdp-6-17-3-2; <--CH2 *SPQ400* (slot 3)
ent-crs-t0::v3dp-1-180,dtdp-6-17-3-3; <--CH3 *SPQ400* (slot 3)
ent-crs-t0::v3dp-1-181,dtdp-6-17-3-4; <--CH4 *SPQ400* (slot 3)

For NBSQ-D:

ent-crs-t0::v3dp-1-160,dtdp-6-13-1-1; <--CH1 *SPQ494* (slot 1)
ent-crs-t0::v3dp-1-161,dtdp-6-13-1-2; <--CH2 *SPQ494* (slot 1)
ent-crs-t0::v3dp-1-162,dtdp-6-13-4-1; <--CH3 *SPQ494* (slot 1)
Virtual Slot 4 in NBSQ-D
ent-crs-t0::v3dp-1-163,dtdp-6-13-4-2; <--CH4 *SPQ494* (slot 1)
Virtual Slot 4 in NBSQ-D
ent-crs-t0::v3dp-1-164,dtdp-6-13-2-1; <--CH1 *SPQ494* (slot 2)
ent-crs-t0::v3dp-1-165,dtdp-6-13-2-2; <--CH2 *SPQ494* (slot 2)
ent-crs-t0::v3dp-1-166,dtdp-6-13-5-1; <--CH3 *SPQ494* (slot 2)
Virtual Slot 5 in NBSQ-D

```
ent-crs-t0::v3dp-1-167,dtdp-6-13-5-2;  <--CH4 SPQ494 (slot 2)
                                           Virtual Slot 5 in NBSQ-D
ent-crs-t0::v3dp-1-168,dtdp-6-13-3-1;  <--CH1 AUA94 (slot 3)
ent-crs-t0::v3dp-1-169,dtdp-6-13-3-2;  <--CH2 AUA94 (slot 3)
```

STOP. YOU HAVE COMPLETED THIS PROCEDURE.

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Introduction

This chapter describes the system administration and provisioning for the *SLC*®-2000 Access System.

- **System administration.** The system administration section includes the following:
 - Version recognition
 - System security
 - Software upgrades
 - Controller Maintenance and Memory Administration.
- **Multiplexing and Mapping.** The multiplexing and mapping section describes the following types of synchronous optical network (SONET) subsystem connections:
 - DS1 to OC-3
 - DS3 to OC-3
 - EC-1 to OC-3
 - OC-3 to OC-3
 - OC-3c to OC-3c (optional)
 - DS1 to EC-1.
- **Provisioning.** The provisioning section covers all the parameters in the system that the user can set.

Administration — SONET and Digital Loop Carrier (DLC) Subsystems

This section covers the following administrative information for both the SONET and DLC subsystems:

- Version recognition
- Security
- Software upgrades
- Software compatibility
- Controller Maintenance and Memory Administration.

The integral test head (ITH) is covered in a separate section of this chapter.

Version Recognition

The *SLC-2000* software releases provide automatic version recognition of all hardware, firmware, and software installed in the system. All common circuit packs and some channel unit circuit packs store the following information that is accessible with the craft interface terminal (CIT):

- *COMMON LANGUAGE** *CLEI* code
- Equipment catalog item (ECI) code
- Apparatus code and series number
- Serial number.

SONET subsystem circuit packs with microprocessors also report the processor and program identification (PID) codes.

Software version information for the DLC and SONET subsystems is available on both the CIT and the user interface panel (UIP).

- **Software Version Information using the UIP.** You can use the **RETRIEVE-PROG-VRSN** UIP command to obtain the version of SONET software running in the system controller (SYSTL) and overhead controller (OHCTL) circuit packs. This command also provides the version of DLC software that is currently running in the DLC subsystem controller circuit packs [provisioning and display controller (PDC), time slot interchange (TSI), bandwidth management processor (BMP), virtual tributary unit/line interface unit (VTU/LIU), and metallic distribution controller (MDC)]. This command also allows the user to view the DLC software release stored on the system memory unit (SMU).

* *COMMON LANGUAGE* is a registered trademark and *CLEI*, *CLLI*, *CLCI*, and *CLFI* are trademarks of Bell Communications Research, Inc.

- **Software Version Information using the CIT.** You can use the **rtrv-eqpt** command on the SONET subsystem CIT to provide version information for the SONET subsystem. For the DLC subsystem, you can use the **RTRV-EQPT** DLC subsystem CIT command to provide information. The system lists version information for software stored on the SMU along with SMU version information. The version of software currently running on the PDC, TSIs, BMPs, VTUs/LIUs, and MDCs is shown with the PDC version information only.

Security

The SLC-2000 system provides security capabilities to protect against unauthorized access to the system through the CIT and data communications channel (DCC) interfaces. The system also provides for security over the TL1/X.25 interface. The security features restrict commands on the SONET subsystem only. On the DLC subsystem, there are no restrictions once a user has logged in.

When security is enabled (default is disabled for the CIT and DCC and always enabled for TL1/X.25), the system allows access for three types of users with a valid login and password:

- **Privileged users.** Privileged users can execute all commands.
- **General users.** General users can execute any commands not restricted to privileged users
- **Reports-only users.** Reports-only users can only execute commands that retrieve reports from the SONET subsystem. These users can also execute DLC subsystem commands.

When the system is first initialized, it provides two default logins and passwords that must be changed by a privileged user before security is enabled. At initialization, privileged users are those users who use the default logins and passwords. Replacement of the SYSCTL circuit pack causes the system to default back to the default logins and passwords. The system allows two authorized privileged users to add, delete, or change up to 50 logins and passwords. Login and password security can be enabled or disabled. You can independently provision time-outs for front and rear access CIT interfaces and the SONET section DCC. Time-out is disabled on the TL1/X.25 interface. For more information on provisioning, see "Circuit Order" in Chapter 4, "Operations and Maintenance Procedures (TOP)".

Authorized privileged users can establish general user and reports-only user logins using the **set - lgn** command.

The following SONET subsystem commands are restricted to privileged users over the CIT and DCC interfaces. See document 824-102-148, *2000 Family of Products Operations Systems Engineering Guide*, for TL1/X.25 command access privileges.

- **init-sys**—Initialize system.
- **rtrv-lgn**—Retrieve login.
- **set-feat**—Set features; Release 5.1 and later.
- **set-fecom**—Set far-end communications.
- **set-lgn**—Set login.
- **set-secu**—Set security.

When security is enabled, the following SONET subsystem commands become restricted to privileged users only:

- **dlt-tadmap**—Delete target identifier (TID) address map.
- **ent-ulsdcc**—Enter upper layer section DCC.
- **init-pm**—Initialize performance monitoring.
- **ins-prog**—Install program.
- **cpy-prog**—Copy program.
- **reset**—System reset.
- **set-date**—Set network element (NE) date and time.
- **set-ne**—Set NE name.

Reports-only users can execute the following SONET subsystem commands:

- **?** (help),
- **logout**
- **rlgn**
- **set-passwd** (their own)
- **toggle**
- all **rtrv** commands except **rtrv-lgn**.

For details on these and other commands, see document 363-208-003, *SLC-2000 Access System, Commands and Messages*.

Upgrading Software — Network Elements

The *SLC-2000* Access System provides an in-service software installation capability to update the generic program in local and remote systems. Upgrades will be distributed on *MS-DOS** formatted diskettes containing the new software and an installation program. These software upgrades are the primary mechanism to add new feature enhancements to the network.



NOTE:

All network elements within the subnetwork must be running the same SONET software release. This means that you must be running the same SONET software in all network elements of a ring or linear network, even if they are part of a larger network. For example, in a SONET Release 7.0 OC-3 ring, you cannot have some nodes running DDM-2000 R7.0 while others are running DDM-2000 R7.1. Also, each *SLC-2000* DLC software release is compatible only with specific DDM-2000 releases. For example, to interface a SONET Release 7.1 OC-3 ring, the *SLC-2000* DLC subsystem must be running Release 3.2 or 3.3 [central office terminal (COT) only].

The upgrade procedure is straightforward. The technician connects the *MS-DOS* personal computer (PC) serial port to the CIT port on the *SLC-2000* system, starts the installation program, and is prompted with a few safety questions before the upgrade installation actually begins. When the technician responds yes at the prompt to proceed, the PC takes over the process and completes the installation.

This procedure is done for both the SONET and DLC software. The DLC software is installed onto the SMU. When complete, the user must enable the SMU to initiate an in-service software installation from the SMU to the DLC subsystem. The SONET software is installed directly onto the SYSCTL and OHCTL. After completing the installation, the *SLC-2000* system automatically restarts with the new software.

Depending on the situation, only one or both of the software packages will need to be upgraded. Refer to document 363-208-022, *SLC-2000 Access System, DLC Subsystem, Software Release Description*, for detailed upgrade procedures. To upgrade the DLC generic software, refer to the "Detailed Level Procedures" tab, "Install New DLC Generic Program."

Upgrading SONET Subsystem Software

Table 5-1 lists the applications that can be upgraded in-service and the required software releases. See Table 5-1 for more information and the TOP section of this manual.

* Registered trademark of Microsoft Corporation.

Table 5-1. SONET Subsystem In-Service Upgrade Compatibility (Note 1)

Current SONET Subsystem Release	Upgrade to (Note 2)								
	6.2.n	7.0.n	7.1.n	7.2	8.0	9.0.n	11.0.n	11.1	13
6.2.n	X	C	C	C	C	C	C	C	C
7.0.n	NA	X	X	X	X	X	X	X	X
7.1.n	NA	NA	X	X	X	X	X	X	X
7.2	NA	NA	NA	X	X	X	X	X	X
8.0	NA	NA	NA	NA	X	X	X	X	X
9.0.n	NA	NA	NA	NA	NA	X	X	X	X
9.1	NA	NA	NA	NA	NA	NA	X	X	X
11.0.n	NA	NA	NA	NA	NA	NA	X	X	X
11.1	NA	NA	NA	NA	NA	NA	NA	X	X
13	NA	NA	NA	NA	NA	NA	NA	NA	X

Notes:

1. All SLC®-2000 systems and DDM-2000 OC-3 systems in a SONET subnetwork should be using the same version of SONET software. *n* is the latest point release available. The releases in this table are SONET software releases only. The symbols in the body of the table have the following meanings:
 - X Requires software download only to upgrade the SONET subsystem.
 - C Requires an upgrade procedure with on-site equipment/fiber changes as well as software download to upgrade the SONET subsystem. Additional changes to SONET software and equipment provisioning may be needed to use features of the new release. See the TOP section of this manual for upgrade procedures.
 - NA Not Applicable. If an NA conversion is required, contact your local technical support organization.
2. When doing an upgrade, it is recommended that the latest point release of SONET software be used, if possible.

For SONET software Releases 7.0 and later ring releases, the BBG7 overhead controller (OHCTL) circuit pack must be series 2:4A or later.

If you have BBG7 OHCTL circuit packs with earlier vintages than series S2:4A and you plan to upgrade to ring releases, you should upgrade the BBG7 OHCTL circuit packs by sending the circuit packs to:

Lucent Technologies Network Systems
Merrimack Valley Works
1600 Osgood Street
North Andover, Massachusetts 01845

Include a repair order that states:

"Modification per CCN31066-MV"

For SONET Release 6.1 and later open systems interconnection (OSI) linear releases, the electrically erasable programmable read-only memory (EEPROM) on the BBG7 OHCTL circuit pack must contain a factory-programmed unique sequence number used as part of the network services access point (NSAP) address for the system. BBG7 OHCTL circuit packs with series number S2:3 and higher have the EEPROM properly programmed. A part of the NSAP address can be provisioned with the **ent-ulsdcc** and **rtrv-ulsdcc** commands; however, user provisioning of the NSAP is not required since the factory provides a unique NSAP address for each OHCTL.



CAUTION:

If you download SONET Software Release 6.1 and later releases to a system that has an OHCTL circuit pack with an earlier series number than S2:3, at the completion of the download, the seven-segment LED on the system controller (SYSCTL) circuit pack will display an "E". If this happens, the SONET subsystem software is completely inoperable. That is, there will be no alarm reporting, no protection switching, and no CIT communications.

If this occurs, there are two things that can be done to make the system operational:

1. Replace the OHCTL circuit pack with one of the proper series and repeat the download. This may have to be done with a forced download through the front CIT interface. Refer to the TOP procedures in Chapter 4, "Operations and Maintenance (TOP)," for information and procedure for doing a forced download of SONET subsystem software.
2. If an OHCTL circuit pack of the proper series is not available, a forced download with the pre-OSI software must be done. Note, however, that pre-OSI and OSI software releases are not compatible. That is, for the system to work properly, all systems in the SONET subnetwork must be running either pre-OSI or OSI software. If pre-OSI and OSI software are mixed in the same SONET subnetwork, there will be no alarm reporting, no protection switching, and no CIT communications.

Since the systems are using OSI software, one system and only one system in the SONET subnetwork must be provisioned as a gateway network element (GNE) directory services network element (DSNE) using the **set-ne** command. Refer to the TOP procedures in Chapter 4, "Operations and Maintenance (TOP)," for provisioning procedures.

Upgrading DLC Subsystem Software

The DLC software is downloaded onto the SMU. The SMU software installation times for each of the software releases at the recommended baud rate of 9,600 bps is available in Table 5-2. This download can be performed independently of the system upgrade; however, if this is done, no backup of the currently installed DLC software is available.

Once the DLC software is downloaded to the SMU and the user enables the SMU, a software installation will occur to distribute the software to the DLC subsystem circuit packs. The system first installs the software to the PDC and then to duplicated bandwidth management core. After the core is successfully installed, the MDCs are loaded, starting with the first MDC in the first MDS shelf. When loading an MDC that supports TR-303 service (R4.0 and later), call processing will be interrupted (stable calls will be maintained) during the time the MDC is being loaded and reset (approximately 4 minutes). If the MDC supports only TR-08 service, stable calls will be maintained, but call processing will be interrupted for about 30 seconds when the MDC is reset for the new load. For fiber in the loop (FITL) systems using the downloadable backplane interface unit (BIU) (MC97793A1), the BIU software resides on the MDC and is installed as soon as the MDC reset is complete. After the BIU software is installed, the BIU resets and all multi-services distant terminal (MSDT) calls will drop back to dial tone. The system installs the software for the VTUs or LIUs last. After completing the installation, the *SLC-2000* system automatically restarts with the new software.

To assist with installation planning of R3.2, R3.3 (COT only), R4.01, R4.2, R4.4, R4.5, and R4.6 software, Table 5-2 provides an estimation of the software installation times for each circuit pack. The total time required for installation of a system will depend on the system configuration. Refer to the TOP procedures in Chapter 4, "Operations and Maintenance Procedures (TOP)," for software installation procedures.

Table 5-2. DLC Subsystem Installation Times

SLC®-2000 System Software Release							
Circuit Pack	R3.2	R3.3	R4.0	R4.1/R4.2	R4.4	R4.5	R4.6
SMU	90 min.	120 min.	110 min.	120 min.	120 min.	120 min.	120 min.
PDC	4 min.	5 min.	4 min.	5 min.	5 min.	5 min.	5 min.
TSI	3 min.	6 to 7 min.	4 min.	6 - 7 min.	6 - 7 min.	6 - 7 min.	6 - 7 min.
BMP	—	6 to 7 min.	4 min.	6 - 7 min.	6 - 7 min.	6 - 7 min.	6 - 7 min.
MDC	2 min.	4 min.	4 min.	4 min.	4 min.	4 min.	4 min.
VTU	2.5 min.	4 min.	3.5 min.	4 min.	4 min.	4 min.	4 min.
LIU	3 min.	4 min.	4 min.	4 min.	4 min.	4 min.	4 min.
BIU	45 min.	60 min.	60 min.	60 min.	60 min.	60 min.	60 min.
DSXBIU	—	—	—	—	Appr. 4 hr.	Appr. 4 hr.	Appr. 4 hr.

Controller Maintenance and Memory Administration

Controller Maintenance

The control for the DLC subsystem and the SONET subsystem is distributed between the following circuit packs:

- **DLC subsystem:**
 - PDC
 - TSIs
 - VTUs/LIUs
 - MDCs
 - BMPs (Release 4.0 and later).
- **SONET subsystem:**
 - SYSCTL
 - OHCTL.

All controller circuit packs have a processor with volatile random access memory (RAM) and nonvolatile memory.

Failures of the SYSCTL, OHCTL, and PDC circuit packs do not affect transmission. This means that no *hits* or *errors* will occur on any traffic if any of these circuit packs fail. A SYSCTL failure will result in the loss of automatic protection switching in the SONET subsystem. This means that if an active SONET subsystem transmission circuit pack should fail while the SYSCTL is failed, the system cannot perform a protection switch to the standby (protection) transmission pack and the service carried by this pack will be affected. However, if a SONET subsystem transmission pack has failed and a protection switch has been performed before a SYSCTL failure, then the protection switch will remain effective during the SYSCTL failure and service is preserved.

Memory Administration

The SLC-2000 system stores all transmission affecting parameters that are set by software in nonvolatile memory and in the RAM in the appropriate transmission circuit packs. Examples of these parameters include bipolar 8-zero substitution/alternate mark inversion (B8ZS/AMI) encoding on DS1 interfaces, distribution line provisioning data, and cross-connect assignments.

On the SONET subsystem, the nonvolatile memory on the SYSCTL circuit pack stores the SONET subsystem parameters.

On the DLC subsystem, the nonvolatile memory is stored on the TSI circuit packs and on the PDC circuit pack. Each TSI stores a full copy of all DLC subsystem parameters and a copy of the check sum. The PDC stores only the check sum. If any one of the stored check sums disagrees with the other two copies, the circuit pack with the incorrect data is updated.

The provisioning sections of this chapter provide more details on memory administration for the SONET and DLC subsystems.

Service-Affecting Actions

The SLC-2000 system is designed to minimize loss of service caused by equipment failure or human action. However, certain controller related actions can cause a loss of provisioning data that affects service in both the DLC and SONET subsystems.

DLC Subsystem

The following actions can cause a loss of provisioning data and/or a loss of service in the DLC subsystem:

- ***Improper installation of a TSI circuit pack.*** Always follow the procedures in the "ARM Shelf Turnup" tab of Chapter 4, "Operations and Maintenance (TOP)," when installing a TSI circuit pack. For example, if a TSI is replaced, and then the other TSI is replaced before the first TSI has fully completed its initialization (including its automatic data memory update), a data memory mismatch may occur. The only way to clear this condition is to execute the **INIT-SYS** command on the DLC subsystem.
- ***Use of the INIT-SYS command.*** Executing the command **INIT-SYS:all** on the DLC subsystem sets all DLC subsystem provisioning data to default values (including line and cross-connect provisioning). This causes loss of service on any metallic or FITL lines.
- ***Use of incompatible software.*** The system maintains the DLC subsystem provisioning data through a software download to the SMU. Downloading or replacing the SMU circuit pack with incompatible software and enabling the PDC could result in a loss of data.

- **Improper removal of the following circuit packs:**
 - **MDC, PTU, or T8U circuit packs.** Removal of these packs will cause the 48 lines associated with that pack to go out of service.
 - **Unprotected TSI circuit pack.** Removal of an unprotected TSI circuit pack will cause all DLC lines to go out of service.
 - **Unprotected VTU/LIU circuit pack.** Removal of an unprotected VTU/LIU circuit pack or loss of more than one VTU/LIU circuit pack will cause the lines associated with the DS1s on the pack to go out of service for TR-08 virtual remote terminals (VRTs). For TR-303 VRTs, only nail-ups and hairpins will be lost; everything else is routed over other available DS1s.
 - **Protected VTU/LIU circuit pack.** Calls will be dropped if the VTU/LIU circuit pack is removed without first switching the DS1 service to protection.
 - **Unprotected BMP circuit pack.** Removal of an unprotected BMP circuit pack will cause all lines on all of the TR-303 VRTs to go out of service.

Removing the SMU, PDC, or link to alarms and networks (LAN) circuit packs does not affect call processing service.

SONET Subsystem

The following actions can cause a loss of provisioning data and/or a loss of service in the SONET subsystem:

- **Replacement of a transmission pack during a SYSCCTL failure.** Replacing a transmission circuit pack when the SYSCCTL is failed or removed can result in a loss of provisioning data and loss of service.
- **Replacement of a SONET subsystem transmission circuit pack in a system without power.** Replacement of a SONET subsystem transmission circuit pack in a system without power can result in a loss of provisioning data. Loss of service may continue on channels associated with the replaced circuit pack after the system is powered up.
- **Improper use of the INIT-SYS command.** Executing the command **INIT-SYS:all** on the SONET subsystem sets all SONET subsystem provisioning data to default values (including line and cross-connect provisioning). This causes loss of service on any SONET channel connected with nondefault cross-connections.
- **Improper removal of the SYSCCTL circuit pack.** Failing to disable the SYSCCTL circuit pack before it is removed in accordance with TOP procedures could result in a protection switch; however, no loss of service occurs. Refer to the "Detailed Level Procedures" tab "DLP-502 Install or Replace SYSCCTL" in Chapter 4, "Operations and Maintenance (TOP)."

- **Use of incompatible software.** The system maintains the SONET subsystem provisioning data through a software download to the SYSCTL. Replacing the SYSCTL circuit pack with incompatible software and intentionally overriding the software check could result in a loss of data.
- **Improper removal of the following unprotected circuit packs:**
 - **Unprotected transmission and timing circuit packs.** Removing these circuit packs will cause a service interruption.
 - **Unprotected synchronous timing generator (TGS) circuit pack.** Removing an unprotected TGS circuit pack will cause up to 84 DS1s to go out of service.
 - **Unprotected optical line interface unit (OLIU) circuit pack.** Removing an unprotected OLIU circuit pack will cause up to 84 DS1s to go out of service.
 - **Unprotected VT to STS-1 multiplexer (MXRV0) circuit pack.** Removing an unprotected MXRV0 circuit pack will cause up to 28 DS1s to go out of service.
 - **Unprotected EC-1 circuit pack.** Removing an unprotected EC-1 circuit pack will cause up to 28 DS1s to go out of service.
 - **Unprotected DS1 circuit pack.** Removing an unprotected DS1 circuit pack will cause up to 4 DS1s to go out of service.

Removing the OHCTL circuit pack does not affect service.

Administration — Multiplexing and Mapping

This section describes the following types of SONET subsystem multiplexing and mapping:



NOTE:

The information in this section pertains **only** to the SONET subsystem.

- DS1 to OC-3
- DS3 to OC-3
- EC-1 to OC-3
- OC-3 to OC-3
- OC-3c to OC-3c (optional)
- DS1 to EC-1.

DS1 to OC-3

The *SLC-2000* system uses the floating virtual tributary (VT) mode asynchronous mapping for clear channel DS1 transport. The system multiplexes the DS1 signal onto an OC-3 signal as follows:

1. Each DS1 is mapped to a VT1.5 signal.
2. Four VT1.5 signals are byte-interleaved to form a virtual tributary group (VT-G) signal.
3. Seven VT-G signals are multiplexed to a VT-structured synchronous transport signal level 1 (STS-1) signal.
4. Three STS-1 signals are byte-interleaved to create an STS-3 signal.
5. The electrical STS-3 signal is then converted to an OC-3 optical signal.

Table 5-3 shows the default mapping of DS1 signals to VT1.5 signals on the *SLC-2000* system. In default mapping, there is a direct relationship between the physical low-speed slot and port on that slot, and the VT1.5 time slot within the OC-3 signal.

For point-to-point networks, this default mapping allows straightforward network administration because a circuit entering on a slot and port on one system (for example, a-1-1) will always leave on a different system but will use the same slot and port position (a-1-1). You can override the default mapping using the **ent-crs-vt1** and **ent-crs-sts1** commands. For more information on these commands, see document 363-208-003, *SLC-2000 Access System, Commands and Messages*.

In the opposite direction, the system demultiplexes a DS1 from an OC-3 as follows:

1. The received OC-3 optical signal is converted back to an electrical STS-3 signal.
2. The STS-3 signal is demultiplexed to three STS-1 signals.
3. Each STS-1 signal is demultiplexed to seven VT-G signals.
4. Each VT-G signal is separated into four VT1.5 signals.
5. Each VT1.5 signal yields a DS1 signal.

In Table 5-3, each DS1 port address identifies a location — a VT-G in an STS-1 or a VT1.5 in a VT-G. For example:

a-1-1, a-1-2, a-1-3 ...
c-1-1, c-1-2, c-1-3 ...

OC-3 signals contain a maximum of three STS-1 signals. All *a* location ports are associated with STS-1 number 1, and *c* location ports are associated with STS-1 number 3. In a DDM-2000 OC-3 multiplexer, the *b* location ports are associated with STS-1 number 2. The mapping of a DS1 to an OC-3 signal requires the port address being connected with a time slot in the OLIU circuit pack. Optical time slots identify the location (for example, STS-1 in the OC-3, VT-G in the STS-1, VT1.5 in the VTG). Some examples of time slot identifications include:

m-1-1-1, m-2-1-3
a-1-1-3, c-3-1-4

Some examples of DS1 to OC-3 mapping using VT1.5 cross-connections include:

a-1-1 to m-1-1-1
c-4-4 to m-3-4-4

Table 5-3. Default DS1 to VT1.5 Mapping

DS1 Port Address (Note)	VT1.5 Within STS-1	VT1.5 Within VT-G	VT-G Within STS-1	STS-1 Within OC-3
a-1-1	1	1	1	1
a-1-2	8	2	1	1
a-1-3	15	3	1	1
a-1-4	22	4	1	1
a-2-1	2	1	2	1
a-2-2	9	2	2	1
a-2-3	16	3	2	1
a-2-4	23	4	2	1
a-3-1	3	1	3	1
a-3-2	10	2	3	1
a-3-3	17	3	3	1
a-3-4	24	4	3	1
a-4-1	4	1	4	1
a-4-2	11	2	4	1
a-4-3	18	3	4	1
a-4-4	25	4	4	1
a-5-1	5	1	5	1
a-5-2	12	2	5	1
a-5-3	19	3	5	1
a-5-4	26	4	5	1
a-6-1	6	1	6	1
a-6-2	13	2	6	1
a-6-3	20	3	6	1
a-6-4	27	4	6	1
a-7-1	7	1	7	1
a-7-2	14	2	7	1
a-7-3	21	3	7	1
a-7-4	28	4	7	1

See Note at the end of the table.

Continued on next page

Table 5-3. Default DS1 to VT1.5 Mapping (Continued)

DS1 Port Address (Note)	VT1.5 Within STS-1	VT1.5 Within VT-G	VT-G Within STS-	STS-1 Within OC-3
c-1-1	1	1	1	3
c-1-2	8	2	1	3
c-1-3	15	3	1	3
c-1-4	22	4	1	3
c-2-1	2	1	2	3
c-2-2	9	2	2	3
c-2-3	16	3	2	3
c-2-4	23	4	2	3
c-3-1	3	1	3	3
c-3-2	10	2	3	3
c-3-3	17	3	3	3
c-3-4	24	4	3	3
c-4-1	4	1	4	3
c-4-2	11	2	4	3
c-4-3	18	3	4	3
c-4-4	25	4	4	3
c-5-1	5	1	5	3
c-5-2	12	2	5	3
c-5-3	19	3	5	3
c-5-4	26	4	5	3
c-6-1	6	1	6	3
c-6-2	13	2	6	3
c-6-3	20	3	6	3
c-6-4	27	4	6	3
c-7-1	7	1	7	3
c-7-2	14	2	7	3
c-7-3	21	3	7	3
c-7-4	28	4	7	3

Note: SLC®-2000 Access System does not use the *b* DS1 Port Address.
The *b* port address is used in DDM-2000 OC-3 systems.

DS3 to OC-3

The *SLC-2000* system multiplexes a DS3 signal onto an OC-3 signal as follows:

1. The DS3 interface maps directly to the STS-1 signal using asynchronous mapping.
2. Three internal STS-1 signals are multiplexed to an STS-3 signal.
3. The electrical STS-3 signal is then converted to an OC-3 optical signal.

In the opposite direction, the system *pulls* a DS3 out of an OC-3 as follows:

1. The received OC-3 optical signal is converted back to an electrical STS-3 signal.
2. The STS-3 signal is demultiplexed to three STS-1 signals.
3. A DS3 signal is recovered directly from its STS-1 signal.

The DS3 signal maps directly into the STS-1 payload. The DS3 location is mapped into the STS-1 in the OC-3 as shown in the following example:

a to m-1
c to m-3
c to m-2

EC-1 to OC-3

The STS1E low-speed interface receives an EC-1 signal from the backplane coaxial connector that is then routed as an internal STS-1 signal. This signal can be an STS-1 or VT1.5 cross-connected to the OC-3 interface. At the OC-3 interface, these three internal STS-1 signals are multiplexed into an STS-3 and converted to an optical OC-3 signal.

In the opposite direction, a received OC-3 is converted into an electrical STS-3 and demultiplexed. After either STS-1 or VT1.5 cross-connections, the resulting STS-1 internal signal is converted to an EC-1 signal by the STS-1 and VT1.5 cross-connections. The following are examples of STS-1 cross-connections:

a to m-1
c to m-2

The following are examples of VT1.5 cross-connections:

a-1-1 to m-1-1-1
a-7-4 to m-1-1-2

OC-3 to OC-3

The system connects one OC-3 signal to another OC-3 signal as follows:

1. The system receives the OC-3 signal from the optical fiber.
2. An STS-3 signal is recovered from the OC-3 signal.
3. The system demultiplexes the STS-3 signal into three STS-1 signals.
4. The STS-1 signals are routed to other OC-3 interfaces as provisioned.
5. Three STS-1 signals are then multiplexed back into an STS-3 signal.
6. The electrical STS-3 signal is then converted into an optical OC-3 signal and transmitted over the fiber.

You can make OC-3 to OC-3 cross-connections at the STS-1 level or at the individual VT1.5 level (DS1 time slots). Examples of STS-1 cross-connections include:

m-1 to c-1
m-2 to c-2
m-3 to c-3

Some examples of VT1.5 time slot cross-connections for OC-3 to OC-3 include:

m-1-1-1 to c-1-1-1
m-3-1-4 to c-3-1-4

These are representative of *pass through* traffic in a DS1 hub network.

OC-3c to OC-3c (Optional)

This application is a feature package option. You must enable it using the **set - feat** command and provision the system to accept OC-3c signals by setting the concatenation mode to *enabled* using the **set - oc3** command. Once enabled and provisioned, the 21G (or 21D) OLIU functions the same as other applications.

The system demultiplexes an incoming OC-3c signal from the Main 21G OLIU interface into three STS-1 signals. However, these STS-1 signals are treated in the concatenated mode. The system sends these signals to the 21G OLIU interface in Function Unit C slots where they are multiplexed into an STS-3c signal and converted back to an OC-3c signal. OC-3c to OC-3c cross-connections are made at the STS-1 level. The only valid cross-connections are:

m-1 to c-1
m-2 to c-2
m-3 to c-3

DS1 to EC-1

For DS1 signals to EC-1 signals, no manual cross-connections are needed or supported. The system automatically creates default cross-connections based on circuit pack equipage.

The system multiplexes the DS1 signal onto an EC-1 signal as follows:

1. Each DS1 is mapped to a VT1.5 signal.
2. Four VT1.5 signals are byte-interleaved to form a VT-G signal.
3. Seven VT-G signals are multiplexed to a VT-structured STS-1 signal.
4. The STS-1 signal is converted to the standard electrical characteristics of EC-1.

This EC-1 signal is managed by the STS1E high-speed interface.

Administration — Integral Test Head (ITH)

The *SLC-2000* ITH supports administrative commands from the mechanized loop testing (MLT) system computer or user interfaces and from an optional maintenance PC over the ITH dial-up link.

Version Recognition

The ITH gives software version identification information each time an MLT user logs on to the ITH and whenever the user issues a "TST_RMU_STAT" command. The report also includes information on the ITH service state, diagnostics and calibration results, and the ITH identification number (consisting of two four-digit primary and secondary identifiers).

The following service states are allowable:

- Available
- Forced available
- Out of service
- Auto out of service
- Site dependent data download required
- Available reset
- Forced available reset
- Out-of-service reset
- Auto out-of-service reset

The diagnostics results are the results of the last full diagnostics run by the ITH. The report indicates whether the diagnostics passed or failed.

The following calibration states are allowable:

- Pass
- Fail.

Software Upgrades

The ITH software is preloaded at the factory and no installation is required at the *SLC-2000* Access System. However, software upgrades are permitted by way of an optional maintenance personal computer. To upgrade the software, an administrator logs on to the ITH from a *UNIX**-based 386 PC over the remote dial-up link and issues commands to reset and download the ITH with the program image that is stored on floppy disk.

Security

Several classes of security exist in the ITH to determine the privileges of the users — administrators, clerks, testers, and repair personnel — and whether the interface is computer or human. Each security class is governed by a unique password that can be changed by the administrator only. On each login attempt, the ITH will validate the password before allowing the caller access to the unit. The following passwords are the default for each type of user:

User	Interface	Default Password
Clerk	Human	hclerk
Tester	Computer	ctest
Administrator	Human	hadm
Administrator	Computer	cadm
Repair	Human	hdiag
Repair	Computer	cdiag

* UNIX is a registered trademark in the United States and other countries, licensed exclusively through X/Open Company Limited.

The following rules govern the password privileges:

- Computer administrators are permitted to do everything. They can run all requests when the ITH is in service or if out of service, by first changing the ITH to the Forced Available state.
- Human administrators are permitted to do maintenance and administration functions. These include, but are not limited to, changing passwords, removing an ITH from service, restoring an ITH to service, setting time outs, and running diagnostics. No callback or tests are permitted. They may run all other requests whether the ITH is in or out of service.
- The tester can run any access, test, or disconnect request. TST-type (test type) commands shall only be run over the computer interface. In general, test commands may not be run when the ITH is out of service except where noted in the MLT command document.
- Human clerks can check the status of the ITH but cannot change it. They can also view time-out parameters, trouble and system activity reports, and get the results of the latest diagnostics and calibration.
- Human and computer repair personnel are able to do all the maintenance functions plus everything clerks can do, and they can remove an ITH from service and restore it to service.

Provisioning — SONET Subsystem

The SONET subsystem allows the user to customize many system characteristics through its provisioning features. Provisioning parameters are set by a combination of onboard switches and software control.

Parameters likely to vary from installation to installation and parameters that will not change in service (for example, DS1 line buildouts) are set with on-board switches. This allows installations to be performed without a CIT using default provisioning values and switch settings. Other parameters that require a wide range of options or in-service changes are set under software control. For example, performance-monitoring thresholds can be customized for each installation using the CIT.

Default Provisioning

Installation provisioning is minimized with default values set at the factory. Each parameter is given a default. The defaults for software parameters are maintained in the SYCTL circuit pack. All provisioning data is stored in nonvolatile memory to prevent data loss during power failures.

Remote Provisioning

Software control of many provisioning parameters allows remote provisioning of the SONET subsystem. This feature is provided especially for parameters likely to change during service to support centralized operations practices.

Automatic Provisioning

Circuit Pack Replacement

Replacement of a failed circuit pack is simplified by automatic provisioning of the original circuit pack values in the replacement circuit pack. The SYSCTL circuit pack maintains a provisioning map of the entire system, so when a transmission or synchronization circuit pack is replaced, the SYSCTL circuit pack automatically downloads values to the new circuit pack. If the SYSCTL circuit pack is ever replaced, provisioning data, except for the line buildout (LBO) settings, from every other circuit pack in the system is automatically uploaded to the nonvolatile memory in the new SYSCTL circuit pack.

Memory Administration

Certain non-service-affecting provisioned data such as alarm delay and target identifier (TID) are stored only on the SYSCTL circuit pack. This means that when a SYSCTL circuit pack is replaced, the new SYSCTL circuit pack should be initialized by pressing the INIT button during the 10-second interval while the Critical alarm indicator is flashing after the SYSCTL circuit pack is inserted. This action is the same as entering the **init-sys:sysctl** CIT command which sets the SYSCTL circuit pack parameters to their default values. Refer to the CIT command **init-sys** in document 363-208-003, *SLC-2000 Access System, Commands and Messages*, and to the procedures for replacing the SYSCTL in Chapter 4, "Operations and Maintenance Procedures (TOP)," of this document.

If parameters other than the default values are needed, the values must be entered using the CIT. If the INIT function is not performed, the values used will be those stored in nonvolatile memory on the new SYSCTL circuit pack. Failure to follow the proper procedure will not cause transmission errors or loss of service but could affect maintenance. For example, an incorrect or duplicate TID could produce confusing UIP reports.

Feature Packaging Provisioning

Certain software features are available only through a special licensing agreement with Lucent Technologies.

- VT performance monitoring
- DS1 performance monitoring
- OC-3c (only supported in linear releases—R6.2.1 and later).

The user can enable these features with privileged user logins (according to the licensing agreement). The **set -feat** command enables the feature and the **rtrv -feat** command allows the user to review the feature. **These features are optional and may not be active on all systems.** For details on these and other commands, see document 363-208-003, *SLC-2000 Access System, Commands and Messages*.

Open Systems Interconnection (OSI) Provisioning

The SONET subsystem supports OSI interworking between *SLC-2000* systems and *DDM-2000* OC-3 and OC-12 Multiplexers. In a given maintenance subnetwork, the network elements (NEs) on each side of an optical span must have their *user-side/network-side* (OSI terminology) parameters set to opposite values using switch S2 on the OHCTL circuit pack. Local procedures should determine the *user* and *network* side of a span. For example, the central office (CO) terminal can be designated the network side and the remote terminal (RT) site the user side. It does not matter as long as the two sides are opposite values.

In a maintenance subnetwork, one and only one system **must** be provisioned as a gateway network element (GNE) by setting its GNE parameter to "yes." The GNE parameter must be set to "yes" to enable the TL1/X.25 interface and provide proper communications over the data communications channel (DCC). Provisioning the system as a GNE also designates the system as a directory services network element (DSNE) for the maintenance subnetwork. The DSNE provides directory service (target identification to network service access point network address translation) for all NEs in a maintenance subnetwork.

The network services access point (NSAP) is a multiple part address that uniquely identifies an NE for OSI interworking purposes. A unique NSAP is programmed into the OHCTL (Series 2:3 and later) circuit pack at the factory. This default NSAP value is adequate to operate current networks. NSAP provisioning, using the **ent -ulsdcc** command, will be used as part of future upgrade procedures. See the **ent -ulsdcc** command in document 363-208-003, *SLC-2000 Access System, Commands and Messages*, for more information on NSAP provisioning.

When an NE is removed from a maintenance subnetwork, either by physically removing it or disabling the SONET DCC, use the **dlt - tadrmap** command to remove the NE from the maintenance subnetwork data base so alarms can be cleared.

DCC Provisioning

The data communications channel (DCC) uses the SONET overhead to communicate between network elements in both linear and ring systems:

- **Linear systems.** There is one DCC for the Main slot pair and one DCC for each of the Function Unit (FN) slot pairs. The DCC follows the active SONET transmission line.
- **Ring systems.** There is one DCC for the *m1* ring and another DCC for the *m2* ring. The FN slot pairs in ring systems have one DCC each except for FN-A, which does not support OLIUs or a DCC.

When network elements are interconnected to form subnetworks with DCC connectivity, each DCC expects to be connected to a distinct DCC at the far end. This is the normal, default situation.

In the SONET subsystem (OC-3 Release 7.1), a new application is supported where the DCC for *m1* and the DCC for *m2* are connected to the identical DCC of a Function Unit of an OC-12 Release 3.1 system. This application is called *Dual 0 × 1* on the OC-12 side. Because the OC-12 system in this release does not support two distinct DCCs in each Function Unit, you must provision the OC-3 system for this application to work with DCC communications that are identical on ring *m1* and ring *m2*. The DCCMode parameter of the **set - ne** command is available in OC-3 Release 7.1 and later ring releases for this situation. The parameter has the following values:

distinct	The system is part of a normal path switched ring network. The DCCs for ring <i>m1</i> and ring <i>m2</i> are distinct and will have different messages on each DCC. This is the default for ring software.
identical	The system is connected to an OC-12 Release 3.1 dual 0 × 1 OC-12 network. The DCCs for ring <i>m1</i> and ring <i>m2</i> are connected to a single DCC on a selected OC-12 function unit that sends identical messages to each ring.

Cross-Connect Provisioning

You can provision the SONET subsystem for cross-connect routing of signals. In some applications, such as linear add/drop, drop, or hubbing, STS-1 or VT1.5 signal cross-connections may be established to route traffic in a specific manner. All cross-connections are bidirectional. With some restrictions, any STS-1 or VT1.5 signal may be cross-connected to a like signal with an available time slot. Any STS-1 or VT1.5 signal between the Main slot and any Function Unit slot may

be cross-connected. Also, any STS-1 or VT1.5 channel in Function Unit A may be cross-connected to any available time slot in Function Unit C when Function Unit C is equipped with OLIUs.

In ring applications, STS-1 and VT1.5 signals may be cross-connected in several ways also.

- ***Bidirectional drop services.*** The normal (default) *two-way* cross-connection is used to connect a like signal in the high-speed Main slot to any available time slot in any Function Unit equipped with low-speed STS1E, DS3 or DS1 circuit packs.
- ***Bidirectional hub applications at a ring node.*** The normal (default) *two-way* cross-connection is used to connect a like signal in the high-speed Main slot to any available time slot in the C Function Unit that has been equipped with OLIU circuit packs.
- ***Bidirectional pass-through service.*** This service is used to connect the high-speed signal from one side of the ring to the other side. Both rings are properly connected using a single *two-way* (**ent - crs**) command. The high-speed time slot entering must be the same leaving in pass-through connections.

The *drop and continue* service provides in a single command (**ent - crs**) the proper bidirectional cross-connection to do the following:

- To **drop** a copy of the high-speed signal in the Main slot to any available time slot in any Function Unit
- To **continue** the signal on the high-speed channel to the next node.

The same command also properly drops the signal from the opposite ring direction.

The SONET subsystem has two cross-connect modes of operation, default and manual.

- ***On linear systems***, this mode is *default* and can be provisioned to *manual*.
- ***On ring systems***, this mode is *manual* and cannot be changed.

You can change the cross-connect mode using the **set - ne** command and selecting the required **crs** mode. You can verify the cross-connect mode with the **rtrv - ne** command. You can implement any cross-connect command at each individual site in a network through the CIT connection, or at any site with a remote login session from any other site.

See document 363-208-000, *SLC-2000 Access System, Application, Planning, and Ordering Guide*, for a description of DS1 and DS0 cross-connect provisioning.

Linear Application Default Cross-Connect Mode

In the default cross-connect mode, STS-1 cross-connections are automatically set up. The default cross-connections are determined according to the circuit pack equipage of the SONET subsystem. No VT1.5 cross-connections are made in the default mode. If slots are unequipped, then no cross-connection is made.

For some applications, such as a point-to-point configuration, the default mode may provide all the necessary cross-connections.

SLC-2000 linear systems support a fixed mapping between STS-1 signals embedded in the OC-3 line signal and the STS-1s associated with signals dropped on the system. This *default* STS-1 signal mapping is shown in Table 5-4. When the **crs** parameter is *default*, the system denies attempts to enter or delete cross-connections. When the value of the **crs** parameter is *manual*, the system does not automatically create or delete cross-connections. Even if a circuit pack is inserted into an empty slot, the system waits for the user to provision the cross-connection before the port is put into service. Likewise, a circuit pack cannot be removed until the cross-connection to the circuit pack is deleted.

Table 5-4. SONET Subsystem OC-3 Default STS-1 Cross-Connections (Termination)

From		To	"To" CP Type (Note)	CIT Command
m-1	<-->	a	MXRVO, STS1E, DS3	-not required-
m-3	<-->	c	MXRVO, STS1E, DS3	-not required-
m-1	<-->	a-1	OLIUI	-not required-
m-3	<-->	c-3	OLIUI	-not required-

Note: The STS1E circuit pack hardware switch must be set to *low-speed* to support cross-connections.

Manual Cross-Connections

If the default cross-connections do not provide the necessary connections, then a manual cross-connect mode may be selected by entering the **set -ne** command and changing the **crs** parameter to manual. In the manual cross-connect mode, the cross-connections can be changed using the following commands:

- **ent -crs -sts1** (Enter Cross-Connection STS-1) — This command creates STS-1 signal cross-connections.
- **dlt -crs -sts1** (Delete Cross-Connection STS-1) — This command deletes STS-1 signal cross-connections.

- **ent-crs-vt1** (Enter Cross-Connection VT1.5) — This command creates VT1.5 signal cross-connections. The 22-type OLIU circuit packs must be used to establish VT1.5 cross-connections.
- **dlt-crs-vt1** (Delete Cross-Connection VT1.5) — This command deletes VT1.5 signal cross-connections.
- **cnvt-crs** (Convert Cross-Connection) — In linear systems, this command converts an existing STS-1 cross-connection to 28 individual VT1.5 cross-connections with the same endpoints as the STS-1 cross-connection. VT1.5 signals carried within the original STS-1 appear in the same time slots in the upstream or downstream DDM-2000 OC-3 before and after the conversion takes place. The 22-type OLIU circuit packs must be used to convert cross-connections.

The **cnvt-crs** command has the unique ability to convert an existing STS-1 signal into its component 28 VT1.5 signals. This conversion enables an easy upgrade of existing STS-1 drop networks to DS1 add/drop networks. No inverse capability is available to convert 28 VT1.5 signals back to a single STS-1 cross-connection. This command is available on linear systems.

The SONET subsystem OC-3 linear and ring systems provide flexible routing of STS-1 and VT1.5 signals between high-speed and function unit interfaces for ring, hubbing, and add/drop applications. These *manual* cross-connections are entered using the CIT and are shown in Tables 5-5 through 5-14. The **crs** parameter must be set to *manual* to enter flexible STS-1 and VT1.5 cross-connections.

Tables 5-5 through 5-14 list the various type cross-connections supported. After the tables are descriptions of applications and the types of cross-connections each application requires.

Table 5-5. SONET Subsystem OC-3 Manual STS-1 Cross-Connections (Termination/Drop)

From	To	"To" CP Type (Note)	Example Command
m-{1-3}	<-->	a	MXRVO, STS1E, DS3
m-{1-3}	<-->	c	MXRVO, STS1E, DS3

Note: The STS1E circuit pack hardware switch must be set to "low-speed" to support cross-connections.

Table 5-6. SONET Subsystem OC-3 Manual STS-1 Cross-Connections (Hub/Drop)

From	To	"To" CP Type	Example Command
m-{1-3}	<-->	a-{1,2}	OLIUI
m-{1-3}	<-->	c-{1-3}	OLIUI

Table 5-7. SONET Subsystem OC-3 Manual STS-1 Cross-Connections (Add)

From	To	"From" CP Type (Note)	Example Command
a	<-->	c-{1-3}	MXRVO, STS1E, DS3
a-{1,2}	<-->	c-{1-3}	OLIUI

Note: The STS1E circuit pack hardware switch must be set to "low-speed" to support cross-connections.

Table 5-8. SONET Subsystem OC-3 Manual STS-1 Cross-Connections (Rings Pass Through)

From	To	"To" CP Type (Note)	Example Command
m-1	<-->	m-1	OLIUI
m-3	<-->	m-3	OLIUI

Note: Address on the left side MUST BE identical to the address on the right side. There is no interchange function for *pass-through* signals.

Table 5-9. SONET Subsystem OC-3 Manual STS-1 Cross-Connections (Rings Drop and Continue)

From	To	"To" CP Type (Note)	Example Command
m-{1-3}	<--> a	STS1E	ent-crs-sts1:m-1,a:cct=dc,ring=m1
m-{1-3}	<--> c	STS1E	ent-crs-sts1:m-3,c:cct=dc,ring=m2

Note: The STS1E circuit pack hardware switch must be set to "*low-speed*" to support cross-connections. The *ring* parameter defines the ring carrying the continue signal. This ring directly connects to the other drop and continue system.

Table 5-10. SONET Subsystem OC-3 Manual VT1.5 Cross-Connections (Termination/Drop)

From	To	"To" CP Type (Note)	Example Command
m-{1-3}-{1-7}-{1-4}	<--> a-{1-7}-{1-4}	MXRVO, STS1E	ent-crs-vt1:m-1-1-1,a-1-1
m-{1-3}-{1-7}-{1-4}	<--> c-{1-7}-{1-4}	MXRVO, STS1E	ent-crs-vt1:m-3-3-3,c-3-3

Note: The STS1E circuit pack hardware switch must be set to "*low-speed*" to support cross-connections.

Table 5-11. SONET Subsystem OC-3 Manual VT1.5 Cross-Connections (Hub/Drop)

From		To	"To" CP Type	Example Command
m-{1-3}-{1-7}-{1-4}	<-->	a-{1,2}-{1-7}-{1-4}	OLIUI	ent-crs-vt1:m-1-1-1,a-1-1-1
m-{1-3}-{1-7}-{1-4}	<-->	c-{1-3}-{1-7}-{1-4}	OLIUI	ent-crs-vt1:m-3-3-3,c-3-3-3

Table 5-12. SONET Subsystem OC-3 Manual VT1.5 Cross-Connections (Add)

From		To	"From" CP Type (Note)	Example Command
a-{1-7}-{1-4}	<-->	c-{1-3}-{1-7}-{1-4}	MXRVO, STS1E	ent-crs-vt1:a-1-1,c-1-1-1
a-{1,2}-{1-7}-{1-4}	<-->	c-{1-3}-{1-7}-{1-4}	OLIUI	ent-crs-vt1:a-2-2-2,c-2-2-2

Note: The STS1E circuit pack hardware switch must be set to "low-speed" to support cross-connections.

Table 5-13. SONET Subsystem OC-3 Manual VT1.5 Cross-Connections (Pass Through)

From		To	"To" CP Type (Note)	Example Command
m-1-{1-7}-{1-4}	<-->	m-1-{1-7}-{1-4}	OLIUI	ent-crs-vt1:m-1-1-2,m-1-1-2
m-2-{1-7}-{1-4}	<-->	m-2-{1-7}-{1-4}	OLIUI	ent-crs-vt1:m-2-3-4,m-2-3-4
m-3-{1-7}-{1-4}	<-->	m-3-{1-7}-{1-4}	OLIUI	ent-crs-vt1:m-3-5-3,m-3-5-3

Note: Address on the left side MUST BE identical to the address on the right side. There is no interchange function for "pass-through" signals.

Table 5-14. SONET Subsystem OC-3 Manual VT1.5 Cross-Connections (Rings Drop and Continue)

From	To	"To" CP Type (Note)	Example Command
m-{1-3}-{1-7}-{1-4}	<--> a-{1-7}-{1-4}	STS1E	ent-crs-vt1:m-1-1-1,a-1-1:cct=dc,ring=m1
m-{1-3}-{1-7}-{1-4}	<--> c-{1-7}-{1-4}	STS1E	ent-crs-vt1:m-3-3-3,c-3-3:cct=dc,ring=m2

Note: The STS1E circuit pack hardware switch must be set to "*low-speed*" to support cross-connections. The "ring" parameter defines the ring carrying the continue signal. This ring directly connects to the other drop and continue system.

Optical Point-to-Point Application

This is a linear application with two NEs. Valid mapping is provided by termination cross-connections. Either *default* or *manual* mode is supported per system. DS1 services are supported either by STS-1 signal mapping to 28 VT1.5 signals as described under default cross-connections or by manual VT cross-connections. VT cross-connections are allowed only if the OLIU circuit pack is a 22-type and the **crs** mode is *manual*.

Optical Drop Application

This is a linear application with multiple NEs in a chain. Function Unit "C" of intermediate nodes is equipped with OLIUs to transport signals to the next NE. Valid mapping is provided by termination and drop cross-connections. Either *default* or *manual* mode is supported per system. Intermediate drop nodes may require *manual* cross-connections. DS1 services are supported either by STS-1 signal mapping to 28 VT1.5 signals as described under default cross-connections or by manual VT cross-connections. VT cross-connections are allowed only if the OLIU circuit pack is a 22-type and the **crs** mode is *manual*.

Optical Hubbing Application

This is a linear application with multiple NEs in a hub/chain. Hub NE Function units can be equipped with OLIUs to transport signals to the next NE. Valid mapping is provided by termination, hub, and drop cross-connections. Either *default* or *manual* mode is supported per system. Intermediate hub nodes may require *manual* cross-connections. DS1 services are supported either by STS-1 signal mapping to 28 VT1.5 signals as described under default cross-connections or by manual VT cross-connections. VT cross-connections are allowed only if the OLIU circuit pack is a 22-type and the **crs** mode is *manual*.

Optical Add/Drop Application

This is a linear application with multiple NEs in a chain. Function Unit "C" of intermediate nodes is equipped with OLIUs to transport signals to the next NE. Valid mapping is provided by termination, add, and drop cross-connections. Either *default* or *manual* mode is supported per system.

Intermediate drop nodes may require *manual* cross-connections. Intermediate add/drop nodes require *manual* cross-connections and an OLIU circuit pack, a 22-type, that supports add/drop cross-connections.

DS1 services are supported either by STS-1 signal mapping to 28 VT1.5 signals as described under default cross-connections or by manual VT cross-connections. VT cross-connections are allowed only if the OLIU circuit pack is a 22-type and the **crs** mode is *manual*.

Electrical EC-1 Multiplexer Application

This is an application with one NE. Valid cross-connections are provided by the system and depend on the equipage. DS1 services are supported by EC-1 (STS-1) signal mapping to 28 VT1.5 signals as described under default cross-connections. The STS1E circuit pack must be hardware-provisioned for the "high-speed" mode.

OC-3 Path Protected Ring Application

This is a path protected ring application with multiple NEs in a two-fiber ring. The main optical units of each node in the ring are equipped with ring OLIU circuit packs, the 22-type, to transport signals to the next NE as well as drop signals at the NE. Valid mapping is provided by termination and pass through cross-connections. Only the *manual* cross-connect mode is supported.

OC-3 Path Protected Ring Drop and Continue Application

This is a path protected ring application with multiple NEs in a two-fiber ring. All but two nodes are normal ring application nodes. (See previous application.) Two nodes are defined to be the drop and continue nodes and are neighbors. They function to provide two copies of each service on the ring to another ring (dual ring interworking) or to wire centers (dual wire center service). Special drop and continue cross-connections are used to support this feature. The STS1E low-speed circuit pack is used to transport traffic between rings or to the wire centers. This feature provides node failure survival functionality. These two special nodes can also provide normal ring functionality at the same time.

OC-3 Path Protected Ring Optical Extension Application

This is a path protected ring application with multiple NEs in a two-fiber ring and OLIU circuit packs in Function Unit C of an NE. This application allows services to exit the ring on OC-3 interfaces to other NEs. Mixed network topologies (ring and linear) are possible but require compatibility between the ring and linear software releases.

Manual Cross-Connect Procedure

The SONET subsystem has a per system parameter called **crs**, which determines if the system uses automatic *default* STS-1 signal routing or requires the user to enter and delete all cross-connections. Manual mode (**crs=manual**) disables the *default* routing and unlocks the cross-connect table for editing by the user.

The following procedure reprovisions linear systems from default to manual.

- a. From the CIT, issue the command **set-ne:crs=manual**; to put the system into *manual* mode. On linear systems, any existing *default cross-connections* made by the system will still be active but are now *manual*.
- b. All cross-connections entered by the user are *manual* connections and must be deleted by the user to change service.
- c. All commands to change signal routings (enter or delete) may be service affecting. A warning and confirmation for the request are issued as explained in document 363-208-003, *SLC-2000 Access System, Commands and Messages*, for the **ent-crs** and **dlt-crs** commands.
- d. Manual routing requires that slots be equipped. The **ent-crs** routing command will check if the slot is equipped and display an error message denying illegal requests.
- e. Manual routing requires that slots be equipped. Therefore, if the last circuit pack of a protected pair is removed from the slot even if there is no signal on the circuit pack, the action is alarmed. The "Update" command will be denied. The manual routing must be deleted before the circuit pack can be removed and the slot can become unequipped using the "Update" command.
- f. The **rtrv-crs** commands display the cross-connect routing table.
- g. In Function slots A and C, more than one STS-1 signal or 28 VT1.5 signals can be manually routed to them. This is invalid for MXRVO, STS1E, and DS3 circuit packs. If a routing command is issued and the circuit pack type is wrong, the command is denied.
- h. In linear systems, to put the system back into *default* cross-connect mode requires that the existing cross-connections be STS-1 and be valid defaults. See Table 5-5. The user is required to reset the cross-connections to meet these rules. If the cross-connect table is not valid, the **set-ne:crs=default**; command is denied.

Manual Cross-Connect Restrictions

Restrictions on manual cross-connections include the following:

- All VT-1.5 cross-connections (**ent - crs - vt1**) are done via the OLIU circuit packs in the Main slots. The OLIU circuit packs must be 22F or 22G-U.
- When Function Unit A is equipped with OLIUs, they can only carry two STS-1 or 56 VT1.5 signals. They cannot be cross-connected with Main or Function Unit C to carry three STS-1 or 84 VT1.5 signals.
- A cross-connection cannot be made to a slot that is in the unequipped state. Also, a cross-connection may not be made with any signal where a cross-connection already exists. The existing cross-connection must be deleted before a new cross-connection can be entered.
- If the system is equipped with OLIUs in Function Unit A, only one STS-1 signal per function unit is allowed to be connected (added) to Function Unit C.
- For VT1.5 cross-connections, all drop and continue cross-connections on a system must be entered into the same ring.
- For ring applications, use the following rules to establish cross-connections in each ring:
 - a. All drop connections (including DRI, if present) from the same ring must be provisioned the same, either all VT1.5 or all STS-1.
 - b. If all 28 VT1.5s (DS1s) in an STS-1 are being passed through at a node in a VT1.5 path-switched ring, the cross-connection may be provisioned as either a pass-through STS-1 or VT1.5. However, if you anticipate dropping VTs from the pass-through node, you should provision the pass throughs as VT cross-connections. OC-3 Release 7.0 does not support the command (**cnvt - crs**) for converting an STS to a VT cross-connection. Also, provisioning now as a VT cross-connection will avoid a hit on traffic if the STS-1 cross-connection has to be converted to 28 VT cross-connections to drop DS1s at a later time.
 - c. On STS-1 path-switched rings, all nodes in the ring must be provisioned as STS-1 cross-connections.

To do a cross-connection successfully, proper addressing of cross-connect points is necessary. For a complete list of valid addresses, refer to Tables 5-5 through 5-14.

Ring Cross-Connect Provisioning

For every DS1, VT1.5, STS-1, or DS3 transported through a ring network, a cross-connection is needed in every NE (node) on the ring. A "drop" cross-connection is needed at the nodes where service enters or exits the ring. A "pass-through" cross-connection is needed at all other nodes (intermediate nodes) on the ring.

For the SONET subsystem, cross-connections of both ring paths are entered with a single command entry per system. This minimizes the possibility of provisioning a circuit without a protection channel. A SONET subsystem OC-3 ring has 84 VT1.5 channels or 3 STS-1 channels. The ring channels are always carried within the 22-type OLIU circuit packs in the Main 1 and Main 2 slots. The VT1.5 ring channels are designated **m-{sts#}-{vtg#}-{vt#}**. The STS-1 channels are designated **m-{sts#}**. In cross-connect provisioning, there is no need to identify ring channels in Main 1 different from Main 2 because both rings are always provisioned with the same information.

At the entry and exit points, the VT channels are cross-connected to the low-speed ports (for example, **{ls group}-{slot#}-{port# on slot}, a-7-4**). These are called "drop" connections. For example, the command **ent-crs-vt1:m-2-6-4,a-1-3** connects the third low-speed port associated with slot 1 of low-speed group A to the fourth VT1.5 within the sixth VT group within the second STS-1 of both rings. Similarly, for STS-1 channels, the command **ent-crs-sts1:m-2,a** connects the DS3 or EC-1 port of Function Group A to the second STS-1 of both rings.

At the intermediate nodes, a pass-through cross-connection establishes a cross-connect path on both rings. Pass through cross-connections are designated by using the same VT or STS-1 ring channel twice in the cross-connect address. For example, the single command **ent-crs-vt1:m-2-6-4:m-2-6-4** connects a pass-through cross-connection both to and from the fourth VT1.5 within the sixth VT group within the second STS-1 of both the service and protection ring. Also note that, unlike linear networks that require 22-type OLIUs in both Main and Fn-C slots to create pass-through connections, ring pass-through cross-connections are made directly between both Main OLIUs.

Depending on local practice, work orders will normally identify the low-speed port designations at the entry and exit points in the network and the target identifiers (TIDs) of the NEs at these points. The work order may also designate the VT1.5 or STS-1 ring channel which will be used for this service. If the work order does not designate a ring channel to use, use the command **rtrv-crs-vt1**; or **rtrv-crs-sts1**; to identify all the ring channels that are currently unassigned. The work order also may not necessarily designate all the other NEs on the ring that need to be provisioned with pass-through cross-connections. In this case, use the **rtrv-nmap** command to identify the TIDs for all the network elements in a ring.

Ring Drop and Continue Cross-Connect Provisioning

All the information on "Ring Cross-Connect Provisioning" applies to "Ring Drop and Continue Cross-Connect Provisioning." Please review "Ring Cross-Connect Provisioning" as that information is not repeated here. Only the new provisioning information is presented here. This information applies to both STS-1 and VT1.5 traffic. Only the cross-connect addresses are different. A mixed traffic ring of STS-1 and VT1.5 drop and continue services is supported.

Two nodes are defined to be drop and continue nodes in a ring maintenance subnetwork and are the exit points where "two" copies of the same service are available. By making two copies of the same service available at two nodes, the network is protected from failure of a node (for example, a CO) that affects all traffic on the ring. For rings that carry drop and continue services, the drop and continue nodes are neighbors and all "drop and continue" traffic must be continued on the ring connecting the two nodes.

In Figure 5-1 (one half of a drop and continue dual ring interworking application), CO 1 and CO 2 are drop and continue nodes. Traffic continued at CO 1 uses Ring 2 which is the fiber connecting CO 1 to CO 2. Likewise, continued traffic at CO 2 uses Ring 1, which is the fiber connecting CO 2 to CO 1.

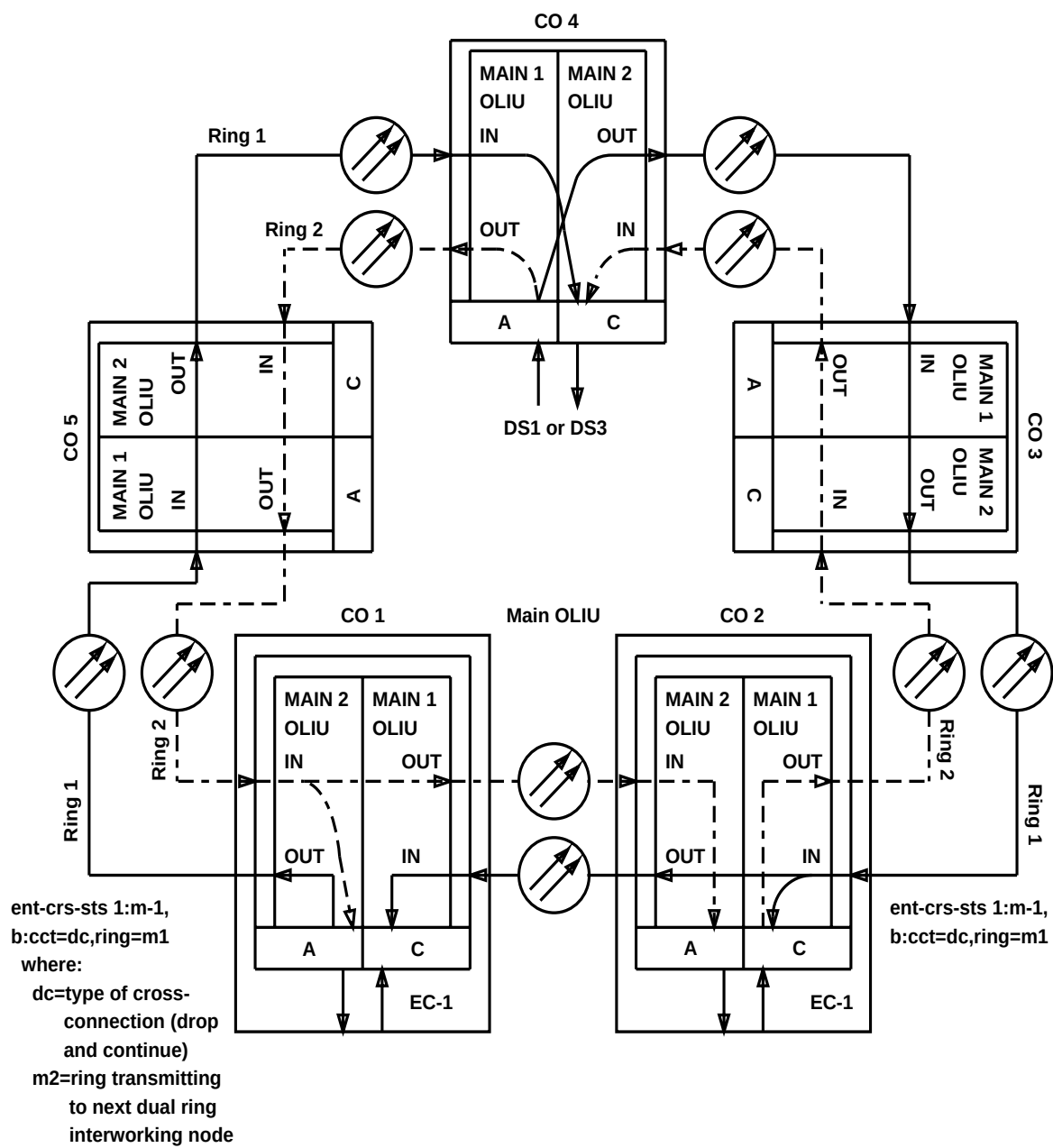


NOTE:

Figure 5-1 shows *SLC-2000* systems only. If *DDM-2000*s are used, the B function group is supported at the *DDM-2000* nodes. For more details, see the provisioning chapter in document 362-206-202, *DDM-2000 OC-3 Multiplexer User/Service Manual*.

When a new service is added to the ring, use the normal procedures to add service to all nodes of a ring except to the drop and continue nodes. Before a drop and continue cross-connection can be made to a low-speed Function Unit, the slots must be equipped with STS1E low-speed circuit packs. This circuit pack type is the interface for drop and continue applications. The cross-connect command for drop and continue at CO 1 (see Figure 5-1) has two new parameters. They are cross-connect type (**cct**) and ring identification (**ring**). The **cct** is **dc** for drop and continue. The parameter **ring** for the **ent-crs-sts1** or **ent-crs-vt1** command defines the direction of the continued signal. The counterclockwise ring is called **m2** because it is always connected to main-2 OLIU. Similarly, the clockwise ring is called **m1** because it is always connected to main-1 OLIU. At CO 1 the parameter for **ring** is **m2**, which means to continue the signal on Ring 2 toward CO 2. For VT1.5 cross-connections, once the first VT drop and continue cross-connection defines the ring direction, all other VT drop and continue cross-connections at that node are forced to use that ring rotation.

Similarly at CO 2, the other drop and continue node, the cross-connect command requires the same two parameters. The **cct** parameter is **dc** and the value for **ring** is **m1**, which means to continue the signal on Ring 1 toward CO 1.



DandCnodes.ps

Figure 5-1. Drop and Continue Nodes

Identifiers

The following identifiers (IDs) are used for the shelf, site, network element, and target IDs.

- **Shelf ID** — The shelf ID is a switch settable parameter with values of from 1 to 8. For the *SLC-2000* Access System, this number is always 1.
- **Site ID** — The site ID is a switch settable parameter with values of from 1 to 8. The site ID is displayed on the seven-segment display on the SYSCTL circuit pack to indicate to which site the UIP alarm LEDs apply. The same site ID should be assigned to all systems in the same bay or cabinet. The site ID should be assigned consecutively starting at the central office (CO) site unless parallel telemetry is used. If parallel telemetry is used, the CO site should be assigned as site 7 and the remote sites assigned numbers 1 through 6 (site 8 is not available).
- **Network element ID** — The network element (NE) ID is a switch settable parameter with values of from 1 to 5. Network elements (DDM-2000 shelves and *SLC-2000* Access Systems) at a specific site that belong to the same subnetwork must be assigned a unique network element ID. The network element ID is combined with the site ID to form a default value for the TID.
- **Target ID** — The TID is a 20-character parameter that is set through the CIT using the **set -ne** command. The TID is used in the **rlgn** command to identify an NE to establish a remote login session. The TID is also used by an operations system (OS) such as network monitoring and analysis (NMA) to identify NEs using the TL1 message-based communications protocol.

On initial powerup or after the **init-sys:all** or **init-sys:sysctl** commands are entered, the system sets the TID to a default value obtained by combining the site ID with the NE ID. The TID must be unique among all NEs served by a common NMA. Therefore, the default TID must be changed using the **set -ne** command to a user-assigned value recognized by the NMA.

Switch Selectable Parameters

Tables 5-15 and 5-16 describe the parameters provisionable using hardware switches. For a complete explanation of parameters, refer to the data sheet for the individual circuit pack.

Table 5-15. Parameters Provisionable Using Hardware Switches (SONET Software Release 7.X and Earlier)

Parameter	Range	Pack	Command (Note)
Site # (par. telem., seven seg. LED)	1-8	SYSCTL	rtrv-ne
Shelf # in bay	1-8	SYSCTL	rtrv-ne
Network Element	1-5	OHCTL	rtrv-ne
C/R (Command/Response DCC bits)	user, network	OHCTL	rtrv-ne
CO/RT select	RT, CO	SYSCTL	rtrv-ne
TBOS display number	1-8	SYSCTL	rtrv-ne
TBOS backup function	primary, secondary, normal, no TBOS	SYSCTL	rtrv-ne
TBOS termination	last, not last	SYSCTL	
Remote TBOS reporting	enabled, disabled	SYSCTL	rtrv-ne
Front CIT data rate	300, 1,200, 2,400, 4,800, 9,600, 19,200 baud	SYSCTL	rtrv-ne
Rear CIT (modem) data rate	300, 1,200, 2,400, 4,800, 9,600, 19,200 baud	SYSCTL	rtrv-ne
Power minor office alarm	minor, major	SYSCTL	rtrv-ne
Optical transmitter power	high, low	21G OLIU	rtrv-oc3
DS1 reference format*	SF, ESF	TGS	rtrv-sync
DS1 reference line coding*	AMI, B8ZS	TGS	rtrv-sync
Timing mode	free running, external DS1, loop timed	TGS	rtrv-sync
SYNC Output LBO †	five settings (cable dependent)	TGS(BBF2B)	
DS1 Output	MULT/SYNC OUT	TGS(BBF2B)	rtrv-sync
DS1 line coding ‡	AMI, B8ZS	DS1	rtrv-t1
DS1 LBO §	five settings (cable dependent)	DS1	
STS1E LBO §	two settings (cable dependent)	STS1E	
STS1E pack type	high-speed, low-speed	STS1E	rtrv-eqpt rtrv-ec1

Note: Current switch settings except DS1 LBO, SYNC Output LBO, STS1E LBO, and TBOS termination can be reported using CIT.

* For both DS1 in and out.

† Operational only in the SYNC OUT mode.

‡ CIT can override switch settings. (Factory default is *unverified*.) Parameter can be set for each port.

§ Parameter can be set for each circuit pack.

Table 5-16. Parameters Provisionable Using Hardware Switches (SONET Software Release 9.0 and Later)

Parameter	Range	Circuit Pack	Command (Note)
Product ID (S1)	"Product Type"	SYSCTL	rtrv-ne
TBOS termination (S2)	last, not last	SYSCTL	–
Optical transmitter power	high, low	21G/21G-U OLIU	rtrv-oc3
DS1 reference format [*]	SF, ESF	TGS	rtrv-sync
DS1 reference line coding [*]	AMI, B8ZS	TGS	rtrv-sync
Shelf timing mode	free-running, external DS1, line timed	TGS	rtrv-sync
SYNC Output LBO [†]	five settings (cable dependent)	TGS	
DS1 Output	MULT/SYNC OUT	TGS	rtrv-sync
DS1 line coding [‡]	AMI, B8ZS	DS1	rtrv-t1
DS1 LBO [§]	five settings (cable dependent)	DS1	
DS3 LBO [§]	two settings (cable dependent)	DS3	–
STS1E LBO [§]	two settings (cable dependent)	STS1E	–
STS1E pack type	high-speed, low-speed	STS1E	rtrv-eqpt rtrv-ec1

Note: Current switch settings except DS1 LBO, SYNC Output LBO, STS1E LBO, and TBOS termination can be reported using CIT.

* For both DS1 in and out.

† Operational only in the SYNC OUT mode.

‡ CIT can override switch settings. (Factory default is *noOverride*.) Parameter can be set for each port.

§ Parameter can be set for each circuit pack.

CIT Selectable Parameters

Table 5-17 describes the parameters provisionable using the CIT on the SONET subsystem. Refer to the command pages in document 363-208-003, *SLC-2000 Access System, Commands and Messages*, for a complete explanation of parameters.

Table 5-17. SONET Subsystem Parameters Provisioned Using the CIT

Parameter	Range	Default (Note 1)	Command (Note 2)
Date	current value	70-01-01	set-date
Time	current value	00:00:00	set-date
Target ID (system name)	20 characters	Site#NE#*	set-ne
Gateway network element [†]	yes, no	no ‡	set-ne
Cross-connect mode	default, manual	default	set-ne
Site number [§]	1-32	32	set-ne
Network element # [§]	1-5	5	set-ne
Shelf number [§]	1-8	1	set-ne
CO/RT select [§]	CO,RT	RT	set-ne
TBOS address [§]	1-8	1	set-ne
TBOS link [§]	primary, secondary, normal, no TBOS	no TBOS	set-ne
TBOS remote [§]	enabled, disabled	disabled	set-ne
DSNE ^{‡§}	yes, no	no	set-ne
AGNE [§]	yes, no	no	set-ne
Alarm group number [§]	1-255	255	set-ne
STS Uneqpd./AIS insert [§]	Uneqpd., AIS	AIS	set-ne
VT Uneqpd./AIS insert [§]	Uneqpd., AIS	AIS	set-ne
System Location [†]	36 characters	null	set-sid
CIT page length	0 (pager off), 3-150 rows	24	set-link
PM thresholds	See Table 5-18	-	set-pmthres
Alarm holdoff delay	0-30 sec	2	set-attr-alm
Alarm clear delay	0-30 sec	15	set-attr-alm
Power minor alarm level [§]	MN, MJ	MN	set-attr-alm
OC-3 degrade threshold	10 ⁻⁵ — 10 ⁻⁹	10 ⁻⁶	set-oc3
Kbyte Messages (sync messaging) [†]	enable, disable	enable	set-oc3
Sync Messaging [§]	K byte, S byte, disable	K byte	set-oc3
Concatenation mode [¶]	enable, disable	enable	set-oc3
Concatenation mode (linear release 8)	disable, sts3c	disable	set-oc3
AIS alarm level of NSA OC-3 Line AIS [§]	CR,MJ,MN,NA	NA	set-oc3
See notes and footnotes at end of table.			

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Table 5-17. SONET Subsystem Parameters Provisioned Using the CIT (Continued)

Parameter	Range	Default (Note 1)	Command (Note 2)
DS1 line coding	AMI,B8ZS,noOverride**	noOverride	set-t1^{††}
DS1 alarm level	MJ, MN, NA	NA	set-t1^{††}
DS1 AIS insertion	yes, no	yes	set-t1^{††}
DS1 failure threshold	10 ⁻³ , 10 ⁻⁶ , 10 ^{-7§} , 10 ^{-8§} BER	10 ⁻³	set-t1^{††}
DS1 BPV to LOS	yes, no	no	set-t1^{††}
DS1 port state [†]	not monitored, AUTO ^{††}	AUTO	set-state-t1^{††}
DS1 PM Mode	off [†] , sf [†] , esf [†] , esfn [†] off [§] , on [§]	off	set-t1^{††}
DS1 PM Format [§]	sf, esf, esfn	esf	set-t1^{††}
DS1 primary port state [§]	NMON, AUTO ^{††}	AUTO	set-state-t1^{††}
Environmental alarm level	CR, MJ, MN, none	MN	set-attr-env
Environmental alarm type	10 characters		set-attr-env
Environmental alarm description	26 characters		set-attr-env
Control point description	26 characters		set-attr-cont
OC-12 degrade threshold ^{§§}	10 ⁻⁵ to 10 ⁻⁹	10 ⁻⁶	set-oc12
Sync Messaging ^{§§}	K byte, S byte, Disabled	K byte	set-oc12
AIS alarm level of NSA OC-12 Line AIS ^{§§}	CR,MJ,MN,NA	NA	set-oc12
STS-1 path signal degrade threshold ^{¶¶}	10 ⁻⁵ to 10 ⁻⁹	0 (disabled)	set-sts1
NSA STS-1 path AIS alarm level	MN, NR	MN	set-sts1
SA STS-1 path AIS alarm level	CR, MN, NA, NR	MN	set-sts1
STS-1 channel state ^{***}	NMON, AUTO ^{††}	AUTO	set-state-sts1
OC-1 line state (ring releases)	NMON, IS	IS	set-state-oc1
VT1.5 path signal degrade threshold ^{¶¶***}	10 ⁻⁵ to 10 ⁻⁹	0 (disabled)	set-vt1
NSA VT path AIS	MN, NR	MN	set-vt1
SA VT path AIS	MJ, MN, NA, NR	MJ for ring MN for linear	set-vt1
VT channel state ^{***}	NMON, AUTO ^{††}	AUTO	set-state-vt1
DS3 VMR mode ^{††}	VMR, VM, clear channel	VMR	set-t3
Clear channel DS3 AIS insertion ^{††}	yes, no	no	set-t3
DS3 sig failure alm. level ^{††}	CR, MJ, MN, NA	CR	set-t3
DS3 failure threshold ^{††}	10 ⁻³ , 10 ⁻⁶ BER	10 ⁻³	set-t3
DS3 PM mode ^{††}	off, on	on	set-t3
DS3 PM frame ^{††}	m13,cbit	m13	set-t3
DS3 PM format ^{††}	pbit, fmbit, cpbit	pbit	set-t3
DS3 port state ^{††}	NMON, AUTO ^{††}	AUTO	set-state-t3
Far end communication	disabled, enabled	enabled	set-fecom^{†††}
DCC identity for OSI ntwks. [§]	userside, networkside	see 363-208-003	set-fecom^{†††}

See notes and footnotes at end of table.

Continued on next page

Table 5-17. SONET Subsystem Parameters Provisioned Using the CIT (Continued)

Parameter	Range	Default (Note 1)	Command (Note 2)
Set security [†]	enabled, disabled, lockout [‡]	disabled	set-secu^{†††}
CIT security [†]	enable, disable, lockout [§]	disable	set-secu^{†††}
CIT timeout (minutes) [†]	0-120	15	set-secu^{†††}
DCC security [†]	enable, disable, lockout [§]	disable	set-secu^{†††}
DCC timeout (minutes) [†]	0-120	15	set-secu^{†††}
Sync Timing Source ^{¶§}	main, fn-c,	main	set-sync
Sync Output Mode [§]	track [§] , lock1, lock2	track	set-sync
Sync Timing Source ^{¶§}	main-1, main-2	main-1	set-sync
SYNC mode switching	revertive, nonrevertive	revertive	set-sync
AIS Threshold	level 5, level 4, level 3, level 2	level 5	set-sync
Auto. sync. reconfig. [§]	enabled, disabled	disabled	set-sync
EC-1 alarm level ^{††}	CR, MJ, MN, NA	CR	set-ec1
EC-1 degrade threshold ^{††}	10 ⁻⁵ to 10 ⁻⁹ BER	10 ⁻⁶	set-ec1
EC-1 port state ^{††}	NMON, AUTO ^{††}	AUTO	set-stats-ec1
Feature Packaging ^{†††} VT PM, DS1 PM, or STS3c	enable, disable	disable	set-feat
X.25 packet size [§]	128,256	256	set-x25
NSAP [§]			
OrganizationID (OperatorID) [§]	6 hex digits	000000	ent-ulsdcc
Reserved (reserved) [§]	4 hex digits	0000	ent-ulsdcc
Routing Data (Domain/Area) [§]	8 hex digits	00000000	ent-ulsdcc
VC ckt. type X.25 attach. SNPA: LCN for PVCs [§]	PVC, SVC LCN, DTE	PVC LCN1(PVC) LCN2 (PVC) LCN3 (PVC)	ent-osacmap
or DTE address for SVC [§]	see 363-208-003		ent-osacmap
OS type (ACID) [§]	see 363-208-003		ent-osacmap
ACID (OS type or funct.) [§]	see 363-208-003		ent-tl1msgmap
TL1 message type [§]	see 363-208-003		ent-tl1msgmap
Action to assoc. message type to OS [§]	enabled, disabled	enabled	ent-tl1msgmap
Cross-connection type [§]	twoway, dc	twoway	ent-crs-sts1
Ring ID for drop&continue [§]	m1,m2	see 363-208-003	ent-crs-sts1
Cross-connection type [§]	twoway, dc, locked	twoway	ent-crs-vt1
See notes and footnotes at end of table.			

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Table 5-17. SONET Subsystem Parameters Provisioned Using the CIT (Continued)

Parameter	Range	Default (Note 1)	Command (Note 2)
Outgoing STS-1 path trace message [§]	62 characters	see 363-208-003	set-trace-sts1
Expected STS-1 path trace message [§]	62 characters	see 363-208-003	set-trace-sts1
OC-1 degrade threshold	10 ⁻⁵ to 10 ⁻⁹	10 ⁻⁶	set-oc1
AIS almn, level of NSA OC-1 line AIS	CR, MJ, MN, NA	NA	set-oc1
OC-12 degrade threshold ^{††}	10 ⁻⁵ to 10 ⁻⁹	10 ⁻⁶	set-oc12
Sync Messaging ^{†††}	K byte, S byte, disabled	K byte	set-oc12
AIS alm. level of NSA OC-12 Line AIS ^{†††}	CR, MJ, MN, NA	NA	set-oc12

Notes:

1. Default means factory default (the CIT prompts display current provisioned values).
2. To view the current values, precede these commands with **rtrv-** instead of **set-**.

* The # is the value set by the switches on the SYSCTL and OHCTL in SONET Subsystem Software Release 7 and earlier.

† SONET Subsystem Software Release 7 and earlier.

‡ One and only one shelf in a subnetwork must be set to "yes" for proper DCC communications.

§ SONET Subsystem Software Release 9.0 and later.

¶ Release 3.2 and later linear releases.

** noOverride means read and use switch settings on circuit pack.

†† Parameter can be set for each port.

‡‡ AUTO means the port or channel is ready to be automatically provisioned via signal detection.

§§ SONET Subsystem Software Release 11 or later with 24G-U OLIUs in the MAIN slots.

¶¶ Ring Releases. Requires 22D-U/22F2-U/22G-U/22G2-U OLIUs.

*** Parameters can be set for each channel.

††† This command is available to privileged users only.

‡‡‡ With 26G-U OLIU in the MAIN slots.

Performance-Monitoring Parameters

Table 5-18 describes the performance-monitoring parameters provisionable using the CIT.

Table 5-18. Performance-Monitoring Parameters Provisionable Using the CIT

Parameter Definition		Threshold Range [Default]		Command
Facility	Measure	Current Quarter Hour	Current Day	
OC-3 Optics	Optical Transmit Power* (21G/21G-U)	-1 dB, -2 dB	-1 dB, -2 dB	set-pmthres-sect
	Laser Bias Current* (21G/21G-U)	enable/disable	enable/disable	set-pmthres-sect
OC-3 Section	SE Frame Seconds (SEFS)	1-63[10]	1-4095[30]	set-pmthres-sect
OC-12 Section [†]	SE Frame Seconds (SEFS)	1-63[10]	1-4095[30]	set-pmthres-sect
OC-1 Section	SE Frame Seconds (SEFS)	1-63[10]	1-4095[30]	set-pmthres-sect
OC-12 Line [†]	B2 Coding Violations (CV)	1-55365[5537]	1-5315040[531504]	set-pmthres-line
	B2 Errored Seconds (ES)	1-900[40]	(1-65535)[900]	set-pmthres-line
	B2 Errored Seconds Type A (ESA)	1-900[30]	(1-65535)[90]	set-pmthres-line
	B2 Errored Seconds Type B (ESB)	1-900[30]	(1-65535)[90]	set-pmthres-line
	B2 Severely Errored Seconds (SES)	1-63[20]	(1-4095)[60]	set-pmthres-line
	B2 Unavailable Seconds (UAS)	1-63[30]	(1-4095)[90]	set-pmthres-line
	STS Pointer Justification (PJC)	1-65535[60]	1-9999999	set-pmthres-line
OC-3 Line	B2 Coding Violations (CV)	1-13841[1384]	1-1328736[132874]	set-pmthres-line
	B2 Errored Seconds (ES)	1-900[40]	(1-65535)[900]	set-pmthres-line
	B2 Errored Seconds Type A (ESA)	1-900[30]	(1-65535)[90]	set-pmthres-line
	B2 Errored Seconds Type B (ESB)	1-900[30]	(1-65535)[90]	set-pmthres-line
	B2 Severely Errored Seconds (SES)	1-63[20]	(1-4095)[60]	set-pmthres-line
	B2 Unavailable Seconds (UAS)	1-63[30]	(1-4095)[90]	set-pmthres-line
	Line Protection Switch Counts (PSC-L)	1-63[2]	(1-255)[4]	set-pmthres-line
	STS Pointer Justification (PJC) [‡]	1-65535[60]	1-9999999[5760]	set-pmthres-line
OC-1 Line	B2 Coding Violations (CV)	1-4613[641]	1-442848[44285]	set-pmthres-line
	B2 Errored Seconds (ES)	1-900[40]	(1-65535)[900]	set-pmthres-line
	B2 Errored Seconds Type A (ESA)	1-900[30]	(1-65535)[90]	set-pmthres-line
	B2 Errored Seconds Type B (ESB)	1-900[30]	(1-65535)[90]	set-pmthres-line
	B2 Severely Errored Seconds (SES)	1-63[20]	(1-4095)[60]	set-pmthres-line
	B2 Unavailable Seconds (UAS)	1-63[30]	(1-4095)[90]	set-pmthres-line
	STS Pointer Justification (PJC) [‡]	1-65535[60]	1-9999999[5760]	set-pmthres-line
EC-1 Line [§]	B2 Coding Violations (CV) EC-1	1-4613[461]	1-442848 [44285]	set-pmthres-line
	B2 Errored Seconds (ES)	1-900[40]	(1-65535)[900]	set-pmthres-line
	B2 Errored Seconds Type A (ESA)	1-900[30]	(1-65535)[90]	set-pmthres-line
	B2 Errored Seconds Type B (ESB)	1-900[30]	(1-65535)[90]	set-pmthres-line
	B2 Severely Errored Seconds (SES)	1-63[20]	(1-4095)[60]	set-pmthres-line
	B2 Unavailable Seconds (UAS)	1-63[30]	(1-4095)[90]	set-pmthres-line
	STS Pointer Justification (PJC) [‡]	1-65535[60]	1-9999999[5760]	set-pmthres-line

See footnotes at end of table.

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Table 5-18. Performance-Monitoring Parameters Provisionable Using the CIT (Continued)

Parameter Definition		Threshold Range [Default]		
Facility	Measure	Current Quarter Hour	Current Day	Command
DS3 Path [¶]	P-Bit Error Counts	1-4026[403]	1-386500[38650]	set-pmthres-t3
	SE Frame Seconds (SEFS)	1-63[10]	1-4095 [30]	set-pmthres-t3
DS3 Path for P-Bit, F&M Bit, and C-Bit from Fiber and DSX ^{**}	CV-P Coding Violations	1-16383[40]	1-1048575[3820]	set-pmthres-t3
	ES-P Errored Seconds	1-900[25]	1-65535[250]	set-pmthres-t3
	SES-P Severely Errored Seconds	1-63[4]	1-4095[40]	set-pmthres-t3
	UAS-P Unavailable Seconds	1-63[10]	1-4095[10]	set-pmthres-t3
	SEFS	1-63[2]	1-4095[8]	set-pmthres-t3
DS3 Line ^{**}	CV-L Coding Violations	1-16383[40]	1-1048575[3865]	set-pmthres-t3
	Errored Seconds, Line (ES-L)	1-900[25]	1-65535[250]	set-pmthres-t3
	Severely Errored Seconds, Line (SES-L)	1-63[4]	1-4095[40]	set-pmthres-t3
STS-1 Path ^{**}	B3 Coding Violations (CV) EC-1	1-4510[461]	1-432960 [43296]	set-pmthres-sts1
	B3 Errored Seconds (ES)	1-900[40]	1-65535[900]	set-pmthres-sts1
	B3 Errored SecondsType A (ESA)	1-900[30]	1-65535[90]	set-pmthres-sts1
	B3 Errored SecondsType B (ESB)	1-900[30]	1-65535[90]	set-pmthres-sts1
	B3 Severely Errored Seconds (SES)	1-63[20]	1-4095[60]	set-pmthres-sts1
	B3 Unavailable Seconds (UAS)	1-63[30]	1-4095[90]	set-pmthres-sts1
VT1.5 Path ^{††}	V5 Errored Seconds (ES)	1-900 [40]	1-65535 [900]	set-pmthres-vt1
	V5 Severely Errored Seconds (SES)	1-63[20]	1-4095 [60]	set-pmthres-vt1
	V5 Unavailable Seconds (UAS)	1-63[30]	1-4095 [90]	set-pmthres-vt1
DS-1 Path ^{‡‡§§}	ES-P Errored Seconds	1-900[65]	1-65535 [648]	set-pmthres-t1
	SES-P Severely Errored Seconds	1-63 [10]	1-4095 [100]	set-pmthres-t1
	UAS-P Unavailable Seconds	1-63 [10]	1-4095 [10]	set-pmthres-t1
	ES-PFE Errored Seconds	1-900 [65]	1-65535 [648]	set-pmthres-t1
	SES-PFE Severely Errored Seconds	1-63 [10]	1-4095 [100]	set-pmthres-t1
	UAS-PFE Unavailable Seconds	1-63 [10]	1-4095 [10]	set-pmthres-t1
	CV-P (SF) Coding Violations [¶]	1-16383 [72]	1-1048575[691]	set-pmthres-t1
	CV-P (ESF) Coding Violations [¶]	1-16383 [13296]	1-1048575[132960]	set-pmthres-t1
	CV-PFE Coding Violations [¶]	1-16383 [13296]	1-1048575[132960]	set-pmthres-t1
DS-1 Line ^{‡‡**}	ES-L Line Errored Seconds	1-900 [65]	1-65535[648]	set-pmthres-t1

* Threshold is set once for both current quarter hour and current day.

† SONET Subsystem Release R11 or later with 24G-U OLIUs.

‡ SONET Subsystem Release R11 or later.

§ Release 5.1 and later ring releases and Release 6.0 and later linear releases.

¶ SONET Subsystem Software Release 7 or earlier.

** SONET Subsystem Software Release 9.0 or later.

†† Release 6.0 and later linear releases and Release 7.0 and later ring releases (feature package option).

‡‡ Release 5.1 and later ring releases and Release 6.0 and later linear releases (feature package option).

§§ Release 9.1 and later in OC-3 systems supports current quarter-hour thresholding and reporting of DS1 PM.

Provisioning — DLC Subsystem

The DLC subsystem supports the following setting of the function and options through its provisioning features:

- Channel units
- DS0 cross-connections
- DS1 cross-connections
- TR-08 modes
- INA DS1 frame format
- DS1 line code
- RT/COT option
- Distribution type for shelves
- Number of lines for an MSDT
- Embedded operations channel (EOC) provisioning of analog and ISDN line terminations (for the Software Release 4.0 TR-303 VRT).

Most of the circuit packs do not have physical option switches; instead, option information is stored electronically in the DLC subsystem data base and then copied into memory registers on the channel units. The craft interface terminal (CIT) is used to enter the provisioning data into the system. For the TR-303 VRT, provisioning is also commanded by the local digital switch (LDS) using the EOC datalink. The DLC subsystem data base is stored on the time slot interchange (TSI) circuit packs.

Default Provisioning

Default provisioning information is stored in the DLC subsystem data base for all electronically provisioned parameters. The data base is initialized at system turnup by the **INITIALIZE-SYSTEM** command of the user interface panel (UIP) or CIT.

The **INITIALIZE-SYSTEM** UIP or CIT command sets the provisioning data for each channel unit slot to a default value, which will match any nonprovisionable channel unit (in other words, POTS, coin, multiparty, and *SPOTS*® channel units). It also deletes all DS1 and DS0 cross-connections. All other DLC subsystem parameters are also set to defaults as shown in Table 5-19.

When the system is turned up, there are no DS0 or DS1 cross-connections on the system. The **INITIALIZE-CRS** command on the UIP provides standard DS0 or DS1 cross-connections. See document 363-208-000, *SLC-2000 Access System, Application, Planning, and Ordering Guide*, for more details.

Automatic Provisioning

Circuit Pack Replacement

When a failed channel unit is replaced, all electronically provisioned options are automatically set to the values stored in the DLC subsystem data base.

TSI Replacement

When the TSI is replaced, the DLC subsystem data base will be automatically duplicated from the other TSI.

CIT Selectable Parameters

Table 5-19 describes the parameters provisionable using the CIT on the DLC subsystem. Refer to the command pages in document 363-208-003, *SLC-2000 Access System, Commands and Messages*, for a complete explanation of parameters.

Table 5-19. Parameters Provisionable Using the CIT (DLC Subsystem)

Parameter	Range	Default (Note)	Command
Type of DT Lines	msdt* †, nbs*	current	ED-DT
DT Mode (dtm)	0, 12‡, 24	quad	
Feeder type	quad*, octet*	quad	
Feeder type	VTU (SONET), LIU (DSX-1)	current value	ED-FDR
INA Framing Format	SF, ESF	SF	ED-INA
TR-08 mode§	(mode)1, (mode)2	current value	ED-MODE-TR8
T8U mode¶	Y (enabled), N (disabled)	current value	ED-MODE-T8U
Terminal loc.	COT, RT	current value	ED-NE
SMU state	enabled, disabled	current value	ED-STATE-SMU
Distribution mode	MET (metallic), FITL (fiber)	current value	ED-DISTN
DS1 equalization**	0-665	0	ED-T1
DS1 line coding** ††	AMI, B8ZS	AMI (R3.1, R3.2) B8ZS (R4.0 and later)	ED-T1
DS1 port primary state**	No Change, OOS-MT-AUTO	No Change	ED-T1
Channel unit provisioning	See Table 5-23	See Table 5-23	ENT-T0, ED-T0, DLT-T0, CPY-T0
CIT page length	0 (pager off), 3-150 rows	24	SET-LINK
Feeder type	VTU (SONET), LIU (DSX-1)	current value	ED-FDR
CORE synchronization mode	For VTU configuration: SONET, COMPCLK For LIU configuration: LPD, FRNG, COMPCLK	SONET †‡	SET-SYNCN
Primary DS1 loop timing ref.	a-{1-7}-{1-4}	a-1-1	SET-SYNCN
Secondary DS1 loop timing ref.	a-{1-7}-{1-4}	a-1-3	SET-SYNCN
Composite clock protection	Y (yes) or N (no)	Y	SET-SYNCN

Note: Default means factory default (the CIT prompts display current values).

* For Software Release 4.4, you must enter these parameters in lowercase.

† When the type of DT is "msdt," the only valid DT mode is "quad."

‡ The "line" parameter of "12" is not valid when the type of DT is set to "nbs" and the DT mode is set to "octet."

§ For a pair of TR-08 VRTs.

¶ For single or range of shelves.

** Can be set on each feeder DS1 port.

†† The enhanced business service (EBS) (P-Phone) channel units (SPQ®328 and SPQ429), the dataport channel units in the 64 clear channel mode (AUA34, AUA34B, AUA52, SPQ334, and SPQ452), and the PGM§§-2000 channel unit must be optioned for B8ZS line coding.

‡‡ When the *feeder configuration* (**ED-FDR**) or *terminal location* (**ED-NE**) is changed, the system automatically provisions the synchronization mode. See the **SET-SYNCN** command in document 363-208-003, *SLC-2000 Access System, Commands and Messages*, for details.

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Parameters Provisioned Over the Embedded Operations Channel (EOC)

Table 5-20 lists the EOC provisionable parameters. Tables 5-21 and 5-22 list the DS1 and ATT ISDN framed path termination parameters referred to in Table 5-20.

Table 5-20. EOC Provisionable Parameters (TR-303 VRT)

Object	Attribute	Range	Default (Note)
Equipment Network Element	Location Name	36 characters	set by set-sid
	System Clock	YYYYMMDDhhmmss.s	19700101000000.0
IDLC Data Link Profile	Maximum I Frames	1-7	7
	N200	1-10	3
	T200	100-1000 ms., increments of 50	150 ms.
	T203	10-300 sec., increments of 10	30 sec.
IDLC Call Processing Profile	T303	700-4700 ms., inc. by 500	700 ms.
	T308	2-5 sec.	4 sec.
	T396	700-14700 ms., inc. by 1000	14700 ms.
	T397	60-180 sec.	120 sec.
ds1 Line Termination	DS1 line coding Line Build Out	AMIZCS, B8ZS* 0-655	B8ZS
ds1 Framed Path Termination	DS1 Frame Format	ESF	ESF
Event Report Control	Discriminator State	True (active), False (inactive)	True
Cross-Connection	From Termination ID To Termination ID Redlined	Local Distinguished Name Local Distinguished Name True, False	
PM Interval Profile (DS1)	Interval Value	15, 60 for minute 1 for day	15 1
ATT PM Freeze Sched. (DS1)	Schedule State Interval PM Start Time	True (Active), False (Inactive) 15, 60 0-23	True Must match PM Interval Profile 0 (Midnight)
DS1 Framed Path Termination	See Table 5-21.		
PM Interval Profile (DSL)	Interval Value	1,2,3,4,6,8,12,24 for interval 1 for hourly/daily	1 1
ATT PM Freeze Schedule (DSL)	Schedule State Interval PM Start Time	True (Active), False (Inactive) 1,2,3,4,6,8,12,24 0-23	True 1 0 (Midnight)
ISDN per System Profile	DSL SES Definition	1-255	3
ATT ISDN Framed Path Term.	See Table 5-22.		

Note: Default means value established by the system on turnup.

* DS1 #1 and DS1 #2 must be set to B8ZS.

Table 5-21. DS1 Framed Path Termination Parameters (EOC Provisionable)

Object	Attribute	Range	Default
DS1 Framed Path Termination	CV Day Current	0*	
	CV Day Previous	0*	
	CV Min Current	0*	
	CV Min Previous	0*	
	ES Day Threshold	1-86400	648
	ES Min Threshold	1-3600	65/259
	ES Day Current	0*	
	ES Day Previous	0*	
	ES Min Current	10	
	ES Min Previous	0*	
	ES Min History	0*	
	SES Day Threshold	1-86400	100
	SES Min Threshold	1-3600	10/40
	SES Day Current	0*	
	SES Day Previous	0*	
	SES Min Current	0*	
	SES Min Previous	0*	
	SES Min History	0*	
	SEFS Day Threshold	1-86400	17
	SEFS Min Threshold	1-3600	2/7
	SEFS Day Current	0*	
	SEFS Day Previous	0*	
	SEFS Min Current	0*	
	SEFS Min Previous	0*	
	SEFS Min History	0*	
	DM Day Threshold	1-1440	4
	DM Min Threshold	1-60	4/15
	DM Day Current	0*	
	DM Day Previous	0*	
	DM Min Current	0*	
	DM Min Previous	0*	
	DM Min History	0*	

See footnotes at end of table.

Continued on next page

Table 5-21. DS1 Framed Path Termination Parameters (EOC Provisionable) (Continued)

Object	Attribute	Range	Default
DS1 Framed Path Termination (Continued)	UAS Day Threshold	1-86400	10
	UAS Min Threshold	1-3600	3/10
	UAS Day Current	0*	
	UAS Day Previous	0*	
	UAS Min Current	0*	
	UAS Min Previous	0*	
	UAS Min History	0*	
	CSS Day Threshold	1-86400	4
	CSS Min Threshold	1-3600	1/2
	CSS Day Current	0*	
	CSS Day Previous	0*	
	CSS Min Current	0*	
	CSS Min Previous	0*	
	CSS Min History	0*	
	APS BER Threshold	6 [†]	

* Partial Accumulate 0 is the only valid value.

† Value is fixed and always equal to 6.

Table 5-22. ISDN Framed Path Termination Parameters (EOC Provisionable)

Object	Attribute	Value	Default
ATT ISDN Framed Path Termination	CV Fe Hr Current	0/Corrupted	0/Corrupted
	SES Fe Hr Current	0/Corrupted	0/Corrupted
	ES Fe Hr Current	0/Corrupted	0/Corrupted
	CV Hr Current	0/Corrupted	0/Corrupted
	SES Hr Current	0/Corrupted	0/Corrupted
	ES Hr Current	0/Corrupted	0/Corrupted
	CV Fe Hr Previous	0/Corrupted	0/Corrupted
	SES Fe Hr Previous	0/Corrupted	0/Corrupted
	ES Fe Hr Previous	0/Corrupted	0/Corrupted

Continued on next page

Table 5-22. ISDN Framed Path Termination Parameters (EOC Provisionable)
(Continued)

Object	Attribute	Value	Default
ATT ISDN Framed Path Termination (Continued)	CV Hr Previous	0/Corrupted	0/Corrupted
	SES Hr Previous	0/Corrupted	0/Corrupted
	ES Hr Previous	0/Corrupted	0/Corrupted
	ES Fe Hr History	empty SET	empty SET
	ES Hr History	empty SET	empty SET
	SES Fe Day Current	0/Corrupted	0/Corrupted
	ES Fe Day Current	0/Corrupted	0/Corrupted
	SES Day Current	0/Corrupted	0/Corrupted
	ES Day Current	0/Corrupted	0/Corrupted
	SES Fe Day Previous	0/Corrupted	0/Corrupted
	ES Fe Day Previous	0/Corrupted	0/Corrupted
	SES Day Previous	0/Corrupted	0/Corrupted
	ES Day Previous	0/Corrupted	0/Corrupted
	SES Hr Threshold	1-3601	10
	ES Hr Threshold	1-3601	40
	SES Day Threshold	1-86401	25
	ES Day Threshold	1-86401	100
	CV Fe Int Current	0/Corrupted	0/Corrupted
	SES Fe Int Current	0/Corrupted	0/Corrupted
	ES Fe Int Current	0/Corrupted	0/Corrupted
	CV Int Current	0/Corrupted	0/Corrupted
	SES Int Current	0/Corrupted	0/Corrupted
	ES Int Current	0/Corrupted	0/Corrupted
	CV Fe Int Previous	0/Corrupted	0/Corrupted
	SES Fe Int Previous	0/Corrupted	0/Corrupted
	ES Fe Int Previous	0/Corrupted	0/Corrupted
	CV Int Previous	0/Corrupted	0/Corrupted
	SES Int Previous	0/Corrupted	0/Corrupted
	ES Int Previous	0/Corrupted	0/Corrupted
	ES Fe Int History	empty SET	empty SET
	ES Int History	empty SET	empty SET
	SES Int Report Threshold	1-86401	5
	ES Int Report Threshold	1-86401	20
	SES Day Report Threshold	1-86401	15
	ES Day Report Threshold	1-86401	50

Channel Unit Parameters

Most provisionable channel units have no switch options. However, the channel units and DT Servers specified in Table 5-23 have option switches that must be set before they are installed. Table 5-23 also specifies the channel units that have switch options that are overridden or complemented by electronic provisioning.

Refer to Chapter 4, "Operations and Maintenance Procedures (TOP)", for specific channel unit option switches and provisioning details.

Table 5-23. Channel Unit Options, Software Release, and Provisioning Method

Channel Unit Code	Option (Note 1)	Terminal (Note 2)	SW Release (Note 3)	Provisioning Method	
				Switch	Electronic
AUA34	Error Correction All 0s allowed	C	3.1		E
AUA41/141	Various	C/R/M/N	3.1		E
AUA41B	Various, Sealing Current	C/R/M	3.2		E
		N	4.4		E
AUA42/142	Various	C/R/M	3.1		E
AUA42B	Various	C/R/M/N	3.1		E
AUA43	Various	C/R/M	3.1		E
AUA43B	Various	C/R/M/N	3.1		E
AUA44()	Various	M/N	3.1		E
AUA45()	COT/RT 3-dB loss	C/R/M/N	3.1	S	
AUA52/152	Data rate Error correction All 0s allowed	C/R/M	3.1		E
AUA52B	Data rate Error correction All 0s allowed	C/R/M	3.1		E
	19.2 rate	M	3.1	S	
	64 rate	M	3.1	S	
	19.2 rate	C/R	3.1		E
	64 rate	C/R	3.1		E
	19.2 rate	M/N	4.2/4.4		E
	64 rate	M/N	4.2/4.4		E
AUA54()	Various	M/N	3.1		E
AUA56B	2.5-dB loss	R/M/N	3.2	S	

See notes and footnote at end of table.

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**Table 5-23. Channel Unit Options, Software Release, and Provisioning Method
(Continued)**

Channel Unit Code	Option (Note 1)	Terminal (Note 2)	SW Release (Note 3)	Provisioning Method	
				Switch	Electronic
AUA57	Ring group	R/M	3.1	S	
AUA75	COT/RT	C/R/M/N	3.1	S	
	D4/D3				
	3 dB loss				
AUA92	DS0 capacity	C	3.1	S	
AUA93	DS0 capacity	M/N	3.2	S	
	DS0 capacity	R	3.2		E
	DS0 capacity	R/M/N	4.2		E
AUA200	Seven types	R/M/N	3.2	S	
AUA232	13 types	C/R/M/N	3.2	S	
AUA252()	Data rate	C/R/M	3.1		E
	Error correction				
	All 0s allowed				
	19.2 rate	M	3.1	S	
	64 rate	M	3.1	S	
	19.2 rate	C/R	3.1		E
	64 rate	C/R	3.1		E
	19.2 rate	M	4.2		E
	64 rate	M	4.2		E
	38.4 rate	C/R/M	3.1	S	
	SW56				
	AB signaling				
	Enhanced SW56				
	QMON/Auto-Disc.				
AUA293	DS0 capacity	C	3.1	S	
	DS0 capacity	M/N	3.2	S	
	DS0 capacity	R	3.2		E
	DS0 capacity	R/M/N	4.2		E

See notes and footnote at end of table.

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Table 5-23. Channel Unit Options, Software Release, and Provisioning Method
(Continued)

Channel Unit Code	Option (Note 1)	Terminal (Note 2)	SW Release (Note 3)	Provisioning Method	
				Switch	Electronic
MCU* 5205	COT/RT	C/R/N	3.1	S	
MCU5405	COT/RT	C/R/N	3.2	S	
PGM* -2000	Switch 1-14	C/R	3.1	S	
SPQ® 334	Error correction All 0s allowed	C	3.3		E
SPQ442	Various	C/R/M/N	3.2		E
SPQ443	Various	C/R/M/N	3.2		E
SPQ444	Various	C/R	3.2		E
SPQ452	Various	C/R/M	3.2/4.2		E
SPQ454	Various	C/R	3.2		E
SPQ456	2.5-dB loss	R/M	3.3/4.2		E
SPQ808/809	DSX/OU Equalization B/Z error correction Alarm severity	R	3.1	S	

Notes:

1. Function Code and "Redline" entries not listed.
2. C=COT
R=RT
M=MSDT
N=NBS, R4.4 unless noted.
3. Entries show the earliest release, R3.1 or later, required to support the channel unit.

* Trademark of Tollgrade Communications, Inc.

Switch Selectable Parameters

Table 5-24 lists the channel units and DT Servers that have switch options. These option values cannot be retrieved with the CIT.

The AUA92, AUA93, and AUA293 ISDN and the AUA252 OCU dataport channel units have a SERVICE switch option for provisioning the channel unit in a *SLC* Series 5 system. The AUA52B OCU dataport has switches for 19.2 data rate and clear channel provisioning. However, in the *SLC*-2000 Access System, these units are provisioned for service using the CIT and are not listed in Table 5-24.

Table 5-24. RT Channel Unit/MSDT Server Options Provisionable Using Switches

Channel Unit	Switch	Range	Description
AUA45() dual ringing repeater	COT/RT	COT, RT	Selects channel unit location.
	ODD	0 dB, -3 dB	Selects the transmit and receive loss for the first (lowest-numbered) channel.
	EVEN	0 dB, -3 dB	Selects the transmit and receive loss for the second channel.
AUA57 frequency selective ringing	D H S	D, H, S	Selects the ringing frequency group for subscriber alerting, either D (Decimonic), H (Harmonic), or S (Synchronism). Exactly one of the switch values must be turned ON.
AUA75 dual private line auto ring	COT/RT	COT, RT	Selects channel unit location.
	D4/D3	D4, D3	Select signaling compatibility for the far-end channel unit. Set to D4 unless the far-end channel is a D3 PLAR unit in a D3 channel bank.
	ODD	0 dB, -3 dB	Selects the transmit and receive loss for the first (lowest-numbered) channel.
	EVEN	0 dB, -3 dB	Selects the transmit and receive loss for the second channel.

Continued on next page

Table 5-24. RT Channel Unit/MSDT Server Options Provisionable Using Switches
(Continued)

Channel Unit	Switch	Range	Description
AUA200 <i>Datapath</i> * Extension DPX channel unit (2-wire switched 56-kb/s data)	DTMF/DP	ON, Off	Selects dialing method. (ON=DTMF/tone dialing)
	WINK	ON, Off	Controls wink indication to switch. (ON=wink start)
	AUTO TRK	ON, Off	Controls DU dialing in auto line mode. (ON=no DU dialing)
	MCD	ON, Off	Controls DU connect delay after off-hook. (ON=2-sec DU delay before connect)
	NDUTST	ON, Off	Controls test access of local DU. (ON=no DU testing)
	PSDS EN	ON, Off	Controls time-out of the handshaking sequence. (ON=time-out enabled)
	H/S SIG	ON, Off	Controls signaling detect mode (hardware/software). (ON=software signaling)
AUA232 DSU Dataport	Error correction	NORM/EC	Selects error correction
	Location	COT/RT	Selects location
	Anti-streaming timer	NORM/ANTI-ST	Selects anti-streaming timer (when RTS EN selected)
	Switched Carrier mode	RTS DIS / RTS EN	Selects switched carrier mode (RTS EN)
	Rate	OFF/56k	Selects rate
	Rate	OFF/19.2k	Selects rate
	Rate	OFF/9.6k	Selects rate
	Rate	OFF/4.8k	Selects rate
	Rate	OFF/2.4k	Selects rate
	Rate	OFF/1.2k	Selects rate
	Character size	10BPC/11BPC	Selects async character size
	DTE mode	ASYNC/SYNC	Selects the DTE mode

See footnotes at end of table.

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Table 5-24. RT Channel Unit/MSDT Server Options Provisionable Using Switches
(Continued)

Channel Unit	Switch	Range	Description
<i>MCU</i> [†] 5205 Metallic channel unit (for alarm circuits)	S1	COT, RT	Selects channel unit location.
<i>MCU</i> 5405 Metallic channel unit for MLT (digital bypass pair)	S1	COT, RT	Selects channel unit location.
<i>SPQ</i> [®] 808 or <i>SPQ</i> 809 DT Server	DSX/OU	OU, DSX	Fiber/T1 carrier application switch. Selection OU is required.
	B8ZS/ZCS	B, Z	Selects between B8ZS and ZCS line coding. This switch is only functional when the DSX/OU switch is set to DSX.
	TRANS- 0, 1, 2	ON, OFF	Selects the amount of preequalization based on the distance between the bank and the DSX-1 cross-connection. This switch is only functional when the DSX/OU switch is set to DSX.
	MJ	ANY, 12	Changes the alarm severity for a subset of failures.

* Trademark of CAE Industries Ltd.

† Trademark of Tollgrade Communications, Inc.

CIT Selectable Parameters

Provisioning Parameters for Software Release 3.1 and 3.2

Tables 5-25 through 5-46 list the valid provisioning parameters, according to function code for channel units used in Software Release 3.1 (R3.1) and 3.2 (R3.2). These parameters are set using the **ent - t0** CIT command, are adjusted using the **ed - t0** command, and may be displayed using the **rtrv - t0** command.

Table 5-25. BRI Function Code Provisioning [AUA92/AUA293 (CLEI=5SC1JE) for COT] [AUA93/AUA293 (CLEI=5SC1HE) for RT] (Note)

Provisioning Parameter	WORD Abbreviation	Values	Default Value
svc=ISDN channel service	SVC	2B+D, B1+D, B2+D, or D	2B+D
rls=Redlined	RLS	NO or YES	NO

Note: You cannot provision the DT BRI channel unit (CU) using the CIT. You must provision the DT BRI CU at the channel unit.

Table 5-26. DFLT Function Code Provisioning (CLEI=Other) (Note)

Provisioning Parameter	WORD Abbreviation	Values	Default Value
rls=Redlined	RLS	NO or YES	NO

Note: For the DFLT function code (CLEI=Other), the channel units are POTS, multiparty, coin, FSR, DID, manual ringdown, PLAR, and DC bypass pair or alarm.

Table 5-27. DPO Function Code Provisioning [AUA43 (CLEI=5SCU6A), AUA43B (CLEI=5SCU6F), and SPQ® 443 (CLEI=SAC1AE)]

Provisioning Parameter	WORD Abbreviation	Values	Default Value
imp=Impedance	IMP	600 or 900	600
bal=Balance	BAL	0 to 15 in steps of 1	3
xmtgn=TransmitGain	XMT(GN)	-1.0 to 6.75 in steps of 0.25	-1.0
rcvgn=ReceiveGain	RCV(GN)	-8.0 to 1.5 in steps of 0.25	-8.0
sl=Slope	SL	0 to 7 in steps of 1	0
rls=Redlined	RLS	NO or YES	NO

Table 5-28. DPT Function Code Provisioning [AUA42 (CLEI=5SCU69), AUA42B (CLEI=5SCU6E), and SPQ® 442 (CLEI=SAC1AH)]

Provisioning Parameter	WORD Abbreviation	Values	Default Value
imp=Impedance	IMP	600 or 900	600
bal=Balance	BAL	0 to 15 in steps of 1	3
xmtgn=TransmitGain	XMT(GN)	-1.0 to 6.75 in steps of 0.25	-1.0
rcvgn=ReceiveGain	RCV(GN)	-8.0 to 1.5 in steps of 0.25	-8.0
sl=Slope	SL	0 to 7 in steps of 1	0
rls=Redlined	RLS	NO or YES	NO

Table 5-29. DS0A Function Code Provisioning [AUA34 (CLEI=5SCU38)]

Provisioning Parameter	WORD Abbreviation	Values	Default Value
ec=Error correction	EC	MVEC [*] , SCEC, NONE	NONE
zc=All-zero-code allowed [†]	ZC	NO or YES	NO
rls=Redlined	RLS	YES or NO	NO

* Do not use MVEC if the data rate is 56 or 64 kb/s.

† Set ZC to YES if the data rate is 64 kb/s.

Table 5-30. DS0A Function Code Provisioning [AUA34B (CLEI=5SC133)]

Provisioning Parameter	WORD Abbreviation	Values	Default Value
ec=Error correction	EC	SCEC, NONE	NONE
zc=All-zero-code allowed [*]	ZC	NO or YES	NO
rls=Redlined	RLS	YES or NO	NO

* Set ZC to YES if the data rate is 64 kb/s.

Table 5-31. DS0B Function Code Provisioning [AUA34 (CLEI=5SCU38)]

Provisioning Parameter	WORD Abbreviation	Values	Default Value
ec=Error correction	EC	MVEC [*] , SCEC, NONE	NONE
zc=All-zero-code allowed [†]	ZC	NO or YES	NO
rls=Redlined	RLS	YES or NO	NO

* Do not use MVEC if the data rate is 56 or 64 kb/s.

† Set ZC to YES if the data rate is 64 kb/s.

Table 5-32. DS0B Function Code Provisioning [AUA34B (CLEI=5SC133)]

Provisioning Parameter	WORD Abbreviation	Values	Default Value
ec=Error correction	EC	SCEC, NONE	NONE
zc=All-zero-code allowed*	ZC	NO or YES	NO
rls=Redlined	RLS	YES or NO	NO

* Set ZC to YES if the data rate is 64 kb/s.

Table 5-33. DX4 Function Code Provisioning [AUA41B (CLEI=5SCUCD)]

Provisioning Parameter	WORD Abbreviation	Values	Default Value
trmt=TRMT attenuator	TRMT	0 to 16.5 in steps of 0.1	16.5
rcv=RCV attenuator	RCV	0 to 16.5 in steps of 0.1	16.5
ln=Nonloaded/loaded	L-N	L or N	N
sl=Slope	SL	0 to 15 in steps of 1	0
bw=Bandwidth	BW	0 to 15 in steps of 1	0
ht=Height	HT	0 to 15 in steps of 1	0
imp=Transmit and receive impedance	TRMT&RCV(IMP)	150, 600, or 1200	600
rls=Redlined	RLS	YES or NO	NO

Table 5-34. EM4C/H Function Code Provisioning [AUA54 (CLEI=5SCU7B) and SPQ®454 (CLEI=SAC1BG)]

Provisioning Parameter	WORD Abbreviation	Values	Default Value
trmt=TRMT attenuator	TRMT	0 to 25.5 in steps of 0.1	16.5
rcv=RCV attenuator	RCV	0 to 25.5 in steps of 0.1	16.5
rls=Redlined	RLS	YES or NO	NO

Table 5-35. ETO4 Function Code Provisioning [AUA41B (CLEI=5SCUCD)]

Provisioning Parameter	WORD Abbreviation	Values	Default Value
trmt=TRMT attenuator	TRMT	0 to 16.5 in steps of 0.1	16.5
rcv=RCV attenuator	RCV	0 to 16.5 in steps of 0.1	16.5
dBJ3=-7 dB (J3)	-7DB(J3)	WH or BK	BK
ln=Nonloaded/loaded	L-N	L or N	N
sl=Slope	SL	0 to 15 in steps of 1	0
bw=Bandwidth	BW	0 to 15 in steps of 1	0
ht=Height	HT	0 to 15 in steps of 1	0
imp=Transmit and receive impedance	TRMT&RCV(IMP)	150, 600, or 1200	600
sc=SealingCurrent	SC	YES or NO	YES
rls=Redlined	RLS	YES or NO	NO

Table 5-36. FXO Function Code Provisioning [AUA42 (CLEI=5SCU69), AUA42B (CLEI=5SCU6E), and SPQ®442 (CLEI=SAC1AH)]

Provisioning Parameter	WORD Abbreviation	Values	Default Value
imp=Impedance	IMP	600 or 900	900
bal=Balance	BAL	0 to 15 in steps of 1	3
xmtgn=TransmitGain	XMT(GN)	-1.0 to 6.75 in steps of 0.25	-1.0
rcvgn=ReceiveGain	RCV(GN)	-8.0 to 1.5 in steps of 0.25	-8.0
sl=Slope	SL	0 to 7 in steps of 1	0
td=TollDiversion	TD	YES or NO	NO
lsgs=SignalingType	LS-GS	LS or GS	GS
oht=OnHookTransmission	OHT	YES or NO	NO
rls=Redlined	RLS	YES or NO	NO

Table 5-37. FXO/P Function Code Provisioning [AUA44 (CLEI=5SCU7C) and SPQ®444 (CLEI=SAC1BF)]

Provisioning Parameter	WORD Abbreviation	Values	Default Value
trmt=TRMT attenuator	TRMT	0 to 16.5 in steps of 0.1	16.5
rcv=RCV attenuator	RCV	0 to 16.5 in steps of 0.1	16.5
ln=Nonloaded/loaded	L-N	L or N	N
sl=Slope	SL	0 to 15 in steps of 1	0
bw=Bandwidth	BW	0 to 15 in steps of 1	0
ht=Height	HT	0 to 15 in steps of 1	0
imp=Transmit and receive impedance	TRMT&RCV(IMP)	150, 600, or 1200	600
rls=Redlined	RLS	YES or NO	NO

Table 5-38. FXS Function Code Provisioning [AUA43 (CLEI=5SCU6A), AUA43B (CLEI=5SCU6F), and SPQ®443 (CLEI=SAC1AE)]

Provisioning Parameter	WORD Abbreviation	Values	Default Value
imp=Impedance	IMP	600 or 900	600
bal=Balance	BAL	0 to 15 in steps of 1	3
xmtgn=TransmitGain	XMT(GN)	-1.0 to 6.75 in steps of 0.25	-1.0
rcvgn=ReceiveGain	RCV(GN)	-8.0 to 1.5 in steps of 0.25	-8.0
sl=Slope	SL	0 to 7 in steps of 1	0
oht=OnHookTransmission	OHT	YES or NO	NO
rls=Redlined	RLS	YES or NO	NO

Table 5-39. FXS/T Function Code Provisioning [AUA41B (CLEI=5SCUCD)]

Provisioning Parameter	WORD Abbreviation	Values	Default Value
trmt=TRMT attenuator	TRMT	0 to 16.5 in steps of 0.1	16.5
rcv=RCV attenuator	RCV	0 to 16.5 in steps of 0.1	16.5
ln=Nonloaded/loaded	L-N	L or N	N
sl=Slope	SL	0 to 15 in steps of 1	0
bw=Bandwidth	BW	0 to 15 in steps of 1	0
ht=Height	HT	0 to 15 in steps of 1	0
imp=Transmit and receive impedance	TRMT&RCV(IMP)	150, 600, or 1200	600
rls=Redlined	RLS	YES or NO	NO

Table 5-40. OCU Function Code Provisioning [AUA52 (CLEI=5SCU48)]

Provisioning Parameter	WORD Abbreviation	Values	Default Value
rate=Subscriber data rate	RATE	2.4, 4.8, 9.6, or 56 kb/s	56
ec=Error correction	EC	MVEC*, SCEC, NONE	NONE
zc=All-zero-code allowed	ZC	NO or YES	NO
scc=Secondary channel used	SCC	NO or YES	NO
rls=Redlined	RLS	YES or NO	NO

* MVEC is not an option when the data rate is 56 kb/s.

Table 5-41. OCU Function Code Provisioning [AUA52B (CLEI=5SC143)] (Note)

Provisioning Parameter	WORD Abbreviation	Values	Default Value
rate=Subscriber data rate	RATE	2.4, 4.8, 9.6, 19.2, 56, or 64 kb/s	56
ec=Error correction	EC	MVEC [*] , SCEC, NONE	NONE
zc=All-zero-code allowed [†]	ZC	NO or YES	NO
scc=Secondary channel used [†]	SCC	NO or YES	NO
rls=Redlined	RLS	YES or NO	NO

Note: For rate=64 kb/s, clear channel (CC) is automatically set to ENABLE. However, for data rates other than 64 kb/s, CC is automatically set to DISABLE.

* MVEC is not allowed with the 56- or 64-kb/s data rate. If MVEC is selected with the 19.2-kb/s data rate, single time slot error correction (STEC) is used.

† When the 64-kb/s rate is selected, the user is not prompted for ZC and SCC. For rate=64 kb/s, ZC and SCC are automatically set to YES.

Table 5-42. PLR1/2 Function Code Provisioning [AUA54 (CLEI=5SCU7B) and SPQ[®]454 (CLEI=SAC1BG)]

Provisioning Parameter	WORD Abbreviation	Values	Default Value
trmt=TRMT attenuator	TRMT	0 to 25.5 in steps of 0.1	16.5
rcv=RCV attenuator	RCV	0 to 25.5 in steps of 0.1	16.5
rls=Redlined	RLS	YES or NO	NO

Table 5-43. TDO Function Code Provisioning [AUA44 (CLEI=5SCU7C) and SPQ[®]444 (CLEI=SAC1BF)]

Provisioning Parameter	WORD Abbreviation	Values	Default Value
trmt=TRMT attenuator	TRMT	0 to 11.6 in steps of 0.1	11.6
rls=Redlined	RLS	YES or NO	NO

Table 5-44. TDS Function Code Provisioning [AUA44 (CLEI=5SCU7C) and SPQ®444 (CLEI=SAC1BF)]

Provisioning Parameter	WORD Abbreviation	Values	Default Value
trmt=TRMT attenuator	TRMT	0 to 11.6 in steps of 0.1	11.6
rls=Redlined	RLS	YES or NO	NO

Table 5-45. TO Function Code Provisioning [AUA42 (CLEI=5SCU69), AUA42B (5SCU6E), AUA43 (5SCU6A), AUA43B (5SCU6F), SPQ®442 (SAC1AH), and SPQ443 (SAC1AE)]

Provisioning Parameter	WORD Abbreviation	Values	Default Value
imp=Impedance	IMP	600 or 900	600
bal=Balance	BAL	0 to 15 in steps of 1	3
xmtgn=TransmitGain	XMT(GN)	-1.0 to 6.75 in steps of 0.25	-1.0
rcvgn=ReceiveGain	RCV(GN)	-8.0 to 1.5 in steps of 0.25	-8.0
sl=Slope	SL	0 to 7 in steps of 1	0
rls=Redlined	RLS	YES or NO	NO

Table 5-46. TO4 Function Code Provisioning [AUA41B (CLEI=5SCUCD)]

Provisioning Parameter	WORD Abbreviation	Values	Default Value
trmt=TRMT attenuator	TRMT	0 to 16.5 in steps of 0.1	16.5
rcv=RCV attenuator	RCV	0 to 16.5 in steps of 0.1	16.5
dBt=-7 dB TRMT	-7DB TRMT	WH or BK	BK
dBrc=-7 dB RCV	-7DB RCV	WH or BK	BK
sc=SealingCurrent	SC	YES or NO	YES
rls=Redlined	RLS	YES or NO	NO

Provisioning Parameters for Software Release 3.3 (COT Only)

Tables 5-47 through 5-73 list the valid provisioning parameters, according to function code for channel units used in Software Release 3.3 (R3.3). These parameters are set using the **ent-t0** CIT command, are adjusted using the **ed-t0** command, and may be displayed using the **rtrv-t0** command.

Table 5-47. BRI Function Code Provisioning [AUA92/AUA293 (CLEI=5SC1JE)]

Provisioning Parameter	WORD Abbreviation	Values	Default Value
svc=ISDN channel service	SVC	2B+D, B1+D, B2+D, or D	2B+D
rls=Redlined	RLS	YES or NO	NO

Table 5-48. DFLT Function Code Provisioning (CLEI=Other) (Note)

Provisioning Parameter	WORD Abbreviation	Values	Default Value
rls=Redlined	RLS	NO or YES	NO

Note: For the DFLT function code (CLEI=Other), the channel units are POTS, multiparty, coin, FSR, DID, manual ringdown, PLAR, and DC bypass pair or alarm.

Table 5-49. DPO Function Code Provisioning [AUA43 (CLEI=5SCU6A), AUA43B (CLEI=5SCU6F), and SPQ® 443 (CLEI=SAC1AE)]

Provisioning Parameter	WORD Abbreviation	Values	Default Value
imp=Impedance	IMP	600 or 900	600
bal=Balance	BAL	0 to 15 in steps of 1	3
xmtgn=TransmitGain	XMT(GN)	-1.0 to 6.75 in steps of 0.25	-1.0
rcvgn=ReceiveGain	RCV(GN)	-8.0 to 1.5 in steps of 0.25	-8.0
sl=Slope	SL	0 to 7 in steps of 1	0
rls=Redlined	RLS	YES or NO	NO

Table 5-50. DPT Function Code Provisioning [AUA42 (CLEI=5SCU69), AUA42B (CLEI=5SCU6E), and SPQ®442 (CLEI=SAC1AH)]

Provisioning Parameter	WORD Abbreviation	Values	Default Value
imp=Impedance	IMP	600 or 900	600
bal=Balance	BAL	0 to 15 in steps of 1	3
xmtgn=TransmitGain	XMT(GN)	-1.0 to 6.75 in steps of 0.25	-1.0
rcvgn=ReceiveGain	RCV(GN)	-8.0 to 1.5 in steps of 0.25	-8.0
sl=Slope	SL	0 to 7 in steps of 1	0
rls=Redlined	RLS	YES or NO	NO

Table 5-51. DS0A Function Code Provisioning [AUA34 (CLEI=5SCU38)]

Provisioning Parameter	WORD Abbreviation	Values	Default Value
ec=Error correction	EC	MVEC*, SCEC, NONE	NONE
zc=All-zero-code allowed [†]	ZC	NO or YES	NO
rls=Redlined	RLS	YES or NO	NO

* Do not use MVEC if the data rate is 56 or 64 kb/s.

† Set ZC to YES if the data rate is 64 kb/s.

Table 5-52. DS0A Function Code Provisioning [AUA34B (CLEI=5SC133)]

Provisioning Parameter	WORD Abbreviation	Values	Default Value
ec=Error correction	EC	SCEC or NONE	NONE
zc=All-zero-code allowed*	ZC	NO or YES	NO
rls=Redlined	RLS	YES or NO	NO

* Set ZC to YES if the data rate is 64 kb/s.

Table 5-53. DS0A Function Code Provisioning [SPQ®334 (CLEI=5SC324)]

Provisioning Parameter	WORD Abbreviation	Values	Default Value
rate=Subscriber data rate	RATE	2.4, 4.8, 9.6, 19.2, 38.4, 56, or 64 kb/s	56
ec=Error correction	EC	SCEC, NONE, MVEC [*]	NONE
zc=All-zero-code allowed [†]	ZC	NO or YES	NO
rls=Redlined	RLS	NO or YES	NO

* MVEC does not operate with the 38.4-, 56-, or 64-kb/s data rate. If you select MVEC with 19.2-kb/s data rate, single time slot 19.2 error correction (19.2EC) is performed.

† You are not prompted for ZC when you select the 64-kb/s data rate. When rate=64 kb/s, ZC is automatically set to YES.

Table 5-54. DS0B Function Code Provisioning [AUA34 (CLEI=5SCU38)]

Provisioning Parameter	WORD Abbreviation	Values	Default Value
ec=Error correction	EC	MVEC [*] , SCEC, NONE	NONE
zc=All-zero-code allowed [†]	ZC	NO or YES	NO
rls=Redlined	RLS	YES or NO	NO

* Do not use MVEC if the data rate is 56 or 64 kb/s.

† Set ZC to YES if the data rate is 64 kb/s.

Table 5-55. DS0B Function Code Provisioning [AUA34B (CLEI=5SC133)]

Provisioning Parameter	WORD Abbreviation	Values	Default Value
ec=Error correction	EC	SCEC or NONE	NONE
zc=All-zero-code allowed *	ZC	NO or YES	NO
rls=Redlined	RLS	YES or NO	NO

* Set ZC to YES if the data rate is 64 kb/s.

Table 5-56. DS0B Function Code Provisioning [SPQ®334 (CLEI=5SC324)]

Provisioning Parameter	WORD Abbreviation	Values	Default Value
rate=Subscriber data rate *	RATE	2.4, 4.8, 9.6, 19.2, 38.4, 56, or 64 kb/s	56
ec=Error correction	EC	NONE or SCEC	NONE
zc=All-zero-code allowed †	ZC	NO or YES	NO
rls=Redlined	RLS	NO or YES	NO

* Valid data rates for DS0B are 56- or 64-kb/s even though all data rates are available for provisioning.

† You are not prompted for ZC when you select the 64-kb/s data rate. When rate=64 kb/s, ZC is automatically set to YES.

Table 5-57. DX4 Function Code Provisioning [AUA41B (CLEI=5SCUCD)]

Provisioning Parameter	WORD Abbreviation	Values	Default Value
trmt=TRMT attenuator	TRMT	0 to 16.5 in steps of 0.1	16.5
rcv=RCV attenuator	RCV	0 to 16.5 in steps of 0.1	16.5
ln=Nonloaded/loaded	L-N	L or N	N
sl=Slope	SL	0 to 15 in steps of 1	0
bw=Bandwidth	BW	0 to 15 in steps of 1	0
ht=Height	HT	0 to 15 in steps of 1	0
imp=Transmit and receive impedance	TRMT&RCV(IMP)	150, 600, or 1200	600
rls=Redlined	RLS	YES or NO	NO

Table 5-58. EBS Function Code Provisioning (CLEI=Other) (Note)

Provisioning Parameter	WORD Abbreviation	Values	Default Value
rls=Redlined	RLS	NO or YES	NO

Note: For the EBS function code (CLEI=Other), the channel units are POTS, multiparty, coin, FSR, DID, manual ringdown, PLAR, and DC bypass pair or alarm.

Table 5-59. EM4C/H Function Code Provisioning [SPQ®454 (CLEI=SAC1BG)]

Provisioning Parameter	WORD Abbreviation	Values	Default Value
trmt=TRMT attenuator	TRMT	0 to 25.5 in steps of 0.1	16.5
rcv=RCV attenuator	RCV	0 to 25.5 in steps of 0.1	16.5
rls=Redlined	RLS	YES or NO	NO

Table 5-60. ETO4 Function Code Provisioning [AUA41B (CLEI=5SCUCD)]

Provisioning Parameter	WORD Abbreviation	Values	Default Value
trmt=TRMT attenuator	TRMT	0 to 16.5 in steps of 0.1	16.5
rcv=RCV attenuator	RCV	0 to 16.5 in steps of 0.1	16.5
dBJ3=-7 dB (J3)	-7DB(J3)	WH or BK	BK
ln=Nonloaded/loaded	L-N	L or N	N
sl=Slope	SL	0 to 15 in steps of 1	0
bw=Bandwidth	BW	0 to 15 in steps of 1	0
ht=Height	HT	0 to 15 in steps of 1	0
imp=Transmit and receive impedance	TRMT&RCV(IMP)	150, 600, or 1200	600
sc=SealingCurrent	SC	YES or NO	YES
rls=Redlined	RLS	YES or NO	NO

Table 5-61. FXO Function Code Provisioning [AUA42 (CLEI=5SCU69), AUA42B (CLEI=5SCU6E), and SPQ®442 (CLEI=SAC1AH)]

Provisioning Parameter	WORD Abbreviation	Values	Default Value
imp=Impedance	IMP	600 or 900	900
bal=Balance	BAL	0 to 15 in steps of 1	3
xmtgn=TransmitGain	XMT(GN)	–1.0 to 6.75 in steps of 0.25	–1.0
rcvgn=ReceiveGain	RCV(GN)	–8.0 to 1.5 in steps of 0.25	–8.0
sl=Slope	SL	0 to 7 in steps of 1	0
td=TollDiversion	TD	YES or NO	NO
lsgs=SignalingType	LS-GS	LS or GS	GS
oht=OnHookTransmission	OHT	YES or NO	NO
rls=Redlined	RLS	YES or NO	NO

Table 5-62. FXO/P Function Code Provisioning [SPQ®444 (CLEI=SAC1BF)]

Provisioning Parameter	WORD Abbreviation	Values	Default Value
trmt=TRMT attenuator	TRMT	0 to 16.5 in steps of 0.1	16.5
rcv=RCV attenuator	RCV	0 to 16.5 in steps of 0.1	16.5
ln=Nonloaded/loaded	L-N	L or N	N
sl=Slope	SL	0 to 15 in steps of 1	0
bw=Bandwidth	BW	0 to 15 in steps of 1	0
ht=Height	HT	0 to 15 in steps of 1	0
imp=Transmit and receive impedance	TRMT&RCV(IMP)	150, 600, or 1200	600
rls=Redlined	RLS	YES or NO	NO

Table 5-63. FXS Function Code Provisioning [AUA43 (CLEI=5SCU6A), AUA43B (CLEI=5SCU6F), and SPQ®443 (CLEI=SAC1AE)]

Provisioning Parameter	WORD Abbreviation	Values	Default Value
imp=Impedance	IMP	600 or 900	600
bal=Balance	BAL	0 to 15 in steps of 1	3
xmtgn=TransmitGain	XMT(GN)	-1.0 to 6.75 in steps of 0.25	-1.0
rcvgn=ReceiveGain	RCV(GN)	-8.0 to 1.5 in steps of 0.25	-8.0
sl=Slope	SL	0 to 7 in steps of 1	0
oht=OnHookTransmission	OHT	YES or NO	NO
rls=Redlined	RLS	YES or NO	NO

Table 5-64. FXS/T Function Code Provisioning [AUA41B (CLEI=5SCUCD)]

Provisioning Parameter	WORD Abbreviation	Values	Default Value
trmt=TRMT attenuator	TRMT	0 to 16.5 in steps of 0.1	16.5
rcv=RCV attenuator	RCV	0 to 16.5 in steps of 0.1	16.5
ln=Nonloaded/loaded	L-N	L or N	N
sl=Slope	SL	0 to 15 in steps of 1	0
bw=Bandwidth	BW	0 to 15 in steps of 1	0
ht=Height	HT	0 to 15 in steps of 1	0
imp=Transmit and receive impedance	TRMT&RCV(IMP)	150, 600, or 1200	600
rls=Redlined	RLS	YES or NO	NO

Table 5-65. OCU Function Code Provisioning [AUA52 (CLEI=5SCU48)]

Provisioning Parameter	WORD Abbreviation	Values	Default Value
rate=Subscriber data rate	RATE	2.4, 4.8, 9.6, or 56 kb/s	56
ec=Error correction	EC	MVEC [*] , SCEC, NONE	NONE
zc=All-zero-code allowed	ZC	NO or YES	NO
scc=Secondary channel used	SCC	NO or YES	NO
rls=Redlined	RLS	YES or NO	NO

* Do not use MVEC when the data rate is 56 kb/s.

**Table 5-66. OCU Function Code Provisioning [AUA52B (CLEI=5SC143)]
(Note)**

Provisioning Parameter	WORD Abbreviation	Values	Default Value
rate=Subscriber data rate	RATE	2.4, 4.8, 9.6, 19.2, 56, or 64 kb/s	56
ec=Error correction	EC	MVEC [*] , SCEC, NONE	NONE
zc=All-zero-code allowed [†]	ZC	NO or YES	NO
scc=Secondary channel used [†]	SCC	NO or YES	NO
rls=Redlined	RLS	YES or NO	NO

Note: For rate=64 kb/s, clear channel (CC) is automatically set to ENABLE. However, for data rates other than 64 kb/s, CC is automatically set to DISABLE.

* MVEC does not operate with the 56- or 64-kb/s data rate. If MVEC is selected with the 19.2-kb/s data rate, single time slot 19.2 error correction (19.2EC) is performed.

† When the 64-kb/s rate is selected, the user is not prompted for ZC and SCC. For rate=64 kb/s, ZC and SCC are automatically set to YES.

Table 5-67. OCU Function Code Provisioning [SPQ®452 (CLEI=5SCTFF)]

Provisioning Parameter	WORD Abbreviation	Values	Default Value
rate=Subscriber data rate	RATE	2.4, 4.8, 9.6, 19.2, 56, or 64 kb/s	56
ec=Error correction	EC	MVEC *, SVEC, NONE	NONE
zc=All-zero-code allowed [†]	ZC	NO or YES	NO
scc=Secondary channel used [†]	SCC	NO or YES	NO
rls=Redlined	RLS	YES or NO	NO

* MVEC does not operate with the 56- or 64-kb/s data rate. If MVEC is selected with the 19.2-kb/s data rate, single time slot 19.2 error correction (19.2EC) is performed.

† When the 64-kb/s rate is selected, the user is not prompted for ZC and SCC. For rate=64 kb/s, ZC and SCC are automatically set to YES.

Table 5-68. PLR1/2 Function Code Provisioning [SPQ®454 (CLEI=SAC1BG)]

Provisioning Parameter	WORD Abbreviation	Values	Default Value
trmt=TRMT attenuator	TRMT	0 to 25.5 in steps of 0.1	16.5
rcv=RCV attenuator	RCV	0 to 25.5 in steps of 0.1	16.5
rls=Redlined	RLS	YES or NO	NO

Table 5-69. SW56 Function Code Provisioning [SPQ®334 (CLEI=5SC324)]

Provisioning Parameter	WORD Abbreviation	Values	Default Value
ab=A/B signaling	AB	NO or YES	NO
rls=Redlined	RLS	NO or YES	NO

Table 5-70. TDO Function Code Provisioning [SPQ®444 (CLEI=SAC1BF)]

Provisioning Parameter	WORD Abbreviation	Values	Default Value
trmt=TRMT attenuator	TRMT	0 to 11.6 in steps of 0.1	11.6
rls=Redlined	RLS	YES or NO	NO

Table 5-71. TDS Function Code Provisioning [SPQ®444 (CLEI=SAC1BF)]

Provisioning Parameter	WORD Abbreviation	Values	Default Value
trmt=TRMT attenuator	TRMT	0 to 11.6 in steps of 0.1	11.6
rls=Redlined	RLS	YES or NO	NO

Table 5-72. TO Function Code Provisioning [AUA42 (CLEI=5SCU69), AUA42B (5SCU6E), AUA43 (5SCU6A), AUA43B (5SCU6F), SPQ®442 (SAC1AH), and SPQ443 (SAC1AE)]

Provisioning Parameter	WORD Abbreviation	Values	Default Value
imp=Impedance	IMP	600 or 900	600
bal=Balance	BAL	0 to 15 in steps of 1	3
xmtgn=TransmitGain	XMT(GN)	-1.0 to 6.75 in steps of 0.25	-1.0
rcvgn=ReceiveGain	RCV(GN)	-8.0 to 1.5 in steps of 0.25	-8.0
sl=Slope	SL	0 to 7 in steps of 1	0
rls=Redlined	RLS	YES or NO	NO

Table 5-73. TO4 Function Code Provisioning [AUA41B (CLEI=5SCUCD)]

Provisioning Parameter	WORD Abbreviation	Values	Default Value
trmt=TRMT attenuator	TRMT	0 to 16.5 in steps of 0.1	16.5
rcv=RCV attenuator	RCV	0 to 16.5 in steps of 0.1	16.5
dBt=-7 dB TRMT	-7DB TRMT	WH or BK	BK
dBrc=-7 dB RCV	-7DB RCV	WH or BK	BK
sc=SealingCurrent	SC	YES or NO	YES
rls=Redlined	RLS	YES or NO	NO

Provisioning Parameters for Software Release 4.0

Tables 5-74 through 5-100 list the valid provisioning parameters, according to function code for channel units used in Software Release 4.0 (R4.0). These parameters are set using the **ent-t0** CIT command, are adjusted using the **ed-t0** command, and may be displayed using the **rtrv-t0** command.

Table 5-74. AC Function Code Provisioning [AUA45/AUA45B (CLEI=Other)]

Provisioning Parameter	WORD Abbreviation	Values	Default Value
rls=Redlined	RLS	YES or NO	NO

Table 5-75. BRI Function Code Provisioning [AUA93/AUA293 (CLEI=5SC1HE)] (Note)

Provisioning Parameter	WORD Abbreviation	Values	Default Value
svc=ISDN channel service	SVC	2B+D, B1+D, B2+D, or D	2B+D
rls=Redlined	RLS	YES or NO	NO

Note: DT Applications (Software Release 4.0 and earlier) require you to provision the AUA93 and AUA293 channel units using the on-board switches.

Table 5-76. DATA Function Code Provisioning [AUA200/AUA232 (CLEI=Other)]

Provisioning Parameter	WORD Abbreviation	Values	Default Value
rls=Redlined	RLS	YES or NO	NO

Table 5-77. DFLT Function Code Provisioning (CLEI=Other) (Note)

Provisioning Parameter	WORD Abbreviation	Values	Default Value
rls=Redlined	RLS	YES or NO	NO

Note: For the DFLT function code (CLEI=Other), the channel units are POTS, multiparty, coin, FSR, DID, manual ringdown, PLAR, and DC bypass pair or alarm.

Table 5-78. DPO Function Code Provisioning [AUA43 (CLEI=5SCU6A), AUA43B (CLEI=5SCU6F), and SPQ®443 (CLEI=SAC1AE)]

Provisioning Parameter	WORD Abbreviation	Values	Default Value
imp=Impedance	IMP	600 or 900	600
bal=Balance	BAL	0 to 15 in steps of 1	3
xmtgn=TransmitGain	XMT(GN)	-1.0 to 6.75 in steps of 0.25	-1.0
rcvgn=ReceiveGain	RCV(GN)	-8.0 to 1.5 in steps of 0.25	-8.0
sl=Slope	SL	0 to 7 in steps of 1	0
rls=Redlined	RLS	YES or NO	NO

Table 5-79. DPT Function Code Provisioning [AUA42 (CLEI=5SCU69), AUA42B (CLEI=5SCU6E), AUA142 (CLEI=5SCU69), and SPQ®442 (CLEI=SAC1AH)]

Provisioning Parameter	WORD Abbreviation	Values	Default Value
imp=Impedance	IMP	600 or 900	600
bal=Balance	BAL	0 to 15 in steps of 1	3
xmtgn=TransmitGain	XMT(GN)	-1.0 to 6.75 in steps of 0.25	-1.0
rcvgn=ReceiveGain	RCV(GN)	-8.0 to 1.5 in steps of 0.25	-8.0
sl=Slope	SL	0 to 7 in steps of 1	0
rls=Redlined	RLS	YES or NO	NO

Table 5-80. DX4 Function Code Provisioning [AUA41B (CLEI=5SCUCD)]

Provisioning Parameter	WORD Abbreviation	Values	Default Value
trmt=TRMT attenuator	TRMT	0 to 16.5 in steps of 0.1	16.5
rcv=RCV attenuator	RCV	0 to 16.5 in steps of 0.1	16.5
ln=Nonloaded/loaded	L-N	L or N	N
sl=Slope	SL	0 to 15 in steps of 1	0
bw=Bandwidth	BW	0 to 15 in steps of 1	0
ht=Height	HT	0 to 15 in steps of 1	0
imp=Transmit and receive impedance	TRMT&RCV(IMP)	150, 600, or 1200	600
rls=Redlined	RLS	YES or NO	NO

**Table 5-81. EM4C/H Function Code Provisioning [AUA54 (CLEI=5SCU7B)
and SPQ®454 (CLEI=SAC1BG)]**

Provisioning Parameter	WORD Abbreviation	Values	Default Value
trmt=TRMT attenuator	TRMT	0 to 25.5 in steps of 0.1	16.5
rcv=RCV attenuator	RCV	0 to 25.5 in steps of 0.1	16.5
rls=Redlined	RLS	NO or YES	NO

Table 5-82. ETO4 Function Code Provisioning [AUA41B (CLEI=5SCUCD)]

Provisioning Parameter	WORD Abbreviation	Values	Default Value
trmt=TRMT attenuator	TRMT	0 to 16.5 in steps of 0.1	16.5
rcv=RCV attenuator	RCV	0 to 16.5 in steps of 0.1	16.5
dBJ3=-7 dB (J3)	-7DB(J3)	WH or BK	BK
ln=Nonloaded/loaded	L-N	L or N	N
sl=Slope	SL	0 to 15 in steps of 1	0
bw=Bandwidth	BW	0 to 15 in steps of 1	0
ht=Height	HT	0 to 15 in steps of 1	0
imp=Transmit and receive impedance	TRMT&RCV(IMP)	150, 600, or 1200	600
sc=SealingCurrent	SC	YES or NO	YES
rls=Redlined	RLS	YES or NO	NO

**Table 5-83. FXO Function Code Provisioning [AUA42 (CLEI=5SCU69),
AUA42B (CLEI=5SCU6E), AUA142 (CLEI=5SCU69), and SPQ®442
(CLEI=SAC1AH)]**

Provisioning Parameter	WORD Abbreviation	Values	Default Value
imp=Impedance	IMP	600 or 900	900
bal=Balance	BAL	0 to 15 in steps of 1	3
xmtgn=TransmitGain	XMT(GN)	-1.0 to 6.75 in steps of 0.25	-1.0
rcvgn=ReceiveGain	RCV(GN)	-8.0 to 1.5 in steps of 0.25	-8.0
sl=Slope	SL	0 to 7 in steps of 1	0
td=TollDiversion	TD	YES or NO	NO
lsgs=SignalingType	LS-GS	LS or GS	GS
oht=OnHookTransmission	OHT	YES or NO	NO
rls=Redlined	RLS	YES or NO	NO

Table 5-84. FXO/P Function Code Provisioning [AUA44 (CLEI=5SCU7C) and SPQ®444 (CLEI=SAC1BF)]

Provisioning Parameter	WORD Abbreviation	Values	Default Value
trmt=TRMT attenuator	TRMT	0 to 16.5 in steps of 0.1	16.5
rcv=RCV attenuator	RCV	0 to 16.5 in steps of 0.1	16.5
ln=Nonloaded/loaded	L-N	L or N	N
sl=Slope	SL	0 to 15 in steps of 1	0
bw=Bandwidth	BW	0 to 15 in steps of 1	0
ht=Height	HT	0 to 15 in steps of 1	0
imp=Transmit and receive impedance	TRMT&RCV(IMP)	150, 600, or 1200	600
rls=Redlined	RLS	YES or NO	NO

Table 5-85. FXS Function Code Provisioning [AUA43 (CLEI=5SCU6A), AUA43B (CLEI=5SCU6F), and SPQ®443 (CLEI=SAC1AE)]

Provisioning Parameter	WORD Abbreviation	Values	Default Value
imp=Impedance	IMP	600 or 900	600
bal=Balance	BAL	0 to 15 in steps of 1	3
xmtgn=TransmitGain	XMT(GN)	-1.0 to 6.75 in steps of 0.25	-1.0
rcvgn=ReceiveGain	RCV(GN)	-8.0 to 1.5 in steps of 0.25	-8.0
sl=Slope	SL	0 to 7 in steps of 1	0
oht=OnHookTransmission	OHT	YES or NO	NO
rls=Redlined	RLS	YES or NO	NO

Table 5-86. FXS/T Function Code Provisioning [AUA41B (CLEI=5SCUCD)]

Provisioning Parameter	WORD Abbreviation	Values	Default Value
trmt=TRMT attenuator	TRMT	0 to 16.5 in steps of 0.1	16.5
rcv=RCV attenuator	RCV	0 to 16.5 in steps of 0.1	16.5
ln=Nonloaded/loaded	L-N	L or N	N
sl=Slope	SL	0 to 15 in steps of 1	0
bw=Bandwidth	BW	0 to 15 in steps of 1	0
ht=Height	HT	0 to 15 in steps of 1	0
imp=Transmit and receive impedance	TRMT&RCV(IMP)	150, 600, or 1200	600
rls=Redlined	RLS	YES or NO	NO

Table 5-87. GO Function Code Provisioning [AUA32, AUA39, and SPQ®340 (CLEI=Other)]

Provisioning Parameter	WORD Abbreviation	Values	Default Value
rls=Redlined	RLS	YES or NO	NO

Table 5-88. GS Function Code Provisioning (CLEI=Other) (Note)

Provisioning Parameter	WORD Abbreviation	Values	Default Value
rls=Redlined	RLS	YES or NO	NO

Note: The apparatus codes can be AUA25, AUA25B, AUA51, AUA53, AUA59, AUA150, AUA151, AUA159, AUA159B, AUA179, SPQ®440, SPQ440B, and SPQ450.

Table 5-89. LO Function Code Provisioning [AUA32, AUA39, SPQ®300, and SPQ340 (CLEI=Other)]

Provisioning Parameter	WORD Abbreviation	Values	Default Value
rls=Redlined	RLS	YES or NO	NO

Table 5-90. LR Function Code Provisioning [AUA75 (CLEI=Other)]

Provisioning Parameter	WORD Abbreviation	Values	Default Value
rls=Redlined	RLS	YES or NO	NO

Table 5-91. LS Function Code Provisioning (CLEI=Other) (Note)

Provisioning Parameter	WORD Abbreviation	Values	Default Value
rls=Redlined	RLS	YES or NO	NO

Note: The apparatus codes can be AUA25, AUA25B, AUA27, AUA51, AUA53, AUA55, AUA57, AUA58, AUA58B, AUA58C, AUA59, AUA150, AUA151, AUA158, AUA158B, AUA159, AUA159B, AUA178, AUA179, SPQ®400, SPQ440, SPQ440B, SPQ450, SPQ478, and SPQ909.

Table 5-92. NO Function Code Provisioning [MCU*5205 and MCU5405 (CLEI=Other)]

Provisioning Parameter	WORD Abbreviation	Values	Default Value
rls=Redlined	RLS	YES or NO	NO

* Trademark of Tollgrade Communications, Inc.

Table 5-93. OCU Function Code Provisioning [AUA52 and AUA152 (CLEI=5SCU48)]

Provisioning Parameter	WORD Abbreviation	Values	Default Value
rate=Subscriber data rate	RATE	2.4, 4.8, 9.6, or 56 kb/s	56
ec=Error correction	EC	MVEC *, SCEC, NONE	NONE
zc=All-zero-code allowed	ZC	NO or YES	NO
scc=Secondary channel used	SCC	NO or YES	NO
rls=Redlined	RLS	YES or NO	NO

* Do not use MVEC when the data rate is 56 kb/s.

Table 5-94. OCU Function Code Provisioning [AUA52B (CLEI=5SC143)] (Note)

Provisioning Parameter	WORD Abbreviation	Values	Default Value
rate=Subscriber data rate	RATE	2.4, 4.8, 9.6, 19.2, 56, or 64 kb/s	56
ec=Error correction	EC	MVEC *, SCEC, NONE	NONE
zc=All-zero-code allowed [†]	ZC	NO or YES	NO
scc=Secondary channel used [†]	SCC	NO or YES	NO
rls=Redlined	RLS	YES or NO	NO

Note: For rate=64 kb/s, clear channel (CC) is automatically set to ENABLE. However, for data rates other than 64 kb/s, CC is automatically set to DISABLE.

* MVEC does not operate with the 56- or 64-kb/s data rate. If MVEC is selected with the 19.2-kb/s data rate, single time slot 19.2 error correction (19.2EC) is performed.

† When the 64-kb/s rate is selected, the user is not prompted for ZC and SCC. For rate=64 kb/s, ZC and SCC are automatically set to YES.

Table 5-95. PLR1/2 Function Code Provisioning [AUA54 (CLEI=5SCU7B) and SPQ®454 (CLEI=SAC1BG)]

Provisioning Parameter	WORD Abbreviation	Values	Default Value
trmt=TRMT attenuator	TRMT	0 to 25.5 in steps of 0.1	16.5
rcv=RCV attenuator	RCV	0 to 25.5 in steps of 0.1	16.5
rls=Redlined	RLS	YES or NO	NO

Table 5-96. RVT Function Code Provisioning [AUA56 (CLEI=Other)]

Provisioning Parameter	WORD Abbreviation	Values	Default Value
rls=Redlined	RLS	YES or NO	NO

Table 5-97. TDO Function Code Provisioning [AUA44 (CLEI=5SCU7C) and SPQ®444 (CLEI=SAC1BF)]

Provisioning Parameter	WORD Abbreviation	Values	Default Value
trmt=TRMT attenuator	TRMT	0 to 11.6 in steps of 0.1	11.6
rls=Redlined	RLS	YES or NO	NO

Table 5-98. TDS Function Code Provisioning [AUA44 (CLEI=5SCU7C) and SPQ®444 (CLEI=SAC1BF)]

Provisioning Parameter	WORD Abbreviation	Values	Default Value
trmt=TRMT attenuator	TRMT	0 to 11.6 in steps of 0.1	11.6
rls=Redlined	RLS	YES or NO	NO

Table 5-99. TO Function Code Provisioning [AUA42/AUA142 (CLEI=5SCU69), AUA42B (5SCU6E), AUA43 (5SCU6A), AUA43B (5SCU6F), SPQ®442 (SAC1AH), and SPQ443 (SAC1AE)]

Provisioning Parameter	WORD Abbreviation	Values	Default Value
imp=Impedance	IMP	600 or 900	600
bal=Balance	BAL	0 to 15 in steps of 1	3
xmtgn=TransmitGain	XMT(GN)	-1.0 to 6.75 in steps of 0.25	-1.0
rcvgn=ReceiveGain	RCV(GN)	-8.0 to 1.5 in steps of 0.25	-8.0
sl=Slope	SL	0 to 7 in steps of 1	0
rls=Redlined	RLS	YES or NO	NO

Table 5-100. TO4 Function Code Provisioning [AUA41B (CLEI=5SCUCD)]

Provisioning Parameter	WORD Abbreviation	Values	Default Value
trmt=TRMT attenuator	TRMT	0 to 16.5 in steps of 0.1	16.5
rcv=RCV attenuator	RCV	0 to 16.5 in steps of 0.1	16.5
dBt=-7 dB TRMT	-7DB TRMT	WH or BK	BK
dBr=-7 dB RCV	-7DB RCV	WH or BK	BK
sc=SealingCurrent	SC	YES or NO	YES
rls=Redlined	RLS	YES or NO	NO

Provisioning Parameters for Software Release 4.2

Tables 5-101 through 5-133 list the valid provisioning parameters, according to function code for channel units used in Software Release 4.2 (R4.2). These parameters are set using the **ent-t0** CIT command, are adjusted using the **ed-t0** command, and may be displayed using the **rtrv-t0** command.

Table 5-101. AC Function Code Provisioning [AUA45 and AUA45B (CLEI=Other)]

Provisioning Parameter	WORD Abbreviation	Values	Default Value
rls=Redlined	RLS	NO or YES	NO

Table 5-102. BRI Function Code Provisioning [AUA93/AUA293 (CLEI=5SC1HE)] (Note)

Provisioning Parameter	WORD Abbreviation	Values	Default Value
svc=ISDN channel service	SVC	2B+D, B1+D, B2+D, or D	2B+D
rls=Redlined	RLS	YES or NO	NO

Note: DT applications (Software Releases 4.2 and later) require you to provision the AUA93 and AUA293 channel units using the CIT (set the on-board switches to match the parameter settings provisioned using the CIT). Software Releases 4.0 and earlier require you to provision the AUA93 and AUA293 channel units using the on-board switches.

Table 5-103. DATA Function Code Provisioning [AUA200 and AUA232 (CLEI=Other)]

Provisioning Parameter	WORD Abbreviation	Values	Default Value
rls=Redlined	RLS	NO or YES	NO

Table 5-104. DFLT Function Code Provisioning (CLEI=Other) (Note)

Provisioning Parameter	WORD Abbreviation	Values	Default Value
rls=Redlined	RLS	NO or YES	NO

Note: For the DFLT function code (CLEI=Other), the channel units are POTS, multiparty, coin, FSR, DID, manual ringdown, PLAR, and DC bypass pair or alarm.

Table 5-105. DFLT Function Code Provisioning [SPQ®456 (CLEI=SACPDC)]

Provisioning Parameter	WORD Abbreviation	Values	Default Value
ls=Transmission loss	LS	0 or 2.5 dB	0 dB
rls=Redlined	RLS	YES or NO	NO

Table 5-106. DPO Function Code Provisioning [AUA43 (CLEI=5SCU6A), AUA43B (CLEI=5SCU6F), and SPQ®443 (CLEI=SAC1AE)]

Provisioning Parameter	WORD Abbreviation	Values	Default Value
imp=Impedance	IMP	600 or 900	600
bal=Balance	BAL	0 to 15 in steps of 1	3
xmtgn=TransmitGain	XMT(GN)	-1.0 to 6.75 in steps of 0.25	-1.0
rcvgn=ReceiveGain	RCV(GN)	-8.0 to 1.5 in steps of 0.25	-8.0
sl=Slope	SL	0 to 7 in steps of 1	0
rls=Redlined	RLS	NO or YES	NO

Table 5-107. DPT Function Code Provisioning [AUA42/AUA142 (CLEI=5SCU69), AUA42B (CLEI=5SCU6E), and SPQ®442 (CLEI=SAC1AH)]

Provisioning Parameter	WORD Abbreviation	Values	Default Value
imp=Impedance	IMP	600 or 900	600
bal=Balance	BAL	0 to 15 in steps of 1	3
xmtgn=TransmitGain	XMT(GN)	-1.0 to 6.75 in steps of 0.25	-1.0
rcvgn=ReceiveGain	RCV(GN)	-8.0 to 1.5 in steps of 0.25	-8.0
sl=Slope	SL	0 to 7 in steps of 1	0
rls=Redlined	RLS	YES or NO	NO

Table 5-108. DX4 Function Code Provisioning [AUA41B (CLEI=5SCUCD)]

Provisioning Parameter	WORD Abbreviation	Values	Default Value
trmt=TRMT attenuator	TRMT	0 to 16.5 in steps of 0.1	16.5
rcv=RCV attenuator	RCV	0 to 16.5 in steps of 0.1	16.5
ln=Nonloaded/loaded	L-N	L or N	N
sl=Slope	SL	0 to 15 in steps of 1	0
bw=Bandwidth	BW	0 to 15 in steps of 1	0
ht=Height	HT	0 to 15 in steps of 1	0
imp=Transmit and receive impedance	TRMT&RCV(IMP)	150, 600, or 1200	600
rls=Redlined	RLS	YES or NO	NO

Table 5-109. EBS Function Code Provisioning [SPQ®429 (CLEI=Other)]

Provisioning Parameter	WORD Abbreviation	Values	Default Value
rls=Redlined	RLS	NO or YES	NO

Table 5-110. EM4C/H Function Code Provisioning [AUA54 (CLEI=5SCU7B) and SPQ®454 (CLEI=SAC1BG)]

Provisioning Parameter	WORD Abbreviation	Values	Default Value
trmt=TRMT attenuator	TRMT	0 to 25.5 in steps of 0.1	16.5
rcv=RCV attenuator	RCV	0 to 25.5 in steps of 0.1	16.5
rls=Redlined	RLS	NO or YES	NO

Table 5-111. ETO4 Function Code Provisioning [AUA41B (CLEI=5SCUCD)]

Provisioning Parameter	WORD Abbreviation	Values	Default Value
trmt=TRMT attenuator	TRMT	0 to 16.5 in steps of 0.1	16.5
rcv=RCV attenuator	RCV	0 to 16.5 in steps of 0.1	16.5
dBJ3=-7 dB (J3)	-7DB(J3)	WH or BK	BK
In=Nonloaded/loaded	L-N	L or N	N
sl=Slope	SL	0 to 15 in steps of 1	0
bw=Bandwidth	BW	0 to 15 in steps of 1	0
ht=Height	HT	0 to 15 in steps of 1	0
imp=Transmit and receive impedance	TRMT&RCV(IMP)	150, 600, or 1200	600
sc=SealingCurrent	SC	YES or NO	YES
rls=Redlined	RLS	NO or YES	NO

Table 5-112. FXO Function Code Provisioning [AUA42 (CLEI=5SCU69), AUA42B (CLEI=5SCU6E), AUA142 (CLEI=5SCU69), and SPQ® 442 (CLEI=SAC1AH)]

Provisioning Parameter	WORD Abbreviation	Values	Default Value
imp=Impedance	IMP	600 or 900	900
bal=Balance	BAL	0 to 15 in steps of 1	3
xmtgn=TransmitGain	XMT(GN)	-1.0 to 6.75 in steps of 0.25	-1.0
rcvgn=ReceiveGain	RCV(GN)	-8.0 to 1.5 in steps of 0.25	-8.0
sl=Slope	SL	0 to 7 in steps of 1	0
td=TollDiversion	TD	NO or YES	NO
lsgs=SignalingType	LS-GS	LS or GS	GS
oht=OnHookTransmission	OHT	NO or YES	NO
rls=Redlined	RLS	NO or YES	NO

Table 5-113. FXO/P Function Code Provisioning [AUA44 (CLEI=5SCU7C) and SPQ® 444 (CLEI=SAC1BF)]

Provisioning Parameter	WORD Abbreviation	Values	Default Value
trmt=TRMT attenuator	TRMT	0 to 16.5 in steps of 0.1	16.5
rcv=RCV attenuator	RCV	0 to 16.5 in steps of 0.1	16.5
ln=Nonloaded/loaded	L-N	L or N	N
sl=Slope	SL	0 to 15 in steps of 1	0
bw=Bandwidth	BW	0 to 15 in steps of 1	0
ht=Height	HT	0 to 15 in steps of 1	0
imp=Transmit and receive impedance	TRMT&RCV(IMP)	150, 600, or 1200	600
rls=Redlined	RLS	NO or YES	NO

Table 5-114. FXS Function Code Provisioning [AUA43 (CLEI=5SCU6A), AUA43B (CLEI=5SCU6F), and SPQ®443 (CLEI=SAC1AE)]

Provisioning Parameter	WORD Abbreviation	Values	Default Value
imp=Impedance	IMP	600 or 900	600
bal=Balance	BAL	0 to 15 in steps of 1	3
xmtgn=TransmitGain	XMT(GN)	-1.0 to 6.75 in steps of 0.25	-1.0
rcvgn=ReceiveGain	RCV(GN)	-8.0 to 1.5 in steps of 0.25	-8.0
sl=Slope	SL	0 to 7 in steps of 1	0
oht=OnHookTransmission	OHT	NO or YES	NO
rls=Redlined	RLS	NO or YES	NO

Table 5-115. FXS/T Function Code Provisioning [AUA41B (CLEI=5SCUCD)]

Provisioning Parameter	WORD Abbreviation	Values	Default Value
trmt=TRMT attenuator	TRMT	0 to 16.5 in steps of 0.1	16.5
rcv=RCV attenuator	RCV	0 to 16.5 in steps of 0.1	16.5
ln=Nonloaded/loaded	L-N	L or N	N
sl=Slope	SL	0 to 15 in steps of 1	0
bw=Bandwidth	BW	0 to 15 in steps of 1	0
ht=Height	HT	0 to 15 in steps of 1	0
imp=Transmit and receive impedance	TRMT&RCV(IMP)	150, 600, or 1200	600
rls=Redlined	RLS	NO or YES	NO

Table 5-116. GO Function Code Provisioning [AUA32, AUA39, and SPQ®340 (CLEI=Other)]

Provisioning Parameter	WORD Abbreviation	Values	Default Value
rls=Redlined	RLS	NO or YES	NO

Table 5-117. GS Function Code Provisioning (CLEI=Other) (Note)

Provisioning Parameter	WORD Abbreviation	Values	Default Value
rls=Redlined	RLS	NO or YES	NO
<i>Note:</i> The apparatus codes can be AUA25, AUA25B, AUA51, AUA53, AUA59, AUA150, AUA151, AUA159, AUA159B, AUA179, SPQ®440, SPQ440B, and SPQ450.			

Table 5-118. LO Function Code Provisioning [AUA32, AUA39, SPQ®300, and SPQ340 (CLEI=Other)]

Provisioning Parameter	WORD Abbreviation	Values	Default Value
rls=Redlined	RLS	NO or YES	NO

Table 5-119. LR Function Code Provisioning [AUA75 (CLEI=Other)]

Provisioning Parameter	WORD Abbreviation	Values	Default Value
rls=Redlined	RLS	NO or YES	NO

Table 5-120. LS Function Code Provisioning (CLEI=Other) (Note)

Provisioning Parameter	WORD Abbreviation	Values	Default Value
rls=Redlined	RLS	NO or YES	NO
<i>Note:</i> The apparatus codes can be AUA25, AUA25B, AUA27, AUA51, AUA53, AUA55, AUA57, AUA58, AUA58B, AUA58C, AUA59, AUA150, AUA151, AUA158, AUA158B, AUA159, AUA159B, AUA178, AUA179, SPQ®400, SPQ440, SPQ440B, SPQ450, SPQ478, and SPQ909.			

Table 5-121. NO Function Code Provisioning [MCU*5205 and MCU5405 (CLEI=Other)]

Provisioning Parameter	WORD Abbreviation	Values	Default Value
rls=Redlined	RLS	NO or YES	NO

* Trademark of Tollgrade Communications, Inc.

Table 5-122. OCU Function Code Provisioning [AUA52 and AUA152 (CLEI=5SCU48)]

Provisioning Parameter	WORD Abbreviation	Values	Default Value
rate=Subscriber data rate	RATE	2.4, 4.8, 9.6, or 56 kb/s	56
ec=Error correction	EC	NONE, SCEC, MVEC*	NONE
zc=All-zero-code allowed	ZC	NO or YES	NO
scc=Secondary channel used	SCC	NO or YES	NO
rls=Redlined	RLS	NO or YES	NO

* Do not use MVEC when the data rate is 56 kb/s.

**Table 5-123. OCU Function Code Provisioning [AUA52B (CLEI=5SC143)]
(Note)**

Provisioning Parameter	WORD Abbreviation	Values	Default Value
rate=Subscriber data rate	RATE	2.4, 4.8, 9.6, 19.2, 56, or 64 kb/s	56
ec=Error correction	EC	NONE, SCEC, MVEC*	NONE
zc=All-zero-code allowed [†]	ZC	NO or YES	NO
scc=Secondary channel used [†]	SCC	NO or YES	NO
rls=Redlined	RLS	NO or YES	NO

Note: For rate=64 kb/s, clear channel (CC) is automatically set to ENABLE. However, for data rates other than 64 kb/s, CC is automatically set to DISABLE.

* MVEC does not operate with the 56- or 64-kb/s data rate. If MVEC is selected with the 19.2-kb/s data rate, single time slot 19.2 error correction (19.2EC) is performed.

† When the 64-kb/s rate is selected, the user is not prompted for ZC and SCC. For rate=64 kb/s, ZC and SCC are automatically set to YES.

Table 5-124. OCU Function Code Provisioning [SPQ®452 (CLEI=5SCTFF)]

Provisioning Parameter	WORD Abbreviation	Values	Default Value
rate=Subscriber data rate	RATE	2.4, 4.8, 9.6, 19.2, 56, or 64 kb/s	56
ec=Error correction	EC	NONE, SCEC, MVEC*	NONE
zc=All-zero-code allowed [†]	ZC	NO or YES	NO
scc=Secondary channel used [†]	SCC	NO or YES	NO
rls=Redlined	RLS	NO or YES	NO

* MVEC does not operate with the 38.4-, 56-, or 64-kb/s data rate. If you select MVEC with the 19.2-kb/s data rate, single time slot 19.2 error correction (19.2EC) is performed.

† You are not prompted for ZC or SCC when you select the 64-kb/s data rate. When rate=64 kb/s, ZC and SCC are automatically set to YES.

Table 5-125. PG5, PG8, PG15, and PG20 Function Code Provisioning [PGM^{*}-2000 (CLEI=SAC1CS)]

Provisioning Parameter	WORD Abbreviation	Values	Default Value
rls=Redlined	RLS	NO or YES	NO

* Trademark of Tollgrade Communications, Inc.

Table 5-126. PLR1/2 Function Code Provisioning [AUA54 (CLEI=5SCU7B), AUA54B (CLEI=5SCU7B), and SPQ[®]454 (CLEI=SAC1BG)]

Provisioning Parameter	WORD Abbreviation	Values	Default Value
trmt=TRMT attenuator	TRMT	0 to 25.5 in steps of 0.1	16.5
rcv=RCV attenuator	RCV	0 to 25.5 in steps of 0.1	16.5
rls=Redlined	RLS	NO or YES	NO

Table 5-127. RVT Function Code Provisioning [AUA56 and AUA56B (CLEI=Other)]

Provisioning Parameter	WORD Abbreviation	Values	Default Value
rls=Redlined	RLS	NO or YES	NO

Table 5-128. RVT Function Code Provisioning [SPQ[®]456 (CLEI=SACPDC)]

Provisioning Parameter	WORD Abbreviation	Values	Default Value
ls=Transmission loss	LS	0 or 2.5 dB	0 dB
rls=Redlined	RLS	NO or YES	NO

Table 5-129. SW56 Function Code Provisioning [SPQ®452 (CLEI=5SCTFF)]

Provisioning Parameter	WORD Abbreviation	Values	Default Value
eh56=Enhanced switched 56	EH56	NO or YES	NO
ab=A/B signaling	AB	NO or YES	NO
qm=Quality monitoring	QM	NO or YES	NO
rls=Redlined	RLS	NO or YES	NO

**Table 5-130. TDO Function Code Provisioning [AUA44 (CLEI=5SCU7C),
AUA44B (CLEI=5SCU7C), and SPQ®444 (CLEI=SAC1BF)]**

Provisioning Parameter	WORD Abbreviation	Values	Default Value
trmt=TRMT attenuator	TRMT	0 to 11.6 in steps of 0.1	11.6
rls=Redlined	RLS	NO or YES	NO

**Table 5-131. TDS Function Code Provisioning [AUA44 (CLEI=5SCU7C),
AUA44B (CLEI=5SCU7C), and SPQ®444 (CLEI=SAC1BF)]**

Provisioning Parameter	WORD Abbreviation	Values	Default Value
trmt=TRMT attenuator	TRMT	0 to 11.6 in steps of 0.1	11.6
rls=Redlined	RLS	NO or YES	NO

Table 5-132. TO Function Code Provisioning [AUA42 and AUA142 (CLEI=5SCU69), AUA42B (5SCU6E), AUA43 (5SCU6A), AUA43B (5SCU6F), SPQ[®]442 (SAC1AH), and SPQ443 (SAC1AE)]

Provisioning Parameter	WORD Abbreviation	Values	Default Value
imp=Impedance	IMP	600 or 900	600
bal=Balance	BAL	0 to 15 in steps of 1	3
xmtgn=TransmitGain	XMT(GN)	-1.0 to 6.75 in steps of 0.25	-1.0
rcvgn=ReceiveGain	RCV(GN)	-8.0 to 1.5 in steps of 0.25	-8.0
sl=Slope	SL	0 to 7 in steps of 1	0
rls=Redlined	RLS	NO or YES	NO

Table 5-133. TO4 Function Code Provisioning [AUA41B (CLEI=5SCUCD)]

Provisioning Parameter	WORD Abbreviation	Values	Default Value
trmt=TRMT attenuator	TRMT	0 to 16.5 in steps of 0.1	16.5
rcv=RCV attenuator	RCV	0 to 16.5 in steps of 0.1	16.5
dBt=-7 dB TRMT	-7DB TRMT	WH or BK	BK
dBr=-7 dB RCV	-7DB RCV	WH or BK	BK
sc=SealingCurrent	SC	YES or NO	YES
rls=Redlined	RLS	NO or YES	NO

Provisioning Parameters for Software Release 4.4

Tables 5-134 through 5-166 list the valid provisioning parameters, according to function code for channel units used in Software Release 4.4 (R4.4). These parameters are set using the **ent-t0** CIT command, are adjusted using the **ed-t0** command, and may be displayed using the **rtrv-t0** command.

Table 5-134. AC Function Code Provisioning [AUA45 and AUA45B (CLEI=Other)]

Provisioning Parameter	WORD Abbreviation	Values	Default Value
rls=Redlined	RLS	NO or YES	NO

Table 5-135. BRI Function Code Provisioning [AUA93/AUA293 (CLEI=5SC1HE)] (Note)

Provisioning Parameter	WORD Abbreviation	Values	Default Value
svc=ISDN channel service	SVC	2B+D, B1+D, B2+D, or D	2B+D
rls=Redlined	RLS	YES or NO	NO

Note: DT applications (Software Releases 4.2 and later) require you to provision the AUA93 and AUA293 channel units using the CIT (set the on-board switches to match the parameter settings provisioned using the CIT). Software Releases 4.0 and earlier require you to provision the AUA93 and AUA293 channel units using the on-board switches.

Table 5-136. DATA Function Code Provisioning [AUA200 and AUA232 (CLEI=Other)]

Provisioning Parameter	WORD Abbreviation	Values	Default Value
rls=Redlined	RLS	NO or YES	NO

Table 5-137. DFLT Function Code Provisioning (CLEI=Other) (Note)

Provisioning Parameter	WORD Abbreviation	Values	Default Value
rls=Redlined	RLS	NO or YES	NO

Note: For the DFLT function code (CLEI=Other), the channel units are POTS, multiparty, coin, FSR, DID, manual ringdown, PLAR, and DC bypass pair or alarm.

Table 5-138. DFLT Function Code Provisioning [SPQ® 456 (CLEI=SACPDC)]

Provisioning Parameter	WORD Abbreviation	Values	Default Value
ls=Transmission loss	LS	0 or 2.5 dB	0 dB
rls=Redlined	RLS	YES or NO	NO

Table 5-139. DPO Function Code Provisioning [AUA43 (CLEI=5SCU6A), AUA43B (CLEI=5SCU6F), and SPQ® 443 (CLEI=SAC1AE)]

Provisioning Parameter	WORD Abbreviation	Values	Default Value
imp=Impedance	IMP	600 or 900	600
bal=Balance	BAL	0 to 15 in steps of 1	3
xmtgn=TransmitGain	XMT(GN)	–1.0 to 6.75 in steps of 0.25	–1.0
rcvgn=ReceiveGain	RCV(GN)	–8.0 to 1.5 in steps of 0.25	–8.0
sl=Slope	SL	0 to 7 in steps of 1	0
rls=Redlined	RLS	NO or YES	NO

Table 5-140. DPT Function Code Provisioning [AUA42 (CLEI=5SCU69), AUA42B (CLEI=5SCU6E), AUA142 (CLEI=5SCU69), and SPQ® 442 (CLEI=SAC1AH)]

Provisioning Parameter	WORD Abbreviation	Values	Default Value
imp=Impedance	IMP	600 or 900	600
bal=Balance	BAL	0 to 15 in steps of 1	3
xmtgn=TransmitGain	XMT(GN)	-1.0 to 6.75 in steps of 0.25	-1.0
rcvgn=ReceiveGain	RCV(GN)	-8.0 to 1.5 in steps of 0.25	-8.0
sl=Slope	SL	0 to 7 in steps of 1	0
rls=Redlined	RLS	YES or NO	NO

Table 5-141. DX4 Function Code Provisioning [AUA41B (CLEI=5SCUCD)]

Provisioning Parameter	WORD Abbreviation	Values	Default Value
trmt=TRMT attenuator	TRMT	0 to 16.5 in steps of 0.1	16.5
rcv=RCV attenuator	RCV	0 to 16.5 in steps of 0.1	16.5
ln=Nonloaded/loaded	L-N	L or N	N
sl=Slope	SL	0 to 15 in steps of 1	0
bw=Bandwidth	BW	0 to 15 in steps of 1	0
ht=Height	HT	0 to 15 in steps of 1	0
imp=Transmit and receive impedance	TRMT&RCV(IMP)	150, 600, or 1200	600
rls=Redlined	RLS	YES or NO	NO

Table 5-142. EBS Function Code Provisioning [SPQ® 429 (CLEI=Other)]

Provisioning Parameter	WORD Abbreviation	Values	Default Value
rls=Redlined	RLS	NO or YES	NO

Table 5-143. EM4C/H Function Code Provisioning [AUA54 (CLEI=5SCU7B) and SPQ®454 (CLEI=SAC1BG)]

Provisioning Parameter	WORD Abbreviation	Values	Default Value
trmt=TRMT attenuator	TRMT	0 to 25.5 in steps of 0.1	16.5
rcv=RCV attenuator	RCV	0 to 25.5 in steps of 0.1	16.5
rls=Redlined	RLS	NO or YES	NO

Table 5-144. ETO4 Function Code Provisioning [AUA41B (CLEI=5SCUCD)]

Provisioning Parameter	WORD Abbreviation	Values	Default Value
trmt=TRMT attenuator	TRMT	0 to 16.5 in steps of 0.1	16.5
rcv=RCV attenuator	RCV	0 to 16.5 in steps of 0.1	16.5
dBJ3=-7 dB (J3)	-7DB(J3)	WH or BK	BK
ln=Nonloaded/loaded	L-N	L or N	N
sl=Slope	SL	0 to 15 in steps of 1	0
bw=Bandwidth	BW	0 to 15 in steps of 1	0
ht=Height	HT	0 to 15 in steps of 1	0
imp=Transmit and receive impedance	TRMT&RCV(IMP)	150, 600, or 1200	600
sc=SealingCurrent	SC	YES or NO	YES
rls=Redlined	RLS	NO or YES	NO

Table 5-145. FXO Function Code Provisioning [AUA42 (CLEI=5SCU69), AUA42B (CLEI=5SCU6E), AUA142 (CLEI=5SCU69), and SPQ® 442 (CLEI=SAC1AH)]

Provisioning Parameter	WORD Abbreviation	Values	Default Value
imp=Impedance	IMP	600 or 900	900
bal=Balance	BAL	0 to 15 in steps of 1	3
xmtgn=TransmitGain	XMT(GN)	-1.0 to 6.75 in steps of 0.25	-1.0
rcvgn=ReceiveGain	RCV(GN)	-8.0 to 1.5 in steps of 0.25	-8.0
sl=Slope	SL	0 to 7 in steps of 1	0
td=TollDiversion	TD	NO or YES	NO
lsgs=SignalingType	LS-GS	LS or GS	GS
oht=OnHookTransmission	OHT	NO or YES	NO
rls=Redlined	RLS	NO or YES	NO

Table 5-146. FXO/P Function Code Provisioning [AUA44 (CLEI=5SCU7C) and SPQ® 444 (CLEI=SAC1BF)]

Provisioning Parameter	WORD Abbreviation	Values	Default Value
trmt=TRMT attenuator	TRMT	0 to 16.5 in steps of 0.1	16.5
rcv=RCV attenuator	RCV	0 to 16.5 in steps of 0.1	16.5
ln=Nonloaded/loaded	L-N	L or N	N
sl=Slope	SL	0 to 15 in steps of 1	0
bw=Bandwidth	BW	0 to 15 in steps of 1	0
ht=Height	HT	0 to 15 in steps of 1	0
imp=Transmit and receive impedance	TRMT&RCV(IMP)	150, 600, or 1200	600
rls=Redlined	RLS	NO or YES	NO

Table 5-147. FXS Function Code Provisioning [AUA43 (CLEI=5SCU6A), AUA43B (CLEI=5SCU6F), and SPQ®443 (CLEI=SAC1AE)]

Provisioning Parameter	WORD Abbreviation	Values	Default Value
imp=Impedance	IMP	600 or 900	600
bal=Balance	BAL	0 to 15 in steps of 1	3
xmtgn=TransmitGain	XMT(GN)	-1.0 to 6.75 in steps of 0.25	-1.0
rcvgn=ReceiveGain	RCV(GN)	-8.0 to 1.5 in steps of 0.25	-8.0
sl=Slope	SL	0 to 7 in steps of 1	0
oht=OnHookTransmission	OHT	NO or YES	NO
rls=Redlined	RLS	NO or YES	NO

Table 5-148. FXS/T Function Code Provisioning [AUA41B (CLEI=5SCUCD)]

Provisioning Parameter	WORD Abbreviation	Values	Default Value
trmt=TRMT attenuator	TRMT	0 to 16.5 in steps of 0.1	16.5
rcv=RCV attenuator	RCV	0 to 16.5 in steps of 0.1	16.5
ln=Nonloaded/loaded	L-N	L or N	N
sl=Slope	SL	0 to 15 in steps of 1	0
bw=Bandwidth	BW	0 to 15 in steps of 1	0
ht=Height	HT	0 to 15 in steps of 1	0
imp=Transmit and receive impedance	TRMT&RCV(IMP)	150, 600, or 1200	600
rls=Redlined	RLS	NO or YES	NO

Table 5-149. GO Function Code Provisioning [AUA32, AUA39, and SPQ®340 (CLEI=Other)]

Provisioning Parameter	WORD Abbreviation	Values	Default Value
rls=Redlined	RLS	NO or YES	NO

Table 5-150. GS Function Code Provisioning (CLEI=Other) (Note)

Provisioning Parameter	WORD Abbreviation	Values	Default Value
rls=Redlined	RLS	NO or YES	NO

Note: The apparatus codes can be AUA25, AUA25B, AUA51, AUA53, AUA59, AUA150, AUA151, AUA159, AUA159B, AUA179, SPQ®440, SPQ440B, and SPQ450.

Table 5-151. LO Function Code Provisioning [AUA32, AUA39, SPQ®300, and SPQ340 (CLEI=Other)]

Provisioning Parameter	WORD Abbreviation	Values	Default Value
rls=Redlined	RLS	NO or YES	NO

Table 5-152. LR Function Code Provisioning [AUA75 (CLEI=Other)]

Provisioning Parameter	WORD Abbreviation	Values	Default Value
rls=Redlined	RLS	NO or YES	NO

Table 5-153. LS Function Code Provisioning (CLEI=Other) (Note)

Provisioning Parameter	WORD Abbreviation	Values	Default Value
rls=Redlined	RLS	NO or YES	NO

Note: The apparatus codes can be AUA25, AUA25B, AUA27, AUA51, AUA53, AUA55, AUA57, AUA58, AUA58B, AUA58C, AUA59, AUA150, AUA151, AUA158, AUA158B, AUA159, AUA159B, AUA178, AUA179, SPQ400, SPQ440, SPQ440B, SPQ450, SPQ478, and SPQ909.

Table 5-154. NO Function Code Provisioning [MCU*5205 and MCU5405 (CLEI=Other)]

Provisioning Parameter	WORD Abbreviation	Values	Default Value
rls=Redlined	RLS	NO or YES	NO

* Trademark of Tollgrade Communications, Inc.

Table 5-155. OCU Function Code Provisioning [AUA52 and AUA152 (CLEI=5SCU48)]

Provisioning Parameter	WORD Abbreviation	Values	Default Value
rate=Subscriber data rate	RATE	2.4, 4.8, 9.6, or 56 kb/s	56
ec=Error correction	EC	NONE, SCEC, MVEC *	NONE
zc=All-zero-code allowed	ZC	NO or YES	NO
scc=Secondary channel used	SCC	NO or YES	NO
rls=Redlined	RLS	NO or YES	NO

* Do not use MVEC when the data rate is 56 kb/s.

**Table 5-156. OCU Function Code Provisioning [AUA52B (CLEI=5SC143)]
(Note)**

Provisioning Parameter	WORD Abbreviation	Values	Default Value
rate=Subscriber data rate	RATE	2.4, 4.8, 9.6, 19.2, 56, or 64 kb/s	56
ec=Error correction	EC	NONE, SCEC, MVEC *	NONE
zc=All-zero-code allowed [†]	ZC	NO or YES	NO
scc=Secondary channel used [†]	SCC	NO or YES	NO
rls=Redlined	RLS	NO or YES	NO

Note: For rate=64 kb/s, clear channel (CC) is automatically set to ENABLE. However, for data rates other than 64 kb/s, CC is automatically set to DISABLE.

* MVEC does not operate with the 56- or 64-kb/s data rate. If MVEC is selected with the 19.2-kb/s data rate, single time slot 19.2 error correction (19.2EC) is performed.

† When the 64-kb/s rate is selected, the user is not prompted for ZC and SCC. For rate=64 kb/s, ZC and SCC are automatically set to YES.

Table 5-157. OCU Function Code Provisioning [SPQ®452 (CLEI=5SCTFF)]

Provisioning Parameter	WORD Abbreviation	Values	Default Value
rate=Subscriber data rate	RATE	2.4, 4.8, 9.6, 19.2, 56, or 64 kb/s	56
ec=Error correction	EC	NONE, SCEC, MVEC *	NONE
zc=All-zero-code allowed [†]	ZC	NO or YES	NO
scc=Secondary channel used [†]	SCC	NO or YES	NO
rls=Redlined	RLS	NO or YES	NO

* MVEC does not operate with the 38.4-, 56-, or 64-kb/s data rate. If you select MVEC with the 19.2-kb/s data rate, single time slot 19.2 error correction (19.2EC) is performed.

† You are not prompted for ZC or SCC when you select the 64-kb/s data rate. When rate=64 kb/s, ZC and SCC are automatically set to YES.

Table 5-158. PG5, PG8, PG15, and PG20 Function Code Provisioning [PGM* - 2000 (CLEI=SAC1CS)]

Provisioning Parameter	WORD Abbreviation	Values	Default Value
rls=Redlined	RLS	NO or YES	NO

* Trademark of Tollgrade Communications, Inc.

Table 5-159. PLR1/2 Function Code Provisioning [AUA54 (CLEI=5SCU7B) and SPQ®454 (CLEI=SAC1BG)]

Provisioning Parameter	WORD Abbreviation	Values	Default Value
trmt=TRMT attenuator	TRMT	0 to 25.5 in steps of 0.1	16.5
rcv=RCV attenuator	RCV	0 to 25.5 in steps of 0.1	16.5
rls=Redlined	RLS	NO or YES	NO

Table 5-160. RVT Function Code Provisioning [AUA56 (CLEI=Other)]

Provisioning Parameter	WORD Abbreviation	Values	Default Value
rls=Redlined	RLS	NO or YES	NO

Table 5-161. RVT Function Code Provisioning [SPQ®456 (CLEI=SACPDC)]

Provisioning Parameter	WORD Abbreviation	Values	Default Value
ls=Transmission loss	LS	0 or 2.5 dB	0 dB
rls=Redlined	RLS	NO or YES	NO

Table 5-162. SW56 Function Code Provisioning [SPQ®452 (CLEI=5SCTFF)]

Provisioning Parameter	WORD Abbreviation	Values	Default Value
eh56=Enhanced switched 56	EH56	NO or YES	NO
ab=A/B signaling	AB	NO or YES	NO
qm=Quality monitoring	QM	NO or YES	NO
rls=Redlined	RLS	NO or YES	NO

Table 5-163. TDO Function Code Provisioning [AUA44 (CLEI=5SCU7C) and SPQ®444 (CLEI=SAC1BF)]

Provisioning Parameter	WORD Abbreviation	Values	Default Value
trmt=TRMT attenuator	TRMT	0 to 11.6 in steps of 0.1	11.6
rls=Redlined	RLS	NO or YES	NO

Table 5-164. TDS Function Code Provisioning [AUA44 (CLEI=5SCU7C) and SPQ®444 (CLEI=SAC1BF)]

Provisioning Parameter	WORD Abbreviation	Values	Default Value
trmt=TRMT attenuator	TRMT	0 to 11.6 in steps of 0.1	11.6
rls=Redlined	RLS	NO or YES	NO

Table 5-165. TO Function Code Provisioning [AUA42 and AUA142 (CLEI=5SCU69), AUA42B (5SCU6E), AUA43 (5SCU6A), AUA43B (5SCU6F), SPQ[®]442 (SAC1AH), and SPQ443 (SAC1AE)]

Provisioning Parameter	WORD Abbreviation	Values	Default Value
imp=Impedance	IMP	600 or 900	600
bal=Balance	BAL	0 to 15 in steps of 1	3
xmtgn=TransmitGain	XMT(GN)	-1.0 to 6.75 in steps of 0.25	-1.0
rcvgn=ReceiveGain	RCV(GN)	-8.0 to 1.5 in steps of 0.25	-8.0
sl=Slope	SL	0 to 7 in steps of 1	0
rls=Redlined	RLS	NO or YES	NO

Table 5-166. TO4 Function Code Provisioning [AUA41B (CLEI=5SCUCD)]

Provisioning Parameter	WORD Abbreviation	Values	Default Value
trmt=TRMT attenuator	TRMT	0 to 16.5 in steps of 0.1	16.5
rcv=RCV attenuator	RCV	0 to 16.5 in steps of 0.1	16.5
dBt=-7 dB TRMT	-7DB TRMT	WH or BK	BK
dBr=-7 dB RCV	-7DB RCV	WH or BK	BK
sc=SealingCurrent	SC	YES or NO	YES
rls=Redlined	RLS	NO or YES	NO

Provisioning Parameters for Software Release 4.5

Tables 5-167 through 5-200 list the valid provisioning parameters, according to function code for channel units used in Software Release 4.5 (R4.5). These parameters are set using the **ent-t0** CIT command, are adjusted using the **ed-t0** command, and may be displayed using the **rtrv-t0** command.

Table 5-167. AC Function Code Provisioning [AUA45 and AUA45B (CLEI=Other)]

Provisioning Parameter	WORD Abbreviation	Values	Default Value
rls=Redlined	RLS	NO or YES	NO

Table 5-168. BRI Function Code Provisioning [AUA93/AUA293 (CLEI=5SC1HE)] (Note)

Provisioning Parameter	WORD Abbreviation	Values	Default Value
svc=ISDN channel service	SVC	2B+D, B1+D, B2+D, or D	D
rls=Redlined	RLS	YES or NO	NO

Note: DT applications (Software Releases 4.2 and later) require you to provision the AUA93 and AUA293 channel units using the CIT (set the on-board switches to match the parameter settings provisioned using the CIT). Software Releases 4.0 and earlier require you to provision the AUA93 and AUA293 channel units using the on-board switches.

Table 5-169. DATA Function Code Provisioning [AUA200 and AUA232 (CLEI=Other)]

Provisioning Parameter	WORD Abbreviation	Values	Default Value
rls=Redlined	RLS	NO or YES	NO

Table 5-170. DFLT Function Code Provisioning (CLEI=Other) (Note)

Provisioning Parameter	WORD Abbreviation	Values	Default Value
rls=Redlined	RLS	NO or YES	NO

Note: For the DFLT function code (CLEI=Other), the channel units are POTS, multiparty, coin, FSR, DID, manual ringdown, PLAR, and DC bypass pair or alarm.

Table 5-171. DFLT Function Code Provisioning [SPQ®456 (CLEI=SACPDC)]

Provisioning Parameter	WORD Abbreviation	Values	Default Value
ls=Transmission loss	LS	0 or 2.5 dB	0 dB
rls=Redlined	RLS	YES or NO	NO

Table 5-172. DPO Function Code Provisioning [AUA43 (CLEI=5SCU6A), AUA43B (CLEI=5SCU6F), and SPQ®443 (CLEI=SAC1AE)]

Provisioning Parameter	WORD Abbreviation	Values	Default Value
imp=Impedance	IMP	600 or 900	600
bal=Balance	BAL	0 to 15 in steps of 1	3
xmtgn=TransmitGain	XMT(GN)	-1.0 to 6.75 in steps of 0.25	-1.0
rcvgn=ReceiveGain	RCV(GN)	-8.0 to 1.5 in steps of 0.25	-8.0
sl=Slope	SL	0 to 7 in steps of 1	0
rls=Redlined	RLS	NO or YES	NO

Table 5-173. DPT Function Code Provisioning [AUA42 (CLEI=5SCU69), AUA42B (CLEI=5SCU6E), AUA142 (CLEI=5SCU69), and SPQ®442 (CLEI=SAC1AH)]

Provisioning Parameter	WORD Abbreviation	Values	Default Value
imp=Impedance	IMP	600 or 900	600
bal=Balance	BAL	0 to 15 in steps of 1	3
xmtgn=TransmitGain	XMT(GN)	-1.0 to 6.75 in steps of 0.25	-1.0
rcvgn=ReceiveGain	RCV(GN)	-8.0 to 1.5 in steps of 0.25	-8.0
sl=Slope	SL	0 to 7 in steps of 1	0
rls=Redlined	RLS	YES or NO	NO

Table 5-174. DX4 Function Code Provisioning [AUA41B (CLEI=5SCUCD)]

Provisioning Parameter	WORD Abbreviation	Values	Default Value
trmt=TRMT attenuator	TRMT	0 to 16.5 in steps of 0.1	16.5
rcv=RCV attenuator	RCV	0 to 16.5 in steps of 0.1	16.5
ln=Nonloaded/loaded	L-N	L or N	N
sl=Slope	SL	0 to 15 in steps of 1	0
bw=Bandwidth	BW	0 to 15 in steps of 1	0
ht=Height	HT	0 to 15 in steps of 1	0
imp=Transmit and receive impedance	TRMT&RCV(IMP)	150, 600, or 1200	600
rls=Redlined	RLS	YES or NO	NO

Table 5-175. EBS Function Code Provisioning [SPQ®429 (CLEI=Other)]

Provisioning Parameter	WORD Abbreviation	Values	Default Value
rls=Redlined	RLS	NO or YES	NO

Table 5-176. EM4C/H Function Code Provisioning [AUA54 (CLEI=5SCU7B) and SPQ®454 (CLEI=SAC1BG)]

Provisioning Parameter	WORD Abbreviation	Values	Default Value
trmt=TRMT attenuator	TRMT	0 to 25.5 in steps of 0.1	16.5
rcv=RCV attenuator	RCV	0 to 25.5 in steps of 0.1	16.5
rls=Redlined	RLS	NO or YES	NO

Table 5-177. ETO4 Function Code Provisioning [AUA41B (CLEI=5SCUCD)]

Provisioning Parameter	WORD Abbreviation	Values	Default Value
trmt=TRMT attenuator	TRMT	0 to 16.5 in steps of 0.1	16.5
rcv=RCV attenuator	RCV	0 to 16.5 in steps of 0.1	16.5
dBJ3=-7 dB (J3)	-7DB(J3)	WH or BK	BK
ln=Nonloaded/loaded	L-N	L or N	N
sl=Slope	SL	0 to 15 in steps of 1	0
bw=Bandwidth	BW	0 to 15 in steps of 1	0
ht=Height	HT	0 to 15 in steps of 1	0
imp=Transmit and receive impedance	TRMT&RCV(IMP)	150, 600, or 1200	600
sc=SealingCurrent	SC	YES or NO	YES
rls=Redlined	RLS	NO or YES	NO

Table 5-178. FXO Function Code Provisioning [AUA42 (CLEI=5SCU69), AUA42B (CLEI=5SCU6E), AUA142 (CLEI=5SCU69), and SPQ® 442 (CLEI=SAC1AH)]

Provisioning Parameter	WORD Abbreviation	Values	Default Value
imp=Impedance	IMP	600 or 900	900
bal=Balance	BAL	0 to 15 in steps of 1	3
xmtgn=TransmitGain	XMT(GN)	-1.0 to 6.75 in steps of 0.25	-1.0
rcvgn=ReceiveGain	RCV(GN)	-8.0 to 1.5 in steps of 0.25	-8.0
sl=Slope	SL	0 to 7 in steps of 1	0
td=TollDiversion	TD	NO or YES	NO
ls=SignalingType	LS-GS	LS or GS	GS
oht=OnHookTransmission	OHT	NO or YES	NO
rls=Redlined	RLS	NO or YES	NO

Table 5-179. FXO/P Function Code Provisioning [AUA44 (CLEI=5SCU7C) and SPQ® 444 (CLEI=SAC1BF)]

Provisioning Parameter	WORD Abbreviation	Values	Default Value
trmt=TRMT attenuator	TRMT	0 to 16.5 in steps of 0.1	16.5
rcv=RCV attenuator	RCV	0 to 16.5 in steps of 0.1	16.5
ln=Nonloaded/loaded	L-N	L or N	N
sl=Slope	SL	0 to 15 in steps of 1	0
bw=Bandwidth	BW	0 to 15 in steps of 1	0
ht=Height	HT	0 to 15 in steps of 1	0
imp=Transmit and receive impedance	TRMT&RCV(IMP)	150, 600, or 1200	600
rls=Redlined	RLS	NO or YES	NO

Table 5-180. FXS Function Code Provisioning [AUA43 (CLEI=5SCU6A), AUA43B (CLEI=5SCU6F), and SPQ®443 (CLEI=SAC1AE)]

Provisioning Parameter	WORD Abbreviation	Values	Default Value
imp=Impedance	IMP	600 or 900	600
bal=Balance	BAL	0 to 15 in steps of 1	3
xmtgn=TransmitGain	XMT(GN)	-1.0 to 6.75 in steps of 0.25	-1.0
rcvgn=ReceiveGain	RCV(GN)	-8.0 to 1.5 in steps of 0.25	-8.0
sl=Slope	SL	0 to 7 in steps of 1	0
oht=OnHookTransmission	OHT	NO or YES	NO
rls=Redlined	RLS	NO or YES	NO

Table 5-181. FXS/T Function Code Provisioning [AUA41B (CLEI=5SCUCD)]

Provisioning Parameter	WORD Abbreviation	Values	Default Value
trmt=TRMT attenuator	TRMT	0 to 16.5 in steps of 0.1	16.5
rcv=RCV attenuator	RCV	0 to 16.5 in steps of 0.1	16.5
ln=Nonloaded/loaded	L-N	L or N	N
sl=Slope	SL	0 to 15 in steps of 1	0
bw=Bandwidth	BW	0 to 15 in steps of 1	0
ht=Height	HT	0 to 15 in steps of 1	0
imp=Transmit and receive impedance	TRMT&RCV(IMP)	150, 600, or 1200	600
rls=Redlined	RLS	NO or YES	NO

Table 5-182. GO Function Code Provisioning [AUA32, AUA39, and SPQ®340 (CLEI=Other)]

Provisioning Parameter	WORD Abbreviation	Values	Default Value
rls=Redlined	RLS	NO or YES	NO

Table 5-183. GS Function Code Provisioning (CLEI=Other) (Note)

Provisioning Parameter	WORD Abbreviation	Values	Default Value
rls=Redlined	RLS	NO or YES	NO

Note: The apparatus codes can be AUA25, AUA25B, AUA51, AUA53, AUA59, AUA150, AUA151, AUA159, AUA159B, AUA179, SPQ® 440, SPQ440B, and SPQ450.

Table 5-184. ISDN Function Code Provisioning [AUA94B (CLIE=5SC18E) and SPQ® 494 (CLEI=5SC212)]

Provisioning Parameter	WORD Abbreviation	Values	Default Value
rls=Redlined	RLS	NO or YES	NO

Table 5-185. LO Function Code Provisioning [AUA32, AUA39, SPQ® 300, and SPQ340 (CLEI=Other)]

Provisioning Parameter	WORD Abbreviation	Values	Default Value
rls=Redlined	RLS	NO or YES	NO

Table 5-186. LR Function Code Provisioning [AUA75 (CLEI=Other)]

Provisioning Parameter	WORD Abbreviation	Values	Default Value
rls=Redlined	RLS	NO or YES	NO

Table 5-187. LS Function Code Provisioning (CLEI=Other) (Note)

Provisioning Parameter	WORD Abbreviation	Values	Default Value
rls=Redlined	RLS	NO or YES	NO

Note: The apparatus codes can be AUA25, AUA25B, AUA27, AUA51, AUA53, AUA55, AUA57, AUA58, AUA58B, AUA58C, AUA59, AUA150, AUA151, AUA158, AUA158B, AUA159, AUA159B, AUA178, AUA179, SPQ®400, SPQ440, SPQ440B, SPQ450, SPQ478, and SPQ909.

Table 5-188. NO Function Code Provisioning [MCU*5205 and MCU5405 (CLEI=Other)]

Provisioning Parameter	WORD Abbreviation	Values	Default Value
rls=Redlined	RLS	NO or YES	NO

* Trademark of Tollgrade Communications, Inc.

Table 5-189. OCU Function Code Provisioning [AUA52 and AUA152 (CLEI=5SCU48)]

Provisioning Parameter	WORD Abbreviation	Values	Default Value
rate=Subscriber data rate	RATE	2.4, 4.8, 9.6, or 56 kb/s	56
ec=Error correction	EC	NONE, SCEC, MVEC*	NONE
zc=All-zero-code allowed	ZC	NO or YES	NO
scc=Secondary channel used	SCC	NO or YES	NO
rls=Redlined	RLS	NO or YES	NO

* Do not use MVEC when the data rate is 56 kb/s.

**Table 5-190. OCU Function Code Provisioning [AUA52B (CLEI=5SC143)]
(Note)**

Provisioning Parameter	WORD Abbreviation	Values	Default Value
rate=Subscriber data rate	RATE	2.4, 4.8, 9.6, 19.2, 56, or 64 kb/s	56
ec=Error correction	EC	NONE, SCEC, MVEC *	NONE
zc=All-zero-code allowed [†]	ZC	NO or YES	NO
scc=Secondary channel used [†]	SCC	NO or YES	NO
rls=Redlined	RLS	NO or YES	NO

Note: For rate=64 kb/s, clear channel (CC) is automatically set to ENABLE. However, for data rates other than 64 kb/s, CC is automatically set to DISABLE.

* MVEC does not operate with the 56- or 64-kb/s data rate. If MVEC is selected with the 19.2-kb/s data rate, single time slot 19.2 error correction (19.2EC) is performed.

† When the 64-kb/s rate is selected, the user is not prompted for ZC and SCC. For rate=64 kb/s, ZC and SCC are automatically set to YES.

Table 5-191. OCU Function Code Provisioning [SPQ®452 (CLEI=5SCTFF)]

Provisioning Parameter	WORD Abbreviation	Values	Default Value
rate=Subscriber data rate	RATE	2.4, 4.8, 9.6, 19.2, 56, or 64 kb/s	56
ec=Error correction	EC	NONE, SCEC, MVEC *	NONE
zc=All-zero-code allowed [†]	ZC	NO or YES	NO
scc=Secondary channel used [†]	SCC	NO or YES	NO
rls=Redlined	RLS	NO or YES	NO

* MVEC does not operate with the 38.4-, 56-, or 64-kb/s data rate. If you select MVEC with the 19.2-kb/s data rate, single time slot 19.2 error correction (19.2EC) is performed.

† You are not prompted for ZC or SCC when you select the 64-kb/s data rate. When rate=64 kb/s, ZC and SCC are automatically set to YES.

**Table 5-192. PG5, PG8, PG15, and PG20 Function Code Provisioning
[PGM^{*}-2000 (CLEI=SAC1CS)]**

Provisioning Parameter	WORD Abbreviation	Values	Default Value
rls=Redlined	RLS	NO or YES	NO

* Trademark of Tollgrade Communications, Inc.

**Table 5-193. PLR1/2 Function Code Provisioning [AUA54 (CLEI=5SCU7B) and
SPQ[®]454 (CLEI=SAC1BG)]**

Provisioning Parameter	WORD Abbreviation	Values	Default Value
trmt=TRMT attenuator	TRMT	0 to 25.5 in steps of 0.1	16.5
rcv=RCV attenuator	RCV	0 to 25.5 in steps of 0.1	16.5
rls=Redlined	RLS	NO or YES	NO

Table 5-194. RVT Function Code Provisioning [AUA56 (CLEI=Other)]

Provisioning Parameter	WORD Abbreviation	Values	Default Value
rls=Redlined	RLS	NO or YES	NO

Table 5-195. RVT Function Code Provisioning [SPQ[®]456 (CLEI=SACPDC)]

Provisioning Parameter	WORD Abbreviation	Values	Default Value
ls=Transmission loss	LS	0 or 2.5 dB	0 dB
rls=Redlined	RLS	NO or YES	NO

Table 5-196. SW56 Function Code Provisioning [SPQ®452 (CLEI=5SCTFF)]

Provisioning Parameter	WORD Abbreviation	Values	Default Value
eh56=Enhanced switched 56	EH56	NO or YES	NO
ab=A/B signaling	AB	NO or YES	NO
qm=Quality monitoring	QM	NO or YES	NO
rls=Redlined	RLS	NO or YES	NO

Table 5-197. TDO Function Code Provisioning [AUA44 (CLEI=5SCU7C) and SPQ®444 (CLEI=SAC1BF)]

Provisioning Parameter	WORD Abbreviation	Values	Default Value
trmt=TRMT attenuator	TRMT	0 to 11.6 in steps of 0.1	11.6
rls=Redlined	RLS	NO or YES	NO

Table 5-198. TDS Function Code Provisioning [AUA44 (CLEI=5SCU7C) and SPQ®444 (CLEI=SAC1BF)]

Provisioning Parameter	WORD Abbreviation	Values	Default Value
trmt=TRMT attenuator	TRMT	0 to 11.6 in steps of 0.1	11.6
rls=Redlined	RLS	NO or YES	NO

Table 5-199. TO Function Code Provisioning [AUA42 and AUA142 (CLEI=5SCU69), AUA42B (5SCU6E), AUA43 (5SCU6A), AUA43B (5SCU6F), SPQ[®]442 (SAC1AH), and SPQ443 (SAC1AE)]

Provisioning Parameter	WORD Abbreviation	Values	Default Value
imp=Impedance	IMP	600 or 900	600
bal=Balance	BAL	0 to 15 in steps of 1	3
xmtgn=TransmitGain	XMT(GN)	-1.0 to 6.75 in steps of 0.25	-1.0
rcvgn=ReceiveGain	RCV(GN)	-8.0 to 1.5 in steps of 0.25	-8.0
sl=Slope	SL	0 to 7 in steps of 1	0
rls=Redlined	RLS	NO or YES	NO

Table 5-200. TO4 Function Code Provisioning [AUA41B (CLEI=5SCUCD)]

Provisioning Parameter	WORD Abbreviation	Values	Default Value
trmt=TRMT attenuator	TRMT	0 to 16.5 in steps of 0.1	16.5
rcv=RCV attenuator	RCV	0 to 16.5 in steps of 0.1	16.5
dBt=-7 dB TRMT	-7DB TRMT	WH or BK	BK
dBr=-7 dB RCV	-7DB RCV	WH or BK	BK
sc=SealingCurrent	SC	YES or NO	YES
rls=Redlined	RLS	NO or YES	NO

Provisioning Parameters for Software Release 4.6

Tables 5-201 through 5-234 list the valid provisioning parameters, according to function code for channel units used in Software Release 4.5 (R4.5). These parameters are set using the **ent-t0** CIT command, are adjusted using the **ed-t0** command, and may be displayed using the **rtrv-t0** command.

Table 5-201. AC Function Code Provisioning [AUA45 and AUA45B (CLEI=Other)]

Provisioning Parameter	WORD Abbreviation	Values	Default Value
rls=Redlined	RLS	NO or YES	NO

Table 5-202. BRI Function Code Provisioning [AUA93/AUA293 (CLEI=5SC1HE)] (Note)

Provisioning Parameter	WORD Abbreviation	Values	Default Value
svc=ISDN channel service	SVC	2B+D, B1+D, B2+D, or D	D
rls=Redlined	RLS	YES or NO	NO

Note: DT applications (Software Releases 4.2 and later) require you to provision the AUA93 and AUA293 channel units using the CIT (set the on-board switches to match the parameter settings provisioned using the CIT). Software Releases 4.0 and earlier require you to provision the AUA93 and AUA293 channel units using the on-board switches.

Table 5-203. DATA Function Code Provisioning [AUA200 and AUA232 (CLEI=Other)]

Provisioning Parameter	WORD Abbreviation	Values	Default Value
rls=Redlined	RLS	NO or YES	NO

Table 5-204. DFLT Function Code Provisioning (CLEI=Other) (Note)

Provisioning Parameter	WORD Abbreviation	Values	Default Value
rls=Redlined	RLS	NO or YES	NO

Note: For the DFLT function code (CLEI=Other), the channel units are POTS, multiparty, coin, FSR, DID, manual ringdown, PLAR, and DC bypass pair or alarm.

Table 5-205. DFLT Function Code Provisioning [SPQ®456 (CLEI=SACPDC)]

Provisioning Parameter	WORD Abbreviation	Values	Default Value
ls=Transmission loss	LS	0 or 2.5 dB	0 dB
rls=Redlined	RLS	YES or NO	NO

Table 5-206. DPO Function Code Provisioning [AUA43 (CLEI=5SCU6A), AUA43B (CLEI=5SCU6F), and SPQ®443 (CLEI=SAC1AE)]

Provisioning Parameter	WORD Abbreviation	Values	Default Value
imp=Impedance	IMP	600 or 900	600
bal=Balance	BAL	0 to 15 in steps of 1	3
xmtgn=TransmitGain	XMT(GN)	-1.0 to 6.75 in steps of 0.25	-1.0
rcvgn=ReceiveGain	RCV(GN)	-8.0 to 1.5 in steps of 0.25	-8.0
sl=Slope	SL	0 to 7 in steps of 1	0
rls=Redlined	RLS	NO or YES	NO

Table 5-207. DPT Function Code Provisioning [AUA42 (CLEI=5SCU69), AUA42B (CLEI=5SCU6E), AUA142 (CLEI=5SCU69), and SPQ®442 (CLEI=SAC1AH)]

Provisioning Parameter	WORD Abbreviation	Values	Default Value
imp=Impedance	IMP	600 or 900	600
bal=Balance	BAL	0 to 15 in steps of 1	3
xmtgn=TransmitGain	XMT(GN)	-1.0 to 6.75 in steps of 0.25	-1.0
rcvgn=ReceiveGain	RCV(GN)	-8.0 to 1.5 in steps of 0.25	-8.0
sl=Slope	SL	0 to 7 in steps of 1	0
rls=Redlined	RLS	YES or NO	NO

Table 5-208. DX4 Function Code Provisioning [AUA41B (CLEI=5SCUCD)]

Provisioning Parameter	WORD Abbreviation	Values	Default Value
trmt=TRMT attenuator	TRMT	0 to 16.5 in steps of 0.1	16.5
rcv=RCV attenuator	RCV	0 to 16.5 in steps of 0.1	16.5
ln=Nonloaded/loaded	L-N	L or N	N
sl=Slope	SL	0 to 15 in steps of 1	0
bw=Bandwidth	BW	0 to 15 in steps of 1	0
ht=Height	HT	0 to 15 in steps of 1	0
imp=Transmit and receive impedance	TRMT&RCV(IMP)	150, 600, or 1200	600
rls=Redlined	RLS	YES or NO	NO

Table 5-209. EBS Function Code Provisioning [SPQ®429 (CLEI=Other)]

Provisioning Parameter	WORD Abbreviation	Values	Default Value
rls=Redlined	RLS	NO or YES	NO

Table 5-210. EM4C/H Function Code Provisioning [AUA54 (CLEI=5SCU7B) and SPQ®454 (CLEI=SAC1BG)]

Provisioning Parameter	WORD Abbreviation	Values	Default Value
trmt=TRMT attenuator	TRMT	0 to 25.5 in steps of 0.1	16.5
rcv=RCV attenuator	RCV	0 to 25.5 in steps of 0.1	16.5
rls=Redlined	RLS	NO or YES	NO

Table 5-211. ETO4 Function Code Provisioning [AUA41B (CLEI=5SCUCD)]

Provisioning Parameter	WORD Abbreviation	Values	Default Value
trmt=TRMT attenuator	TRMT	0 to 16.5 in steps of 0.1	16.5
rcv=RCV attenuator	RCV	0 to 16.5 in steps of 0.1	16.5
dBJ3=-7 dB (J3)	-7DB(J3)	WH or BK	BK
ln=Nonloaded/loaded	L-N	L or N	N
sl=Slope	SL	0 to 15 in steps of 1	0
bw=Bandwidth	BW	0 to 15 in steps of 1	0
ht=Height	HT	0 to 15 in steps of 1	0
imp=Transmit and receive impedance	TRMT&RCV(IMP)	150, 600, or 1200	600
sc=SealingCurrent	SC	YES or NO	YES
rls=Redlined	RLS	NO or YES	NO

Table 5-212. FXO Function Code Provisioning [AUA42 (CLEI=5SCU69), AUA42B (CLEI=5SCU6E), AUA142 (CLEI=5SCU69), and SPQ® 442 (CLEI=SAC1AH)]

Provisioning Parameter	WORD Abbreviation	Values	Default Value
imp=Impedance	IMP	600 or 900	900
bal=Balance	BAL	0 to 15 in steps of 1	3
xmtgn=TransmitGain	XMT(GN)	-1.0 to 6.75 in steps of 0.25	-1.0
rcvgn=ReceiveGain	RCV(GN)	-8.0 to 1.5 in steps of 0.25	-8.0
sl=Slope	SL	0 to 7 in steps of 1	0
td=TollDiversion	TD	NO or YES	NO
lsgs=SignalingType	LS-GS	LS or GS	GS
oht=OnHookTransmission	OHT	NO or YES	NO
rls=Redlined	RLS	NO or YES	NO

Table 5-213. FXO/P Function Code Provisioning [AUA44 (CLEI=5SCU7C) and SPQ® 444 (CLEI=SAC1BF)]

Provisioning Parameter	WORD Abbreviation	Values	Default Value
trmt=TRMT attenuator	TRMT	0 to 16.5 in steps of 0.1	16.5
rcv=RCV attenuator	RCV	0 to 16.5 in steps of 0.1	16.5
ln=Nonloaded/loaded	L-N	L or N	N
sl=Slope	SL	0 to 15 in steps of 1	0
bw=Bandwidth	BW	0 to 15 in steps of 1	0
ht=Height	HT	0 to 15 in steps of 1	0
imp=Transmit and receive impedance	TRMT&RCV(IMP)	150, 600, or 1200	600
rls=Redlined	RLS	NO or YES	NO

Table 5-214. FXS Function Code Provisioning [AUA43 (CLEI=5SCU6A), AUA43B (CLEI=5SCU6F), and SPQ®443 (CLEI=SAC1AE)]

Provisioning Parameter	WORD Abbreviation	Values	Default Value
imp=Impedance	IMP	600 or 900	600
bal=Balance	BAL	0 to 15 in steps of 1	3
xmtgn=TransmitGain	XMT(GN)	-1.0 to 6.75 in steps of 0.25	-1.0
rcvgn=ReceiveGain	RCV(GN)	-8.0 to 1.5 in steps of 0.25	-8.0
sl=Slope	SL	0 to 7 in steps of 1	0
oht=OnHookTransmission	OHT	NO or YES	NO
rls=Redlined	RLS	NO or YES	NO

Table 5-215. FXS/T Function Code Provisioning [AUA41B (CLEI=5SCUCD)]

Provisioning Parameter	WORD Abbreviation	Values	Default Value
trmt=TRMT attenuator	TRMT	0 to 16.5 in steps of 0.1	16.5
rcv=RCV attenuator	RCV	0 to 16.5 in steps of 0.1	16.5
ln=Nonloaded/loaded	L-N	L or N	N
sl=Slope	SL	0 to 15 in steps of 1	0
bw=Bandwidth	BW	0 to 15 in steps of 1	0
ht=Height	HT	0 to 15 in steps of 1	0
imp=Transmit and receive impedance	TRMT&RCV(IMP)	150, 600, or 1200	600
rls=Redlined	RLS	NO or YES	NO

Table 5-216. GO Function Code Provisioning [AUA32, AUA39, and SPQ®340 (CLEI=Other)]

Provisioning Parameter	WORD Abbreviation	Values	Default Value
rls=Redlined	RLS	NO or YES	NO

Table 5-217. GS Function Code Provisioning (CLEI=Other) (Note)

Provisioning Parameter	WORD Abbreviation	Values	Default Value
rls=Redlined	RLS	NO or YES	NO
<i>Note:</i> The apparatus codes can be AUA25, AUA25B, AUA51, AUA53, AUA59, AUA150, AUA151, AUA159, AUA159B, AUA179, SPQ® 440, SPQ440B, and SPQ450.			

Table 5-218. ISDN Function Code Provisioning [AUA94B (CLIE=5SC18E) and SPQ® 494 (CLEI=5SC212)]

Provisioning Parameter	WORD Abbreviation	Values	Default Value
rls=Redlined	RLS	NO or YES	NO

Table 5-219. LO Function Code Provisioning [AUA32, AUA39, SPQ® 300, and SPQ340 (CLEI=Other)]

Provisioning Parameter	WORD Abbreviation	Values	Default Value
rls=Redlined	RLS	NO or YES	NO

Table 5-220. LR Function Code Provisioning [AUA75 (CLEI=Other)]

Provisioning Parameter	WORD Abbreviation	Values	Default Value
rls=Redlined	RLS	NO or YES	NO

Table 5-221. LS Function Code Provisioning (CLEI=Other) (Note)

Provisioning Parameter	WORD Abbreviation	Values	Default Value
rls=Redlined	RLS	NO or YES	NO

Note: The apparatus codes can be AUA25, AUA25B, AUA27, AUA51, AUA53, AUA55, AUA57, AUA58, AUA58B, AUA58C, AUA59, AUA150, AUA151, AUA158, AUA158B, AUA159, AUA159B, AUA178, AUA179, SPQ®400, SPQ440, SPQ440B, SPQ450, SPQ478, and SPQ909.

Table 5-222. NO Function Code Provisioning [MCU*5205 and MCU5405 (CLEI=Other)]

Provisioning Parameter	WORD Abbreviation	Values	Default Value
rls=Redlined	RLS	NO or YES	NO

* Trademark of Tollgrade Communications, Inc.

Table 5-223. OCU Function Code Provisioning [AUA52 and AUA152 (CLEI=5SCU48)]

Provisioning Parameter	WORD Abbreviation	Values	Default Value
rate=Subscriber data rate	RATE	2.4, 4.8, 9.6, or 56 kb/s	56
ec=Error correction	EC	NONE, SCEC, MVEC*	NONE
zc=All-zero-code allowed	ZC	NO or YES	NO
scc=Secondary channel used	SCC	NO or YES	NO
rls=Redlined	RLS	NO or YES	NO

* Do not use MVEC when the data rate is 56 kb/s.

**Table 5-224. OCU Function Code Provisioning [AUA52B (CLEI=5SC143)]
(Note)**

Provisioning Parameter	WORD Abbreviation	Values	Default Value
rate=Subscriber data rate	RATE	2.4, 4.8, 9.6, 19.2, 56, or 64 kb/s	56
ec=Error correction	EC	NONE, SCEC, MVEC *	NONE
zc=All-zero-code allowed [†]	ZC	NO or YES	NO
scc=Secondary channel used [†]	SCC	NO or YES	NO
rls=Redlined	RLS	NO or YES	NO

Note: For rate=64 kb/s, clear channel (CC) is automatically set to ENABLE. However, for data rates other than 64 kb/s, CC is automatically set to DISABLE.

* MVEC does not operate with the 56- or 64-kb/s data rate. If MVEC is selected with the 19.2-kb/s data rate, single time slot 19.2 error correction (19.2EC) is performed.

† When the 64-kb/s rate is selected, the user is not prompted for ZC and SCC. For rate=64 kb/s, ZC and SCC are automatically set to YES.

Table 5-225. OCU Function Code Provisioning [SPQ®452 (CLEI=5SCTFF)]

Provisioning Parameter	WORD Abbreviation	Values	Default Value
rate=Subscriber data rate	RATE	2.4, 4.8, 9.6, 19.2, 56, or 64 kb/s	56
ec=Error correction	EC	NONE, SCEC, MVEC *	NONE
zc=All-zero-code allowed [†]	ZC	NO or YES	NO
scc=Secondary channel used [†]	SCC	NO or YES	NO
rls=Redlined	RLS	NO or YES	NO

* MVEC does not operate with the 38.4-, 56-, or 64-kb/s data rate. If you select MVEC with the 19.2-kb/s data rate, single time slot 19.2 error correction (19.2EC) is performed.

† You are not prompted for ZC or SCC when you select the 64-kb/s data rate. When rate=64 kb/s, ZC and SCC are automatically set to YES.

**Table 5-226. PG5, PG8, PG15, and PG20 Function Code Provisioning
[PGM^{*}-2000 (CLEI=SAC1CS)]**

Provisioning Parameter	WORD Abbreviation	Values	Default Value
rls=Redlined	RLS	NO or YES	NO

* Trademark of Tollgrade Communications, Inc.

**Table 5-227. PLR1/2 Function Code Provisioning [AUA54 (CLEI=5SCU7B) and
SPQ[®]454 (CLEI=SAC1BG)]**

Provisioning Parameter	WORD Abbreviation	Values	Default Value
trmt=TRMT attenuator	TRMT	0 to 25.5 in steps of 0.1	16.5
rcv=RCV attenuator	RCV	0 to 25.5 in steps of 0.1	16.5
rls=Redlined	RLS	NO or YES	NO

Table 5-228. RVT Function Code Provisioning [AUA56 (CLEI=Other)]

Provisioning Parameter	WORD Abbreviation	Values	Default Value
rls=Redlined	RLS	NO or YES	NO

Table 5-229. RVT Function Code Provisioning [SPQ[®]456 (CLEI=SACPDC)]

Provisioning Parameter	WORD Abbreviation	Values	Default Value
ls=Transmission loss	LS	0 or 2.5 dB	0 dB
rls=Redlined	RLS	NO or YES	NO

Table 5-230. SW56 Function Code Provisioning [SPQ®452 (CLEI=5SCTFF)]

Provisioning Parameter	WORD Abbreviation	Values	Default Value
eh56=Enhanced switched 56	EH56	NO or YES	NO
ab=A/B signaling	AB	NO or YES	NO
qm=Quality monitoring	QM	NO or YES	NO
rls=Redlined	RLS	NO or YES	NO

Table 5-231. TDO Function Code Provisioning [AUA44 (CLEI=5SCU7C) and SPQ®444 (CLEI=SAC1BF)]

Provisioning Parameter	WORD Abbreviation	Values	Default Value
trmt=TRMT attenuator	TRMT	0 to 11.6 in steps of 0.1	11.6
rls=Redlined	RLS	NO or YES	NO

Table 5-232. TDS Function Code Provisioning [AUA44 (CLEI=5SCU7C) and SPQ®444 (CLEI=SAC1BF)]

Provisioning Parameter	WORD Abbreviation	Values	Default Value
trmt=TRMT attenuator	TRMT	0 to 11.6 in steps of 0.1	11.6
rls=Redlined	RLS	NO or YES	NO

Table 5-233. TO Function Code Provisioning [AUA42 and AUA142 (CLEI=5SCU69), AUA42B (5SCU6E), AUA43 (5SCU6A), AUA43B (5SCU6F), SPQ[®]442 (SAC1AH), and SPQ443 (SAC1AE)]

Provisioning Parameter	WORD Abbreviation	Values	Default Value
imp=Impedance	IMP	600 or 900	600
bal=Balance	BAL	0 to 15 in steps of 1	3
xmtgn=TransmitGain	XMT(GN)	-1.0 to 6.75 in steps of 0.25	-1.0
rcvgn=ReceiveGain	RCV(GN)	-8.0 to 1.5 in steps of 0.25	-8.0
sl=Slope	SL	0 to 7 in steps of 1	0
rls=Redlined	RLS	NO or YES	NO

Table 5-234. TO4 Function Code Provisioning [AUA41B (CLEI=5SCUCD)]

Provisioning Parameter	WORD Abbreviation	Values	Default Value
trmt=TRMT attenuator	TRMT	0 to 16.5 in steps of 0.1	16.5
rcv=RCV attenuator	RCV	0 to 16.5 in steps of 0.1	16.5
dBt=-7 dB TRMT	-7DB TRMT	WH or BK	BK
dBrc=-7 dB RCV	-7DB RCV	WH or BK	BK
sc=SealingCurrent	SC	YES or NO	YES
rls=Redlined	RLS	NO or YES	NO

Plug-In Data Sheets

6

This tab provides a convenient place to store Lucent Technologies Data Sheets for the plug-ins used in the *SLC*®-2000 Access System.

Software Release Descriptions

7

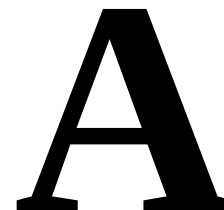
This tab provides a convenient place to store software release descriptions (SRDs) for the *SLC*®-2000 Access System.

Technical Reference(s)

8

This tab provides a convenient place to store technical reference(s) for the *SLC*®-2000 Access System.

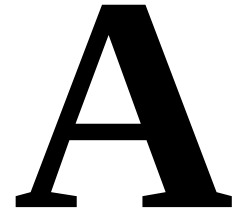
Fiber Service Module (FSM)



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Fiber Service Module (FSM)



Introduction

This appendix provides an overview of the Fiber Service Module (FSM) for the *SLC*[®]-2000 Access System. It includes the following sections:

- Functional description
- Physical description.

For a detailed description of the installation and end-to-end acceptance procedures when installing the FSM in an Multi-Services Distant Terminal (MSDT) configuration, see 363-205-004, *SLC-2000 Multi-Services Distant Terminal Feature, User/Service and Ordering Manual*.

For a detailed description of the installation and end-to-end acceptance procedures when installing the FSM in a DDM-2000 FiberReach Narrowband shelf (NBS) configuration, contact your regional technical assistance center (RTAC) on 1-800-225-RTAC.

Functional Description

The FSM provides expanded fiber-in-the-loop (FITL) distribution capability for Multi-Services Distant Terminals (MSDTs) or DDM-2000 FiberReach Terminal Narrowband Shelves (NBSs) using DSX-1 transmission extensions (no protection switching). Located at both the *SLC-2000* host digital terminal (HDT) site and at the optical network unit (ONU) locations, the FSM multiplexes up to 12 DSX-1s into a single 51.84-Mb/s digital bit stream for optical fiber transport. The optical loss budget is 10 dB from the HDT to the ONU site. Figure A-1 shows a block diagram of the FSM in an HDT-to-MSDT arrangement. Figure A-2 shows a block diagram of the FSM in an HDT-to-NBS arrangement.

The FSM meets customer needs to increase deployment of FITL ONUs and DSX-1 extensions in various installation configurations.

- **At the HDT site**, the FSMs will take up to 12 DSX-1 signals at the rate of 1.544-Mb/s from both the existing MSDT or DT Servers and from other equipment and multiplex them into a single 51.84-Mb/s optical signal. DSX-1 signals from other equipment can include signals from the *SLC-2000* function group C. The FSM then transmits the optical signal to the ONU site. In the opposite direction, the FSM receives the 51.84-Mb/s optical signal from the ONU site and demultiplexes it back into DSX-1 signals for use by the *SLC-2000* HDT. All DSX-1 signals are functionally interchangeable.

When using the FSM with the *SLC-2000* MSDT (Figure A-1), you replace the high density optics shelf (HDOS) optical unit (OU) with a specially designed *cut-through board (CTB)*. As shown in Figure A-1, this board interfaces between the MSDT or DT Server (*SPQ*®808, *SPQ*809, or *SPQ*810 circuit pack) and the FSM. The FSM does not affect existing link requirements between the Server and the MSDT.

Figure A-1 also shows a configuration that does not use the HDOS shelf. In this case, the MDS is wired directly to a DSX patch panel. However, when using this configuration, all MSDT or DT Servers on that specific MDS shelf *must* go through the FSM. This configuration is not as flexible as using the HDOS/CTB configuration.

When using the FSM with the DDM-2000 FiberReach Narrowband Shelf, the DSX-1 signal from the Server is wired to the FSM through the patch panel (Figure A-2).

- **At the *ONU* site**, the FSM receives the 51.84-Mb/s optical signal from the HDT site and demultiplexes it back into DSX-1 signals for use with the ONU or other customer equipment. When used with other customer equipment, the FSM sends the DSX-1 signal to an AEK-type repeater that transmits the signal to the customer equipment. In the opposite direction, the FSM will take DSX-1 signals from the ONU and from other equipment and multiplex them into a 51.84-Mb/s optical signal. It then transmits the optical signal to the HDT site.

When the FSM is the digital pipe to the HDT from the *SLC-2000* MSDTs, you replace the MSDT OU with a *digital signal translator* (DST) circuit pack. As shown in Figure A-1, this board interfaces between the backplane interface unit (BIU) of the MSDT and the FSM.

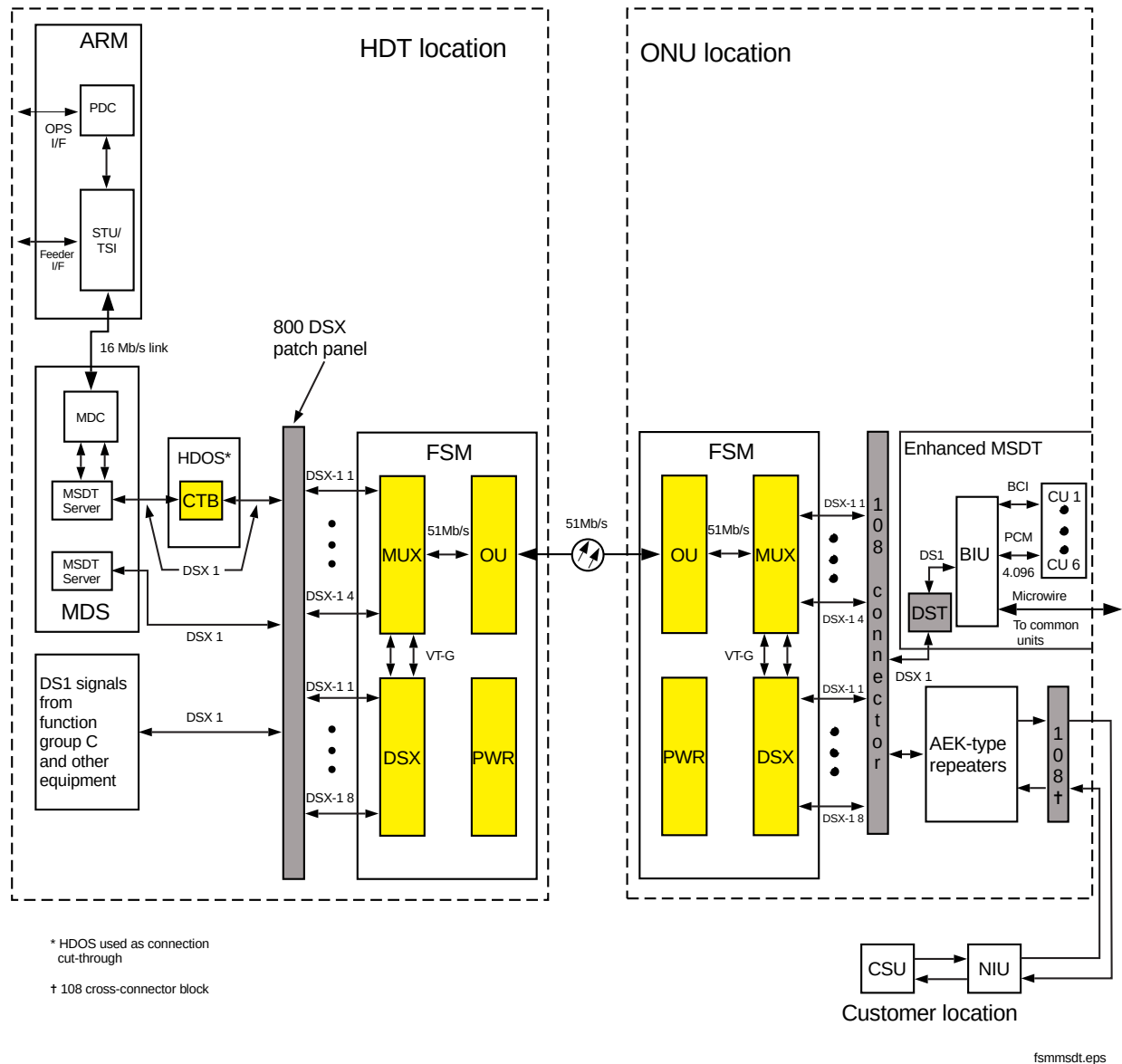


Figure A-1. Block Diagram of the Fiber Service Module (FSM) in a Typical HDT-to-MSDT Arrangement

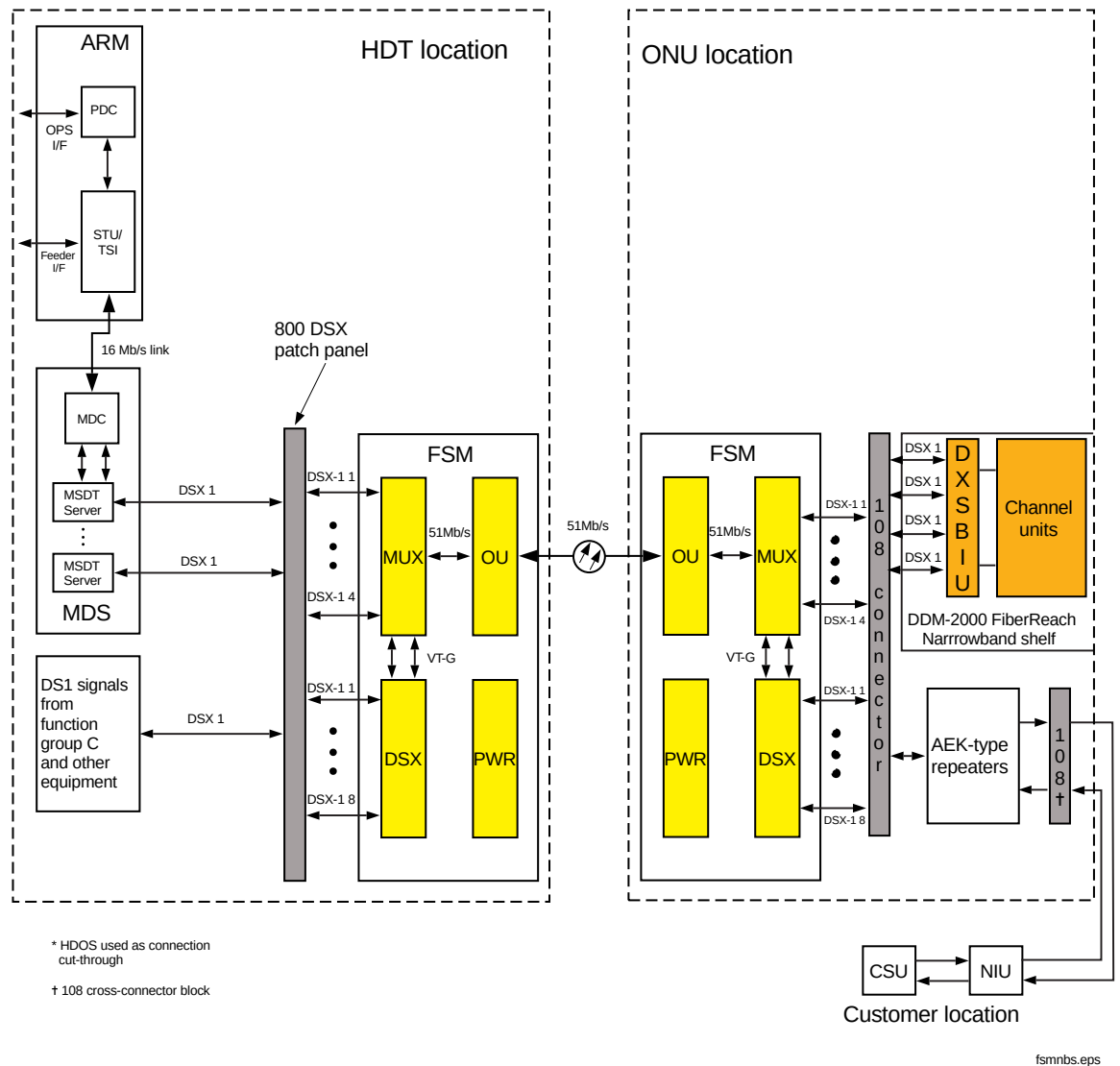


Figure A-2. Block Diagram of the Fiber Service Module (FSM) in a Typical HDT-to-NBS Arrangement

Physical Description

FSM Assembly

The FSM (Figure A-3) is made up of the following circuit packs:

- **PWR circuit pack (BDJ[®]241).** This circuit pack supplies the FSM with ± 5 volts of power.
- **MUX circuit pack (BDJ243).** This circuit pack multiplexes four DSX-1 signals and two VT-G groups into a 51.84-Mb/s bit stream. At the HDT site, the MUX circuit pack can either interface DSX-1 signals from the MSDT or DT Servers in the SLC-2000 MDS assembly or DSX-1 signals from other equipment such as function group C to the OU circuit pack. At the ONU site, it interfaces between the OU circuit pack and the following:
 - **SLC-2000 MSDT:** DST circuit pack
 - **DDM-2000 FiberReach Narrowband Shelf:** DSXBIU circuit pack
 - **T1 Facility to Customer Equipment:** AEK-type repeater.
- **DSX circuit pack (BDJ242).** This circuit pack multiplexes eight DSX-1 signals into two VT-G DS1 groups. The VT-G groups are then sent to the MUX circuit pack to be multiplexed into a 51.84-Mb/s bit stream.
- **OU circuit pack (BDJ244).** This circuit pack performs the electrical-to-optical and optical-to-electrical conversions. It provides a single-fiber bidirectional optical interface between the FSM at the HDT site and the FSM at the ONU site.

The FSM also provides the following options and features:

- **Fault and Alarm Indications.** The FSM provides local LED fault indication and a summary alarm contact closure.
- **DSX-1 Line Failure.** The FSM transmits AIS (alarm indication signal) alarm indication when receive DSX-1 line failure is detected.
- **FSM Without the DSX Circuit Pack.** You can install the FSM without the DSX circuit pack (that interfaces eight DSX-1s) and still provide four DSX-1 fiber link transmission.
- **DSX-1 Repeater Shelf at ONU Site.** At the ONU site, the FSM also works with a DSX-1 repeater shelf for spans up to 1.5 kft (22 AWG PIC cable).
- **Cabling Options.** Cabling options are provided for new or retrofit installations of multiple FSMs at the RT/HDT.



FSM Arrangement in the HDT

Figure A-4 shows the recommended arrangement of the FSM at the HDT. The following equipment at the HDT is associated with the FSM:

- **Fiber Service Shelf (FSS).** The FSM is located in the *fiber service shelf*. The fiber service shelf is located in the *SLC-2000* HDT bay and contains up to six FSMs. Since each FSM can support up to 12 DSX-1 signals, the fiber service shelf can support up to 72 DSX-1 signals. These DSX-1 signals can be a mix of VF circuits from the *SLC-2000* function group A and DS1s either from function group C or from other equipment (like an add/drop multiplexer and/or a digital cross-connect system).
- **HDOS AYB7 Cut-through Board (CTB).** The FSM functionally replaces the OU in the HDOS assembly when the HDT is hosting a *SLC-2000* MSDT ONU. When the FSM receives a DSX-1 signal from an Server in the MDS assembly, the signal must pass through a *cut-through board* in the HDOS assembly when the HDOS is used. The cut-through board passes the signal between the Server and the FSM without changing its characteristics. You must physically wire the connections between the AYB7 CTB and the DSX-1 patch panel block.



NOTE:

The CTB is not used when the MDS shelf connects directly to the DSX-1 panel.

- **Auxiliary Fuse Panel.** The FSMs at the HDT require an *auxiliary fuse panel* to provide a –48 volt feeder to power the FSMs. Lucent Technologies recommends a 1 amp fuse for each card cage.
- **DSX-1 Patch Panel.** This panel interfaces between the FSM and the source of the DSX-1 signal — usually either the MSDT or DT Server or function group C.

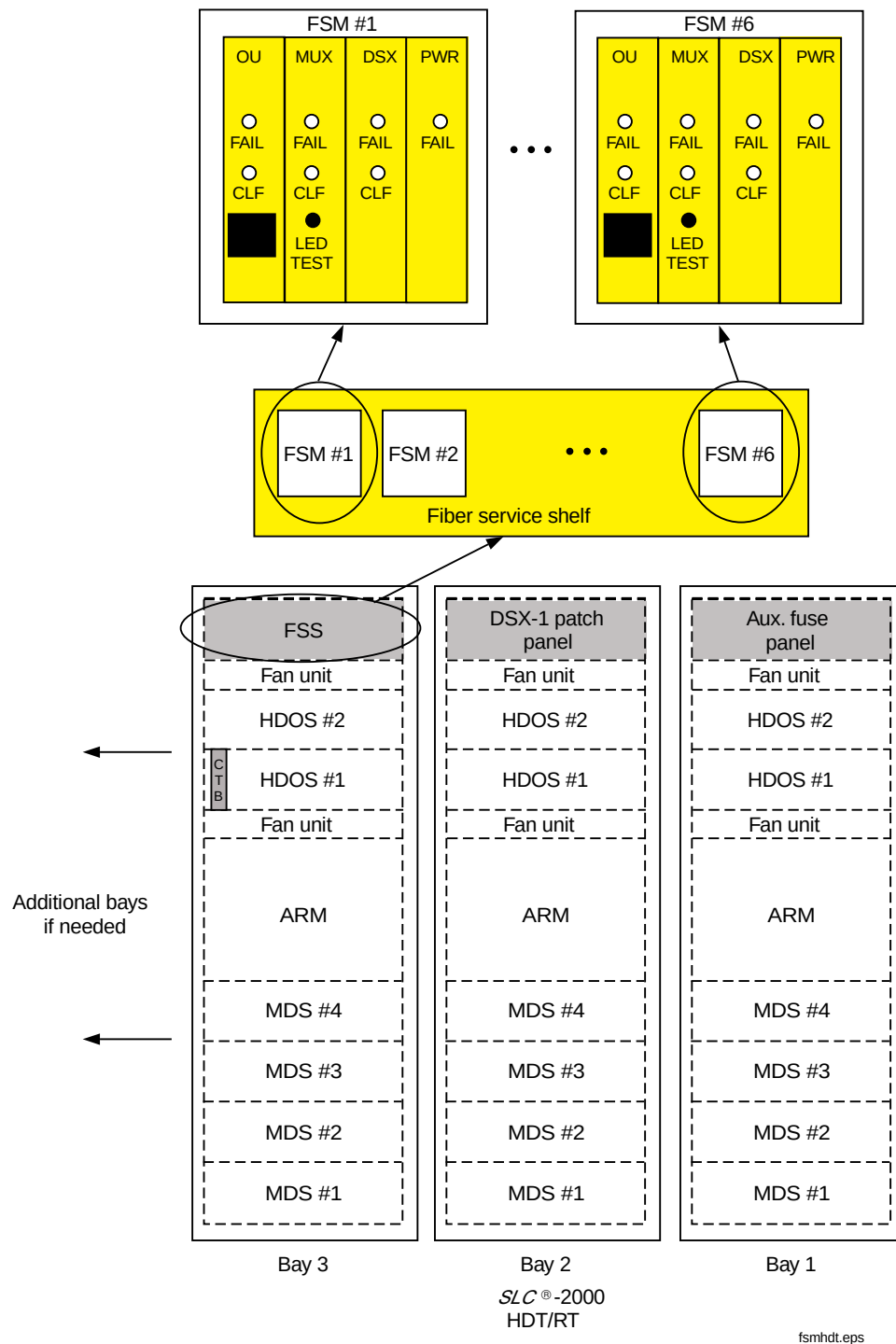
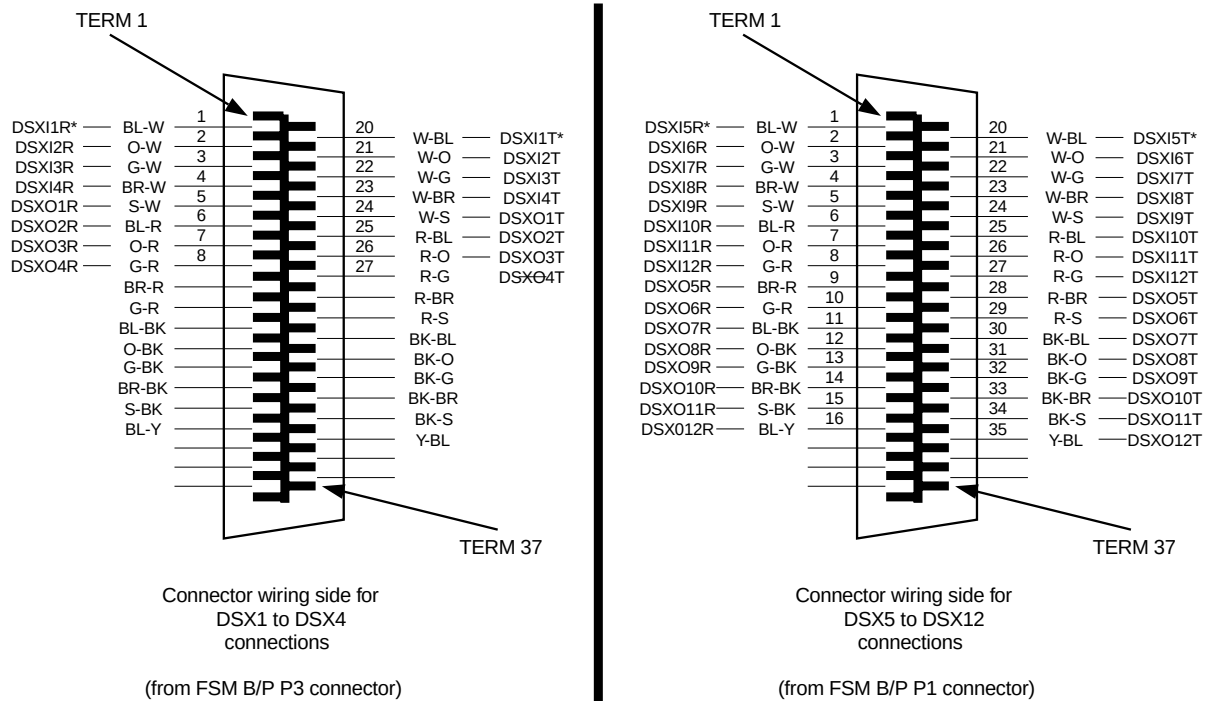


Figure A-4. Recommended FSM Arrangement in the HDT

Figure A-5 shows the color code and DSX-1 designation of each of the 12 DSX-1 circuits from the FSM to a DSX-1 patch panel for cables J6 and J7.



* Use the following pin designation examples:

- DSXI1R is DSX1 input 1 Ring
- DSXI1T is DSX1 input 1 Tip
- DSXO1R is DSX1 output 1 Ring
- DSXO1T is DSX1 output 1 Tip
- etc.

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Figure A-5. FSM DSX-1 Wiring Diagram at HDT

Figure A-6 shows the wiring diagram of the FSM at the HDT.



Figure A-6. FSM Wiring Diagram at HDT

FSM Arrangement at the ONU Site

Equipment Arrangement for a SLC-2000 MSDT ONU

Figure A-7 shows the FSM equipment at the MSDT site. The following equipment at the MSDT is associated with the FSM:

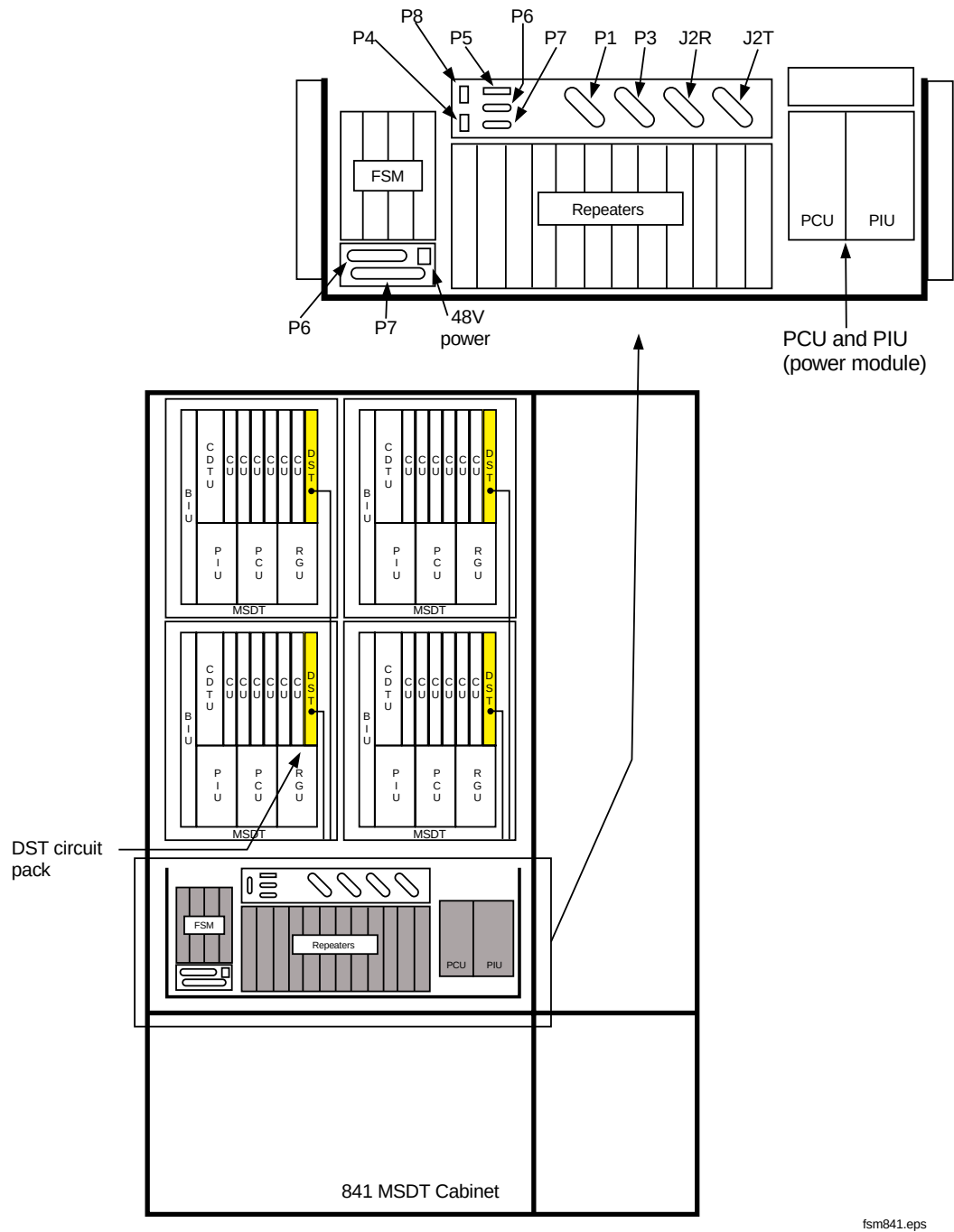
- **841 Cabinet.** The 841 cabinet is an above-ground cabinet that can house up to four MSDTs, the FSM, and repeater equipment.
- **FSM/Repeater/Power Shelf (COMCODE 847367596).** This shelf at the MSDT site houses the following equipment:
 - **FSM Assembly.** This shelf houses the FSM assembly and its four circuit packs.
 - **Repeater Cage containing the AEK-type Repeaters.** Up to 12 AEK-type repeaters allow the FSM to interface DSX-1 signal cable for spans up to 1.5 kft (22 AWG PIC cable).
 - **Power Cage containing the Power Converter Unit (PCU) and Power Interface Unit (PIU).** The PCU (AUA422) and PIU (AUA424 or AUA434) provide –48 volts of power to the FSM and the repeaters.



NOTE:

Although the AUA434 PIU can be used, Lucent Technologies recommends using the AUA424 PIU when possible.

- **DST Circuit Pack.** The digital signal translator (DST) circuit pack replaces the OU in the MSDT when an FSM is used. It interfaces the DS1 rate signal from the MSDT's BIU with the DSX-1 line from the FSM. The circuit pack descrambles the DS1 signal from the BIU and sends it to the FSM. In the opposite direction, it scrambles the DSX-1 signal from the FSM and sends it to the BIU. It also provides signal level translation.



fsm841.eps

Figure A-7. FSM Equipment in the 841 MSDT Cabinet

Figure A-8 shows the T1 lightning protector field, FSM DSX-1 wiring block, repeater DSX-1 wiring block, repeater T1 wiring block, and the feeder distribution panel.



Lucent Technologies recommends that the wiring of the DSX-1 and T1 blocks be done with twisted pair wire to minimize signal interference.

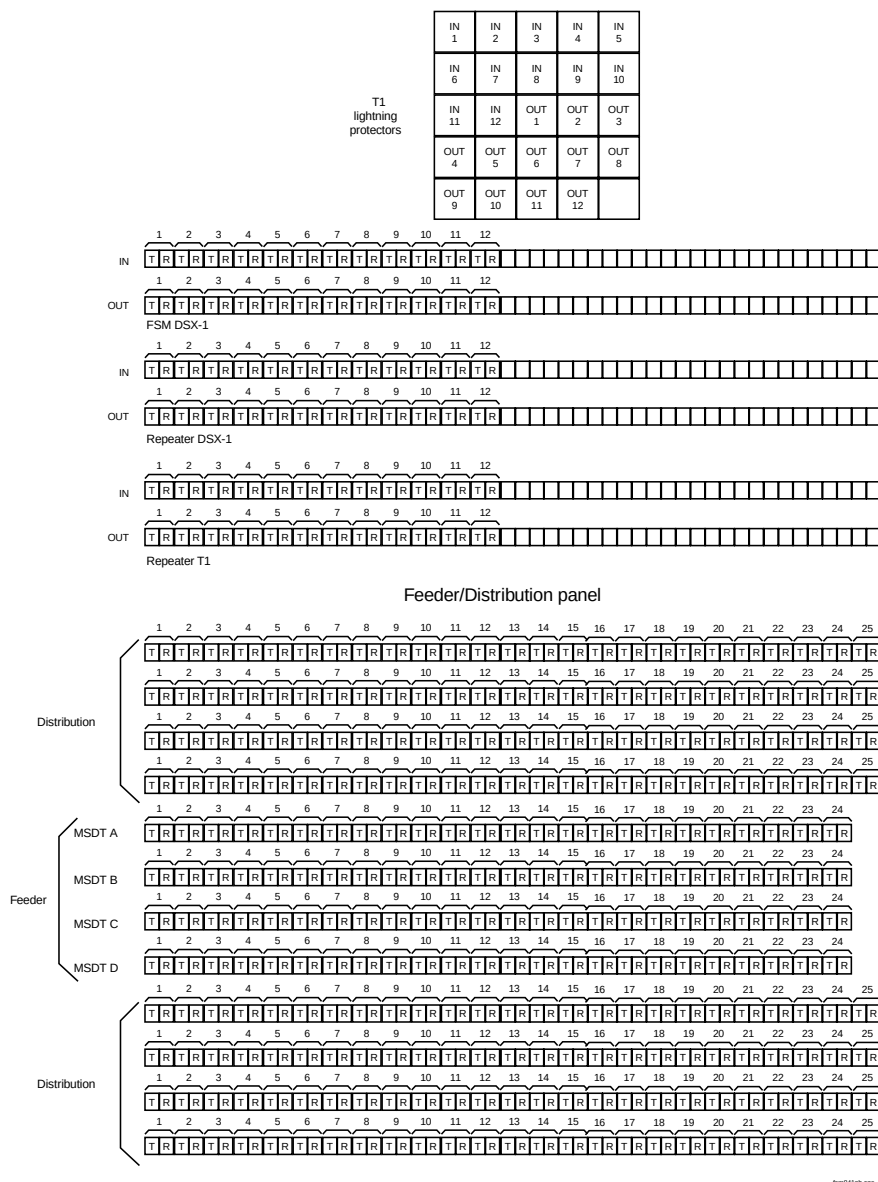
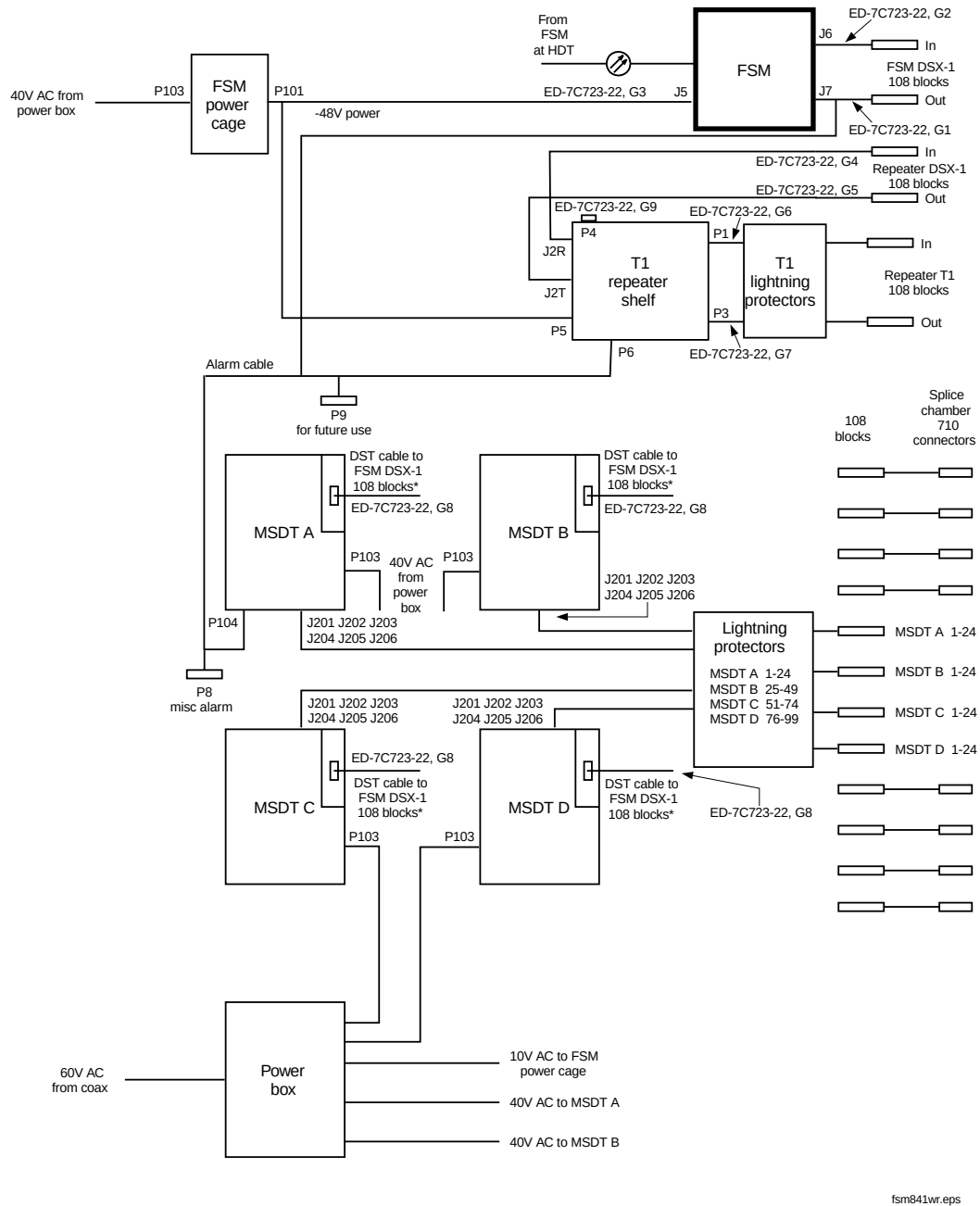


Figure A-8. FSM Protectors, Wiring Blocks, and Feeder/Distribution Panel in the 841 Cabinet

Figure A-9 shows the 841/MSDT/FSM cabinet wiring diagram.



* See Figure B-9.1 for the connections between the DST circuit pack and the 108 connector.

Figure A-9. 841/MSDT/FSM Cabinet Wiring Diagram

Figure A-10 shows the 841/MSDT/FSM repeater shelf assembly wiring diagram.

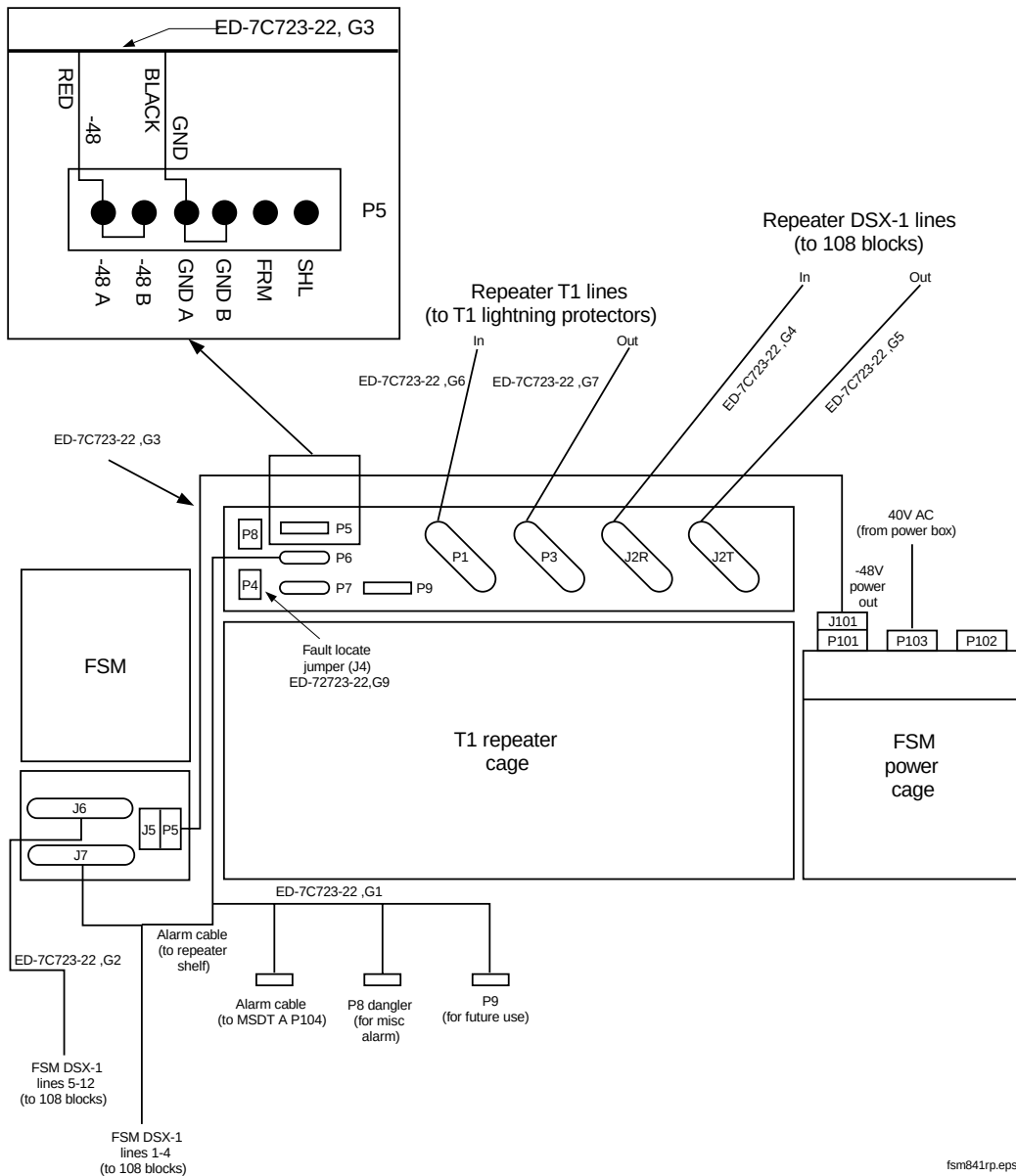


Figure A-10. 841/MSDT/FSM Repeater Shelf Assembly Wiring Diagram

Equipment Arrangement for a DDM-2000 FiberReach Narrowband Shelf ONU

For the equipment arrangement when using the FSM to feed a DDM-2000 FiberReach Narrowband Shelf ONU, contact your regional technical assistance center (RTAC) by dialing 1-800-225-RTAC or your Lucent Technologies Account Executive.

Alarms

SLC-2000 MSDT

In the 841/MSDT/FSM cabinet arrangement, the T1 repeater shelf and the FSM alarms are sent to the HDT by MSDT (A). At the HDT, they can be accessed with the UIP or CIT. This alarm and the door alarm are on the P8 connector that is connected to P104 of MSDT (A). On P104, pins 3 and 4 are for the miscellaneous alarms and pins 1 and 2 are for the door alarm.

DDM-2000 FiberReach Narrowband Shelf

In the cabinet arrangement containing the NBS, the FSM alarms are sent to the HDT by DSXBIU in the NBS. At the HDT, they can be accessed with the UIP or CIT.

FSM COMMON LANGUAGE CLEI* Codes

Table A-1 lists the new FSM *CLEI* codes (and changes to the FITL *CLEI* codes) for the RT/HDT and MSDT shelves, modules, and plug-ins.

For equipment at the DDM-2000 FiberReach Narrowband Shelf ONU, contact your regional technical assistance center (RTAC) by dialing 1-800-225-RTAC or your Lucent Technologies Account Executive.



NOTE:

When using the SLC-2000 DLC to supply DSX-1 lines from the "C" function group to the FSM, you must order the MXRVO, the BBF1B DS1 low-speed interface card, and the cabling (ED-7C723-37, G1 or G2) that goes from the "C" function group to the DSX-1 patch panel. In addition, you need two cables (ED-7C723-37, G1 or G1) that connect the DSX-1 lines from the FSM to the DSX-1 patch panel.

*

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Table A-1. CLEI Codes for FSM Applications

Equipment	Description (Note)	CLEI* Code	COMCODE or Drawing Number
<i>In the RT/HDT:</i>			
SPQ®-808	MSDT or DT Server in MDS assy.	SAIUMBFBAA	107063992
AUA408 Ser. 2	MSDT Server in MDS assy.	SAIUMB0	106275662
SPQ809	MSDT or DT Server in MDS assy. (TR-303)	5SCF40JCAA	107345100
SPQ810	MSDT or DT Server in MDS assy. (TR-303)	LFMAEKOAMA	J1C265AC-1L3
HDOS	HDOS assembly	SAIUN90BAA	107287435
AYB7	HDOS cut-through board (CTB)	SAMYABABAA	847528403
FSS	Fiber service shelf	—	ED-7C723-37, G2 (150 feet)
Cabling	FSM DSX-1 cable to DSX	SAMA290AMA	601783343
FSM (with cables)	Fiber service module (with cable)	—	ED-7C723-37, G1 (75 feet)
Cabling	FSM DSX-1 cable to DSX	SNCM4A2AAA	106439409
BBG2	MXRV0	SNCLA70AAA	106543606
BBF1B	Low-speed DS1 interface		
<i>841 Cabinet:</i>			
4 MSDTs, 4 Fiber jumper cables (No FSM)		F04OH0255	107276412
4 MSDTs, 5 Fiber jumper cables (with FSM)		F95OH0012	107500811
4 MSDTs, 1 Fiber jumper cable (with FSM)		F94OH0013	107500829
FSM/Repeater/Power Shelf		—	847367596
<i>In the MSDT:</i>			
FSM (without cables)	Fiber service module	—	ED-7C723-21, G1
MSDT	Enhanced MSDT assembly	To be provided	To be provided
BYB7	MSDT DST pack (for the FSM)	SAIUNH0BAA	107287401
MC97780A1 I3:3	MSDT BIU	5SCT42BAAA	107129363
FHA2 MC97793A1	MSDT BIU (downloadable, TR303)	5SPQACAAAA	107255382
FHA1 MC97789A1	MSDT BIU	To be provided	107163859
AUA411 S1:1	MSDT CDTU	5SPQAA3AAA	106275696
AUA411B	MSDT CDTU (TR-303)	To be provided	107431579
AUA413 S1:2	MSDT RGU	5SPQ10SAAB	106275977
AUA424	MSDT PIU	5SPQABX	107086407
AUA434	MSDT PIU (60V)	5SPQACBAAA	107248965
AUA417 S1:1	MSDT PCU	5SPQAA1AAA	106436504
AUA422 S1:1	MSDT PCU	5SPQABWAAA	107086399
AUA423 S1:1	MSDT RGU	5SPQABLAAA	106835598
—	Repeater shelf	T1M1KC0ARA	ED-8C730-31, G2 (Part number 007-00504-000)
<i>FSM circuit packs (in the RT/HDT and MSDT):</i>			
BDJ241 S1:1	FSM PWR pack	SAIUNJ0BAA	107287351
BDJ242 S1:1	FSM DSX pack	SAIUNK0BAA	107287369
BDJ243 S1:1	FSM MUX pack	SAIUNL0BAA	107287377
BDJ244 S1:1	FSM OU pack	SAIUNM0BAA	107287385
Note: Some plug-ins have switch settings that may be set by Operations Systems; data sheets for those plug-ins are to be provided.			
* COMMON LANGUAGE is a registered trademark and CLEI, CLLI, CLCI, and CLFI are trademarks of Bell Communications Research, Inc.			

FSM Installation and Acceptance

Refer to 363-205-004, *SLC-2000 Multi-Services Distant Terminal Feature, User/Service and Ordering Manual*, for detailed information on turn-up and end-to-end acceptance when using the FSM to feed a *SLC-2000* MSDT ONU.

For detailed information on turn-up and end-to-end acceptance when using the FSM to feed a *DDM-2000* FiberReach Narrowband Shelf ONU, contact your regional technical assistance center (RTAC) by dialing 1-800-225-RTAC or your Lucent Technologies Account Executive.

Glossary

A

ABN

abnormal

ACD

applied computing devices

ACO

alarm cutoff

AID

access identifier

AIS

alarm indication signal

ALC

automatic loss compensation

ALIC5

analog line to integrated *SLC*[®] carrier at *5ESS*[®] switch cut

AMD

alphanumeric message display

AMU

analog measurement unit

ANI

automatic number identification

APG

applications and planning guide

APS

automatic protection switching

APOG

applications, planning, and ordering guide

ASCII

American Standard Code for Information Interchange

ARM

access resource manager

ATU

alarm and test unit

B

BITS

building integrated timing supply

BIU

backplane interface unit

BMP

bandwidth management processor

BOC

Bell Operating Company

BRITE

basic rate interface transmission extension

C

CAU

craft access unit

CD-ROM

compact disk, read-only memory

CDTU

channel and drop test unit

CF

coin first

CIT

craft interface terminal

CLF

carrier line failure

COMCATS

Computerized Catalog System

CO

central office

COT

central office terminal

CSU

channel service unit

CTB

cut-through board

CU

channel unit

D**DCC**

data communications channel

DDS

digital data system

DID

direct inward dial

DLC

digital loop carrier

DLP

detailed level procedure

DPLL

digital phase-locked loop

DSNE

directory services network element

DST

digital signal translator

DSU

data service unit

DS0

digital signal level zero

DS1

digital signal level one

DTF

dial tone first

E

EBS

enhanced business service

ECI

equipment catalog item

EEPROM

electronically erasable programmable read-only memory

EMC

electromagnetic compliance

EOC

embedded operations channel

ERL

echo return loss

ESD

electrostatic discharge

ESF

extended superframe

ESF/ndl

extended superframe/new data link

F

FE

far end

FECOM

far-end communications

FERF

far-end receive failure

FITL

fiber in the loop

FMAC

Facility Maintenance and Control System

FSM

fiber service module

FSR

frequency selective ringing

FSS

fiber service shelf

G

GNE
gateway network element

H

HDOS
high density optics shelf

HDT
host digital terminal

I

IC
internal clock

ID
identifier

INA
integrated network access

IS-3
optical interconnect signal level 3

ISDN
Integrated Services Digital Network

ITH
integral test head

L

LAN
link to alarms and networks

LBO
line build-out

LDS
local digital switch

LED

light-emitting diode

LEIM

loop electronics inventory module

LIU

line interface unit

LOF

loss of frame

LOS

loss of signal

LTD

local test desk

M

MDC

metallic distribution controller

MDF

main distributing frame

MDS

metallic distribution shelf

MLT

mechanized loop testing

MSDT

multi-services distant terminal

MUX

multiplexer

MXRV0

VT to STS-1 multiplexer

N

NBS

narrowband shelf

NCTE

network channel terminating equipment

NE

network element or near end

NIF
network interface

NMA
network monitoring and analysis

NSA
non-service-affecting

NSAP
network services access point

NTP
non-trouble-clearing procedure

O

OAM&P
operation, administration, maintenance, and provisioning

OCU
office channel unit

OHCTL
overhead controller

OLIU
optical line interface unit

ONU
optical network unit

OPS/INE
Order Provisioning System/Intelligent Network Element

OS
operations system

OSEG
operations system engineering guide

OSI
open systems interconnection

OU
optical unit

P

PAU

power amplifier unit

PBX

private branch exchange

PC

personal computer

PCU

power converter unit

PDC

provisioning and display controller

PGTC

pair gain test controller

PID

program identifier

PIN

positive-intrinsic-negative

PLAR

private line auto ring

PMN

power minor (alarm)

POTS

plain old telephone service

PRS

primary reference source

PRU

positive ringing unit

PTU

power and test unit

R

RAM

random access memory

RBOC

Regional Bell Operating Company

RC

recent change

RHC
regional holding company

RMU
remote measurement unit

RT
remote terminal

RTU
remote test unit

RTAC
Regional Technical Assistance Center

S

SA
service-affecting

SARTS
Switched Access Remote Test System

SD
schematic diagram

SDE
synchronization distribution expander

SID
system identification

SMU
system memory unit

SONET
synchronous optical network

SRD
software release description

SRL
singing return loss

STEC
single time slot error correction

STS-1
synchronous transport signal level 1

STU
system timing unit

SU
signaling unit

SXS

step-by-step

SYSCTL

system controller

T

T8U

TR-08 unit

TAP

test access point or trouble analysis procedure

TBOS

telemetry byte-oriented serial

TBCU

test bus control unit

TCVCXO

temperature-compensated, voltage-controlled crystal oscillator

TDM

time division multiplexing

TGS

synchronous timing generator

THC

test head controller

TID

target identification

TLB

timing looped back

TLP

test point level

TMC

time slot management channel

TMS

transmission measuring set

TOP

task-oriented practice

TSA
time slot assignment

TSI
time slot interchange

TSU
transmission signaling unit

U

UIP
user interface panel

USM
user service manual

V

VF
voice frequency

VOM
volt-ohm-multimeter

VRT
virtual remote terminal

VT
virtual tributary

VT-G
virtual tributary group

VTU
virtual tributary unit

W

WORD
work order record detail

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