

Lucent Technologies
Bell Labs Innovations



DDM-2000 OC-3 Multiplexer Releases 8.0 through 11.1

User/Service Manual (TOP) -
Volume II

363-206-280
Issue 4A
September 1998

Copyright © 1998 Lucent Technologies, All Rights Reserved

This material is protected by the copyright laws of the United States and other countries. It may not be reproduced, distributed or altered in any fashion by any entity, including other Lucent Technologies Business Units or Divisions, without expressed written consent of the Customer Training and Information Products organization.

For permission to reproduce or distribute, contact: Product Development Manager 1-888-LTINFO6 (1-888-584-6366).

Notice

Every effort was made to ensure that the information in this document is complete and accurate at the time of printing. However, information is subject to change.

Mandatory Customer Information

Interference Information: Part 15 of Federal Communications Commission (FCC) Rules.

NOTE: This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to Part 15 of FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy, and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residence is likely to cause harmful interference in which case the user will be required to correct the interference at the users own expense.

Security Statement

In rare instances, unauthorized individuals make connections to the telecommunications network through the use of remote access features. In such event, applicable tariffs require that the customer pay all network charges for traffic. Lucent Technologies cannot be responsible for such charges and will not make any allowance or give any credit for charges that result from unauthorized access.

Trademarks

ANSI is a registered trademark of American National Standards Institute.

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

DANTEL is a registered trademark of Dantel, Inc.

DEC is a trademark of Digital Equipment Corporation.

FIND-R-SCOPE is a registered trademark of F. J. W. Industries, Inc.

Fujitsu is a registered trademark of Fujitsu Limited.

Hayes and V-Series are registered trademarks of Hayes Microcomputer Products, Inc.

HP is a registered trademark of Hewlett-Packard Company.

IBM is a registered trademark of International Business Machines Corporation.

MagaStar is a trademark of Harris Corporation.

Microsoft is a registered trademark of Microsoft Corporation.

MS-DOS is a registered trademark of Microsoft Corporation.

NCR is a registered trademark of NCR Corporation.

National Electrical Safety Code is a registered trademark of the Institute of Electrical and Electronics Engineers, Inc.

PairGain is pending.

Paradyne is a registered trademark of AT&T.

Penril is a registered trademark of Penril Corporation.

PROCOMM is a registered trademark of Datastorm Technologies, Inc.

Safari is a registered trademark of AT&T.

5ESS, DACScan, LGX, SLC, ST, Teletype, and Western Electric are registered trademarks of Lucent Technologies.

Toshiba is a registered trademark of Kabushik Kaisha Toshiba.

UL is a registered trademark of Underwriters Laboratories, Inc.

Windows is a registered trademark of Microsoft Corporation.

Warranty

Lucent Technologies provides a 5-year limited warranty to this product. For more information, consult your local Account Executive.

The Year 2000

DDM-2000 Multiplexers store dates relative to a non-zero default of January 1, 1970. The last year that can be provisioned using the "**set-date**" command is 2069. Therefore, DDM-2000 Multiplexers will not be affected by the arrival of the year 2000.

Document Ordering Information

The ordering number for this document is 363-206-280. To order this document, call 1-888-582-3688. For more ordering information, refer to "How to Order Documents" in the section "About this Document" in Volume I.

Customer Assistance and Technical Support

The Lucent Technologies Regional Technical Assistance Center (RTAC) provides a technical assistance telephone number which is staffed 24 hours a day. For technical assistance, call 1-800-225-RTAC in accordance with local operating procedures.

Documentation Support

Lucent Technologies provides a telephone number for you to report errors or to ask questions about the information in this document. The support telephone number is 1-888-584-6366. To order documents, see "Document Ordering Information" above.

Developed by Lucent Technologies Customer Training and Information Products organization.

How Are We Doing?

Document Title: DDM-2000 OC-3 Multiplexer Releases 8.0 through 11.1 User/Service Manual
(TOP) - Volume II

Document No.: 363-206-280

Issue 4A

Date: September 1998

Lucent Technologies welcomes your feedback on this document. Your comments can be of great value in helping us improve our documentation.

1. Please rate the effectiveness of this document in the following areas:

	Excellent	Good	Fair	Poor	Not Applicable
Ease of Use					////////////////
Clarity					////////////////
Completeness					////////////////
Accuracy					////////////////
Organization					////////////////
Appearance					////////////////
Examples					
Illustrations					
Overall Satisfaction					////////////////

2. Please check the ways you feel we could improve this document:

☐ Improve the overview/introduction	☐ Make it more concise/brief
☐ Improve the table of contents	☐ Add more step-by-step procedures/tutorials
☐ Improve the organization	☐ Add more troubleshooting information
☐ Include more figures	☐ Make it less technical
☐ Add more examples	☐ Add more/better quick reference aids
☐ Add more detail	☐ Improve the index

Please provide details for the suggested improvement. _____

3. What did you like most about this document?

4. Feel free to write any comments below or on an attached sheet.

If we may contact you concerning your comments, please complete the following:

Name: _____ Telephone Number: _____

Company/Organization: _____ Date: _____

Address: _____

When you have completed this form, please fold, tape, and return to address on back
or Fax to: 336-727-3043.

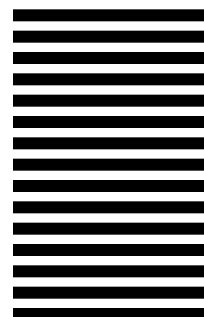
Lucent Technologies
Bell Labs Innovations



-----Do Not Cut—Fold Here And Tape-----



NO POSTAGE
NECESSARY
IF MAILED
IN THE
UNITED STATES



BUSINESS REPLY MAIL

FIRST CLASS PERMIT NO. 1999 GREENSBORO, N.C.

POSTAGE WILL BE PAID BY ADDRESSEE

DOCUMENTATION SERVICES
2400 Reynolda Road
Winston-Salem, NC 27199-2029



How Are We Doing?

Document Title: DDM-2000 OC-3 Multiplexer Releases 8.0 through 11.1 User/Service Manual
(TOP) - Volume II

Document No.: 363-206-280

Issue 4A

Date: September 1998

Lucent Technologies welcomes your feedback on this document. Your comments can be of great value in helping us improve our documentation.

1. Please rate the effectiveness of this document in the following areas:

	Excellent	Good	Fair	Poor	Not Applicable
Ease of Use					////////////////
Clarity					////////////////
Completeness					////////////////
Accuracy					////////////////
Organization					////////////////
Appearance					////////////////
Examples					
Illustrations					
Overall Satisfaction					////////////////

2. Please check the ways you feel we could improve this document:

☐ Improve the overview/introduction	☐ Make it more concise/brief
☐ Improve the table of contents	☐ Add more step-by-step procedures/tutorials
☐ Improve the organization	☐ Add more troubleshooting information
☐ Include more figures	☐ Make it less technical
☐ Add more examples	☐ Add more/better quick reference aids
☐ Add more detail	☐ Improve the index

Please provide details for the suggested improvement. _____

3. What did you like most about this document?

4. Feel free to write any comments below or on an attached sheet.

If we may contact you concerning your comments, please complete the following:

Name: _____ Telephone Number: _____

Company/Organization: _____ Date: _____

Address: _____

When you have completed this form, please fold, tape, and return to address on back
or Fax to: 336-727-3043.

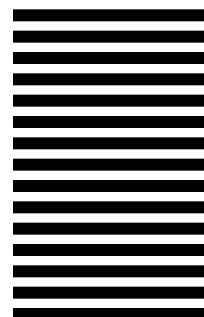
Lucent Technologies
Bell Labs Innovations



-----Do Not Cut—Fold Here And Tape-----



NO POSTAGE
NECESSARY
IF MAILED
IN THE
UNITED STATES



BUSINESS REPLY MAIL

FIRST CLASS PERMIT NO. 1999 GREENSBORO, N.C.

POSTAGE WILL BE PAID BY ADDRESSEE

DOCUMENTATION SERVICES
2400 Reynolda Road
Winston-Salem, NC 27199-2029



Operation and Maintenance (TOP)

Contents

Overview	1
TOP Section Organization	1
How To Use This TOP Section	3
■ Screen Display and Panel Stamping Fonts	5
■ DDM-2000 OC-3 Installation	5
Safety Instructions	5
■ Product Safety Labels	5
Lightwave Safety Guidelines	6
■ General Laser Information	6
■ Lasers and Eye Damage	6
■ Classification of Lasers	7
■ Lightwave Safety Precautions	7
■ Safety Precautions for Enclosed Systems	8
■ Safety Precautions for Unenclosed Systems	9
Electrostatic Discharge (ESD) Considerations	10
General Safety Instructions	13
Installation Safety Instructions	14
Master Task Index	15
Numerical List of TOP Procedures	27
CPro-2000 Graphical User Interface and Provisioning Tool	33

Contents

Integrated Transport Management (ITM)	
SubNetwork Controller (SNC)	34
Acceptance Tab (Yellow)	
■ Task Index — Acceptance	
System Turnup/Circuit Order Tab (Orange)	
■ Task Index — System Turnup/Circuit Order	
Operation Tab (Green)	
■ Task Index — Operation	
Trouble Clearing Tab (Red)	
■ Task Index — Trouble Clearing	
Detailed Level Procedures Tab (Blue)	

Operation and Maintenance (TOP)

Overview

This section supports the turnup, operation, and maintenance of the DDM-2000 OC-3 Multiplexer. It includes the following five separate tabs:

- Acceptance — Yellow tab
- System Turnup/Circuit Order — Orange tab
- Operation — Green tab
- Trouble Clearing — Red tab
- Detailed Level Procedures — Blue tab.

TOP Section Organization

The **Acceptance** tab covers procedures to check the shelf or system after the shelf has been equipped or after the system has been established.

The **System Turnup/Circuit Order** tab includes procedures for the following:

- a. Equipping (turning up) a shelf in a looped back condition for the first time.
- b. Establishing an end-to-end system after all shelves have been equipped.
- c. Establishing initial end-to-end DS1, DS3, EC-1, OC-3c, HDSL, or DS3-to-DS1 (TMUX) service.
- d. Adding, converting, or discontinuing DS1, DS3, EC-1, OC-3c, or HDSL service to an in-service system.

- e. Adding new shelves or spans to existing configurations.
- f. Upgrading software to a new release.
- g. Converting or upgrading an OC-3 system to an OC-12 system.
- h. Upgrading an OC-3 point-to-point system to path switched ring.
- i. Establishing OC-3/IS-3 dual ring interworking (DRI) OC-3 to OC-12 or FT-2000 OC-48.
- j. Upgrading OC-3/FT-2000 OC-48 DRI from EC-1 to OC-3.
- k. Establishing single-homed or dual-homed FiberReach access via DDM-2000 OC-3 backbone ring.
- l. Establishing single-homed or dual-homed OC-3 access via DDM-2000 OC-12 or FT-2000 OC-48 backbone ring.
- m. Establishing stand-alone FiberReach access via DDM-2000 OC-3 host.
- n. Establishing OC-3 optical span extensions between FT-2000 OC-48, DDM-2000 OC-3, and DDM-2000 OC-12.
- o. Upgrading DDM-2000 OC-3/OC-12 DRI from EC-1 to OC-3/IS-3.
- p. Establishing FiberReach access via DDM-2000 OC-3 host shelf in OC-3 Release 8 linear configuration.
- q. Upgrading an OC-3 ring network to an OC-12 ring network using OC-3 shelves.
- r. Upgrading an OC-3 ring network to an OC-12 ring network using OC-3/OC-12 shelves.

The **Operation** tab covers procedures for operating the system such as connecting and using the craft interface terminal (CIT), displaying alarm and status conditions, installing a new generic program, etc.

The **Trouble Clearing** tab covers alarms and trouble reports.

The **Detailed Level Procedures** (DLP) tab contains all of the DLPs, beginning with DLP-500, used in this manual.

How To Use This TOP Section

Procedures in this TOP consist of the following:

- a. Task Index (**IXL**) - an index listing tasks that may need to be performed in establishing, operating, and maintaining the DDM-2000 OC-3 Multiplexer system. Each colored tab in this manual contains a separate index (**IXL-001**) and it is always first under each tab.
- b. Non-Trouble-Clearing Procedure (**NTP**) - a director level procedure that lists normal work items to perform other than trouble clearing.
- c. Trouble Analysis Procedure (**TAP**) - a director level procedure that contains step-by-step trouble-clearing instructions to locate and/or fix troubles.
- d. Detailed Level Procedures (**DLP**) - detailed step-by-step instructions.

All procedures in each section of this TOP are in numerical order, regardless of the type of procedure (see Table 1). Table 1, which lists all the procedures used in this TOP, is provided as a reference only. It should not be used alone in finding instructions for performing tasks.

To find the instructions for performing acceptance, system turnup/circuit order, operation, or trouble clearing tasks, proceed as follows:

1. Find your job in the Task Index (for example: **Acceptance IXL-001**) under the appropriate colored tab and go to the referenced procedure. Or you may use the Master Task Index (**IXL-001**) in this introduction.
2. Turn to the indicated director level, detail level, or trouble-clearing procedure listed under the "GO TO" column for the task being performed.
3. Perform all the items in the director level procedure 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. 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. All DLPs are in the Detailed Level Procedures tab section of this manual.
4. **IMPORTANT:** Unless otherwise directed, when you complete a Detailed Level Procedure, you **MUST** return to the procedure that sent you there.
5. **IMPORTANT:** Unless otherwise directed, if one director level procedure sends you to another director level procedure, you should not return to the first director level procedure after you complete the second.

6. Sometimes you will be asked to verify that things have occurred. This may take the form of a formal statement of the expected response. At other times, the instructions will merely state *verify that ...*

If the expected response is not observed and a specific trouble clearing reference is not made, you should reference the trouble analysis procedures under the Trouble Clearing tab to clear the trouble.

7. When performing tests or procedures using a CIT and system commands, you should refer to the "Commands and Reports" section of this manual for a description of the command, its parameters, and the output messages associated with the command.
8. If a procedure refers to software releases, for example Release 8 or later, it refers to all linear and ring releases with a numerical value of 8 or higher. If the procedure refers to software releases as Release 9 or later ring releases, it refers to all ring software releases with a numerical value of 9 or higher.
9. If you need assistance in clearing a trouble after completing all the applicable trouble-clearing procedures in this section, contact your local or regional maintenance assistance group. The telephone number for the Lucent Technologies Regional Technical Assistance Center (RTAC) is **1-800-225-RTAC**.

Circuit packs being returned for repair should be sent to the following address:

Lucent Technologies
Returned Goods Dept.
Dept. JC0221210
1600 Osgood Street
North Andover, Massachusetts 01845

Telephone: 1-508-960-5179
or
FAX to: 1-508-960-1705

Screen Display and Panel Stamping Fonts

The procedures in this manual use a monospace font to identify actual text on a screen or a response displayed from the system. A **bold** font identifies panel stamping such as alarm names or circuit pack names. Also, the **bold** font is used throughout this manual for emphasis.

DDM-2000 OC-3 Installation

363-206-204, *DDM-2000 OC-3 Multiplexer Installation Manual*, is available for customers planning to install the equipment themselves. To acquire this manual, refer to "How to Order Documents" in the About This Document tab.

Lucent Technologies recommends that **ONLY** designated Lucent Technologies cables be used with DDM-2000. Failure to use these cables will void the product warranty.

Safety Instructions

Product Safety Labels

These instructions involve lasers, lightwave optical cable and connectors, and precautions when handling circuit packs to prevent damage from electrostatic discharge. The appropriate user/service manual contains admonishments in the form of **DANGERS**, **WARNINGS**, and **CAUTIONS** that must be followed at all times.

These admonishments have the following definitions:

- **DANGER** indicates the presence of a hazard that **will** cause death or severe personal injury if the hazard is not avoided.
- **WARNING** indicates the presence of a hazard that **can** cause death or severe personal injury if the hazard is not avoided.
- **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 alert symbol  appears throughout these products and the appropriate user/service manual to alert the user to the presence of important operating and maintenance (servicing) instructions for the DDM-2000 Multiplexers.

Lightwave Safety Guidelines

General Laser Information

Lightwave/lightguide systems, their associated test sets, and similar operating systems use semiconductor laser transmitters that emit light at wavelengths between approximately 800 nanometers and 1600 nanometers. The emitted light is above the red end of the visible spectrum, which is normally not visible to the human eye. Although radiant energy at near-infrared wavelengths is officially designated invisible, some people can see the shorter wavelength energy even at power levels several orders of magnitude below any that have been shown to cause injury to the eye.

Conventional lasers can produce an intense beam of monochromatic light. The term monochromaticity means a single wavelength output of pure color that may be visible or invisible to the eye. A conventional laser produces a small-size beam of light, and because the beam size is small the power density (also called irradiance) is very high. Consequently, lasers and laser products are subject to federal and applicable state regulations as well as international standards for their safe operation.

A conventional laser beam expands very little over distance or is said to be very well collimated. Thus, conventional laser irradiance remains relatively constant over distance. However, lasers used in lightwave systems have a large beam divergence, typically 10 to 20 degrees. Here, irradiance obeys the inverse square law (doubling the distance reduces the irradiance by a factor of 4) and rapidly decreases over distance.

Lasers and Eye Damage

Light energy emitted by laser and high-radiance LEDs in the 400-1400 nm range may cause eye damage if absorbed by the retina. When a beam of light enters the eye, the eye magnifies and focuses the energy, magnifying the irradiance. The irradiance of energy that reaches the retina is approximately 10^5 or 100,000 times that at the cornea; and if sufficiently intense, may cause a retinal burn.

The damage mechanism at the wavelengths used in telecommunications is thermal in origin (that is, damage caused by heating). Therefore, a specific amount of energy is required for a definite time to heat an area of retinal tissue. Damage is not instantaneous. It occurs only when one looks at the light sufficiently long enough that the product of the retinal irradiance and the viewing time exceeds the damage threshold. Light energies above 1400 nm would cause surface and skin burns and do not affect the retinal area.

Classification of Lasers

Manufacturers of lasers and laser products in the U.S. are regulated by the Food and Drug Administration's Center for Devices and Radiological Health (FDA/CDRH) under 21 CFR 1040. These regulations require manufacturers to certify each laser or laser product as belonging to one of four major Classes — Class I, II, IIIa, IIIb, or IV. Lasers are classified according to the accessible emission limits and their potential for causing injury. Lightwave systems are generally classified as Class I, because, under normal operation conditions, all energized laser transmitting circuit packs are terminated on optical fibers which enclose the laser energy with fiber sheath, forming a protective housing. Also, covers are in place over the circuit pack shelves.

Lightwave Safety Precautions

In its normal operating mode, a lightwave system is totally enclosed and presents no risk of eye injury. It is a Class I system under the FDA/CDRH scheme.

The lightguide cables that interconnect various components of a lightwave system can disconnect or break, and may expose people to lightwave emission. Also, certain measures and maintenance procedures may expose the technician to emission from the semiconductor laser during installation and servicing. Unlike more familiar laser devices, such as solid-state and gas lasers, the emission pattern of a semiconductor laser results in a highly divergent beam. In a divergent beam, the irradiance (power intensity) decreases rapidly with distance. The greater the distance, the less energy will enter the eye, and the less potential risk for eye injury.

Inadvertently viewing an unterminated fiber or damaged fiber with the unaided eye at distances greater than 5 to 6 inches normally will not cause eye injury provided the power in the fiber is less than a few mW at the shorter wavelengths and higher at the longer wavelengths. However, damage may occur if an optical instrument such as a microscope, magnifying glass, or eye loupe, is used to stare at the energized fiber end.



CAUTION:

Use of controls or adjustments or performance of procedures other than those specified herein may result in hazardous laser radiation exposure.

Safety Precautions for Enclosed Systems

Under normal operating conditions, lightwave transmission systems are completely enclosed; nonetheless, the following precautions should be observed:

1. Because of the potential for eye damage, technicians should neither disconnect any lightwave cable nor splice and stare into the optical connectors terminating the cables.
2. Under no circumstances shall lightwave/lightguide operations be performed by a technician before satisfactorily completing an approved training course.
3. Since viewing lightwave emission directly with an optical instrument, such as an eye loupe greatly increases the risk of eye damage, an appropriate label must appear in plain view on the front of the main frame or lightguide termination/interconnection equipment. The safety label (Figure 1) shall read as follows:

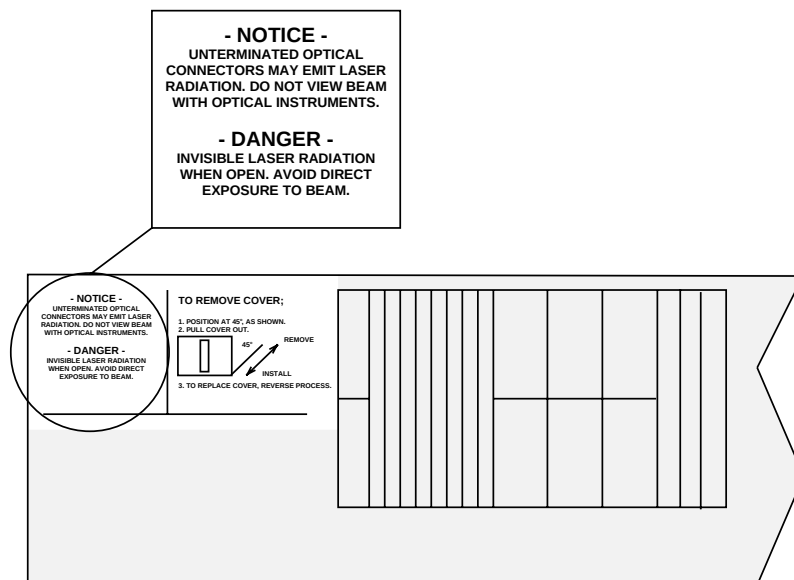


Figure 1. Safety Label on Inside of Front Shelf Cover

Safety Precautions for Unenclosed Systems

During service, maintenance, or restoration, a lightwave transmission system is considered unenclosed. Under these conditions, follow these practices:

1. Only authorized, trained personnel shall be permitted to do service, maintenance, and restoration. Avoid exposing the eye to emissions from unterminated, energized optical connectors at close distances. Connectors associated with lightwave regenerators are recessed, which limits exposure distance. However, technicians removing or replacing regenerators should not stare or look directly into the vacant regenerator slot with optical instruments or magnifying lenses. (Normal eyewear or indirect viewing instruments, such as a Find-R-Scope are not considered magnifying lenses or optical instruments.)
2. Only authorized, trained personnel shall use the lightwave test equipment during installation or servicing, since this equipment contains semiconductor lasers. (Some examples of lightguide test equipment are OTDR's, Hand-Held Loss Test Sets, and Feature Finders.)
3. Under no circumstances shall any personnel scan a fiber with an optical test set without verifying that all lightwave sources on the fiber are turned off.
4. All unauthorized personnel shall be excluded from the immediate area of lightwave transmission systems during installation and service.

Consult ANSI Z136.1 American National Standard for Safe Use of Lasers for guidance on the safe use of lasers in the workplace.

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 precautions should be observed when handling circuit packs in order to prevent damage by electrostatic discharge:

- Assume all circuit packs contain solid state electronic components that can be damaged by ESD. Use only Lucent Technologies manufactured UL recognized circuit packs specified in the appropriate user/service manual in this system.
- 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.
- 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.
- 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 styrofoam* containers away from all circuit packs. Upon removal from the bay, immediately put circuit packs into static-safe packages.
- Whenever possible, maintain relative humidity above 20 percent.

*

Registered trademark of The Dow Chemical Company.

To reduce the possibility of ESD damage, shelves are equipped with grounding jacks to enable personnel to ground themselves using wrist straps (see Figure 2) while handling circuit packs or working on a shelf(s). The jacks for connection of wrist straps are located at the lower right-hand corner of each shelf and are labeled. When grounding jacks are not provided, an alligator clip adapter enables connection to bay frame ground.

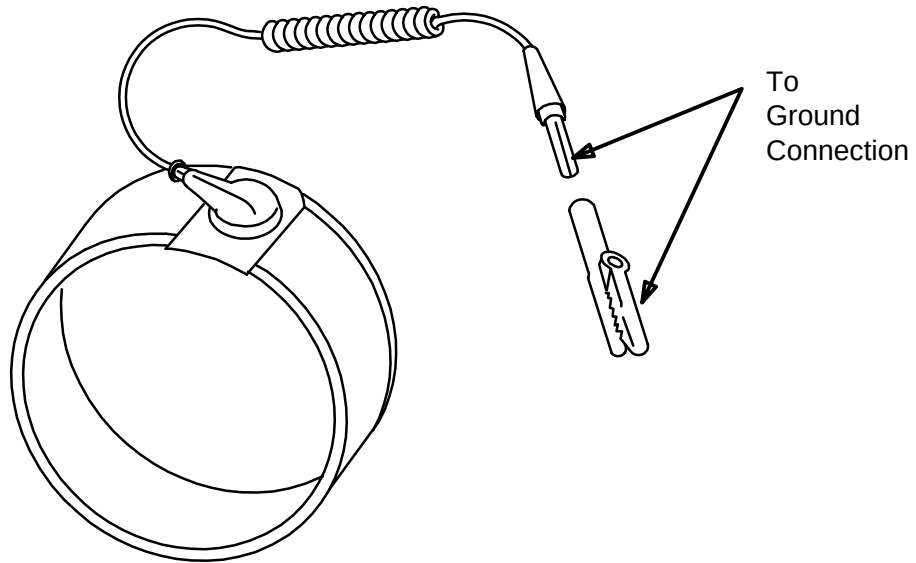


Figure 2. Static Control Wrist Strap

THIS PAGE INTENTIONALLY LEFT BLANK.

General Safety Instructions

GENERAL SAFETY INSTRUCTIONS

1. Read and understand all instructions.
2. Follow all warnings and instructions marked on the product.
3. Do not place this product on an unstable cart, stand, or table. The product may fall, causing serious damage to the product.
4. Slots and openings in this product's back or bottom are provided for ventilation. To protect it from overheating, these openings must not be blocked or covered. This product should not be placed in a built-in installation unless proper ventilation is provided. For information on proper ventilation requirements, consult the "Equipment Installation Considerations" section of 363-206-204, *DDM-2000 OC-3 Multiplexer Installation Manual*; or 363-206-208, *DDM-2000 OC-12 Multiplexer Installation Manual*; or 363-206-310, *DDM-2000 FiberReach Multiplexer Installation Manual*.
5. This product should be operated only from the type of power source indicated on the marking label. For information on proper electrical distribution and power requirements, refer to the "Power" and "Technical Specifications" sections of the appropriate user/service manual.
6. Never push objects of any kind into this product through cabinet slots as they may touch dangerous voltage points or short out parts that could result in a risk of fire or electrical shock. Never spill liquid of any kind on the product.
7. To reduce the risk of electrical shock, do not disassemble this product. Service should be performed by trained personnel only. Opening or removing covers and/or circuit packs may expose you to dangerous voltages or other risks. Incorrect reassembly can cause electrical shock when the unit is subsequently used.
8.



CAUTION:
Disconnect two (2) power connections when removing power from the system.
9. Use only Lucent Technologies' manufactured UL recognized circuit packs. Recognized circuit packs are listed in the appropriate user/service manual.

SAVE THESE INSTRUCTIONS.

Installation Safety Instructions

INSTALLATION SAFETY INSTRUCTIONS

1. Read and understand all instructions.
2. Installation and maintenance procedures must be followed and performed by trained personnel only.
3. All DS1 and DS3 interfaces should not leave the building premises unless connected to telecommunication devices providing primary or secondary protection, as applicable.
4. For information on proper mounting instructions, consult 363-206-204, *DDM-2000 OC-3 Multiplexer Installation Manual*; or 363-206-208, *DDM-2000 OC-12 Multiplexer Installation Manual*; or 363-206-310, *DDM-2000 FiberReach Multiplexer Installation Manual*.
5. Never install telecommunication wiring during a lightning storm.
6. Never install telecommunication connections in wet locations.
7. Never touch uninsulated telecommunication wires or terminals unless the telecommunication line has been disconnected at the DS1 or DS3 interface.
8. Use caution when installing or modifying telecommunication lines.

SAVE THESE INSTRUCTIONS.

Master Task Index Operation and Maintenance

FIND YOUR JOB IN THE LIST BELOW THEN GO TO

ABN Indication — Clear Trouble Clearing: TAP-109

CIT — Activate Optional System Features . . . Detailed Level Procedure: DLP-512

CIT — Connect and Establish Session . . . Detailed Level Procedure: DLP-521

CIT — Enable or Disable System Security
and/or Edit, Delete, or Enter a User's Login . . . Detailed Level Procedure: DLP-541

DS1 Service — Add New
Group Already In Service Circuit Order: NTP-006

DS1 Service — Add New MXRVO Group —
System In Service Circuit Order: NTP-008

DS1 Service — Add New STS1E High Speed Group —
EC-1 Electrical Multiplexer
System In Service Circuit Order: NTP-032

DS1 Service — Convert to DS3 Group Service Circuit Order: NTP-009

DS1 Service — Discontinue Circuit Order: NTP-011

DS1 Service — Establish Initial End-to-End —
Group Equipped But Not In Service System Turnup: NTP-004

DS3 Service — Add New DS3 Group — In Service Circuit Order: NTP-007

DS3 Service — Convert to DS1 MXRVO Group Service . . . Circuit Order: NTP-010

FIND YOUR JOB IN THE LIST BELOW THEN GO TO

DS3 Service — Discontinue	Circuit Order: NTP-012
DS3 Service — Establish Initial End-to-End — Group Equipped But Not In Service	System Turnup: NTP-005
DS3-to-DS1 Service — Establish Initial End-to-End — TMUX Group Equipped But Not In Service	System Turnup: NTP-053
DS3-to-DS1 Service — Add New TMUX Group — System In Service	Circuit Order: NTP-054
EC-1 Service — Add New STS1E Group — System In Service	Circuit Order: NTP-035
EC-1 Service — Establish Initial End-to-End — Group Equipped But Not In Service	System Turnup: NTP-034
EC-1 Service — Discontinue	Circuit Order: NTP-036
FAULT LED Indication (Flashing) — Clear	Trouble Clearing: TAP-110
FE SEL — Display Alarm/Status Condition	Detailed Level Procedure: DLP-530
LEDs — Test	Detailed Level Procedure: DLP-509
NE ACTY/FE ACTY Alarm Only — Clear	Trouble Clearing: TAP-117
SYSCTL — Install BBG8/BBG8B — New Shelf Only BBG9 OHCTL Installed	Detailed Level Procedure: DLP-549
SYSCTL — Replace — In Service	Detailed Level Procedure: DLP-501

FIND YOUR JOB IN THE LIST BELOW THEN GO TO

Accept DDM-2000 OC-3 Multiplexer Shelf
(Looped Back) Acceptance: NTP-003

Accept End-to-End System — OC-3 Point-to-Point Acceptance: NTP-004

Accept DDM-2000 OC-3 Multiplexer (Equipped) —
Overview Acceptance: NTP-002

Add DDM-2000 OC-3 Shelf —
Linear or Hub Configuration
Shelf Added in Middle of Optical Span Circuit Order: NTP-014

Add OC-3 Optical Span Linear Extension —
Extension Added Between FT-2000 and DDM-2000 OC-3 Circuit Order: NTP-049

Add DDM-2000 OC-3 Shelf and/or New Optical Span —
Shelf and/or Span Added as Extension to
DDM-2000 OC-3 Ring, Hub, Point-to-Point,
Linear Add/Drop Circuit Order: NTP-015

Add New DDM-2000 OC-3, OC-12, or FiberReach Node (Shelf)
To DDM-2000 OC-3/OC-12 Path Switched Ring Circuit Order: NTP-026

Add New DS1 Service —
Group Already In Service Circuit Order: NTP-006

Add New DS3 Group For DS3 Service —
System In Service Circuit Order: NTP-007

Add New HDSL Service —
Group Already In Service Circuit Order: NTP-028

Add New MXRVO Group For DS1 Service —
System In Service Circuit Order: NTP-008

FIND YOUR JOB IN THE LIST BELOW THEN GO TO

Add New TMUX Group for DS3 Service — System In Service	Circuit Order: NTP-054
Add New STS1E High Speed Group For DS1 Service — EC-1 Electrical Multiplexer Shelf System In Service	Circuit Order: NTP-032
Add New STS1E Low Speed Group For EC-1 Service — System In Service	Circuit Order: NTP-035
Alarm — Critical (CR) — Clear	Trouble Clearing: TAP-101
Alarm — Major (MJ) — Clear	Trouble Clearing: TAP-102
Alarm — Minor (MN) — Clear	Trouble Clearing: TAP-112
Alarm — NE ACTY/FE ACTY Only — Clear	Trouble Clearing: TAP-117
Alarm — Power Minor (PMN) — Clear	Trouble Clearing: TAP-104
Alarm Group — Establish New	Detailed Level Procedure: DLP-564
Alarm/Status Condition — Display Using FE SEL	Detailed Level Procedure: DLP-530
Convert (Upgrade) DDM-2000 OC-3 Shelf to DS1 Add/Drop OC-3 Shelf	Circuit Order: NTP-020
Convert (Upgrade) DDM-2000 OC-3 System to OC-12 System Linear and Hub Configuration	Circuit Order: NTP-021
Convert DS1 Group Service to DS3 Group Service	Circuit Order: NTP-009
Convert DS1 Group Service to EC-1 Group Service	Circuit Order: NTP-038

FIND YOUR JOB IN THE LIST BELOW THEN GO TO

Convert DS3 Group Service to DS1 MXRVO Group Service	Circuit Order: NTP-010
Copy Diskettes (Floppy Disks) and Make Backups	Detailed Level Procedure: DLP-534
Critical (CR) Alarm — Clear	Trouble Clearing: TAP-101
Discontinue DS1 Service	Circuit Order: NTP-011
Discontinue DS3 Service	Circuit Order: NTP-012
Discontinue OC-3 Optical Span Extension	Circuit Order: NTP-019
Discontinue DDM-2000 Node (Shelf) From DDM-2000 OC-3 Path Switched Ring	Circuit Order: NTP-027
Discontinue EC-1 Service	Circuit Order: NTP-036
Discontinue HDSL Service	Circuit Order: NTP-037
Discontinue STS1E High Speed Group — EC-1 Electrical Multiplexer Shelf	Circuit Order: NTP-033
Diskettes (Floppy Disks) — Copy and Make Backups	Detailed Level Procedure: DLP-534
Display Terminal Alarm/Status Condition — Using FE SEL	Detailed Level Procedure: DLP-530
Equip DDM-2000 EC-1 Electrical Multiplexer Shelf — Looped Back	System Turnup: NTP-031
Equip DDM-2000 OC-3 Shelf (Looped Back)	System Turnup: NTP-016
Establish DDM-2000 OC-3c (STS-3c) Service	System Turnup: NTP-002

FIND YOUR JOB IN THE LIST BELOW THEN GO TO

Establish Dual-Homed FiberReach Access
via DDM-2000 OC-3 Backbone Ring System Turnup: NTP-044

Establish Dual-Homed OC-3 Access
via FT-2000 OC-48 Backbone Ring System Turnup: NTP-048

Establish Dual-Homed OC-3 Access
via DDM-2000 OC-12 Backbone Ring System Turnup: NTP-050

Establish EC-1 Dual Ring Interworking —
DDM-2000 OC-3 to OC-12 or FT-2000
OC-3 Optical Fiber Spans Circuit Order: NTP-013

Establish End-to-End System —
OC-3 Point-to-Point System Turnup: NTP-003

Establish End-to-End DDM-2000 OC-3 System —
OC-3 Optical Fiber Spans
Linear or Hub Configuration System Turnup: NTP-017

Establish End-to-End DDM-2000 OC-3 System —
Optical Fiber Spans
Path Switched Ring Network System Turnup: NTP-022

Establish FiberReach Access
via DDM-2000 OC-3 Release 9 and Later Host Shelf
OC-3 Release 8 Linear Configuration System Turnup: NTP-052

Establish Initial Low Speed EC-1 Service —
Group Equipped But Not In Service System Turnup: NTP-034

Establish Initial End-to-End DS1 Service —
Group Equipped But Not In Service System Turnup: NTP-004

Establish Initial End-to-End DS3 Service —
Group Equipped But Not In Service System Turnup: NTP-005

FIND YOUR JOB IN THE LIST BELOW THEN GO TO

Establish Initial HDSL Service —
Group Equipped But Not In Service System Turnup: NTP-025

Establish OC-3/IS-3 Dual Ring Interworking —
DDM-2000 OC-3 to OC-12 or FT-2000 Ring Configurations
OC-3 Optical Fiber Spans System Turnup: NTP-041

Establish OC-3 Optical Span Extension —
Between DDM-2000 OC-12 Ring and DDM-2000 OC-3 . . . System Turnup: NTP-018

Establish Remote Login Detailed Level Procedure: DLP-522

Establish Single-Homed FiberReach Access
via DDM-2000 OC-3 Backbone Ring System Turnup: NTP-043

Establish Single-Homed OC-3 Access
via DDM-2000 OC-12 Backbone Ring System Turnup: NTP-040

Establish Single-Homed OC-3 Access
via FT-2000 OC-48 Backbone Ring System Turnup: NTP-047

Establish Stand Alone FiberReach Access
via DDM-2000 OC-3 Host Shelf System Turnup: NTP-045

Fan Shelf Alarm — Clear Trouble Clearing: TAP-118

Fan Shelf Assembly — Test Detailed Level Procedure: DLP-539

Fan Shelf Filter — Replace Detailed Level Procedure: DLP-540

Fuse — Remove –48V DC User Panel Detailed Level Procedure: DLP-555

Generic Software Version Identification —
Retrieve Detailed Level Procedure: DLP-531

FIND YOUR JOB IN THE LIST BELOW THEN GO TO

Install BBG8/BBG8B SYSCCTL — New Shelf Only BBG9 OHCTL Installed	Detailed Level Procedure: DLP-549
Install New Software Generic Program — In-Service System Local Shelf Download	Detailed Level Procedure: DLP-532
Install Software Generic Program — New Shelf Installation Only BBG8/BBG8B SYSCCTL and BBG9 OHCTL Installed	Detailed Level Procedure: DLP-561
Install New Software Generic Program — In-Service System Remote Shelf Download	Detailed Level Procedure: DLP-562
Login — Establish Remote	Detailed Level Procedure: DLP-522
Maintenance Philosophy	Trouble Clearing: TAD-100
Major (MJ) Alarm — Clear	Trouble Clearing: TAP-102
Minor (MN) Alarm — Clear	Trouble Clearing: TAP-112
Modem — Condition and Connect	Detailed Level Procedure: DLP-526
Obtain Equipment, Check Software, Prepare and Connect PC for Software Download	Detailed Level Procedure: DLP-566
Option Settings — Check (Set)	Detailed Level Procedure: DLP-513
Circuit Pack — Replace (Reference Only)	Detailed Level Procedure: DLP-523
Power Minor (PMN) Alarm — Clear	Trouble Clearing: TAP-104

FIND YOUR JOB IN THE LIST BELOW THEN GO TO

Remote Login — Establish	Detailed Level Procedure: DLP-522
Replace Circuit Pack (Reference Only)	Detailed Level Procedure: DLP-523
Service — Convert DS1 to DS3 Group Service	Circuit Order: NTP-009
Service — Convert DS1 to EC-1 Group Service	Circuit Order: NTP-038
Service — Convert DS3 to DS1 MXRVO Group Service	Circuit Order: NTP-010
Service — Discontinue DS1	Circuit Order: NTP-011
Service — Discontinue DS3	Circuit Order: NTP-012
Service — Discontinue EC-1	Circuit Order: NTP-036
Service — Establish Initial End-to-End EC-1 — Group Equipped But Not In Service	System Turnup: NTP-034
Service — Establish Initial End-to-End DS1 — Group Equipped But Not In Service	System Turnup: NTP-004
Service — Establish Initial End-to-End DS3 — Group Equipped But Not In Service	System Turnup: NTP-005
Shelf — Add DDM-2000 OC-3 — Linear or Hub Configuration Shelf Added in Middle of Optical Span	Circuit Order: NTP-014
Shelf — Add DDM-2000 OC-3 and/or New Optical Span— Shelf and/or Span Added as Extension to DDM-2000 OC-3 Ring Hub, Point-to-Point, Linear Add/Drop	Circuit Order: NTP-015

FIND YOUR JOB IN THE LIST BELOW THEN GO TO

Shelf — Equip DDM-2000 EC-1 Electrical Multiplexer —
Looped Back System Turnup: NTP-031

Shelf — Equip DDM-2000 OC-3 (Looped Back) System Turnup: NTP-016

Software Generic Program — Install —
In-Service System
Local Shelf Download Detailed Level Procedure: DLP-532

Software Generic Program — Install —
New Shelf Installation
Only BBG8/BBG8B SYSCCTL and
BBG9 OHCTL Installed Detailed Level Procedure: DLP-561

Software Generic Program — Install —
In-Service System
Remote Shelf Download Detailed Level Procedure: DLP-562

Software Version ID — Retrieve Detailed Level Procedure: DLP-531

Span — Add OC-3 Shelf and/or New Optical Span —
Hub, Point-to-Point, Linear Add/Drop Configuration Circuit Order: NTP-015

Span — OC-3 Optical — Discontinue Circuit Order: NTP-019

Sync Messaging —
Change Kbyte to Sbyte Detailed Level Procedure: DLP-565

System Backup and Restore — CPro-2000 Operation: NTP-002

System — Establish End-to-End DDM-2000 OC-3 —
OC-3 Point-to-Point System Turnup: NTP-003

System — Establish End-to-End DDM-2000 OC-3 —
OC-3 Optical Fiber Spans
Linear or Hub Configuration System Turnup: NTP-017

FIND YOUR JOB IN THE LIST BELOW THEN GO TO

System — Establish End-to-End DDM-2000 OC-3 — Optical Fiber Spans Path Switched Ring Network	System Turnup: NTP-022
Telemetry — Upgrade TBOS/Parallel to TL1/X.25	Detailed Level Procedure: DLP-538
Test LEDs	Detailed Level Procedure: DLP-509
Test (Accept) DDM-2000 OC-3 Multiplexer (Looped Back)	Acceptance: NTP-003
Test (Accept) End-to-End System	Acceptance: NTP-004
Test (Accept) DDM-2000 OC-3 Multiplexer (Equipped) — Overview	Acceptance: NTP-002
Timing — Upgrade	Detailed Level Procedure: DLP-535
Trouble Report — Clear	Trouble Clearing: TAP-105
Upgrade Timing	Detailed Level Procedure: DLP-535
Upgrade TBOS/Parallel Telemetry to TL1/X.25	Detailed Level Procedure: DLP-538
Upgrade (Convert) DDM-2000 OC-3 Shelf to DS1 Add/Drop OC-3 Shelf	Circuit Order: NTP-020
Upgrade (Convert) DDM-2000 OC-3 System to OC-12 System Linear or Hub Configuration	Circuit Order: NTP-021

FIND YOUR JOB IN THE LIST BELOW THEN GO TO

Upgrade DDM-2000 OC-3 Point-to-Point
to Path Switched Ring
In Service Circuit Order: NTP-029

Upgrade DDM-2000 OC-3 Point-to-Point
to Path Switched Ring
Out of Service Circuit Order: NTP-030

Upgrade DDM-2000 OC-3 Add/Drop
Network to Path Switched Ring Circuit Order: NTP-039

Upgrade DDM-2000 OC-3/FT-2000 Dual Ring
Interworking Network from EC-1 to OC-3
In Service Circuit Order: NTP-042

Upgrade DDM-2000 OC-3/OC-12 Dual Ring
Interworking Network from EC-1 to OC-3/IS-3
In Service Circuit Order: NTP-051

Upgrade DDM-2000 OC-3 Ring Network to
OC-12 Ring Network Using OC-3 Shelves
In Service Circuit Order: NTP-023

Upgrade DDM-2000 OC-3 Ring Network to
OC-12 Ring Network Using OC-3/OC-12 Shelves
In Service Circuit Order: NTP-024

Upgrade DDM-2000 OC-3 Release 6 to Release 8 or
Release 7.1 or 7.2 to Release 9 or 11
System In Service Circuit Order: NTP-046

Upgrade DDM-2000 OC-12 Ring by Removing OC-12 Shelf
and Replacing with Existing Single-Homed OC-3 Shelf
In Service Circuit Order: NTP-055

Numerical List of TOP Procedures

Table 1. Numerical List of TOP Procedures (Note)

Acceptance Tab

IXL-001	Acceptance Task Index
NTP-002	Overview of Acceptance (Test) Procedures for DDM-2000 OC-3 Multiplexer (Equipped)
NTP-003	Test (Accept) DDM-2000 OC-3 Multiplexer Shelf (Looped-Back)
NTP-004	Test (Accept) End-to-End DDM-2000 OC-3 System (Network)

System Turnup/Circuit Order Tab

IXL-001	Task Index System Turnup/Circuit Order
NTP-002	Establish DDM-2000 OC-3c (STS-3c) Service
NTP-003	Establish End-to-End System DDM-2000 OC-3 Point-to-Point
NTP-004	Establish Initial End-to-End DS1 Service Group Equipped But Not In-Service
NTP-005	Establish Initial End-to-End DS3 Service Group Equipped But Not In Service
NTP-006	Add New DS1 Service Group Already In Service
NTP-007	Add New DS3 Group for DS3 Service System In Service
NTP-008	Add New MXRVO Group for DS1 Service System In Service
NTP-009	Convert DS1 Group Service to DS3 Group Service
NTP-010	Convert DS3 Group Service to DS1 MXRVO Group Service
NTP-011	Discontinue End-to-End DS1 Service
NTP-012	Discontinue End-to-End DS3 Service
NTP-013	Establish EC-1 Dual Ring Interworking DDM-2000 OC-3 to OC-12 or FT-2000 Ring Configurations OC-3 Optical Fiber Spans
NTP-014	Add DDM-2000 OC-3 Shelf Linear or Hub Configuration Shelf Added in Middle of Optical Span
NTP-015	Add DDM-2000 OC-3 Shelf and/or New Optical Span Shelf and/or Span Added as Extension to DDM-2000 OC-3 Ring, Hub, Point-to-Point, Linear Add/Drop Configuration
NTP-016	Equip DDM-2000 OC-3 Shelf (Looped-Back)
NTP-017	Establish End-to-End DDM-2000 OC-3 System OC-3 Optical Fiber Spans Linear or Hub Configuration

See note at end of table.

Table 1. Numerical List of TOP Procedures (Contd) (Note)

System Turnup/Circuit Order Tab (Contd)

NTP-018	Establish OC-3 Optical Span Extension Between DDM-2000 OC-12 Ring and DDM-2000 OC-3
NTP-019	Discontinue OC-3 Optical Span Extension
NTP-020	Convert (Upgrade) DDM-2000 OC-3 Shelf to DS1 Add/Drop Shelf
NTP-021	Convert (Upgrade) DDM-2000 OC-3 System to OC-12 System Linear and Hub Configuration
NTP-022	Establish End-to-End DDM-2000 OC-3 System Optical Fiber Spans Path Switched Ring Network
NTP-023	Upgrade DDM-2000 OC-3 Ring Network to OC-12 Ring Network Using OC-3 Shelves In Service
NTP-024	Upgrade DDM-2000 OC-3 Ring Network to OC-12 Ring Network Using OC-3/OC-12 Shelves In Service
NTP-025	Establish Initial HDSL Service Group Equipped But Not In Service
NTP-026	Add New DDM-2000 OC-3, OC-12, or FiberReach Node (Shelf) To DDM-2000 OC-3/OC-12 Path Switched Ring
NTP-027	Discontinue DDM-2000 Node (Shelf) From DDM-2000 OC-3 Path Switched Ring Network
NTP-028	Add New HDSL Service Group Already In Service
NTP-029	Upgrade DDM-2000 OC-3 Point-to-Point Network to Path Switched Ring In Service
NTP-030	Upgrade DDM-2000 OC-3 Point-to-Point to Path Switched Ring Out of Service
NTP-031	Equip DDM-2000 EC-1 Electrical Multiplexer Shelf Looped Back
NTP-032	Add New STS1E High Speed Group for DS1 Service EC-1 Electrical Multiplexer Shelf System In Service
NTP-033	Discontinue STS1E High Speed Group EC-1 Electrical Multiplexer Shelf
NTP-034	Establish Initial Low Speed EC-1 Interface Group Equipped But Not In Service
NTP-035	Add New STS1E Low Speed Group for EC-1 Interface System In Service
NTP-036	Discontinue EC-1 Interface
NTP-037	Discontinue End-to-End HDSL Service

See note at end of table.

Table 1. Numerical List of TOP Procedures (Contd) (Note)

System Turnup/Circuit Order Tab (Contd)

NTP-038	Convert DS1 Group Service to EC-1 Group Service
NTP-039	Upgrade DDM-2000 OC-3 Add/Drop Network to Path Switched Ring
NTP-040	Establish Single-Homed OC-3 Access via DDM-2000 OC-12 Backbone Ring
NTP-041	Establish OC-3/IS-3 Dual Ring Interworking DDM-2000 OC-3 to OC-12 or FT-2000 Ring Configurations OC-3 Optical Fiber Spans
NTP-042	Upgrade DDM-2000 OC-3/FT-2000 Dual Ring Interworking Network from EC-1 to OC-3 In Service
NTP-043	Establish Single-Homed FiberReach Access via DDM-2000 OC-3 Backbone Ring
NTP-044	Establish Dual-Homed FiberReach Access via DDM-2000 OC-3 Backbone Ring
NTP-045	Establish Stand-Alone FiberReach Access via DDM-2000 OC-3 Host Shelf
NTP-046	Upgrade DDM-2000 OC-3 Release 6 to Release 8 or Release 7.1 or 7.2 to Release 9 or 11 System In Service
NTP-047	Establish Single-Homed OC-3 Access via FT-2000 OC-48 Backbone Ring
NTP-048	Establish Dual-Homed OC-3 Access via FT-2000 OC-48 Backbone Ring
NTP-049	Establish OC-3 Optical Span Linear Extension Extension Added Between FT-2000 and DDM-2000 OC-3
NTP-050	Establish Dual-Homed OC-3 Access via DDM-2000 OC-12 Backbone Ring
NTP-051	Upgrade DDM-2000 OC-3/OC-12 Dual Ring Interworking Network from EC-1 to OC-3/IS-3 In Service
NTP-052	Establish FiberReach Access via DDM-2000 OC-3 Release 9 and Later Host Shelf OC-3 Release 8 Linear Configuration
NTP-053	Establish Initial End-to-End DS3-to-DS1 Service TMUX Group Equipped But Not In Service
NTP-054	Add New TMUX Group for DS3 Service System In Service
NTP-055	Upgrade DDM-2000 OC-12 Ring by Removing OC-12 Shelf and Replacing with Existing Single-Homed OC-3 Shelf In Service

See note at end of table.

Operations Tab

IXL-001	Task Index Operations
NTP-002	CPro-2000 System Backup and Restore

Trouble Clearing Tab

IXL-001	Task Index Trouble Clearing
TAD-100	Maintenance Philosophy

Table 1. Numerical List of TOP Procedures (Contd) (Note)

Trouble Clearing Tab (Contd)

TAP-101	Clear Critical (CR) Alarm
TAP-102	Clear Major (MJ) Alarm
TAP-103	Clear Multiple Failure
TAP-104	Clear Power Minor (PMN) Alarm
TAP-105	Clear Trouble Report
TAP-106	Isolate and Clear Failure
TAP-107	Clear Far End Alarm Using Craft Interface Terminal (CIT)
TAP-108	Clear Obscure Failure Condition
TAP-109	Clear Abnormal (ABN) Indication
TAP-110	Clear Flashing FAULT LED Indication
TAP-111	Clear OLIU or Fiber Trouble — Linear Extensions/Configurations
TAP-112	Clear Minor (MN) Alarm
TAP-113	Clear Obscure Minor (MN) Alarm
TAP-114	Clear External Minor Alarm at RT
TAP-115	Clear LED Test Trouble
TAP-116	Clear Trouble During Program Upgrade
TAP-117	Clear NE ACTY/FE ACTY Alarm Only
TAP-118	Clear Fan Shelf Alarm
TAP-119	Clear OLIU or Fiber Trouble — Path Protected Ring
TAP-120	Clear STS/VT AIS Alarm Conditions
TAP-121	Clear Brownout Condition — Flashing L in FE Display

Detailed Level Procedures (DLP) Tab

DLP-500	Install OHCTL Circuit Pack New Shelf
DLP-501	Replace SYSCTL In Service
DLP-502	Install STS1E Circuit Packs

See note at end of table.

Table 1. Numerical List of TOP Procedures (Contd) (Note)

Detailed Level Procedures (DLP) Tab (Contd)

DLP-503	Install TGS Circuit Packs
DLP-504	Install OLIU Circuit Packs
DLP-505	Connect Optical Loop
DLP-506	Install MXRVO Circuit Packs
DLP-507	Install DS3/TMUX Circuit Packs
DLP-508	Install DS1/DS1PM Circuit Packs
DLP-509	Perform LED Test
DLP-510	Perform DS1 Transmission Test
DLP-511	Perform DS3 Transmission Test
DLP-512	Activate Optional System Features Using CIT
DLP-513	Set Circuit Pack Options
DLP-514	Perform Optical Fiber Connections and Verification of Optical Facility
DLP-515	Perform End-to-End Optical Line Test
DLP-516	Check Local Office Alarms
DLP-517	Check Parallel Telemetry
DLP-518	Check Telemetry Byte-Oriented Serial (TBOS) Telemetry
DLP-519	Test Protection Switching Function
DLP-520	Condition DS1/DS1PM Circuit Pack/Port for New DS1 Service
DLP-521	Connect CIT and Establish Session
DLP-522	Establish Remote Login
DLP-523	Replace Circuit Pack
DLP-524	Check -48 V DC Office Battery
DLP-525	Perform Automatic End-to-End OC-3 Line Test
DLP-526	Condition and Connect Modems to Establish Communication From Remote CIT Location
DLP-527	Clean Optical Fibers, Connectors, and Lightguide Buildouts (LBOs)
DLP-528	Perform Automatic Local Transmission Test
DLP-529	Perform Automatic Cross-Connect Wiring Test
DLP-530	Operate FE SEL Pushbutton on SYSCTL
DLP-531	Retrieve Generic Software Version ID
DLP-532	Install New Software Generic Program In-Service System Local Shelf Download
DLP-533	Introduction to the Personal Computer (PC)
DLP-534	Copy Diskettes and Make Backups
DLP-535	Upgrade BBF2 TGS To BBF2B TGS
DLP-536	Perform Test of RT Batteries Using 197A BATTERY LOAD TEST SET
DLP-537	Check 197A BATTERY LOAD TEST SET

See note at end of table.

Table 1. Numerical List of TOP Procedures (Contd) (Note)

Detailed Level Procedures (DLP) Tab (Contd)

DLP-538	Upgrade Telemetry Byte-Oriented Serial (TBOS)/Parallel Telemetry to TL1/X.25
DLP-539	Test ED-8C733-30, G7 Fan Shelf
DLP-540	Replace ED-8C733-30, G4 Fan Filter
DLP-541	Enable or Disable System and/or Edit, Delete, or Enter a User's Login
DLP-542	Replace Existing OLIU With Different Type OLIU
DLP-543	Change Timing Mode on TGS Circuit Pack
DLP-544	Perform OC-3c (STS-3c) Transmission Test
DLP-545	Make VT1.5 (DS1) or STS1 (DS3) Cross-Connections Using CIT Linear or Add/Drop Configuration
DLP-546	Make VT1.5 (DS1) or STS1 (DS3) Cross-Connections Using CIT Single OC-3 Ring Configuration
DLP-547	DDM-2000 Receiver Sensitivity Test
DLP-548	Replace Defective Fan Pack
DLP-549	Install BBG8/BBG8B SYSCCTL New Shelf Only BBG9 OHCTL Installed
DLP-550	Make VT1.5 (DS1) or STS1 (DS3) Cross-Connections Using CIT Dual Ring Interworking Configuration Release 9 and Later
DLP-551	Replace DDM-2000 OC-3 Shelf User Panel Out of Service
DLP-552	Install/Remove Lightguide Buildout
DLP-553	Perform DS3 Transmission Test Dual Ring Interconnection
DLP-554	Perform DS1 Transmission Test Dual Ring Interconnection
DLP-555	Remove -48 V DC User Panel Fuse
DLP-556	Perform End-to-End OC-1 Optical Line Test
DLP-557	Make VT1.5 (DS1) or STS1 Cross-Connections Using CIT Single/Dual Homing OC-3/OC-1 Ring Configuration
DLP-558	Make VT1.5 (DS1) or STS1 Cross-Connections Using CIT Stand Alone OC-3/OC-1 Ring Configuration
DLP-559	Make Cross-Connections Using CIT Single/Dual Homing and OC-3 Extensions OC-48/OC-3 Configurations
DLP-560	Make Cross-Connections Using CIT Single/Dual Homing OC-12/OC-3 Ring Configuration

See note at end of table.

Table 1. Numerical List of TOP Procedures (Contd) (Note)

Detailed Level Procedures (DLP) Tab (Contd)

DLP-561	Install Software Generic Program New Shelf Installation Only BBG8/BBG8B SYSCTL and BBG9 OHCTL Installed
DLP-562	Install Software Generic Program In-Service System Remote Shelf Download
DLP-563	Provision STS-1 Path Trace
DLP-564	Establish New Alarm Group System In-Service
DLP-565	Sync Messaging - Change Kbyte to Sbyte
DLP-566	Obtain Equipment, Check Software, Prepare and Connect Personal Computer (PC) for Software Download
DLP-567	Install BBF8 HDSL Circuit Packs

Note: Table 1 is provided as a reference only, and should not be used alone in finding instructions for performing tasks.

CPro-2000 Graphical User Interface and Provisioning Tool

The CPro-2000 Graphical User Interface and Provisioning Tool is a *Microsoft[†] Windows[†]* based user interface that can optionally be used with the DDM-2000 OC-3 Multiplexer. The tool simplifies and mechanizes administration, maintenance, and provisioning operations for ring networks. With the tool a user can:

- Display and control cross-connections at each network element (NE) in a subnetwork, and the entire subnetwork, including dual ring interworking (DRI) (for example, drop and continue paths at DRI nodes).
- Obtain and display graphical images of the subnetwork configuration, equipment, and cross-connections.
- Perform an analysis of the subnetwork to detect provisioning errors.
- Retrieve and store data about a selected NE.
- Backup and restore provisioning information including cross-connections, DS1 port options, DS3 port options, EC-1 port options, and OC-3 line options.

[†] Registered trademark of Microsoft Corporation.

In response to a user, the tool automatically complies and sends all the necessary commands to perform a task. If the user is provisioning cross-connections, for example, the tool automatically prevents provisioning errors by comparing the new provisioning information with the subnetwork inventory. For more information, see 190-523-1xx (release dependent), *CPro-2000 User Manual*.

Integrated Transport Management (ITM) SubNetwork Controller (SNC)

ITM SNC is an element management system that supports SONET NEs such as the Lucent Technologies' DDM-2000, FT-2000, *SLC*[‡]-2000, and the Fujitsu[‡] Lightwave Multiplexer (FLM). ITM SNC provides fault, provisioning, configuration, and security management functions via a Graphical User Interface (GUI). Through these functions, ITM SNC is able to support communication multiplexing or concentration, to provide network security, and to record all database changes. ITM SNC also provides a cut-through capability, allowing the ITM SNC user to access an NE through its native command set.

ITM SNC operates as an enhanced graphical tool and as a general configuration management aid. It provides NE, port, cross-connection, and path provisioning, as well as flowthrough from provisioning operations systems (OSs) to NEs. ITM SNC also provides fault management through subnetwork alarm and event preprocessing prior to sending fault information to a network surveillance system such as the Network Monitoring and Analysis-Facility (NMA-F). For more information, see 107-564-2xx (release dependent), *Integrated Transport Management (ITM) SubNetwork Controller (SNC), User Guide* and 107-564-2xx (release dependent), *Integrated Transport Management SubNetwork Controller, System Administration Guide*.

‡ Registered trademark of Fujitsu Limited.

Task Index Acceptance

FIND YOUR JOB IN THE LIST BELOW THEN GO TO

Acceptance Procedures (Shelf Equipped)

⇒ **NOTE:**

The following procedures are for use in testing the DDM-2000 OC-3 Multiplexer system after another organization has equipped it. The procedures test the DDM-2000 OC-3 system *after* all circuit packs have been installed and the shelf is looped back or after a system has been established end-to-end. They are not intended to be used for initial system turnup or in establishing an end-to-end system. System Turnup procedures are found in this manual under the System Turnup/Circuit Order tab.

Test (Accept) DDM-2000 OC-3 Multiplexer (Equipped) —

Overview Acceptance: NTP-002

Test (Accept) DDM-2000 OC-3 Multiplexer Shelf
(Looped Back)

Acceptance: NTP-003

Test (Accept) End-to-End DDM-2000 OC-3

System (Network) Acceptance: NTP-004

Acceptance Procedures (Shelf Unequipped)

⇒ **NOTE:**

Procedures for installing and testing DDM-2000 OC-3 system bays, shelves, and cables are found in 363-206-204, *DDM-2000 OC-3 Multiplexer Installation Manual*.

Overview of Acceptance (Test) Procedures for DDM-2000 OC-3 Multiplexer (Equipped)

DO ITEMS BELOW IN ORDER LISTED FOR DETAILS, GO TO

- A.  **WARNING:**
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:**
*DDM-2000 circuit packs contain static sensitive components which can be damaged by electrostatic discharge. A static ground wrist strap must be worn when handling the circuit packs. See electrostatic discharge considerations in **Trouble Clearing: TAD-100**.*

-  **NOTE:**
This procedure is an overview of acceptance procedures that may be performed on the DDM-2000 OC-3 Multiplexer. It assumes that the DDM-2000 OC-3 shelf or system has been installed and equipped with circuit packs. It also assumes that the system is being tested (accepted) by an organization that *did not* install it. This procedure is for reference only. It contains a list of items that may be performed in doing acceptance of a shelf or system and is not intended to be done in sequence.

Verify that office battery has been applied to the shelf.
(PWR ON LED lighted on User Panel.)

DLP-524

DO ITEMS BELOW IN ORDER LISTED FOR DETAILS, GO TO

B. Set (check) circuit pack option switch settings, if required. **DLP-513**

C. Test (accept) DDM-2000 OC-3 Multiplexer (looped back).
[Acceptance: NTP-003]

D. Test (accept) end-to-end DDM-2000 OC-3 System
[Acceptance: NTP-004]

E. If required, perform DS1 transmission tests on each DS1
port:

a. Linear or Single Ring Configuration	DLP-510
b. Dual Ring (DRI) Configuration	DLP-554
c. Single/Dual Homing Configuration	DLP-510
-

F. If required, perform DS3 transmission tests on each DS3
port:

a. Linear or Single Ring Configuration	DLP-511
b. Dual Ring (DRI) Configuration	DLP-553
c. Single/Dual Homing Configuration	DLP-511
-

G. If required, perform OC-3c transmission tests. **DLP-544**

DO ITEMS BELOW IN ORDER LISTED FOR DETAILS, GO TO

H. Verify/set option settings using **rtrv-ne/set-ne:**
commands.

I. Verify/set option settings using **rtrv-()/set-():** **DLP-512**
commands.

Test (Accept) DDM-2000 OC-3 Multiplexer Shelf (Looped-Back)

DO ITEMS BELOW IN ORDER LISTED FOR DETAILS, GO TO

1. **WARNING:**

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:

*DDM-2000 circuit packs contain static sensitive components which can be damaged by electrostatic discharge. A static ground wrist strap must be worn when handling the circuit packs. See electrostatic discharge considerations in **Trouble Clearing: TAD-100**.*

 NOTE 1:

This test is to be performed if the DDM-2000 is being tested or accepted by an organization that did not install it.

 NOTE 2:

It is assumed that the DDM-2000 is installed, powered, equipped, and free of alarms. If it was not left in that condition, notify the organization that installed the DDM-2000 that they have not completed the installation or use **Trouble Clearing: IXL-001**.

 NOTE 3:

If the DDM-2000 fails to respond in the indicated manner, you should refer the trouble to the organization that installed the DDM-2000 or use **Trouble Clearing: IXL-001**.

DO ITEMS BELOW IN ORDER LISTED FOR DETAILS, GO TO

⇒ NOTE 4:

The **rtrv-()** commands (**rtrv-ne**, **rtrv-oc3**, **rtrv-sync**, or **rtrv-t1**) may be used to retrieve switch settings except for LBO settings on **DS1** and **DS3** circuit packs.

Verify correct circuit packs have been installed and option switches have been set correctly, if not already performed.

DLP-513

2. ▲ CAUTION:

*Before looping a shelf, verify/set DSNE parameter of the **rtrv-ne:/set-ne:** command to **no**. This parameter will be set as required when the shelf is integrated into a network. Only one DSNE is allowed in a network.*

⇒ NOTE 1:

An "inconsistent DCC values" alarm will occur when the **OLIUs** are looped back. To clear the alarm during a fiber loopback, use the **set-fecom:address:com=disable** command to disable the DCC.

⇒ NOTE 2:

An "AGNE communication failure" alarm will also occur when the **OLIUs** are looped back. This alarm occurs because at least one shelf in the network must be set as an AGNE but the default for the shelf is AGNE=**no**. To clear the alarm during a fiber loopback, use the **set-ne:tid:agne=yes** command.

Install **OLIU** optical loops between their respective **IN** and **OUT** optical connectors.

DLP-505

DO ITEMS BELOW IN ORDER LISTED FOR DETAILS, GO TO

3. **NOTE 1:**

If the **ACO** button is depressed longer than 2 seconds, the **SYSCTL** display will scroll through the software version code and all LEDs will remain lighted until the code is displayed.

 NOTE 2:

The proper release of software must be installed for this test to work. If software has not been installed, the letter "P" will be displayed in the seven-segment **FE ID** display. If the software in the **SYSCTL** is incompatible with the software in the **OHCTL** or with the shelf configuration, the letter "d" or "C" will be displayed in the 7-segment **FE ID** display. If the proper release of software has not been installed or if the **SYSCTL** and **OHCTL** have incompatible software, refer the problem to the organization that installed the shelf.

Depress and hold the **ACO** pushbutton on the User Panel. Verify that all User Panel and circuit pack LEDs and the **SYSCTL** display light. Verify proper version of software is installed.

DLP-509

-
4. Release the **ACO** pushbutton. Verify that all LEDs on the DDM-2000 go off.
-

DO ITEMS BELOW IN ORDER LISTED FOR DETAILS, GO TO

5.  **CAUTION:**
*The **init-sys:all** command should **NOT** be used on an in-service system.*

 **NOTE 1:**
A craft interface terminal (CIT) is required to access the optional features of the DDM-2000.

 **NOTE 2:**
During installation and/or initial testing, provisionable parameters may have been set which need to be reset to their default values. STS1 and/or VT1.5 cross-connections may have been made which should be deleted before the system is placed in service. The **init-sys:all** command may be used to reset all provisionable parameters and cross-connections to default values.

 **NOTE 3:**
An "inconsistent DCC values" alarm will occur when the **init-sys:all** command is executed. To clear the alarm, use the **set-fecom:address:com=disable** command to disable the DCC.

 **NOTE 4:**
An "AGNE communication failure" alarm will also occur when the **init-sys:all** command is executed because the AGNE parameter of the **set-ne:** command is set to **no** again. To clear the alarm, use the **set-ne:tid:agne=yes** command.

If required, use the command **init-sys:all** to reset provisionable parameters to default values.

DO ITEMS BELOW IN ORDER LISTED FOR DETAILS, GO TO

6. ➤ **NOTE 1:**

Automatic turnup tests using the **test-auto** command are available for linear releases only. Automatic local and DSX turnup tests will **not** operate properly if a local DDM-2000 shelf is provisioned for line-timed mode. The timing mode must be set to external or free running (**DLP-513**) before executing the **test-auto:** command. The timing mode should be returned to the correct state after these tests have been run. For ring releases, perform the DS1 or DS3 transmission tests.

➤ **NOTE 2:**

These procedures assume that the DDM-2000 has been connected to the DSX-() cross-connect points, as required. DS1 and/or DS3 circuit packs must be inserted, as required, before performing these tests.

➤ **NOTE 3:**

The automatic turnup tests, using **test-auto** commands, expect the default internal STS-1 cross-connections to be in place. If the cross-connections are not in place or have been deleted, all **MXRVO** and **DS3** circuit packs will fail when the automatic test is run.

Perform transmission and cross-connect tests for each group, as required. Refer any failures to organization that installed the DDM-2000.

Ring Releases:

- A. DS1 Transmission/Cross-Connect Test
- B. DS3 Transmission/Cross-Connect Test

DLP-510
DLP-511

DO ITEMS BELOW IN ORDER LISTED FOR DETAILS, GO TO

Linear Releases:

A. Automatic Local (looped back) Transmission Test	DLP-528
B. Automatic Cross-Connect Wiring Test	DLP-529
-

7. Test ED-8C733-30, G7 fan shelf, if installed.	DLP-539
-

8.  **NOTE:**
A craft interface terminal (CIT) is required to access the optional features of the DDM-2000 OC-3 Multiplexer. Refer to the Commands and Reports section and use the **rtrv-()** commands to determine the existing options.

Activate optional features that you require at this time.	DLP-512

9. After each shelf in the network has been tested, the DDM-2000 will be ready for end-to-end testing.
[Acceptance: NTP-004]
-

Test (Accept) End-to-End DDM-2000 OC-3 System (Network)

DO ITEMS BELOW IN ORDER LISTED FOR DETAILS, GO TO

1.  **WARNING:**
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:**
*DDM-2000 circuit packs contain static sensitive components which can be damaged by electrostatic discharge. A static ground wrist strap must be worn when handling the circuit packs. See electrostatic discharge considerations in **Trouble Clearing: TAD-100**.*

 -  **NOTE 1:**
This test is to be performed if the DDM-2000 is being tested or accepted by an organization that did not install it.

 -  **NOTE 2:**
It is assumed that the DDM-2000 is installed and running in an end-to-end network configuration and each shelf has previously been tested in a looped-back configuration.

 -  **NOTE 3:**
If the DDM-2000 fails to respond in the indicated manner, refer the trouble to the organization that installed the DDM-2000 or use **Trouble Clearing: IXL-001**.
-

DO ITEMS BELOW IN ORDER LISTED FOR DETAILS, GO TO

2.  **CAUTION:**
*The "**init-sys:all**" command should NOT be used on an in-service system.*

 **NOTE 1:**
During installation and/or initial testing, provisionable parameters may have been set which need to be reset to default values. STS-1 and/or VT1.5 (DS1) cross-connections may have been made which should be deleted before the system is placed in service. The "**init-sys:all**" command will reset all provisionable parameters and cross-connections to default values. If parameters have already been set to their proper values and you are sure they are set correctly, you may not want to perform this step. Some parameters will have to be reset later before service is established.

 **NOTE 2:**
An "inconsistent DCC values" alarm will occur when the "**init-sys:all**" command is executed, if fecom has not been enabled at both ends of the system.

 **NOTE 3:**
A network requires that at least one shelf be designated as an AGNE. An "AGNE communication failure" alarm will occur when the "**init-sys:all**" command is executed because the AGNE parameter of the "**set-ne:**" command is set to **no** again. The alarm will clear when you use the "**set-ne:tid:agne=yes**" command to designate an AGNE.

If required, use the "**init-sys:all**" command to reset provisionable parameters to default values.

DO ITEMS BELOW IN ORDER LISTED FOR DETAILS, GO TO

3. **NOTE 1:**

If external timing mode is specified but the timing reference was not available at shelf turnup, the **TGS** option switches may not be set correctly. The specified timing mode must be set on the **TGS** circuit packs.

 NOTE 2:

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.

 NOTE 3:

If external timing is selected and the **NE ACTY** LED remains lighted after the **TGS** circuit pack is reinserted, use the CIT and the "**rtrv-sync**" command to check the operational mode of the system. If the mode is Holdover instead of External, check that the incoming timing references are connected. Also check Mode Switching (revertive or nonrevertive) and the external DS1 Line Code/Format switch settings.

Use "**rtrv-sync**" command at each node to verify proper timing options. At least one node in the network should be set for *DS1 External* or *Free Running* unless timing is obtained from an optical interface (**FUNCTION UNITS C**) to another portion of the network. Verify **TGS** circuit pack options are set correctly [**DLP-513**].

DO ITEMS BELOW IN ORDER LISTED FOR DETAILS, GO TO

4. **NOTE 1:**

The "**set-ne:**" command designates a shelf as the directory service network element (DSNE). **One**, and only one, shelf in the subnetwork **must** be provisioned as a DSNE. If there is no DSNE in the network, all DCC communication can become disabled. If more than one shelf is provisioned as DSNE, a "duplicate DSNE" alarm will occur. Multiple GNEs are allowed and a shelf is automatically provisioned as a GNE when connected to an active X.25 interface.

 NOTE 2:

Shelves may be designated as an alarm gateway network element (AGNE) and assigned an alarm group number. (Default alarm group number is 255.) At least one AGNE is required per alarm group. One primary AGNE and one backup per alarm group is recommended. For a network greater than 16 nodes, the AGNE and TL1 GNE should be on separate nodes.

Use the "**rtrv-ne:**" and "**set-ne:**" commands to verify/set ONE shelf as the DSNE. Use the "**rtrv-ne:**" and "**set-ne:**" commands to verify/set the AGNE(s) and alarm group number, as required.

DO ITEMS BELOW IN ORDER LISTED FOR DETAILS, GO TO

5. Determine the optical loss of the optical facility from office records or by making the required measurements.

-
6.  **NOTE:**
Only **21G/21G-U OLIUs** have option switches. There are no option switches on other OC-3 **OLIUs**.

If **21G/21G-U OLIUs** are installed, ensure **HIGH/LOW POWER** option switches are set to agree with the loss of the optical facility.

DLP-513

-
7. Use "**rtrv-fecom:**" and "**set-fecom:com=enabled**" commands to verify/enable the DCC channel between all nodes, as required.

-
8.  **NOTE:**
The "**rtrv-map-network**" and "**rtrv-map-neighbor**" commands may be used to retrieve a map of the network, including the systems in the network and how they are connected.

Ensure all DDM-2000 OC-3 shelves (**OLIUs**) in the network have been properly connected to the optical facility. Verify the integrity of each optical span.

DLP-514

DO ITEMS BELOW IN ORDER LISTED FOR DETAILS, GO TO

9.  **NOTE 1:**
If Kbyte/Sbyte (sync messaging) is enabled for any node in a system, it **must** be enabled at all nodes of the system.
-  **NOTE 2:**
The "**rtrv-oc3:**" or "**rtrv-oc12:**" command retrieves the "OC-3 Line Provisioning Report" or "OC-12 Line Provisioning Report". This report displays the provisioned configuration of OC-3 or OC-12 lines. See the "Commands and Reports" section of this manual for a description of the "**rtrv-oc3:**" or "**rtrv-oc12:**" command format.

Use the "**rtrv-oc3:**" or "**rtrv-oc12:**" command to obtain the "OC-3 Line Provisioning Report" or "OC-12 Line Provisioning Report" and verify if Kbyte is enabled or disabled. Use the "**set-oc3:**" or "**set-oc12:**" command to enable or disable the Kbyte/Sbyte parameter, as required.

DO ITEMS BELOW IN ORDER LISTED FOR DETAILS, GO TO

10.  **NOTE 1:**
If Sync Autoreconfiguration is enabled, Kbyte/Sbyte must also be enabled.
-  **NOTE 2:**
If Sync Autoreconfiguration is enabled at any line-timed node in a linear system, it **must** be enabled at all line-timed nodes of a linear system.
-  **NOTE 3:**
The "**rtrv-sync:**" command retrieves the "Synchronization Report". This report displays the provisioning and operational information on the synchronization attributes of the DDM-2000. See the "Commands and Reports" section of this manual for a description of the "**rtrv-sync:**" command format.

Use the "**rtrv-sync:**" command to obtain the "Synchronization Report" and verify if Sync Autoreconfiguration is enabled or disabled. Use the "**set-sync:**" command to enable or disable the Sync Autoreconfiguration parameter, as required.

DO ITEMS BELOW IN ORDER LISTED FOR DETAILS, GO TO

11. **NOTE 1:**

The section data communication channel (DCC), used for far end communications, must be enabled at each network element (shelf) for the end-to-end line test to work. Default condition for the DCC channel is "enabled." If it has been disabled, use the "**set - fecom:**" command **at each shelf** to enable far-end communications.

 NOTE 2:

The "**r lgn**" command can be used to log in to each shelf at optical span being tested.

Perform end-to-end line test on all optical spans. Report any failures to the organization that installed the DDM-2000.

- A. Ring Releases
- B. Linear Releases

DLP-515
DLP-525

-
12. Perform end-to-end DS1 transmission test in the **Mux** direction for each **FUNCTION UNITS** group, if required.

- A. DS1 Single Ring Test in **Mux** Direction
- B. DS1 Dual Ring (DRI) Test in **Mux** Direction
- C. DS1 Single/Dual Homing Test in **Mux** Direction

DLP-510
DLP-554
DLP-510

DO ITEMS BELOW IN ORDER LISTED FOR DETAILS, GO TO

13.	Perform end-to-end DS3 transmission test in the Mux direction for each FUNCTION UNITS group, if required.	
	A. DS3 Single Ring Test in Mux Direction	DLP-511
	B. DS3 Dual Ring (DRI) Test in Mux Direction	DLP-553
	C. DS3 Single/Dual Homing Test in Mux Direction	DLP-511
14.	Perform end-to-end OC-3c (STS-3c) transmission test in the Mux direction, if required.	DLP-544
15.	Check local office alarm interface as required.	DLP-516
16.	Check office telemetry interface as required:	
	A. Parallel telemetry	DLP-517
	B. Serial telemetry	DLP-518
17.	Test protection switching function, if required.	DLP-519
18.	The system is ready for service to be established.	
19.	Activate remaining optional features, as required.	DLP-512

Task Index

System Turnup/Circuit Order

FIND YOUR JOB IN THE LIST BELOW THEN GO TO

Equipment Required for Shelf Turnup

1. IBM* compatible personal computer with *MS-DOS*[†] software Release 2.1 or later. Used for loading software.
2. Proper software release for system configuration you have.
3. **FS1E-E-02** lightguide jumpers for looping shelf **OLIUs**.

Initial Shelf Turnup and Establishing End-to-End System

⇒ NOTE:

These procedures are used to equip DDM-2000 OC-3 shelves, establish end-to-end OC-3 systems, and establish initial end-to-end DS1/DS3 service after all necessary bay, shelf, and cable installation has been done.

Shelf — Equipping (Looped Back)

Equip DDM-2000 OC-3 Shelf (Looped Back) —
as EC-1 Multiplexer System Turnup: NTP-031

Equip DDM-2000 OC-3 Shelf (Looped Back) System Turnup: NTP-016

Equip DDM-2000 OC-3 Shelf (Looped Back) —
For OC-3c Service System Turnup: NTP-002

* Registered trademark of International Business Machines Corporation.

† Registered trademark of Microsoft Corporation.

FIND YOUR JOB IN THE LIST BELOW THEN GO TO

System — Establish End-to-End

⇒ NOTE:

Figures 1-31 show a variety of system configurations and may be used as a quick reference to most of the system end-to-end procedures listed here.

Establish FiberReach Access —
via DDM-2000 OC-3 Release 9 Host Shelf
OC-3 Release 8 Linear Configuration System Turnup: NTP-052

Establish Dual-Homed FiberReach Access —
via DDM-2000 OC-3 Backbone Ring System Turnup: NTP-044

Establish Dual-Homed OC-3 Access —
via DDM-2000 OC-12 Backbone Ring System Turnup: NTP-050

Establish Dual-Homed OC-3 Access —
via FT-2000 OC-48 Backbone Ring System Turnup: NTP-048

Establish EC-1 Dual Ring Interworking —
DDM-2000 OC-3 to OC-12 or FT-2000 Ring
OC-3 Optical Fiber Spans System Turnup: NTP-013

Establish Single-Homed OC-3 Access —
via DDM-2000 OC-12 Backbone Ring System Turnup: NTP-040

Establish Single-Homed OC-3 Access —
via FT-2000 OC-48 Backbone Ring System Turnup: NTP-047

Establish End-to-End DDM-2000 OC-3 System —
DDM-2000 OC-3 Optical Fiber Spans
Linear and Hub Configurations System Turnup: NTP-017

FIND YOUR JOB IN THE LIST BELOW THEN GO TO

Establish End-to-End DDM-2000 OC-3 System —
Optical Fiber Spans
OC-3 Path Switched Ring Network System Turnup: NTP-022

Establish OC-3/IS-3 Dual Ring Interworking —
DDM-2000 OC-3 to OC-12 or FT-2000 Ring
OC-3 Optical Fiber Spans System Turnup: NTP-041

Establish End-to-End DDM-2000 OC-3 System —
OC-3 Point-to-Point System Turnup: NTP-003

Establish Single-Homed FiberReach Access —
via DDM-2000 OC-3 Backbone Ring System Turnup: NTP-043

Establish Stand Alone FiberReach Access —
via DDM-2000 OC-3 Host Shelf System Turnup: NTP-045

Service — Establish Initial DS1

Establish Initial End-to-End DS1 Service —
(Group Equipped But Not In Service) System Turnup: NTP-004

Establish Initial Low Speed EC-1 Interface —
Group Equipped With STS1E Not In Service System Turnup: NTP-034

Service — Establish Initial DS3

Establish Initial End-to-End DS3 Service —
(Group Equipped But Not In Service) System Turnup: NTP-005

Establish Initial Low Speed EC-1 Interface —
Group Equipped With STS1E Not In Service System Turnup: NTP-034

Service — Establish Initial HDSL

Establish Initial HDSL Service —
(Group Equipped But Not In Service) System Turnup: NTP-025

FIND YOUR JOB IN THE LIST BELOW THEN GO TO

Service — Establish Initial TMUX

Establish Initial End-to-End DS3-to-DS1 Service —
(TMUX Group Equipped But Not In Service) System Turnup: NTP-053

Circuit Order/Work Order Procedures

⇒ NOTE:

Some of these procedures are used to add, convert, or discontinue DS1 and/or DS3 service after the system is running with initial service. Other procedures are used to add new shelves and optical spans and upgrade system configurations.

Alarm Group — Establish New

Establish New Alarm Group Detailed Level Procedure: DLP-564

Shelf/Span — Adding New

Add DDM-2000 OC-3 Shelf —
To Linear or Hub Configuration
Shelf Added in Middle of Optical Span Circuit Order: NTP-014

Add DDM-2000 OC-3 Node (Shelf) —
To DDM-2000 OC-3 or OC-12 Path Switched Ring Circuit Order: NTP-026

Add DDM-2000 OC-3 Shelf and/or Optical Span —
Shelf and/or Span Added as Extension
to DDM-2000 OC-3 Ring,
Hub, Point-to-Point, Linear Add/Drop Configuration Circuit Order: NTP-015

Add DDM-2000 OC-3 Shelf and Optical Span —
Shelf Added as Extension to DDM-2000 OC-12 Circuit Order: NTP-018

FIND YOUR JOB IN THE LIST BELOW THEN GO TO

Add OC-3 Optical Span Linear Extension —
Extension Added Between FT-2000 and DDM-2000 OC-3 System Turnup: NTP-049

Shelf/Span — Discontinue

Span — OC-3 Optical — Discontinue Circuit Order: NTP-019

Discontinue DDM-2000 OC-3 Node (Shelf) —
From DDM-2000 OC-3 Path Switched Ring Circuit Order: NTP-027

Service — Adding New DS1

Add New DS1 Service —
MXRVO/STS1E Group Already In Service Circuit Order: NTP-006

Add New MXRVO Group for DS1 Service —
In-Service Circuit Order: NTP-008

Service — Adding New DS3

Add New DS3 Group for DS3 Service —
System In-Service Circuit Order: NTP-007

EC-1 Interface — Adding

Add New STS1E Group for EC-1 Interface —
System In Service Circuit Order: NTP-035

Add New STS1E High Speed Group for DS1 Service —
EC-1 Electrical Multiplexer Shelf
System In Service Circuit Order: NTP-032

Service — Adding New HDSL

Add New HDSL Service —
(Group Already In Service) Circuit Order: NTP-028

FIND YOUR JOB IN THE LIST BELOW THEN GO TO

Service — Adding New TMUX

Add New TMUX Group for DS3 Service —
System In Service Circuit Order: NTP-054

Conversions

Change Kbyte Sync Messaging to

Sbyte Sync Messaging Detailed Level Procedures: DLP-565

Convert (Upgrade) DDM-2000 OC-3 Shelf —
to DS1 Add/Drop Shelf Circuit Order: NTP-020

Convert (Upgrade) DDM-2000 OC-3 System —
to OC-12 System (Linear) Circuit Order: NTP-021

Convert DS1 Group Service to EC-1 Group Service Circuit Order: NTP-038

Convert DS1 Group Service to DS3 Group Service Circuit Order: NTP-009

Convert DS3 Group Service to DS1 Group Service Circuit Order: NTP-010

Service — Discontinue DS1

Discontinue DS1 Service Circuit Order: NTP-011

Service — Discontinue DS3

Discontinue DS3 Service Circuit Order: NTP-012

Service — Discontinue EC-1 Interface

Discontinue EC-1 Service — Circuit Order: NTP-036

Discontinue STS1E High Speed Group —
EC-1 Electrical Multiplexer Shelf Circuit Order: NTP-033

FIND YOUR JOB IN THE LIST BELOW THEN GO TO

Service — Discontinue HDSL

Discontinue End-to-End HDSL Service Circuit Order: NTP-037

Shelf (Node) — Discontinue

Discontinue an OC-3 Shelf (Node) —
From Path Switched Ring Circuit Order: NTP-027

Span (Shelf) — Discontinue OC-3 Optical

Discontinue an OC-3 Optical Span —
From Linear and Hub Configurations Circuit Order: NTP-019

Upgrades

Upgrade DDM-2000 OC-3/FT-2000 Dual Ring
Interworking Network from EC-1 to OC-3
In Service System Turnup: NTP-042

Upgrade DDM-2000 OC-3/OC-12 Dual Ring
Interworking Network from EC-1 to OC-3/IS-3
In Service Circuit Order: NTP-051

Upgrade DDM-2000 OC-3 Ring Network to
OC-12 Ring Network Using OC-3 Shelves
In Service Circuit Order: NTP-023

Upgrade DDM-2000 OC-3 Ring Network to
OC-12 Ring Network Using OC-3/OC-12 Shelves
In Service Circuit Order: NTP-024

Upgrade DDM-2000 OC-3 System —
Linear Add/Drop to Path Switched Ring
In Service Circuit Order: NTP-039

FIND YOUR JOB IN THE LIST BELOW THEN GO TO

Upgrade DDM-2000 OC-3 System —
Point-to-Point to Path Switched Ring
In Service Circuit Order: NTP-029

Upgrade DDM-2000 OC-3 System —
Point-to-Point to Path Switched Ring
Out of Service Circuit Order: NTP-030

Upgrade DDM-2000 OC-12 Ring by Removing OC-12 Shelf
and Replacing with Existing Single-Homed OC-3 Shelf
In Service Circuit Order: NTP-055

Upgrade DDM-2000 OC-3 System —
Release 6 to Release 8 or
Release 7.1 or 7.2 to Release 9 or 11
System In Service System Turnup: NTP-046

Upgrade Software Program —
In-Service System
Local Shelf Download Detailed Level Procedure: DLP-532

Upgrade Software Program —
In-Service System
Remote Shelf Download Detailed Level Procedure: DLP-562

Upgrade Timing Detailed Level Procedures: DLP-535

Upgrade TBOS/Parallel Telemetry to
TL1/X.25 Detailed Level Procedures: DLP-538

Examples of System Configurations - Turnup Procedures

The following figures are for reference only and are not intended to suggest any working configuration. They are used to support this **IXL-001**.

The figures in this section show a variety of subnetwork configurations and associated flow diagrams. Figure 1 depicts a large network configuration consisting of FT-2000 OC-48, DDM-2000 OC-3, OC-12, and FiberReach. The remainder of the figures illustrate individual subnetworks necessary to establish the large network configuration. Some subnetwork configurations can be established as stand-alone subnetworks and added later to the overall large network configuration (For Example, the OC-3 ring subnetworks in Figures 6 and 7). Other subnetworks require you establish the host subnetwork first (For Example, the single-homed OC-3 access ring via the FT-2000 ring in Figures 2 and 3). The shaded areas in each figure show the configuration being established.

The following is a list of the configurations shown in this section:

- Figure 2 Single-Homed OC-3 Access via FT-2000 Ring
- Figure 4 Single-Homed FiberReach Access via DDM-2000 OC-3 Ring
- Figure 6 End-to-End DDM-2000 OC-3 Path Switched Ring System
- Figure 8 OC-3 Optical Extension Between FT-2000 and DDM-2000 OC-3
- Figure 10 OC-3 Shelf/Optical Span Extension Added to DDM-2000 OC-3
- Figure 12 Dual-Homed FiberReach Access via DDM-2000 OC-3 Ring
- Figure 14 End-to-End DDM-2000 OC-12 Path Switched Ring System
- Figure 16 OC-3 Optical Extension Between DDM-2000 OC-3 Ring and OC-12 ring
- Figure 18 OC-3 Optical Extension Between FT-2000 OC-48 Ring and DDM-2000 OC-12 ring
- Figure 20 OC-3 Dual Ring Interworking - FT-2000 OC-48 Ring to DDM-2000 OC-3 ring
- Figure 22 Single-Homed OC-12 Access via FT-2000 OC-48 Ring
- Figure 24 Single-Homed OC-3 Access via DDM-2000 OC-12 Ring
- Figure 26 Dual-Homed OC-3 Access via FT-2000 OC-48 Ring
- Figure 28 Dual-Homed OC-12 Access via FT-2000 OC-48 Ring
- Figure 30 Dual-Homed OC-3 Access via DDM-2000 OC-12 Ring

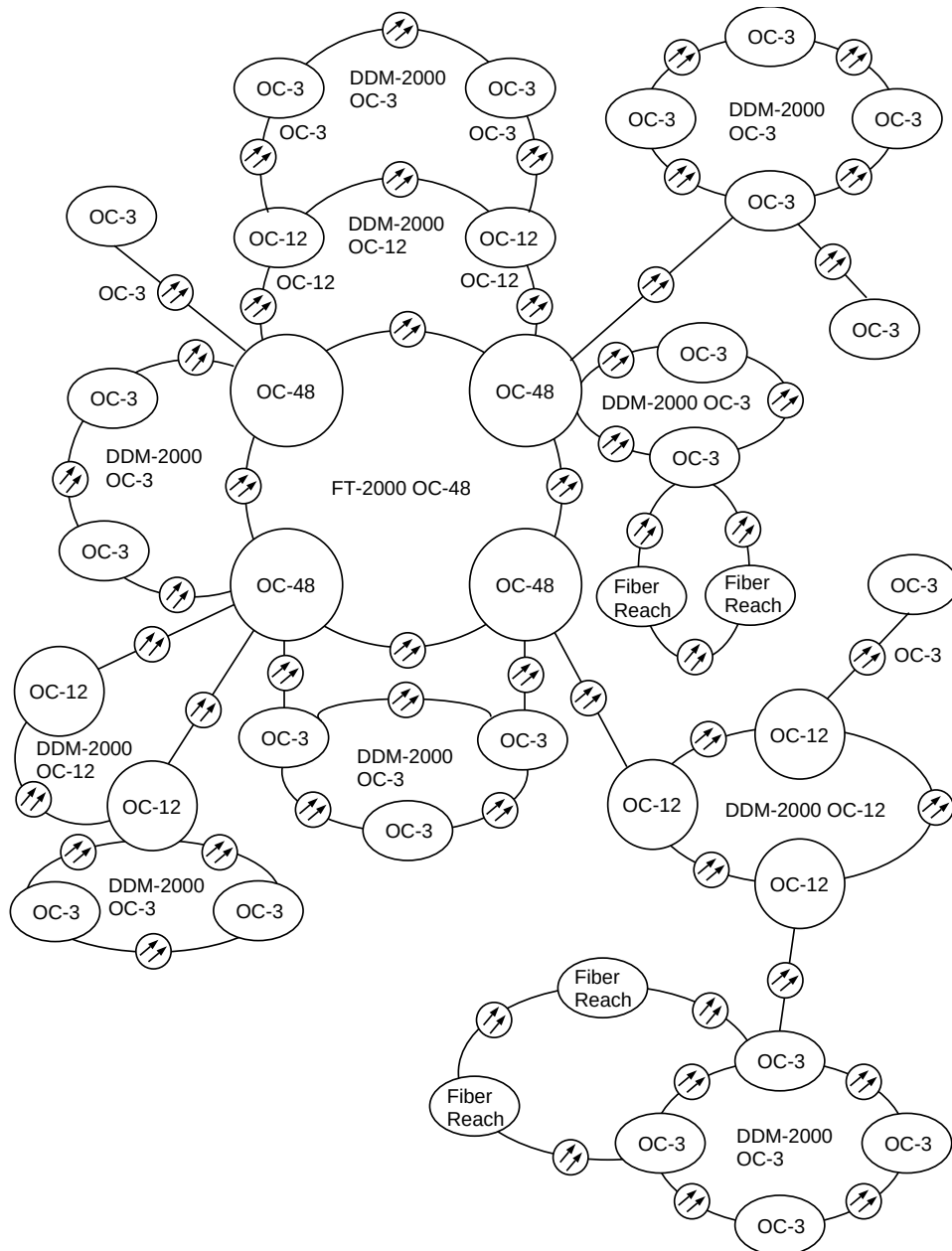


Figure 1. DDM-2000/FT-2000 Large Network Configurations

Establish Single-Homed OC-3 Access via FT-2000 OC-48 Backbone Ring
See Figure 3

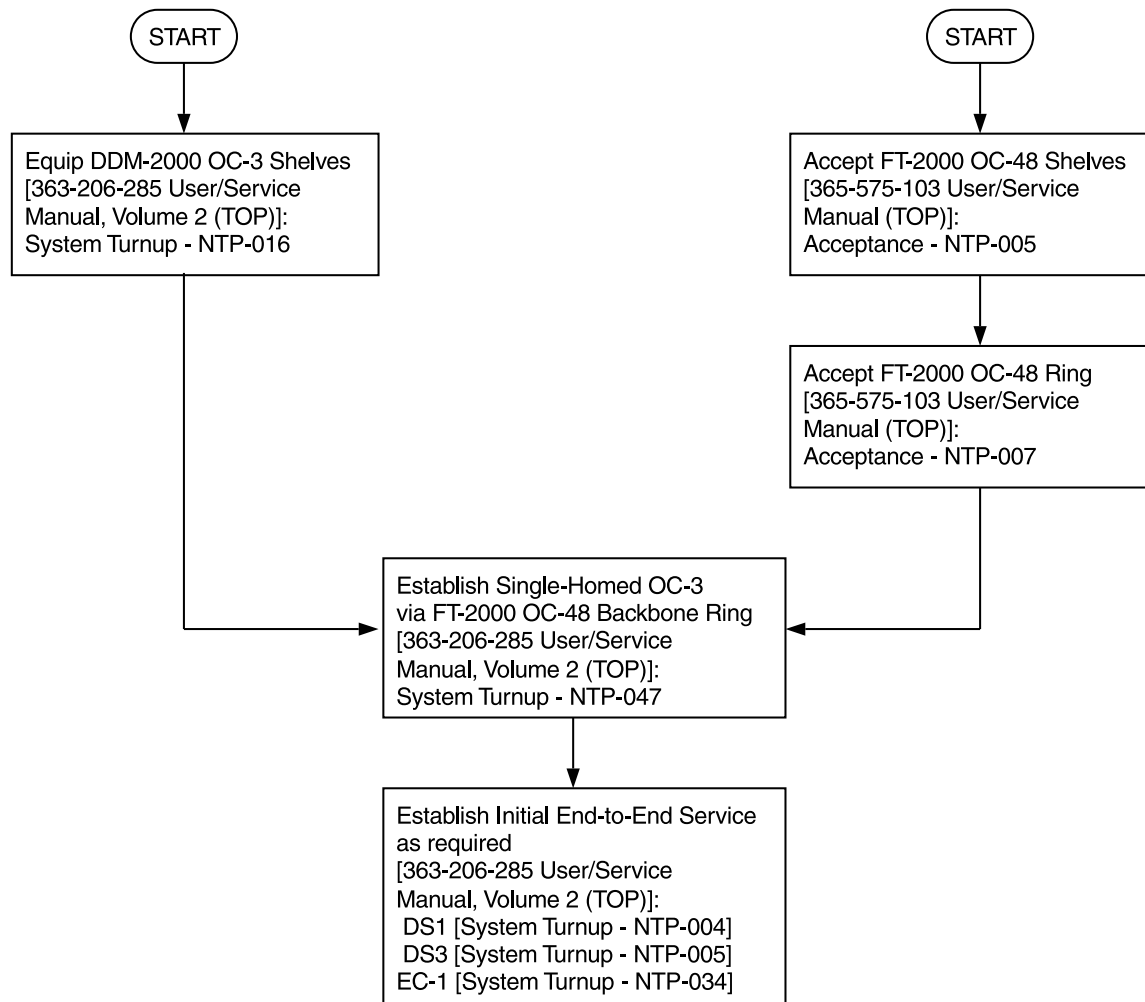


Figure 2. DDM-2000/FT-2000 Large Network Configurations — Single Homed OC-3 Access via FT-2000 Backbone Ring

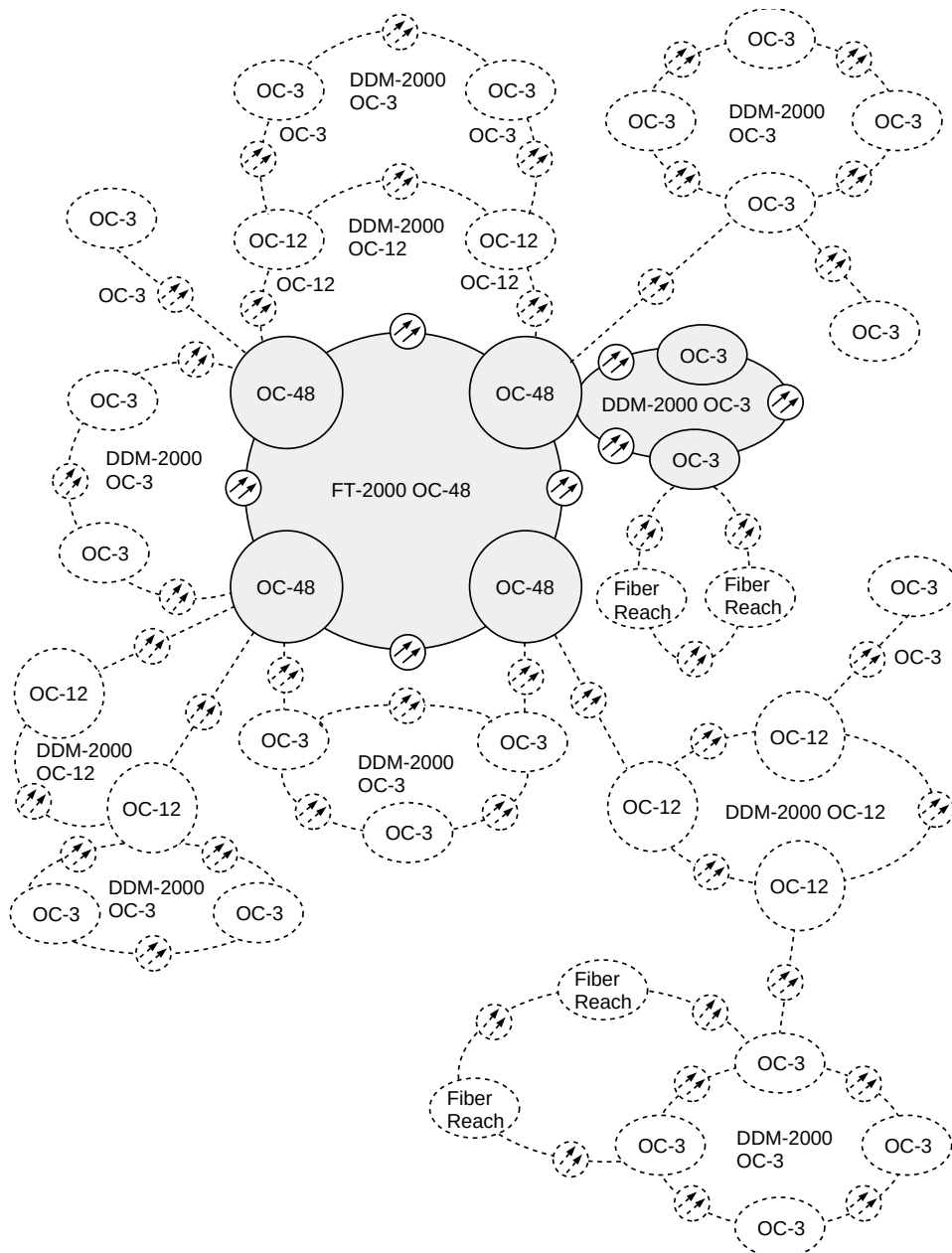


Figure 3. DDM-2000/FT-2000 Large Network Configurations — Single Homed OC-3 Access via FT-2000 Backbone Ring

Establish Single-Homed FiberReach Access
via DDM-2000 OC-3 Backbone Ring
See Figure 5

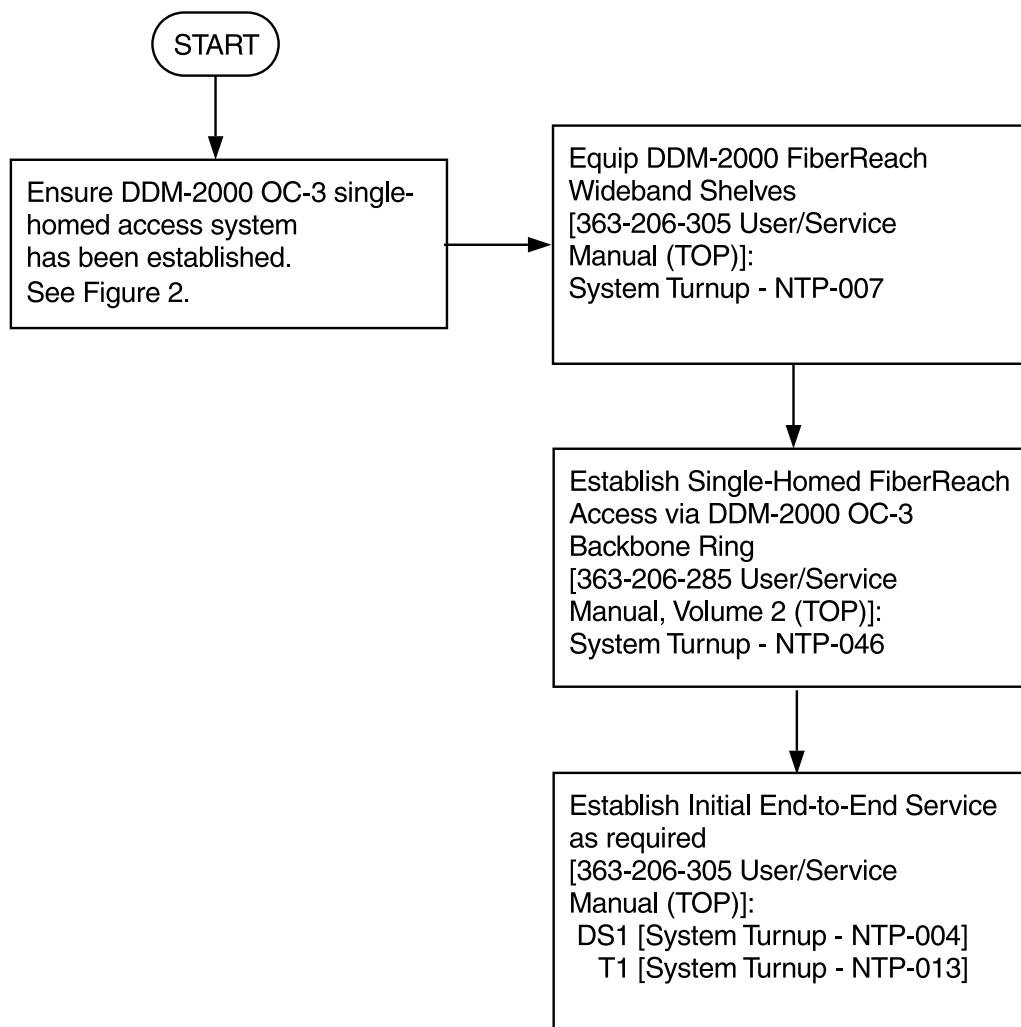


Figure 4. DDM-2000/FT-2000 Large Network Configurations — Single Homed FiberReach Access via DDM-2000 OC-3 Backbone Ring

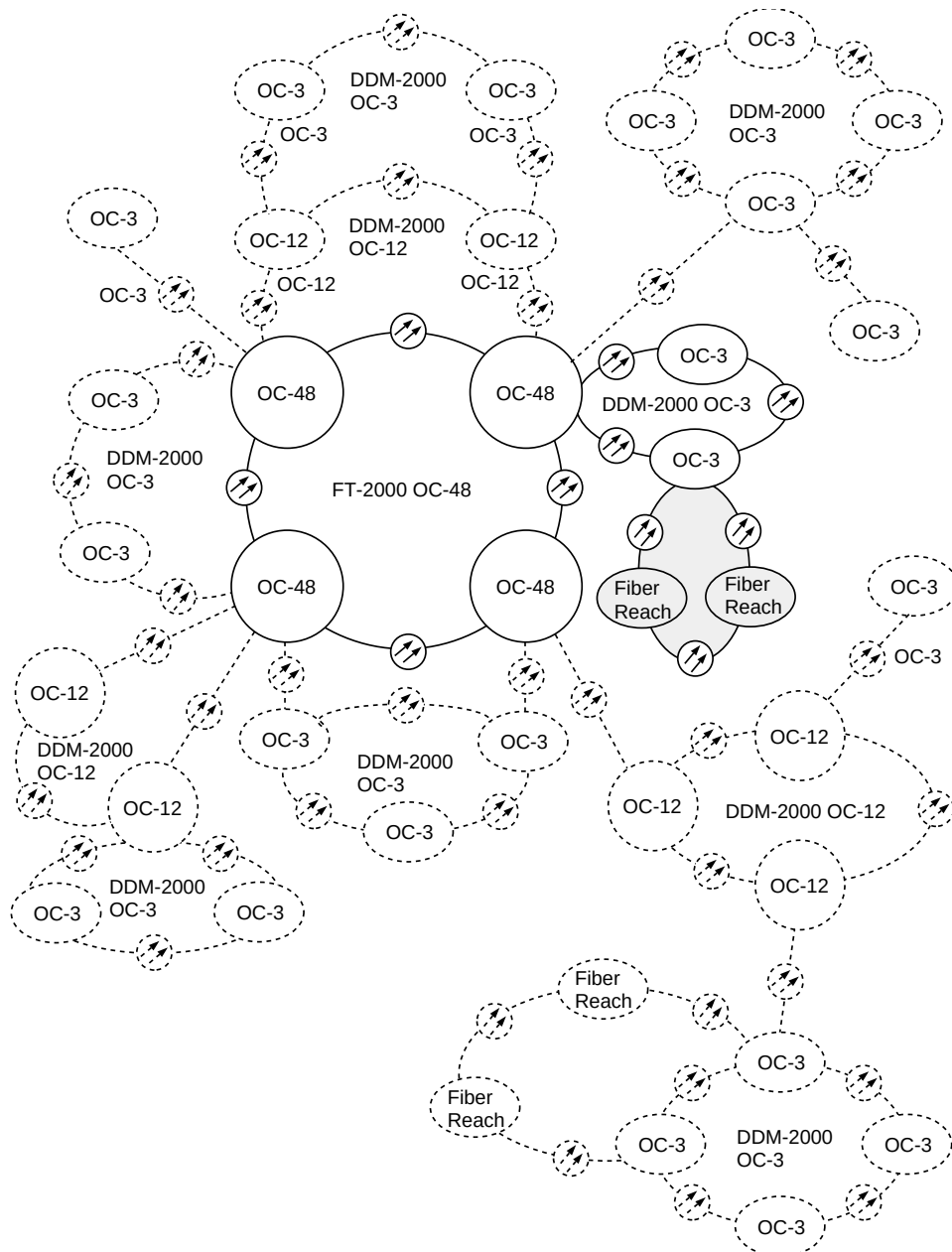


Figure 5. DDM-2000/FT-2000 Large Network Configurations — Single Homed FiberReach Access via DDM-2000 OC-3 Backbone Ring

Establish End-to-End DDM-2000 OC-3 System - Path Switched Ring
See Figure 7

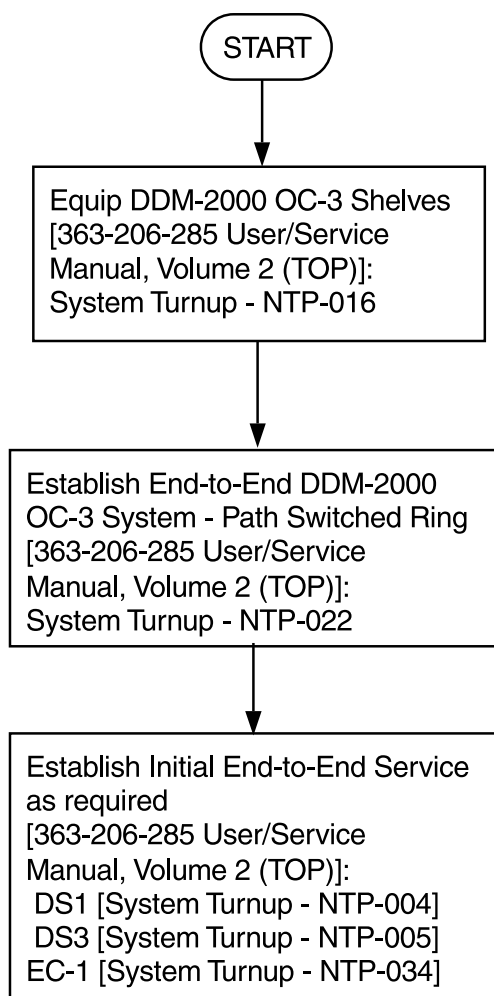


Figure 6. DDM-2000/FT-2000 Large Network Configurations — DDM-2000 OC-3 Path Switched Ring

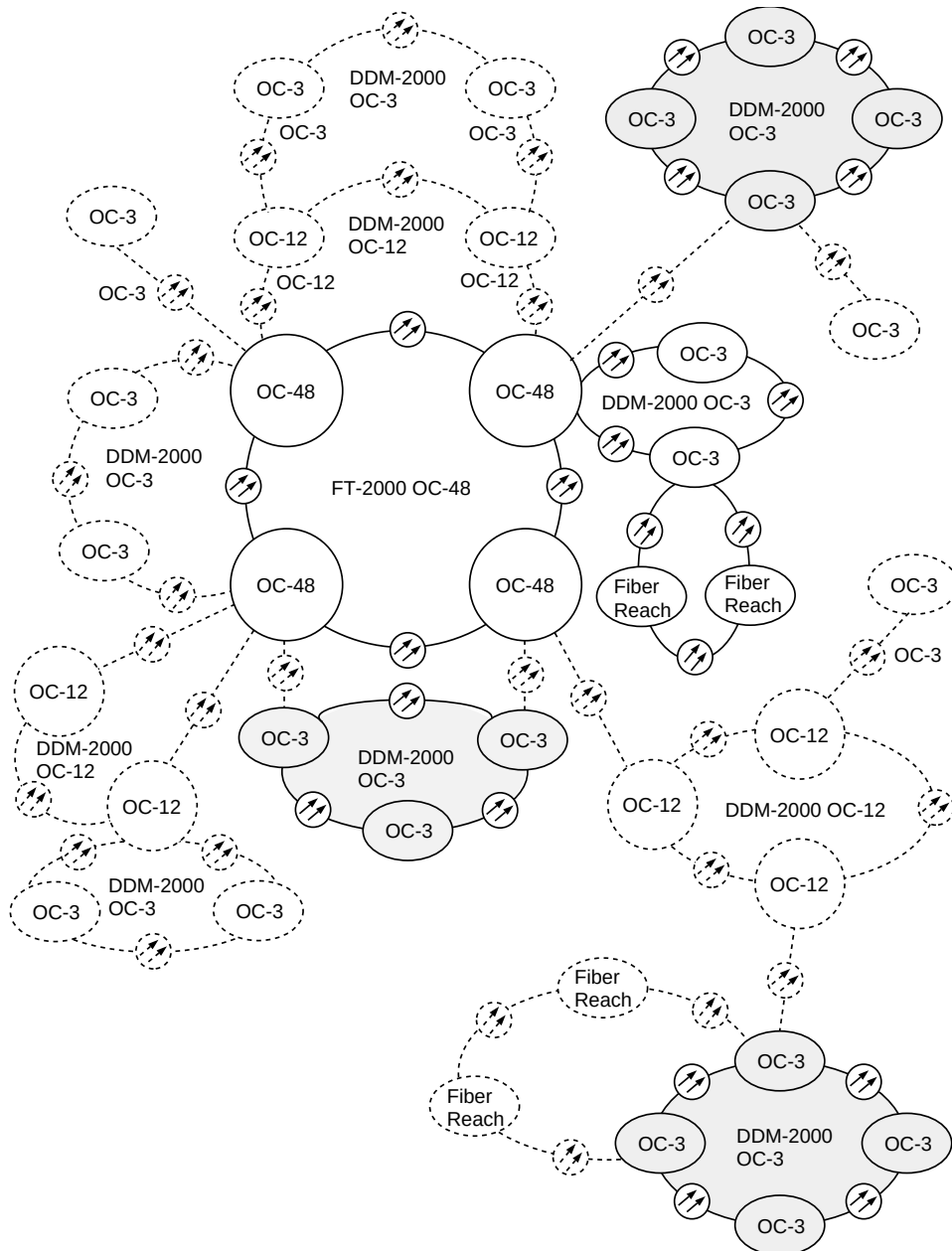


Figure 7. DDM-2000/FT-2000 Large Network Configurations — DDM-2000 OC-3 Path Switched Ring

Establish OC-3 Optical Span Linear Extension
Between FT-2000 and DDM-2000 OC-3
See Figure 9

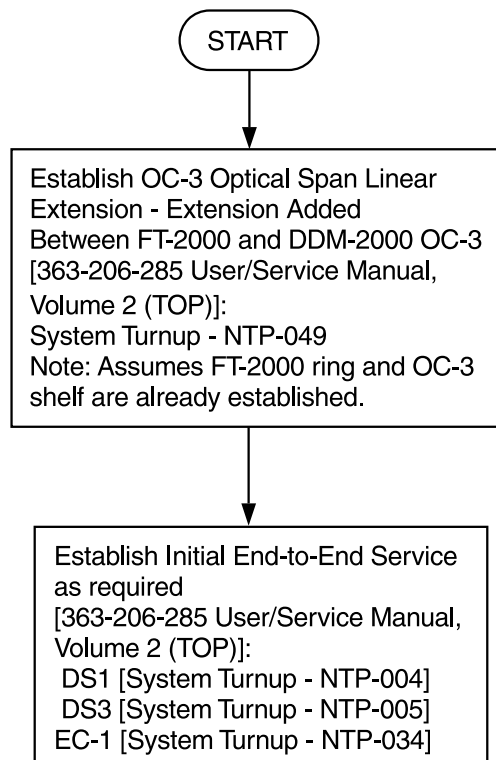


Figure 8. DDM-2000/FT-2000 Large Network Configurations — OC-3 Optical Span Linear Extension Between FT-2000 and DDM-2000 OC-3

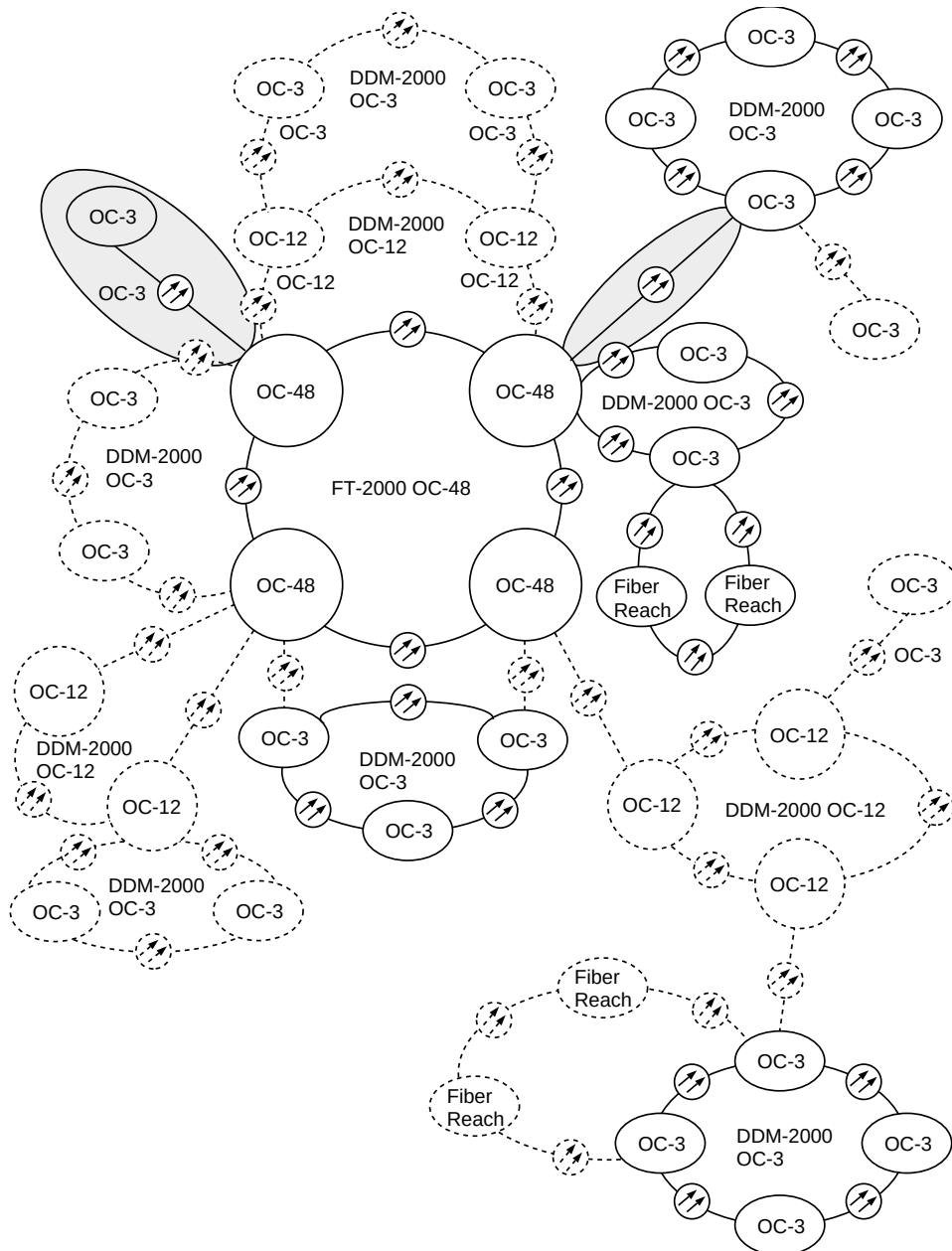


Figure 9. DDM-2000/FT-2000 Large Network Configurations — OC-3 Optical Span Linear Extension Between FT-2000 and DDM-2000 OC-3

Add OC-3 Shelf and/or New Optical Span
Added as Extension to DDM-2000 OC-3 Ring
See Figure 11

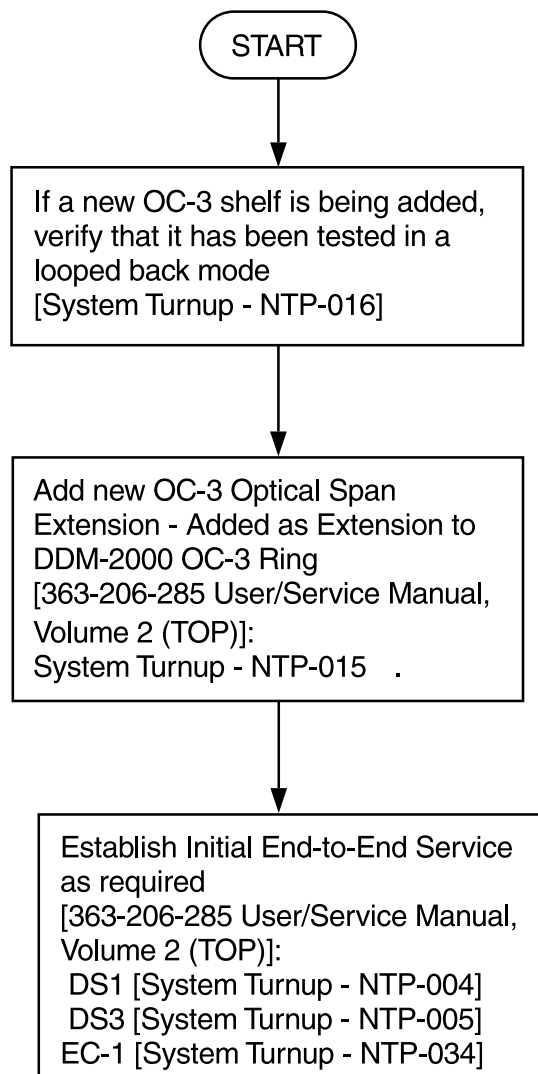


Figure 10. DDM-2000/FT-2000 Large Network Configurations — OC-3 Shelf and/or Optical Span Added as Extension to DDM-2000 OC-3 Ring

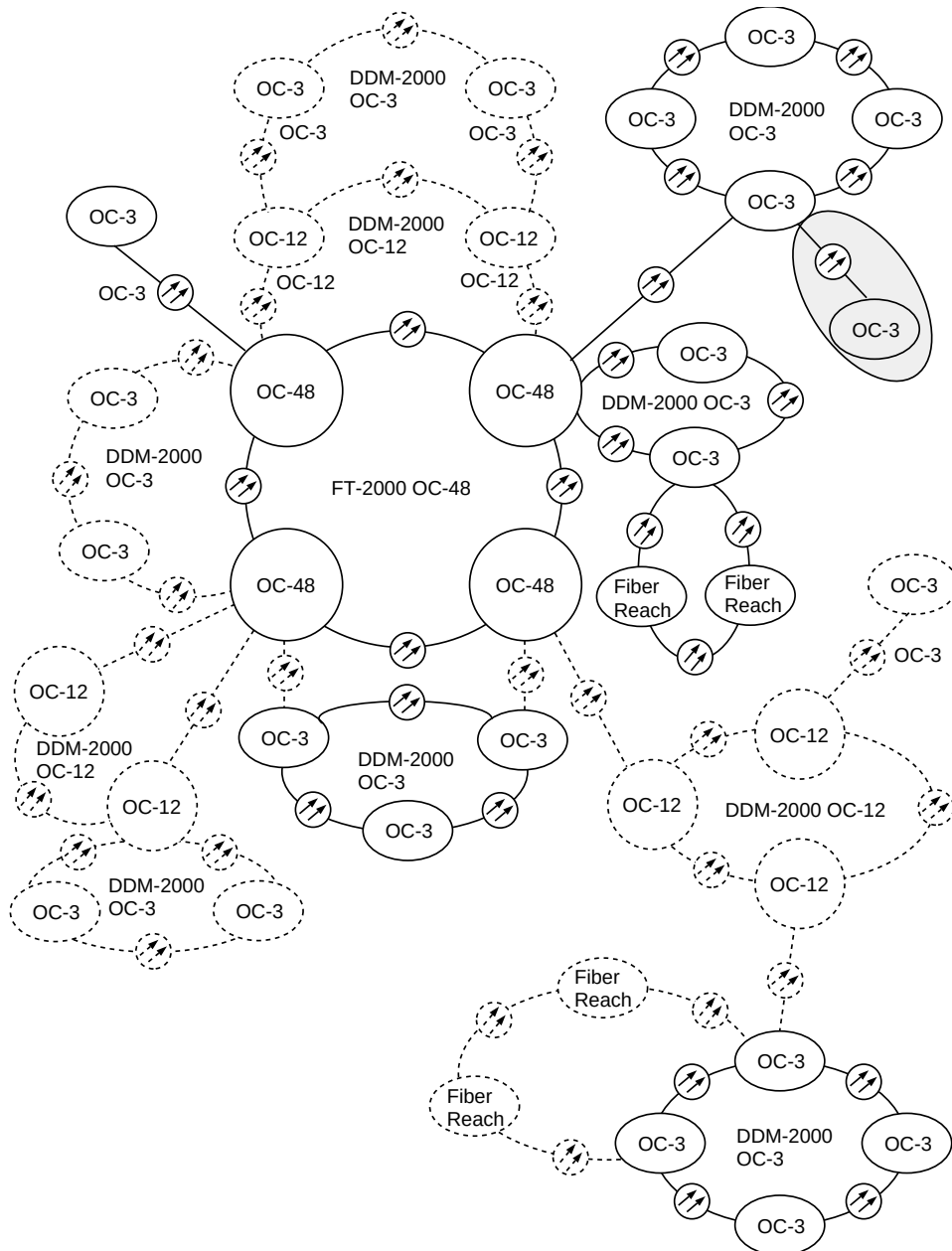


Figure 11. DDM-2000/FT-2000 Large Network Configurations — OC-3 Shelf and/or Optical Span Added as Extension to DDM-2000 OC-3 Ring

Establish Dual-Homed FiberReach Access
via DDM-2000 OC-3 Backbone Ring
See Figure 13

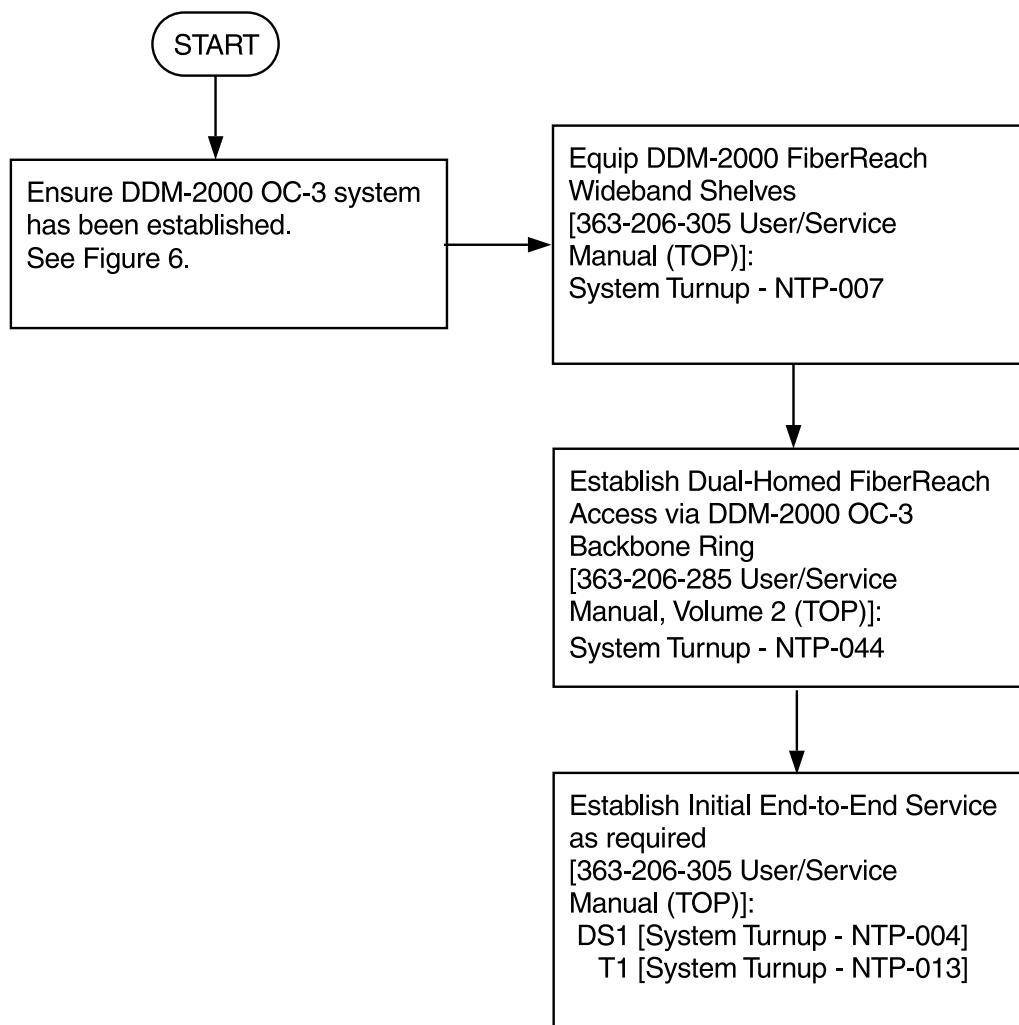


Figure 12. DDM-2000/FT-2000 Large Network Configurations — Dual Homed FiberReach Access via DDM-2000 OC-3 Backbone Ring

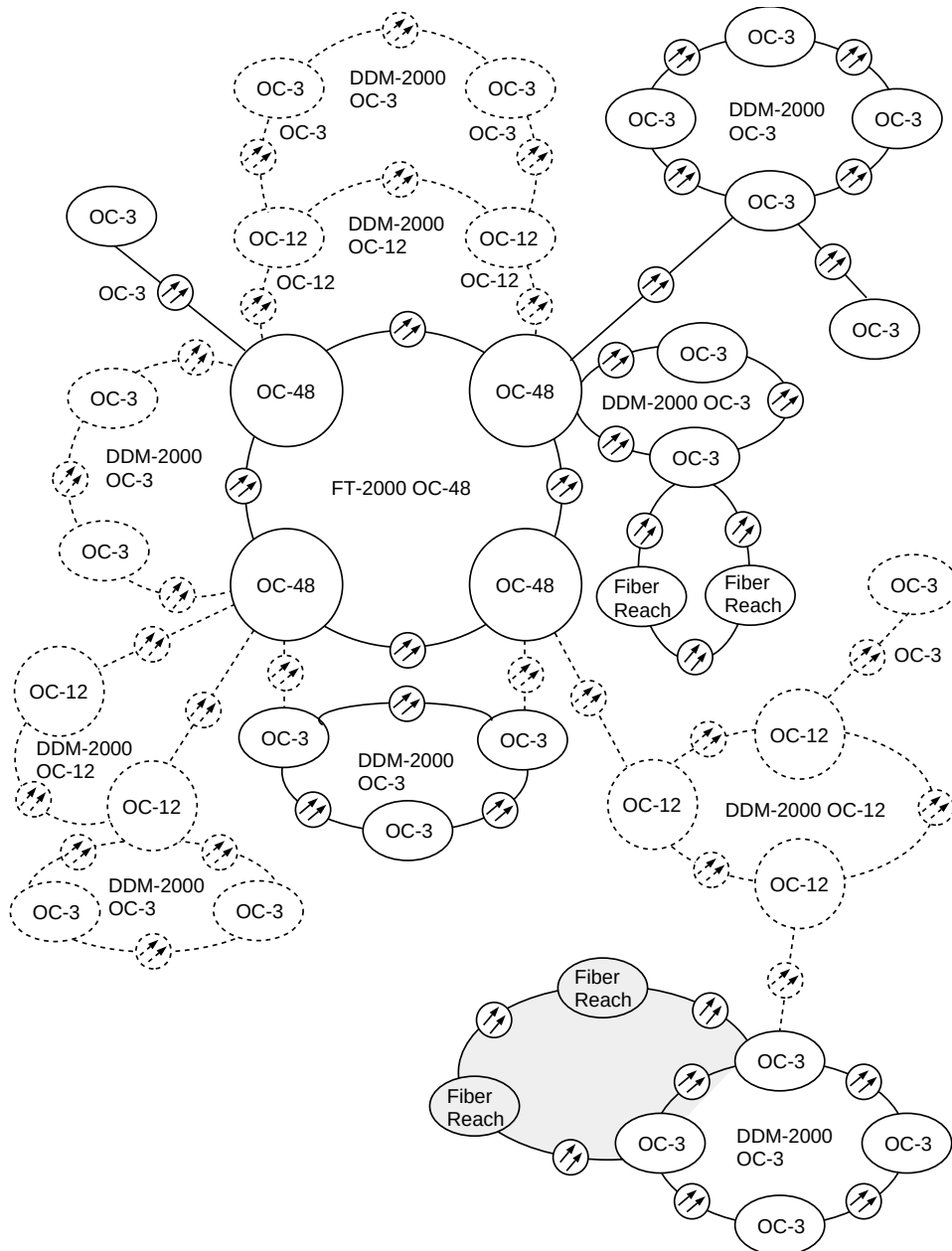


Figure 13. DDM-2000/FT-2000 Large Network Configurations — Dual Homed FiberReach Access via DDM-2000 OC-3 Backbone Ring

Establish End-to-End DDM-2000 OC-12 System - Path Switched Ring
See Figure 15

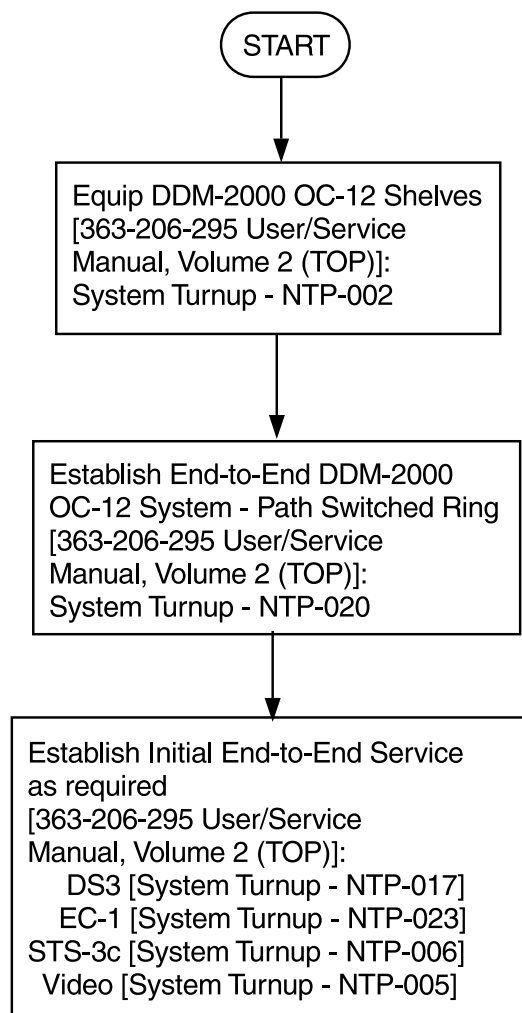


Figure 14. DDM-2000/FT-2000 Large Network Configurations — DDM-2000 OC-12 Path Switched Ring

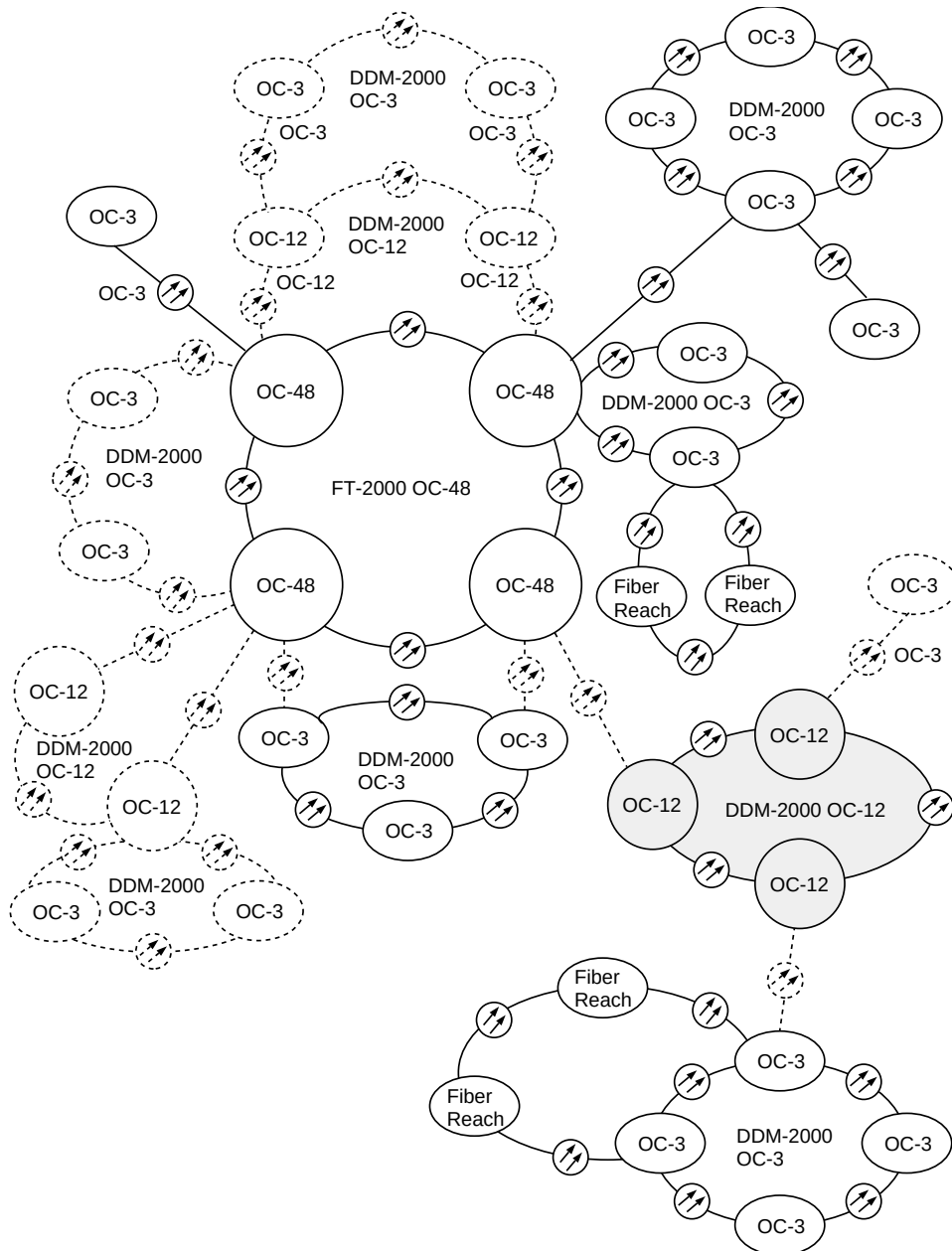


Figure 15. DDM-2000/FT-2000 Large Network Configurations — DDM-2000 OC-12 Path Switched Ring

Establish OC-3 Optical Span Extension
Between DDM-2000 OC-12 Ring and DDM-2000 OC-3
See Figure 17

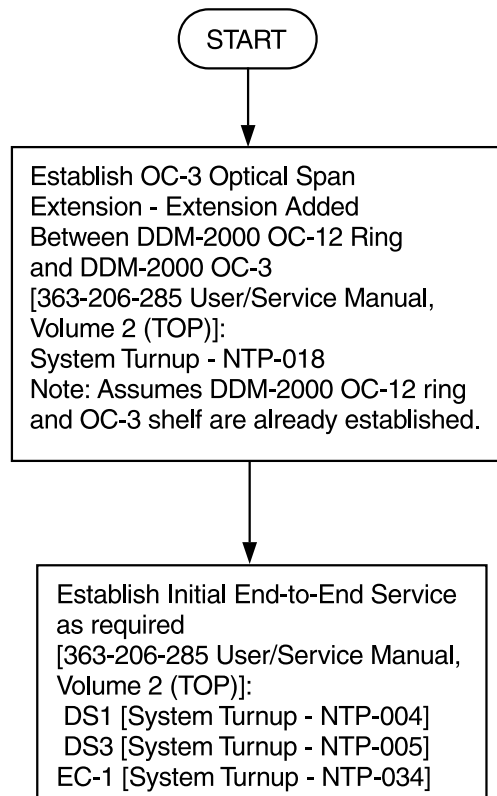


Figure 16. DDM-2000/FT-2000 Large Network Configurations — OC-3 Optical Span Extension Between DDM-2000 OC-12 Ring and DDM-2000 OC-3

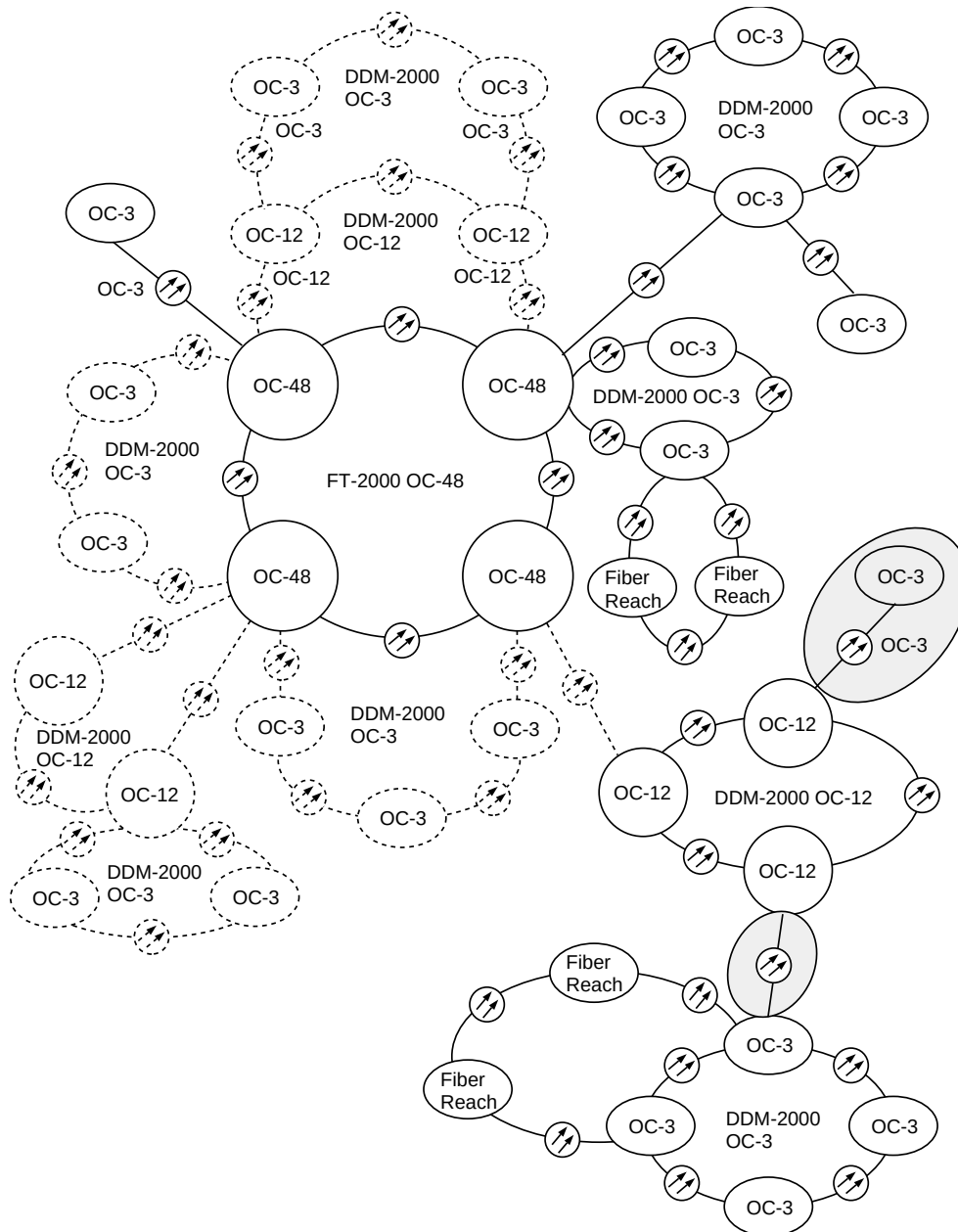


Figure 17. DDM-2000/FT-2000 Large Network Configurations — OC-3 Optical Span Extension Between DDM-2000 OC-12 Ring and DDM-2000 OC-3

Establish OC-3/IS-3 Optical Span Extension
Between FT-2000 and DDM-2000 OC-12 Ring
See Figure 19

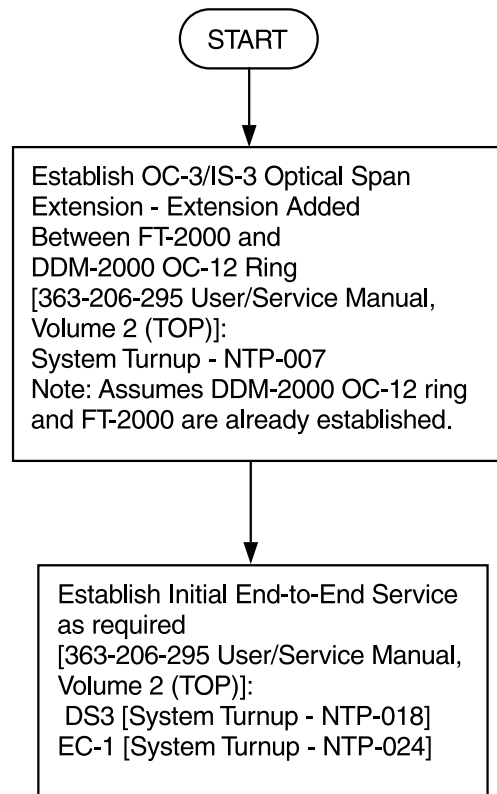


Figure 18. DDM-2000/FT-2000 Large Network Configurations — OC-3/IS-3 Optical Span Extension Between DDM-2000 OC-12 Ring and FT-2000 OC-48

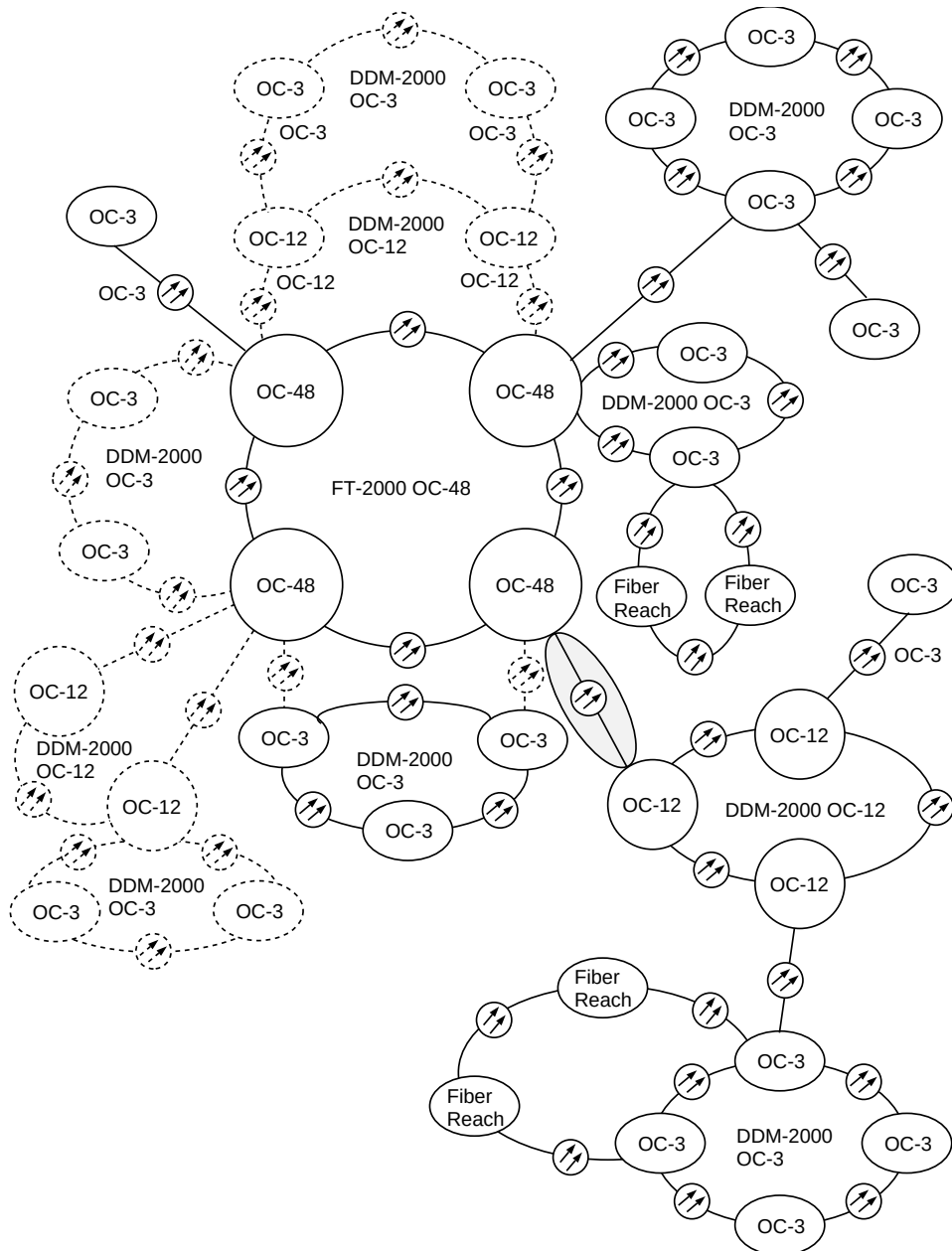


Figure 19. DDM-2000/FT-2000 Large Network Configurations — OC-3/IS-3 Optical Span Extension Between DDM-2000 OC-12 Ring and FT-2000 OC-48

Establish OC-3/IS-3 Dual Ring Interworking
DDM-2000 OC-3 to FT-2000 Ring
See Figure 21

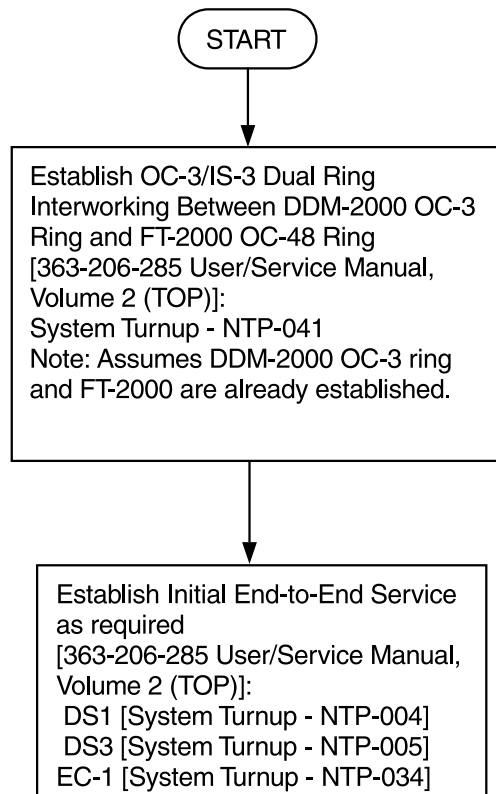


Figure 20. DDM-2000/FT-2000 Large Network Configurations — OC-3/IS-3 Dual Ring Interworking Between DDM-2000 OC-3 Ring and FT-2000 OC-48

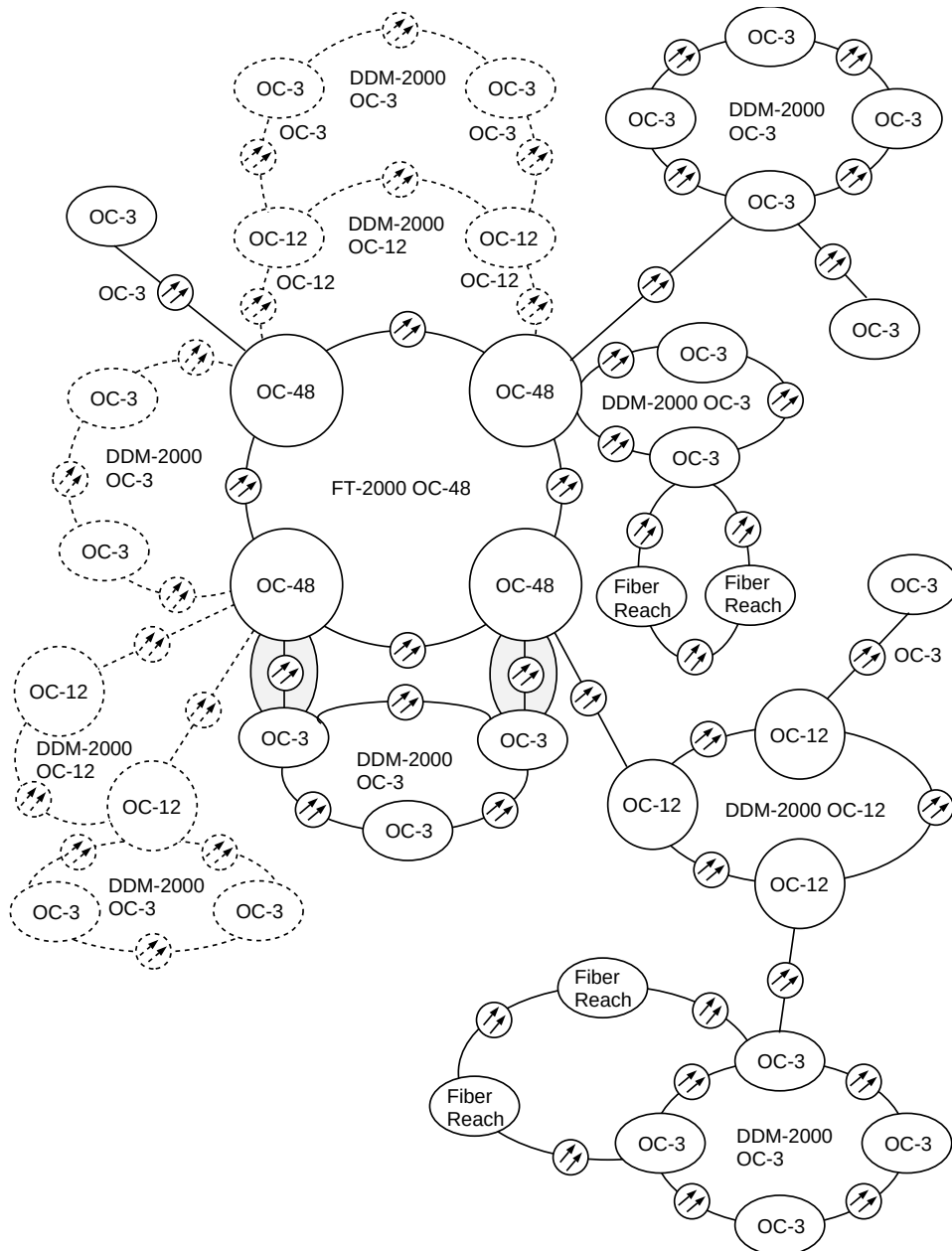


Figure 21. DDM-2000/FT-2000 Large Network Configurations — OC-3/IS-3 Dual Ring Interworking Between DDM-2000 OC-3 Ring and FT-2000 OC-48

Establish Single-Homed OC-12 Access
via FT-2000 OC-48 Backbone Ring
See Figure 23

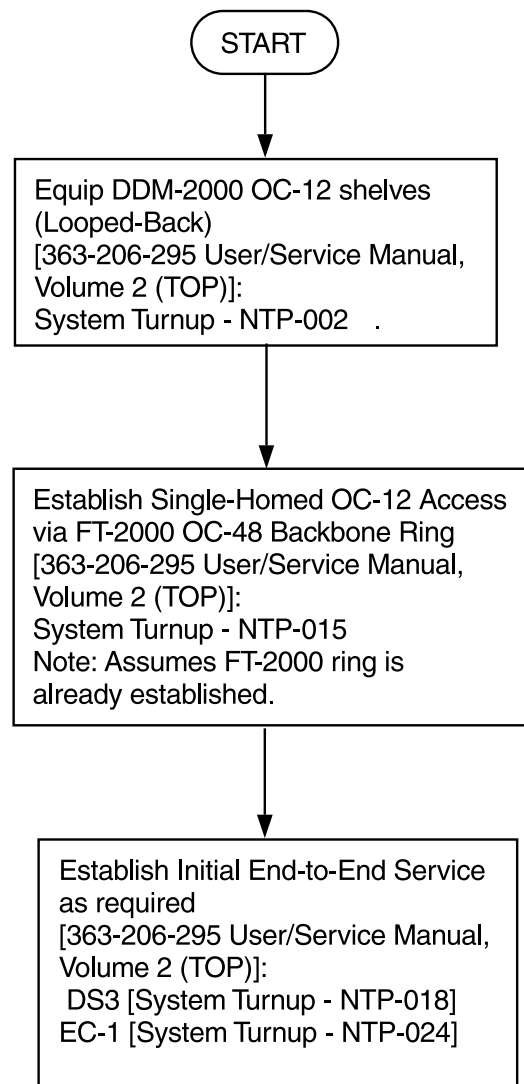


Figure 22. DDM-2000/FT-2000 Large Network Configurations — Single-Homed OC-12 Access via FT-2000 OC-48 Backbone Ring

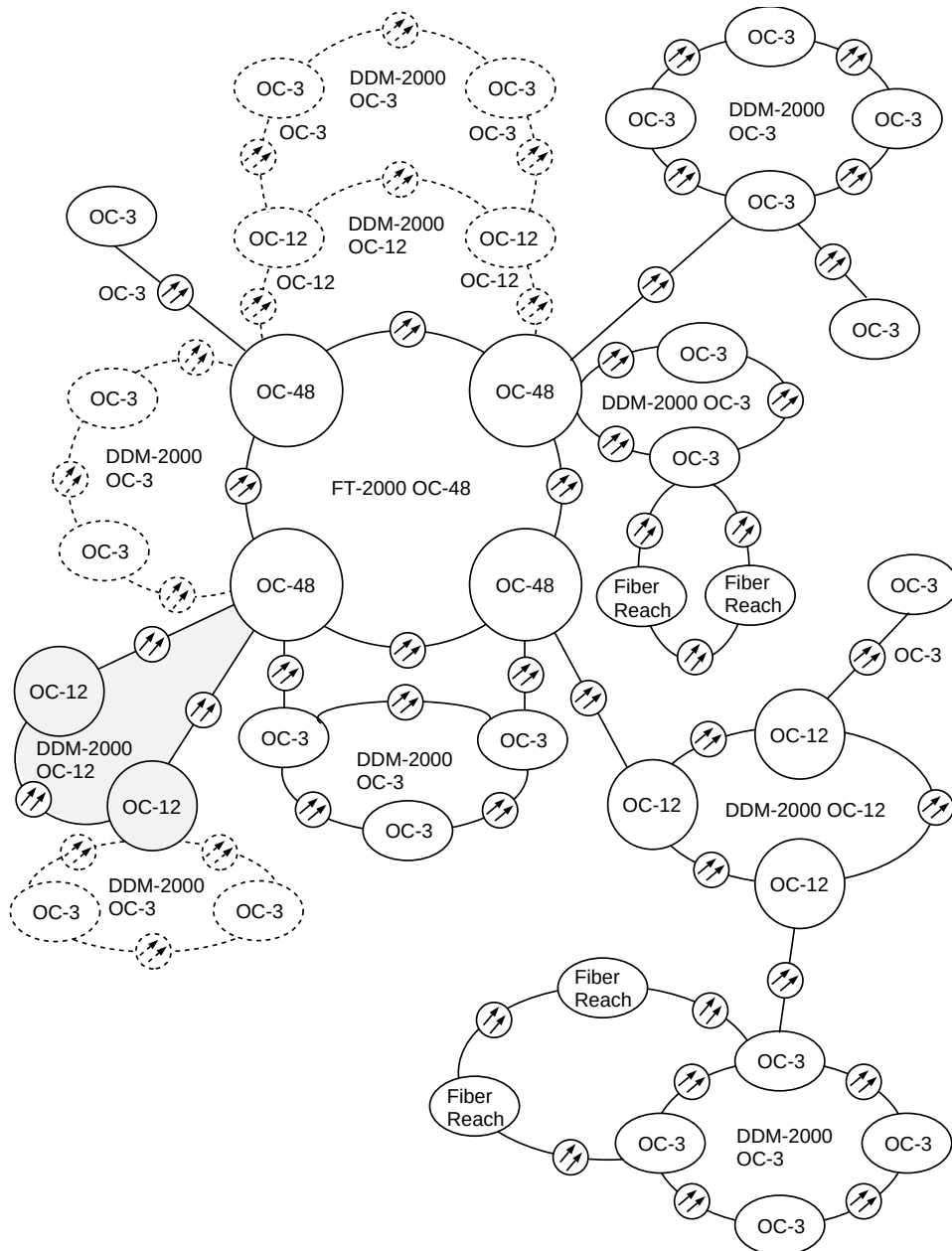


Figure 23. DDM-2000/FT-2000 Large Network Configurations — Single-Homed OC-12 Access via FT-2000 OC-48 Backbone Ring

Establish Single-Homed OC-3 Access
via DDM-2000 OC-12 Backbone Ring
See Figure 25

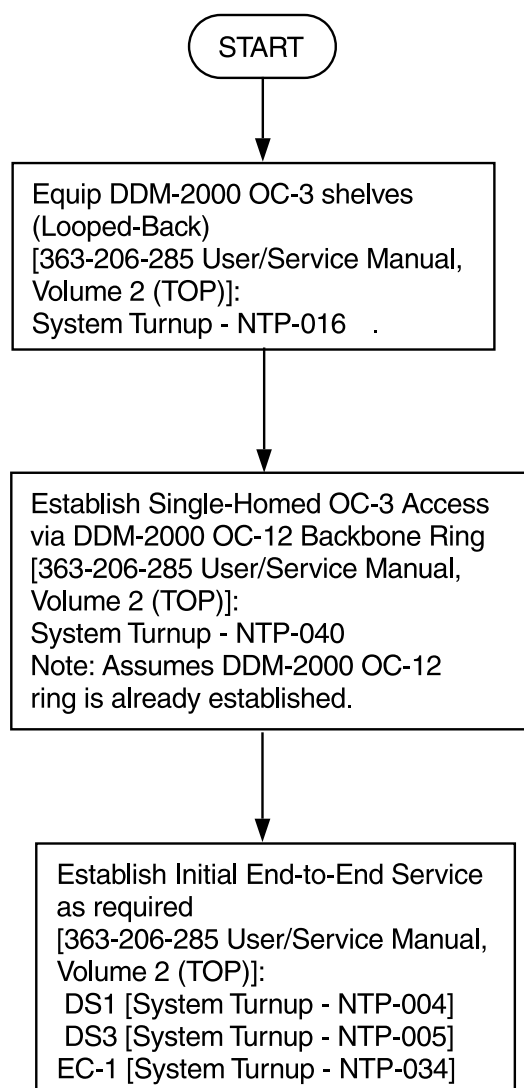


Figure 24. DDM-2000/FT-2000 Large Network Configurations — Single-Homed OC-3 Access via DDM-2000 OC-12 Backbone Ring

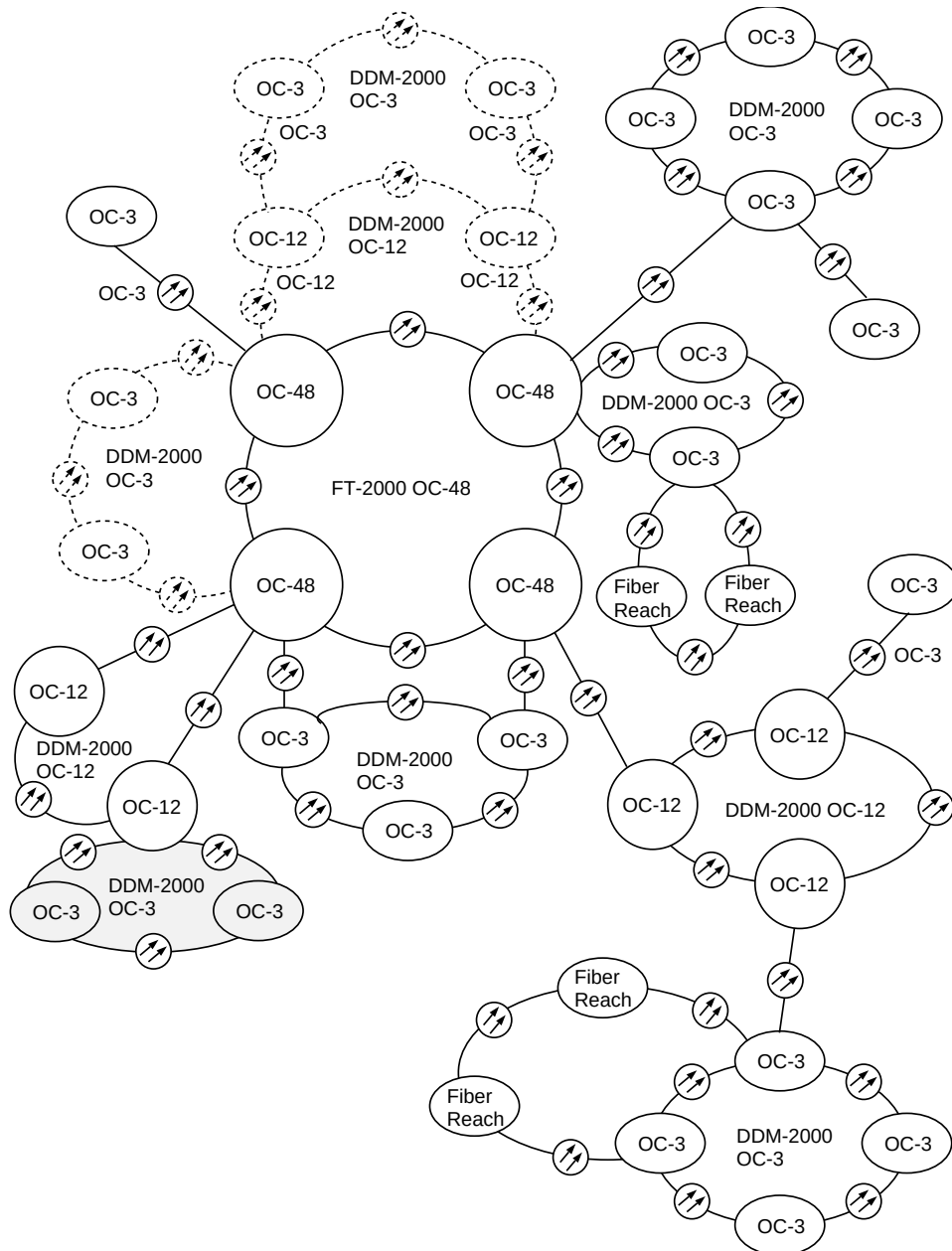


Figure 25. DDM-2000/FT-2000 Large Network Configurations — Single-Homed OC-3 Access via DDM-2000 OC-12 Backbone Ring

Establish Dual-Homed OC-3 Access
via FT-2000 OC-48 Backbone Ring
See Figure 27

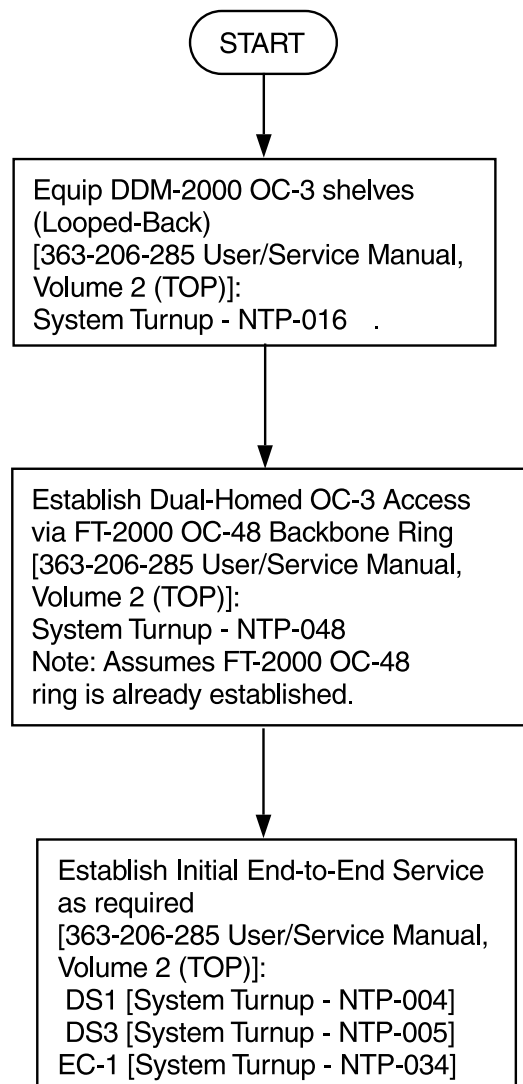


Figure 26. DDM-2000/FT-2000 Large Network Configurations — Dual-Homed OC-3 Access via FT-2000 OC-48 Backbone Ring

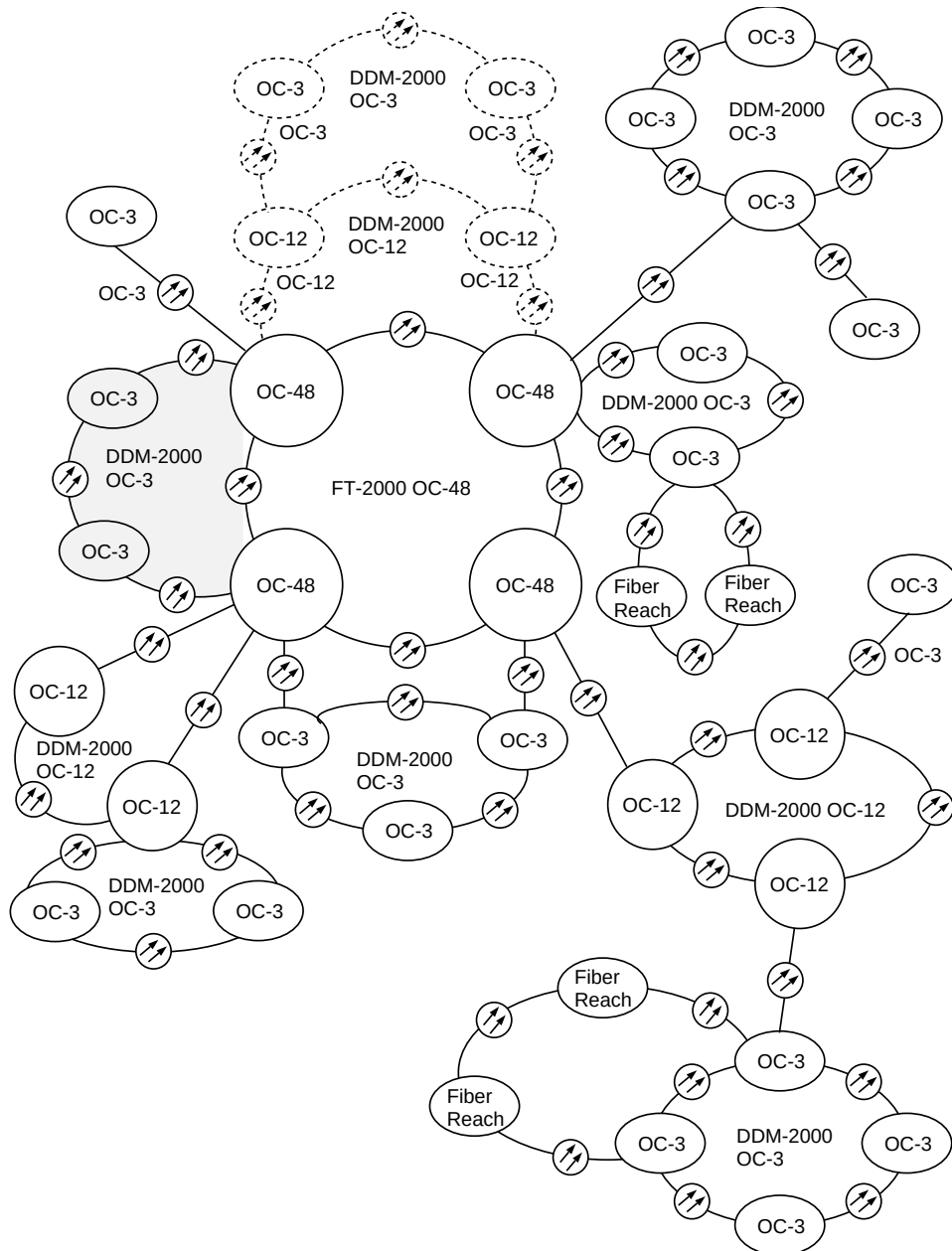


Figure 27. DDM-2000/FT-2000 Large Network Configurations — Dual-Homed OC-3 Access via FT-2000 OC-48 Backbone Ring

Establish Dual-Homed OC-12 Access
via FT-2000 OC-48 Backbone Ring
See Figure 29

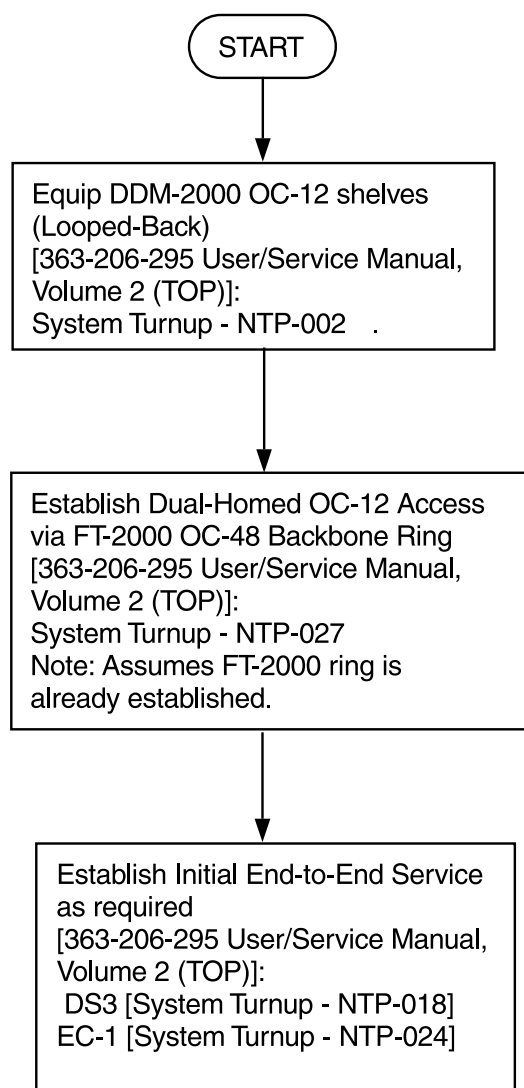


Figure 28. DDM-2000/FT-2000 Large Network Configurations — Dual-Homed OC-12 Access via FT-2000 OC-48 Backbone Ring

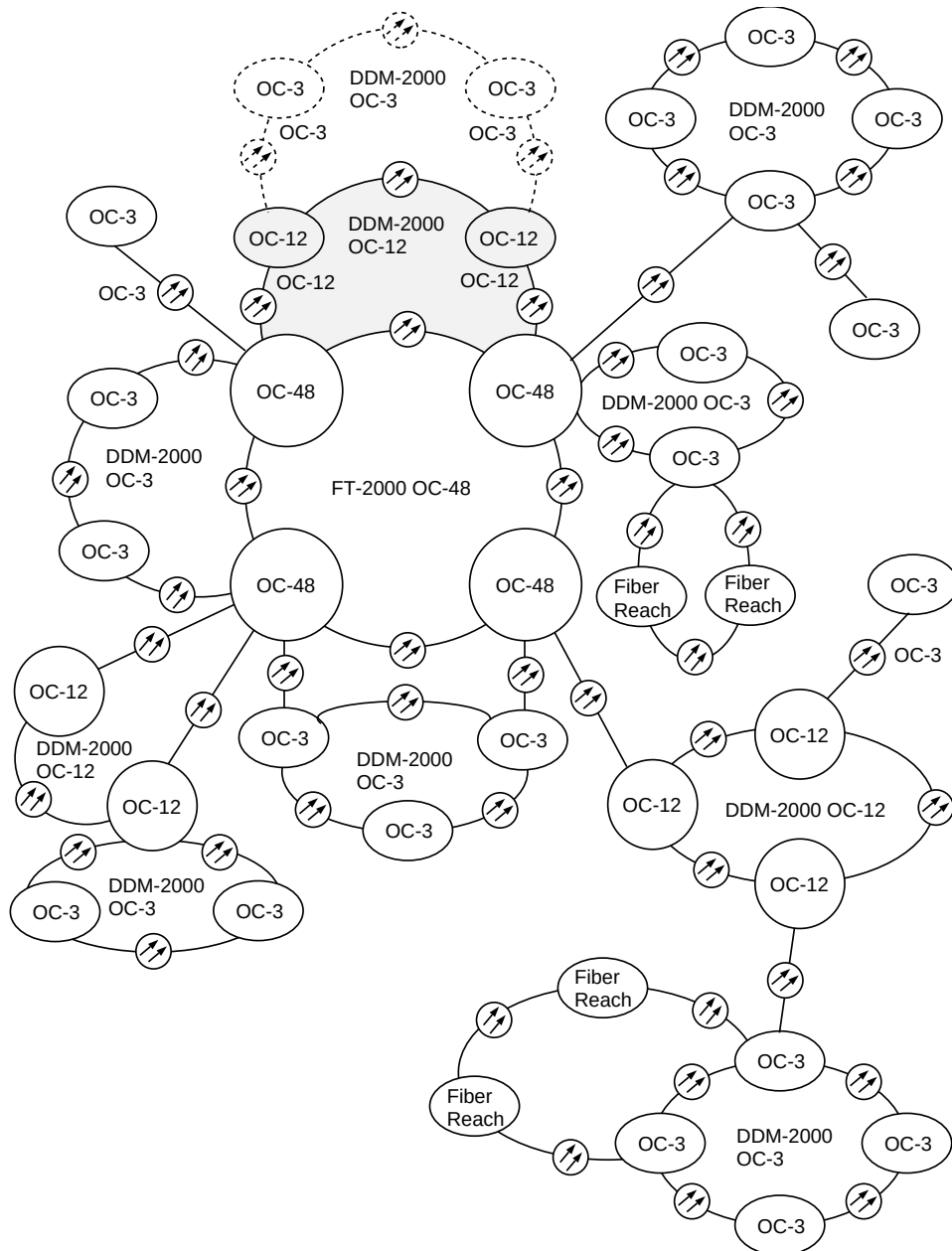


Figure 29. DDM-2000/FT-2000 Large Network Configurations — Dual-Homed OC-12 Access via FT-2000 OC-48 Backbone Ring

Establish Dual-Homed OC-3 Access
via DDM-2000 OC-12 Backbone Ring
See Figure 31

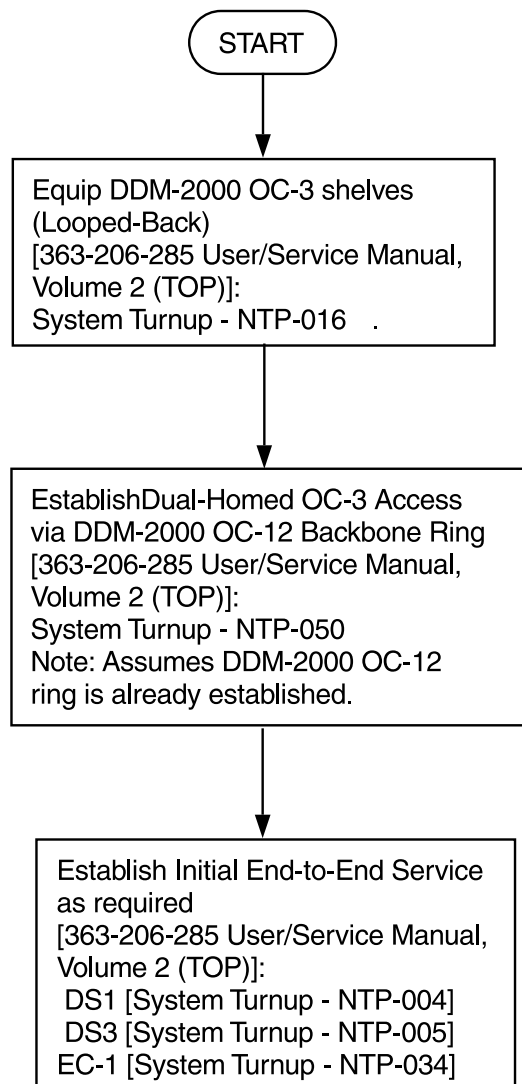


Figure 30. DDM-2000/FT-2000 Large Network Configurations — Dual-Homed OC-3 Access via DDM-2000 OC-12 Backbone Ring

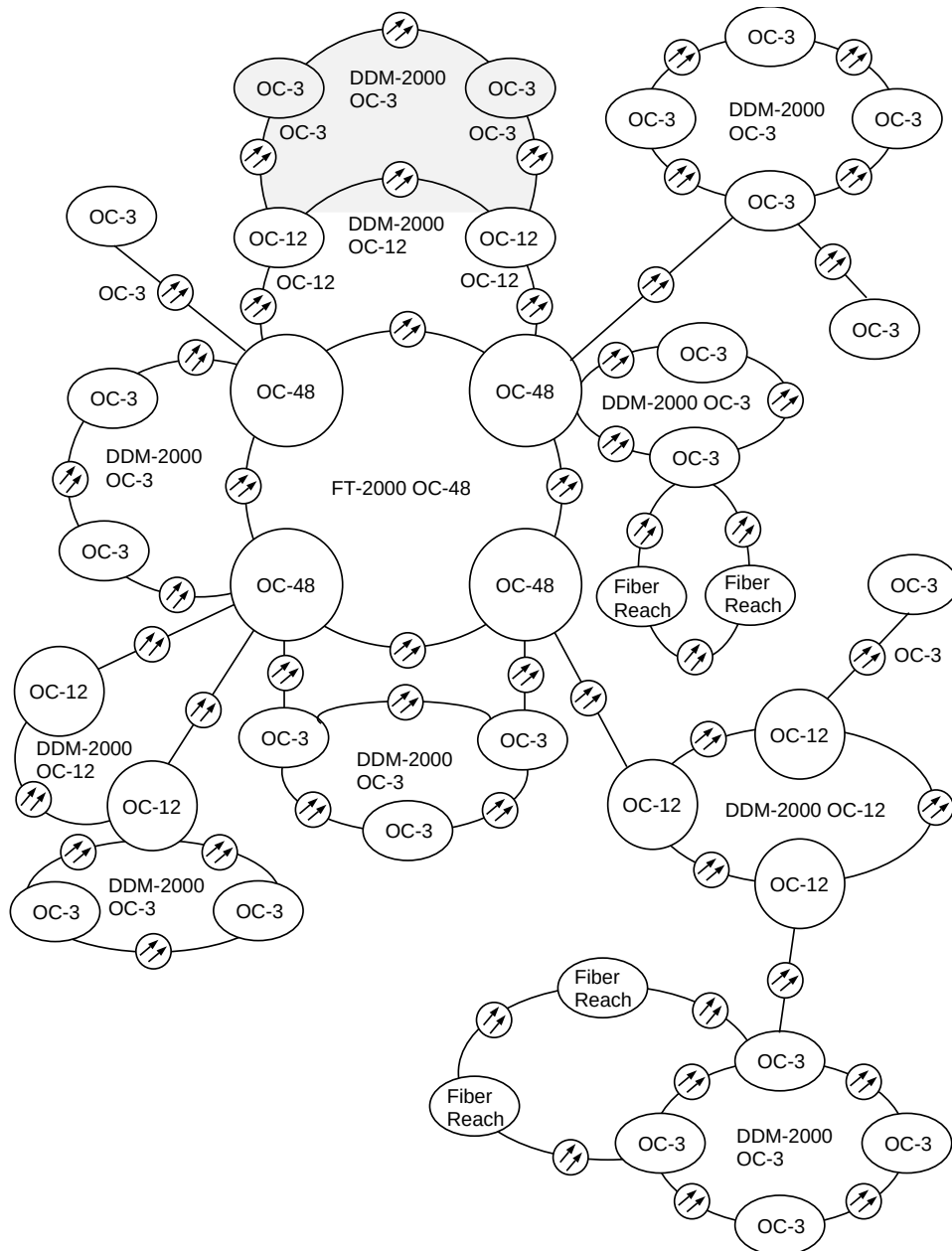


Figure 31. DDM-2000/FT-2000 Large Network Configurations — Dual-Homed OC-3 Access via DDM-2000 OC-12 Backbone Ring

Establish DDM-2000 OC-3c (STS-3c) Service

DO ITEMS BELOW IN ORDER LISTED FOR DETAILS, GO TO

1. **WARNING:**

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:

*DDM-2000 circuit packs contain static sensitive components which can be damaged by electrostatic discharge. A static ground wrist strap must be worn when handling the circuit packs. See electrostatic discharge considerations in **Trouble Clearing: TAD-100**.*

 NOTE 1:

It is assumed that the DDM-2000 has been properly equipped and has passed the looped transmission test(s) [**System Turnup: NTP-016**]. It is also assumed that the end-to-end OC-3 optical spans have been established.

 NOTE 2:

It is assumed that the DDM-2000 OC-3 shelf is colocated with the broadband terminal equipment which is connected to the **OLIUs** in the DDM-2000 OC-3 **FUNCTION UNITS C** slots.

 NOTE 3:

It is assumed that **21G/21G-U/21G2-U OLIUs** are installed in **MAIN** and **FUNCTION UNITS C** slots for OC-3c service and that the **OLIUs** in **FUNCTION UNITS C** slots are looped back at the terminating ends. **FUNCTION UNITS A** and **B** and **LOW SPEED** slots are not equipped when the DDM-2000 OC-3 shelf is equipped for OC-3c service.

DO ITEMS BELOW IN ORDER LISTED . . . FOR DETAILS, GO TO

Verify **21G/21G-U/21G2-U OLIU** circuit packs are installed in **FUNCTION UNITS C** slots.

2. **NOTE 1:**

The "**set -ne:**" command designates a shelf as the directory service network element (DSNE). **One**, and only one, shelf in the subnetwork **must** be provisioned as a DSNE. If there is no DSNE in the network, all DCC communication can become disabled. If more than one shelf is provisioned as DSNE, a "duplicate DSNE" alarm will occur. Multiple GNEs are allowed and a shelf is automatically provisioned as a GNE when connected to an active X.25 interface.

 NOTE 2:

Shelves may be designated as an alarm gateway network element (AGNE) and assigned an alarm group number. (Default alarm group number is 255.) At least one AGNE is required per alarm group. One primary AGNE and one backup per alarm group is recommended. For a network greater than 16 nodes, the AGNE and TL1 GNE should be on separate nodes.

Use the "**set -ne:**" command to:

- Designate ONE shelf in the subnetwork as the DSNE, if not already performed.
 - Designate the AGNE(s) and alarm group number, as required.
 - Set cross-connect mode to manual ("**crs>manual**").
-

DO ITEMS BELOW IN ORDER LISTED FOR DETAILS, GO TO

3. Use the "**ent-crs-sts1:**" command at each shelf to make the following STS-1 cross-connections: m-1 to c-1, m-2 to c-2, and m-3 to c-3. For example, "**ent-crs-sts1:m-1,c-1**".

-
4. Use the "**set-feat:feat=sts3c,act=enable**" command to allow OC-3c service to be supported.

-
5. Use the "**set-oc3:**" command to set the OC-3 line for **concat** mode.

-
6. Determine the optical loss of the OC-3c span from the DDM-2000 to the terminating equipment.

-
7. Remove optical loops from **OLIUs** in **FUNCTION UNITS C** slots and the terminating equipment.

-
8.  **NOTE:**
There are no option switches on the **21G2-U OLIU**.

Set the option switches on the **21G/21G-U OLIUs** in the **FUNCTION UNITS C** slots to agree with the loss of the optical span to the terminating equipment.

DLP-513

DO ITEMS BELOW IN ORDER LISTED FOR DETAILS, GO TO

9.  **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) and connect the optical cables from the DDM-2000 OC-3 to the terminating equipment. **DLP-514**

-
10. Perform an OC-3c transmission test using a SONET test set, if required. **DLP-544**
-

Establish End-to-End System DDM-2000 OC-3 Point to Point

DO ITEMS BELOW IN ORDER LISTED FOR DETAILS, GO TO

1.  **WARNING:**
Open optical connectors may emit invisible laser radiation. Avoid direct exposure to the beam. Do not view beam with optical instruments. Use of controls or adjustments or performance of procedures other than those specified herein may result in hazardous radiation exposure.

 **CAUTION:**
*DDM-2000 circuit packs contain static sensitive components which can be damaged by electrostatic discharge. A static ground wrist strap must be worn when handling the circuit packs. See electrostatic discharge considerations in **Trouble Clearing: TAD-100**.*

 **NOTE 1:**
If the DDM-2000 fails to respond in the indicated manner, refer to **Trouble Clearing: IXL-001**.

 **NOTE 2:**
It is assumed that the DDM-2000s at both ends of the system have been equipped and passed the looped shelf transmission test(s) [**System Turnup: NTP-016**].

Determine the optical loss of the optical facility from office records or by making the required measurements.

DO ITEMS BELOW IN ORDER LISTED FOR DETAILS, GO TO

2. **NOTE 1:**

For a given optical span, the network elements that terminate on each side of the span must have their DCC Network Side/User Side (NS/US) parameters set to opposite values to avoid an "inconsistent DCC values" alarm. Figure 1 illustrates the parameter settings.

 NOTE 2:

Setting the DCC Network Side/User Side (NS/US) parameters with the **set - fecom** command will cause a controller reset. It may take 2 minutes or more for the controller to stabilize after the reset.

Use the **rtrv - fecom/set - fecom** command to verify/set the DCC Network Side/User Side (NS/US) parameter settings.

3. **NOTE 1:**

The **set - ne:** command designates a shelf as the directory service network element (DSNE). **One**, and only one, shelf in the subnetwork **must** be provisioned as a DSNE. If there is no DSNE in the network, all DCC communication can become disabled. If more than one shelf is provisioned as DSNE, a "duplicate DSNE" alarm will occur. Multiple GNEs are allowed and a shelf is automatically provisioned as a GNE when connected to an active X.25 interface.

DO ITEMS BELOW IN ORDER LISTED FOR DETAILS, GO TO

⇒ **NOTE 2:**

Shelves may be designated as an alarm gateway network element (AGNE) and assigned an alarm group number. (Default alarm group number is 255.) At least one AGNE is required per alarm group. One primary AGNE and one backup per alarm group is recommended. For a network greater than 16 nodes, the AGNE and TL1 GNE should be on separate nodes.

⇒ **NOTE 3:**

Setting the DSNE parameters with the **set -ne** command will cause a controller reset. It may take 2 minutes or more for the controller to stabilize after the reset.

Use the **set -ne:** command to designate ONE shelf as the DSNE.

Use the **set -ne:** to designate the AGNE(s) and alarm group number, as required.

4. ⇒ **NOTE:**

Two or more shelves in the same network with the same TBOS display number will cause a "duplicate TBOS display" alarm. Two or more shelves in the same network with the same site/ne address will cause a "duplicate site/ne address" alarm. Two or more shelves in the same network with the same system name or TID will cause a "duplicate TID" alarm.

DO ITEMS BELOW IN ORDER LISTED FOR DETAILS, GO TO

Verify no duplicate TBOS, site/ne, or TID settings exist. The **rtrv-ne:** command may be used at each shelf in the network to display settings. If duplicates exist, determine new settings and use the **set-ne** command to change settings.

5. Remove **OLIU** optical loops (if installed).
-

6.  **NOTE:**
The section data communication channel (DCC), used for far-end communications, must be enabled at each network element (shelf) for the end-to-end line test to work. Default condition for the DCC channel is "enabled." If it has been disabled, use the **set-fecom:** command **at each shelf** to enable far-end communications (fecom).

At each shelf, use the **set-fecom:address:com=enabled** command to ensure far end communications (fecom) is enabled.

7. If **21G/21G-U OLIUs** are installed, set the option switch on the **21G/21G-U OLIUs** to agree with the loss of the optical facility.
-

DLP-513

DO ITEMS BELOW IN ORDER LISTED FOR DETAILS, GO TO

8. ➤ **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, and perform optical fiber connections and verification of the optical facility. **DLP-514**

9. ➤ **NOTE 1:**
If line timing mode is specified or external timing mode is specified but the timing reference was not available at shelf turnup, the **TGS** option switches are probably set for *free running*. Before the end-to-end system is established, the specified timing mode must be set on the **TGS** circuit pack.

➤ **NOTE 2:**
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.

➤ **NOTE 3:**
If external timing is selected and the **NE ACTY** LED remains lighted after the **TGS** circuit pack is reinserted, use the CIT and the **rtrv-sync** command to check the operational mode of the system. If the mode is **Holdover** instead of **External**, check that the incoming timing references are connected.

Set timing mode on **TGS** to the timing mode specified in work order or office records. **DLP-513**

DO ITEMS BELOW IN ORDER LISTED FOR DETAILS, GO TO

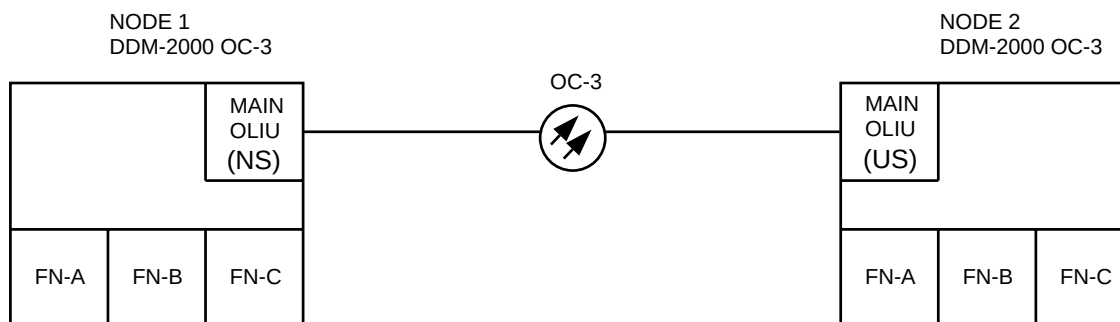
10. Perform end-to-end OC-3 line test. **DLP-525**

11. Perform end-to-end DS1 transmission test for each group, if required. **DLP-510**

12. Perform end-to-end DS3 transmission test for each group, if required. **DLP-511**

13. The system is now ready for initial DS1, DS3, or EC-1 service to be established.
[System Turnup: NTP-004] (DS1),
[System Turnup: NTP-005] (DS3),
[System Turnup: NTP-034] (EC-1).

DO ITEMS BELOW IN ORDER LISTED FOR DETAILS, GO TO



DDM-2000 OC-3 Linear Applications DCC Network Side (NS)/User Side (US) Defaults (set-fecom:nsus=ns/us)				
21-Type/ 22-Type OLIUs	MAIN dcc-m	FN-A dcc-a	FN-B dcc-b	FN-C dcc-c
	US	NS	NS	NS

Figure 1. Example of Linear System Network Side/User Side Settings

Establish Initial End-to-End DS1 Service Group Equipped But Not In Service

DO ITEMS BELOW IN ORDER LISTED FOR DETAILS, GO TO

1.  **CAUTION:**
*DDM-2000 circuit packs contain static sensitive components which can be damaged by electrostatic discharge. A static ground wrist strap must be worn when handling the circuit packs. See electrostatic discharge considerations in **Trouble Clearing: TAD-100**.*

 **NOTE 1:**
The OC-3 system must be established before continuing with this procedure. If all the nodes of the network have not been equipped and installed, refer to **System Turnup/Circuit Order: IXL-001** for procedures to equip the DDM-2000 shelves and establish the system.

 **NOTE 2:**
If the DS1 terminating end(s) are in a DDM-2000 OC-3, this procedure assumes that **MXRVO** circuit packs have already been installed during initial shelf turnup and either **MXRVO** or **STS1E** circuit packs have been installed during initial shelf turnup at the other DDM-2000 OC-3 terminating end(s) of the circuit. If the terminating end is in another system, it is assumed that the appropriate installation and connections have been made to that system. If the appropriate circuit packs have not been installed and the system is in-service on other groups, refer to **System Turnup/Circuit Order: IXL-001** for procedures to add a new group for DS1 service.

DO ITEMS BELOW IN ORDER LISTED FOR DETAILS, GO TO

⇒ NOTE 3:

If the DDM-2000 fails to respond in the indicated manner, refer to
Trouble Clearing: IXL-001.

Verify that no LEDs or alarms are activated. If any LEDs
or alarms are activated, refer to **Trouble Clearing:**
IXL-001 and follow the appropriate trouble-clearing
procedure.

2. ⇒ NOTE:

The "**rtrv-eqpt:**" command retrieves the "Equipage and
Version Report". This report lists the circuit pack type and version
information for one or more slots. See the "Commands and Reports"
section of this manual for a description of the "**rtrv-eqpt:**"
command format.

At each DDM-2000 OC-3 terminating end, use the
"**rtrv-eqpt:**" command to obtain the "Equipage and
Version Report" and verify that the proper service
and protection (if required) **MXRVO (STS1E)** circuit
packs have been installed in (**FUNCTION UNITS**
group(s) **A**, **B**, or **C**) being put into service.

DO ITEMS BELOW IN ORDER LISTED FOR DETAILS, GO TO

3. At the DS1 terminating node(s) of the circuit being established, determine which DS1 port(s) is to be put into service and what options are to be selected.

-
4.  **NOTE:**
The "**rtrv-t1:**" command retrieves the "T1 Port Provisioning Report". This report lists information about each DS1 port. This information includes attributes set by the "**set-t1:**" command. See the "Commands and Reports" section of this manual for a description of the "**rtrv-t1:**" command format.

At each DS1 terminating node, use the "**rtrv-t1:**" command to obtain the "T1 Port Provisioning Report" and verify the hardware and software option settings.

DO ITEMS BELOW IN ORDER LISTED FOR DETAILS, GO TO

5. ➤ **NOTE 1:**

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 terminate 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.

➤ **NOTE 2:**

If DS1 protection is required and any service **DS1PM** circuit packs are installed, a **DS1PM** circuit pack must be installed in the protection **8(P)** slot.

➤ **NOTE 3:**

If the **LOW SPEED GROUP** is to be equipped with any **BBF3/BBF3B DS1PM** circuit packs, both service and protection **MXRVO** circuit packs must be installed in the corresponding **FUNCTION UNITS** group.

At each DS1 terminating node, set option switches and install **DS1/DS1PM** circuit pack(s), as required.

DLP-508

DO ITEMS BELOW IN ORDER LISTED . . . FOR DETAILS, GO TO

6.  **CAUTION 1:**
*No service **LOW SPEED** DS1 slot locations should be left empty in **GROUPs** equipped with protection **DS1/DS1PM** circuit packs and corresponding to **FUNCTION UNITS** groups equipped with **MXRVO** circuit packs.*

-  **CAUTION 2:**
*When a **DS1/DS1PM** circuit pack is switched to protection, removal of any other **DS1/DS1PM** circuit pack or **177A** Retainer Card in the same **LOW SPEED GROUP** will result in a loss of service to the protected **DS1/DS1PM** and the removed **DS1/DS1PM** circuit pack.*

-  **NOTE:**
177A Retainer Cards are used to disconnect the cross-connect wiring associated with unused service DS1 **LOW SPEED** slot locations from the DDM-2000's internal protection bus.

Install **177A** Retainer Cards into all unused service **DS1** slots in **LOW SPEED GROUPs** equipped with protection **DS1/DS1PM** circuit packs and corresponding to **FUNCTION UNITS** groups equipped with **MXRVO** circuit packs.

-
7. At each DS1 terminating node, use the "**set-t1:**" command to set the characteristics of the DS1 port of the circuit being established.
-
8. At each DS1 terminating node, make the appropriate cable connection(s) to the DS1 cross-connect point(s) or equivalent connection point(s) for the circuit being added.
-

DO ITEMS BELOW IN ORDER LISTED FOR DETAILS, GO TO

9. Verify that no LEDs or alarms are activated. If any LEDs or alarms are activated, refer to **Trouble Clearing: IXL-001** and follow the appropriate trouble-clearing procedure.
10. If one of the terminating nodes is equipped with **STS1E** circuit packs for an EC-1 interface to support DS1 services being established, establish initial EC-1 low-speed interface [**NTP-034**].
11.  **NOTE 1:**
Ring releases support only manual VT1.5 and STS-1 cross-connections. Linear releases support default cross-connections and manual cross-connections if the shelf is set to manual using the "**set-ne:crs>manual**" command. In ring releases or when a shelf is set for manual cross-connections, manual STS-1 and/or DS1 cross-connections have to be made at each shelf to configure the transmission path for each DS3/DS1 circuit being established. Either terminating (drop) cross-connections or "drop and continue" cross-connections are made at terminating nodes and pass-through cross-connections are made at intermediate nodes.

DO ITEMS BELOW IN ORDER LISTED . . . FOR DETAILS, GO TO

⇒ **NOTE 2:**

In ring configurations, you should use the following rules in establishing cross-connections in each ring:

1. All drop connections (including DRI, if present) from the same STS-1 timeslot must be provisioned the same, either all VT1.5 or STS-1.
2. If all 28 VT1.5s (DS1s) in an STS-1 are being passed through at a node in a VT1.5 path-switched ring, then the cross-connection may be provisioned as either a pass-through STS-1 or VT1.5. However, if you anticipate dropping VT1.5s from the pass-through node in the future, you should provision the pass-throughs as VT1.5 cross-connections. OC-3 ring Releases 7.0 and earlier do not support the command (**cnvt-crs**) for converting an STS-1 to a VT1.5 cross-connect. Also, provisioning now as a VT1.5 cross-connect will avoid a hit on traffic if the STS-1 cross-connect has to be converted to 28 VT1.5 cross-connections to drop DS1s at a later time.
3. On STS-1 path-switched rings, all nodes in the ring must be provisioned as STS-1 cross-connections.

⇒ **NOTE 3:**

The following commands may be used to convert, delete, enter, and retrieve cross-connections: "**cnvt-crs**", "**dlt-crs-sts1**", "**dlt-crs-vt1**", "**ent-crs-sts1**", "**ent-crs-vt1**", "**rtrv-crs-sts1**", and "**rtrv-crs-vt1**". See the "Commands and Reports" section of this manual for a description of commands. See "Cross-Connection Provisioning" in the "Administration and Provisioning" section of this manual for more information on cross-connection provisioning.

Determine the necessary cross-connections for each node from the work order or circuit order.

DO ITEMS BELOW IN ORDER LISTED FOR DETAILS, GO TO

12. Make necessary VT1.5/STS1 cross-connections at each node in the network.

A. Linear or Add/Drop Configuration	DLP-545
B. Single Ring Configuration	DLP-546
C. Dual Ring Interworking (DRI) Configuration	DLP-550
D. Single/Dual OC-3/FiberReach Configuration	DLP-557
E. Stand Alone OC-3/FiberReach Configuration	DLP-558
F. Single/Dual OC-3/OC-48 Configuration	DLP-559
G. Single/Dual OC-3/OC-12 Configuration	DLP-560

-
13.  **NOTE:**

For a DS1 circuit in a path protected ring network, the "sw-path- () :address" command must be used at the terminating nodes (and dual ring interworking (DRI) nodes in a DRI ring network) to switch the active VT1.5 (DS1) path to repeat this test on the other path(s).

Perform DS1 end-to-end transmission test for each circuit being put into service, as required:

A. Linear or Ring Configuration	DLP-510
B. Dual Ring Interworking (DRI) Configuration	DLP-554
C. OC-3/FiberReach Configuration	DLP-510

DO ITEMS BELOW IN ORDER LISTED FOR DETAILS, GO TO

14. Use the **"rtrv-state-eqpt"** command to determine the port state of the DS1 port(s) of the circuit being established.

-
15.  **NOTE:**

If a port is in the *nmon* (*n*) state, the signal is not monitored or alarmed. The port will not automatically go to the *in service* (*i*) state when a signal is detected as it will in the *auto* (*a*) state. In the *nmon* state, the port must be returned to the *auto* state, using the **"set-state-t1:"** command, to turn on monitoring of signal failures and before any circuit packs associated with that port can be removed from the equipment list by the **"upd"** command.

Use the **"set-state-t1:"** command to set the port state of the DS1 port(s) of the circuit being established.

-
16. If **BBF3/BBF3B DS1PM** circuit packs are installed and the optional ***ds1pm*** performance monitoring feature is to be used, use the **"set-feat:feat=ds1pm,act=enable"** command to enable the feature.
-

Establish Initial End-to-End DS3 Service Group Equipped But Not In Service

DO ITEMS BELOW IN ORDER LISTED FOR DETAILS, GO TO

1.  **CAUTION:**
*DDM-2000 circuit packs contain static sensitive components which can be damaged by electrostatic discharge. A static ground wrist strap must be worn when handling the circuit packs. See electrostatic discharge considerations in **Trouble Clearing: TAD-100**.*

 **NOTE 1:**
The OC-3 system must be established before continuing with this procedure. If all the nodes of the network have not been equipped and installed, refer to **System Turnup/Circuit Order: IXL-001** for procedures to equip the DDM-2000 shelves, and to establish a system.

 **NOTE 2:**
This procedure assumes that **DS3** circuit packs have already been installed during the initial shelf turnup at the DS3 terminating end(s) of the circuit and either **DS3** or **STS1E** circuit packs have been installed during initial shelf turnup at the other terminating end of the circuit. If the appropriate circuit packs have not been installed and the system is in service on other groups, refer to **System Turnup/Circuit Order: IXL-001** for procedures to add a new DS3 group for DS3 service.

 **NOTE 3:**
If the DDM-2000 fails to respond in the indicated manner, refer to **Trouble Clearing: IXL-001**.

DO ITEMS BELOW IN ORDER LISTED FOR DETAILS, GO TO

At the DS3 terminating node(s) of the circuit being established, determine which DS3 port is to be put into service and what options are to be selected.

2. **NOTE:**

The "**rtrv-eqpt:**" command retrieves the "Equipage and Version Report". This report lists the circuit pack type and version information for one or more slots. See the "Commands and Reports" section of this manual for a description of the "**rtrv-eqpt:**" command format.

Use the "**rtrv-eqpt:**" command to obtain the "Equipage and Version Report" and verify that the service and protection (if required) **DS3** circuit packs have been installed in proper group (**FUNCTION UNITS A, B, or C**) being put into service.

3. **NOTE:**

The "**rtrv-t3:**" command retrieves the "T3 Port Provisioning Report". This report lists information about each DS3 port. This information includes attributes set by the "**set-t3:**" command. See the "Commands and Reports" section of this manual for a description of the "**rtrv-t3:**" command format.

Use the "**rtrv-t3:**" command to obtain the "T3 Port Provisioning Report" and verify the software option settings.

DO ITEMS BELOW IN ORDER LISTED FOR DETAILS, GO TO

4.  **NOTE:**
 DS1 circuit packs **cannot** be installed in a group that is equipped with
 DS3 circuit packs.

Verify the line build out (LBO) option jumpers are
installed as required and reinstall **DS3** circuit pack(s).

DLP-513

-
5. Make the appropriate cable connection(s) to the DS3
cross-connect point(s) or equivalent connection point(s)
for the circuit being added.

-
6. Verify that no LEDs or alarms are activated. If any LEDs
or alarms are activated, refer to **Trouble Clearing:**
IXL-001 and follow the appropriate trouble-clearing
procedure.

-
7. If one of the terminating nodes is equipped with **STS1E**
circuit packs for an EC-1 interface to support DS3
services being established, establish initial EC-1 low-
speed interface.

NTP-034

DO ITEMS BELOW IN ORDER LISTED FOR DETAILS, GO TO

8. **NOTE 1:**

Ring releases support only manual VT1.5 and STS-1 cross-connections. Linear releases support default cross-connections and manual cross-connections if the shelf is set to manual using the "**set-ne:crs=manual**" command. In ring releases or when a shelf is set for manual cross-connections, manual STS-1 and/or DS1 cross-connections have to be made at each shelf to configure the transmission path for each DS3/DS1 circuit being established. Either terminating (drop) cross-connections or "drop and continue" cross-connections are made at terminating nodes and pass-through cross-connections are made at intermediate nodes.

 NOTE 2:

In ring configurations, you should use the following rules in establishing cross-connections in each ring:

1. All drop connections (including DRI, if present) from the same STS-1 timeslot must be provisioned the same, either all VT1.5 or STS-1.
2. If all 28 VT1.5s (DS1s) in an STS-1 are being passed through at a node in a VT1.5 path-switched ring, then the cross-connection may be provisioned as either a pass-through STS-1 or VT1.5. However, if you anticipate dropping VT1.5s from the pass-through node in the future, you should provision the pass-throughs as VT1.5 cross-connections. Also, provisioning now as a VT1.5 cross-connect will avoid a hit on traffic if the STS-1 cross-connect has to be converted ("**cnvt-crs**") to 28 VT1.5 cross-connects to drop DS1s at a later time.
3. On STS-1 path-switched rings, all nodes in the ring must be provisioned as STS-1 cross-connections.

DO ITEMS BELOW IN ORDER LISTED FOR DETAILS, GO TO

⇒ **NOTE 3:**

The following commands may be used to delete, enter, and retrieve STS-1 cross-connections in a path protected ring network: "**dlt-crs-sts1**", "**ent-crs-sts1**", and "**rtrv-crs-sts1**". See the "Commands and Reports" section of this manual for a description of commands.

Determine the necessary STS-1 cross-connections for each node from the work order or circuit order.

-
9. Make necessary STS-1 cross-connections for each node in the network.

A. Linear or Add/Drop Configuration	DLP-545
B. Single Ring Configuration	DLP-546
C. Dual Ring Interworking (DRI) Configuration	DLP-550
D. Single/Dual OC-3/OC-48 Configuration	DLP-559
E. Single/Dual OC-3/OC-12 Configuration	DLP-560

10. ⇒ **NOTE:**

For a DS3 circuit in a path protected ring network, the "**sw-path-sts1:address**" command must be used at the terminating nodes [and dual ring interworking (DRI) nodes in a DRI ring network] to switch the active STS-1 (DS3) path to repeat this test on the other path(s).

DO ITEMS BELOW IN ORDER LISTED FOR DETAILS, GO TO

Perform DS3 end-to-end transmission test for each circuit being put into service (optional).

A. Linear or Single Ring Configuration	DLP-511
B. Dual Ring Interworking (DRI) Configuration	DLP-553
C. Single/Dual Homing Ring Configuration	DLP-511
-

11. Use the "**set - t3:**" command to set the characteristics of the DS3 port of the circuit being established.
-

12. Use the "**rtrv-state-eqpt**" command to determine the port state of the DS3 port of the circuit being established.
-

13.  **NOTE:**
If a port is in the *nmon* (*n*) state, the signal is not monitored or alarmed. The port will not automatically go to the *in service* (*i*) state when a signal is detected as it will in the *auto* (*a*) state. In the *nmon* state, the port must be returned to the *auto* state, using the "**set-state-t3:**" command, to turn on monitoring of signal failures and before any circuit packs associated with that port can be removed from the equipment list by the "**upd**" command.

Use the "**set-state-t3:**" command to set the port state of the DS3 port of the circuit being established.

Add New DS1 Service Group Already In Service

DO ITEMS BELOW IN ORDER LISTED FOR DETAILS, GO TO

1.  **CAUTION:**
*DDM-2000 circuit packs contain static sensitive components which can be damaged by electrostatic discharge. A static ground wrist strap must be worn when handling the circuit packs. See electrostatic discharge considerations in **Trouble Clearing: TAD-100**.*

 **NOTE 1:**
This procedure assumes that the DDM-2000 is in service and that a new DS1 port or **DS1/DS1PM** circuit pack is being added to a **LOW SPEED GROUP** that is already in service and the corresponding **FUNCTION UNITS** group is equipped with **MXRVO** circuit packs at the DS1 terminating end(s). It also assumes that **STS1E** circuit packs have been installed if the other end is an EC-1 interface. If proper circuit packs have not been installed and the system is in service on other groups, refer to **System Turnup/Circuit Order: IXL-001** for procedures to add a new group (**MXRVO** or **STS1E**).

 **NOTE 2:**
If the **LOW SPEED GROUP** is to be equipped with any **BBF3/BBF3B DS1PM** circuit packs, both service and protection **MXRVO** circuit packs must be installed in the corresponding **FUNCTION UNITS** group. Also, if DS1 protection is required and service **DS1PM** circuit packs are to be installed, a **DS1PM** circuit pack must first be installed in the protection **8(P)** slot.

DO ITEMS BELOW IN ORDER LISTED FOR DETAILS, GO TO

⇒ **NOTE 3:**

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 terminate 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.

⇒ **NOTE 4:**

If the DDM-2000 fails to respond in the indicated manner, refer to **Trouble Clearing: IXL-001**.

Determine which DS1 ports/slots are to be put into service and what options are to be selected.

-
2. Verify that no LEDs or alarms are activated. If any LEDs or alarms are activated, refer to **Trouble Clearing: IXL-001** and follow the appropriate trouble-clearing procedure.
-

DO ITEMS BELOW IN ORDER LISTED FOR DETAILS, GO TO

3.  **CAUTION 1:**
*To minimize "hits" on in-service ports on **DS1/DS1PM** circuit packs having a port added, it is recommended that a CIT be used to manually switch (using the "**switch-ls**" command) the DS1 to protection if the **DS1/DS1PM** circuit pack is removed or to set channel options without removing the circuit pack.*

 **CAUTION 2:**
*If the protection **DS1/DS1PM** circuit pack is not available for a protection switch, removing a service **DS1/DS1PM** circuit pack will interrupt service on all ports on that circuit pack. If a CIT is available, use the "**rtrv-state-eqpt**" command to check the status of the protection switch.*

 **CAUTION 3:**
*When a **DS1/DS1PM** circuit pack is switched to protection, removal of any other **DS1/DS1PM** circuit pack or **177A** Retainer Card in the same **LOW SPEED GROUP** will result in a loss of service to the protection **DS1/DS1PM** circuit pack and the removed **DS1/DS1PM** circuit pack.*

 **CAUTION 4:**
*No service **LOW SPEED** DS1 slot locations should be left empty in **GROUPs** equipped with protection **DS1/DS1PM** circuit packs and corresponding to **FUNCTION UNITS** groups equipped with **MXRVO** circuit packs.*

Condition **DS1/DS1PM** circuit pack or port for new DS1
service being added.

DLP-520

DO ITEMS BELOW IN ORDER LISTED FOR DETAILS, GO TO

4. At each DS1 terminating node, use the "**set-t1:**" command to set the characteristics of the DS1 port being established, if not already performed.

-
5. At each DS1 terminating node, make the appropriate cable connection(s) to the DS1 cross-connect point(s) or equivalent connection point(s) for the circuit(s) being added.

-
6. Verify that no LEDs or alarms are activated. If any LEDs or alarms are activated, refer to **Trouble Clearing: IXL-001** and follow the appropriate trouble-clearing procedure.

-
7.  **NOTE 1:**
Ring releases support only manual VT1.5 and STS-1 cross-connections. Linear releases support default cross-connections and manual cross-connections if the shelf is set to manual using the "**set-ne:crs>manual**" command. In ring releases or when a shelf is set for manual cross-connections, manual STS-1 and/or DS1 cross-connections have to be made at each shelf to configure the transmission path for each DS3/DS1 circuit being established. Either terminating (drop) cross-connections or "drop and continue" cross-connections are made at terminating nodes and pass-through cross-connections are made at intermediate nodes.

DO ITEMS BELOW IN ORDER LISTED . . . FOR DETAILS, GO TO

⇒ **NOTE 2:**

In ring configurations, you should use the following rules in establishing cross-connections in each ring:

1. All drop connections (including DRI, if present) from the same STS-1 timeslot must be provisioned the same, either all VT1.5 or STS-1.
2. If all 28 VT1.5s (DS1s) in an STS-1 are being passed through at a node in a VT1.5 path-switched ring, then the cross-connection may be provisioned as either a pass-through STS-1 or VT1.5. However, if you anticipate dropping VT1.5s from the pass-through node in the future, you should provision the pass-throughs as VT1.5 cross-connections. Also, provisioning now as a VT1.5 cross-connect will avoid a hit on traffic if the STS-1 cross-connect has to be converted ("**cnvt-crs**") to 28 VT1.5 cross-connects to drop DS1s at a later time.
3. On STS-1 path-switched rings, all nodes in the ring must be provisioned as STS-1 cross-connections.

⇒ **NOTE 3:**

The following commands may be used to convert, delete, enter, and retrieve cross-connections: "**cnvt-crs**", "**dlt-crs-sts1**", "**dlt-crs-vt1**", "**ent-crs-sts1**", "**ent-crs-vt1**", "**rtrv-crs-sts1**", and "**rtrv-crs-vt1**". See the "Commands and Reports" section of this manual for a description of commands. See "Cross-Connection Provisioning" in the "Administration and Provisioning" section of this manual for more information on cross-connection provisioning.

Determine the necessary cross-connections for each node from the work order or circuit order.

DO ITEMS BELOW IN ORDER LISTED FOR DETAILS, GO TO

8. Make necessary VT1.5/STS1 cross-connections for each node in the network.

A. Linear or Add/Drop Configuration	DLP-545
B. Single Ring Configuration	DLP-546
C. Dual Ring Interworking (DRI) Configuration	DLP-550
D. Single/Dual OC-3/FiberReach Configuration	DLP-557
E. Stand Alone OC-3/FiberReach Configuration	DLP-558
F. Single/Dual OC-3/OC-48 Configuration	DLP-559
G. Single/Dual OC-3/OC-12 Configuration	DLP-560

-
9.  **NOTE:**

For a DS1 circuit in a path protected ring network, the "**sw-path-vt1: address**" command must be used at the terminating nodes [and dual ring interworking (DRI) nodes in a DRI ring network] to switch the active VT1.5 (DS1) path to repeat this test on the other path.

Perform DS1 end-to-end transmission test for each circuit being put into service.

A. Linear or Single Ring Configuration	DLP-510
B. Dual Ring Interworking (DRI) Configuration	DLP-554
C. OC-3/FiberReach Configuration	DLP-510

-
10. Use the "**rtrv-state-eqpt**" command to determine the port state of the DS1 port(s) of the circuit being established.
-

DO ITEMS BELOW IN ORDER LISTED FOR DETAILS, GO TO

11.  **NOTE:**
If a port is in the *nmon* (*n*) state, the signal is not monitored or alarmed. The port will not automatically go to the *in service* (*i*) state when a signal is detected as it will in the *auto* (*a*) state. In the *nmon* state, the port must be returned to the *auto* state, using the "**set-state-t1:**" command, to turn on monitoring of signal failures and before any circuit packs associated with that port can be removed from the equipment list by the **upd** command.

Use the "**set-state-t1:**" command to set the port state of the DS1 port(s) of the circuit being established.

-
12. If **BBF3/BBF3B DS1PM** circuit packs are installed and the optional **ds1pm** performance monitoring feature is to be used, use the "**set-feat:feat=ds1pm,act=enable**" command to enable the feature.
-

Add New DS3 Group for DS3 Service System In Service

DO ITEMS BELOW IN ORDER LISTED FOR DETAILS, GO TO

1.  **CAUTION:**
*DDM-2000 circuit packs contain static sensitive components which can be damaged by electrostatic discharge. A static ground wrist strap must be worn when handling the circuit packs. See electrostatic discharge considerations in **Trouble Clearing: TAD-100**.*

 **NOTE 1:**
This procedure assumes that the DDM-2000 is in service and that a new group is being equipped with **DS3/DS3PM** circuit packs for DS3 service. It also assumes that **STS1E** circuit packs have been installed if the other end is an EC-1 interface. If it has not been installed, refer to **System Turnup/Circuit Order: IXL-001** for procedures to add a new **STS1E** group.

 **NOTE 2:**
If the DDM-2000 fails to respond in the indicated manner, refer to **Trouble Clearing: IXL-001**.

Determine which **FUNCTION UNITS** group (**A**, **B**, or **C**) is being equipped.

DO ITEMS BELOW IN ORDER LISTED FOR DETAILS, GO TO

2. Use the "**rtrv-alm**" command to verify that no alarms, locks, loops, or switches are present.

-
3. Verify no **DS1/DS1PM** circuit packs are installed in **LOW SPEED** slots associated with new DS3 **FUNCTION UNITS** group being added.
-

4. Set line build out (LBO) option jumpers and install **DS3/DS3PM** circuit packs into proper slots of **FUNCTION UNITS** group (**A, B, or C**) being equipped.
-

DLP-507

5. Make the appropriate connection(s) to the DS3 cross-connect point(s) or equivalent connection point(s) for the circuit(s) being added.
-

6. Verify that no LEDs or alarms are activated. If any LEDs or alarms are activated, refer to **Trouble Clearing: IXL-001**.
-

DO ITEMS BELOW IN ORDER LISTED . . . FOR DETAILS, GO TO

7. **NOTE 1:**

Ring releases support only manual VT1.5 and STS-1 cross-connections. Linear releases support default cross-connections and manual cross-connections if the shelf is set to manual using the "**set-ne:crs=manual**" command. In ring releases or when a shelf is set for manual cross-connections, manual STS-1 and/or DS1 cross-connections have to be made at each shelf to configure the transmission path for each DS3/DS1 circuit being established. Either terminating (drop) cross-connections or "drop and continue" cross-connections are made at terminating nodes and pass-through cross-connections are made at intermediate nodes.

 NOTE 2:

In ring configurations, you should use the following rules in establishing cross-connections in each ring:

1. All drop connections (including DRI, if present) from the same STS-1 timeslot must be provisioned the same, either all VT1.5 or STS-1.
2. If all 28 VT1.5s (DS1s) in an STS-1 are being passed through at a node in a VT1.5 path-switched ring, then the cross-connection may be provisioned as either a pass-through STS-1 or VT1.5. However, if you anticipate dropping VT1.5s from the pass-through node in the future, you should provision the pass-throughs as VT1.5 cross-connections. Also, provisioning now as a VT1.5 cross-connect will avoid a hit on traffic if the STS-1 cross-connect has to be converted to 28 VT1.5 cross-connects to drop DS1s at a later time.
3. On STS-1 path-switched rings, all nodes in the ring must be provisioned as STS-1 cross-connections.

DO ITEMS BELOW IN ORDER LISTED . . . FOR DETAILS, GO TO

⇒ **NOTE 3:**

The following commands may be used to convert, delete, enter, and retrieve STS-1 cross-connections: "**dlt-crs-sts1**", "**ent-crs-sts1**", and "**rtrv-crs-sts1**". See the "Commands and Reports" section of this manual for a description of commands. See "Cross-Connection Provisioning" in the "Administration and Provisioning" section of this manual for more information on cross-connection provisioning.

Determine the necessary STS-1 cross-connections for each node from the work order or circuit order.

-
8. Make necessary STS-1 cross-connections for each node in the network.

A. Linear or Add/Drop Configuration	DLP-545
B. Ring Configuration	DLP-546
C. Dual Ring Interworking (DRI) Configuration	DLP-550
D. Single/Dual OC-3/OC-48 Configuration	DLP-559
E. Single/Dual OC-3/OC-12 Configuration	DLP-560

9. ⇒ **NOTE:**

For a DS3 circuit in a path protected ring network, the "**sw-path-sts1:address**" command must be used at the terminating nodes [and dual ring interworking (DRI) nodes in a DRI ring network] to switch the active STS-1 (DS3) path to repeat this test on the other path.

DO ITEMS BELOW IN ORDER LISTED FOR DETAILS, GO TO

Perform DS3 end-to-end transmission test for each circuit being put into service (optional).

A. Linear or Single Ring Configuration	DLP-511
B. Dual Ring Interworking (DRI) Configuration	DLP-553
C. Single/Dual Homing Configuration	DLP-511
-

10. Use the "**set-t3:**" command to set the characteristics of the DS3 port.
-

11. Use the "**rtrv-state-eqpt**" command to determine the port state of the DS3 port(s) of the circuit being established.
-

12.  **NOTE:**
If a port is in the *nmon* (*n*) state, the signal is not monitored or alarmed. The port will not automatically go to the *in service* (*i*) state when a signal is detected as it will in the *auto* (*a*) state. In the *nmon* state, the port must be returned to the *auto* state, using the "**set-state-t3:**" command, to turn on monitoring of signal failures and before any circuit packs associated with that port can be removed from the equipment list by the "**upd**" command.

Use the "**set-state-t3:**" command to set the port state of the DS3 port(s) of the circuit being established.

Add New MXRVO Group for DS1 Service System In Service

DO ITEMS BELOW IN ORDER LISTED FOR DETAILS, GO TO

1.  **WARNING:**
*DDM-2000 circuit packs contain static sensitive components which can be damaged by electrostatic discharge. A static ground wrist strap must be worn when handling the circuit packs. See electrostatic discharge considerations in **Trouble Clearing: TAD-100**.*

 **NOTE 1:**
This procedure assumes that the DDM-2000 is in service and that a new **FUNCTION UNITS** group(s) is being added with **MXRVO** circuit packs for DS1 service. If the group is already equipped with **MXRVO** circuit packs, refer to **Circuit Order: NTP-006**. This procedure also assumes that **STS1E** circuit packs have been installed if the other end is an EC-1 interface. If proper circuit packs have not been installed at the EC-1 interface, refer to **System Turnup/Circuit Order: IXL-001** for procedures to add new **STS1E** group.

 **NOTE 2:**
If the DDM-2000 fails to respond in the indicated manner, refer to **Trouble Clearing: IXL-001**.

Determine which **FUNCTION UNITS** group (**A**, **B**, or **C**) is being equipped.

DO ITEMS BELOW IN ORDER LISTED FOR DETAILS, GO TO

2. Use the "**rtrv-alm**" command to verify that no alarms, locks, loops, or switches are present.

-
3.  **NOTE:**
If the **LOW SPEED GROUP** is to be equipped with any **BBF3/BBF3B DS1PM** circuit packs, both service and protection **MXRVO** circuit packs must be installed in the corresponding **FUNCTION UNITS** group.

At DS1 terminating end, install **MXRVO** circuit packs into proper slots of **FUNCTION UNITS** group (**A**, **B**, or **C**) being equipped.

DLP-506

-
4.  **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 terminate 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.

DO ITEMS BELOW IN ORDER LISTED FOR DETAILS, GO TO

Option and install required service **DS1/DS1PM** circuit packs. **DLP-508**

5.  **NOTE:**
If DS1 protection is required and service **DS1PM** circuit packs are installed, a **DS1PM** circuit pack must be installed in the protection **8(P)** slot.

Install protection **DS1/DS1PM** circuit pack into slot **8(P)** of **LOW SPEED GROUP** being put into service, if required. **DLP-508**

6. At the DS1 terminating end(s) use the "**set - t1**" command to set the characteristics of the DS1 ports.
-

7.  **CAUTION:**
*No service **LOW SPEED** DS1 slot locations should be left empty in **GROUPs** equipped with protection **DS1/DS1PM** circuit packs and corresponding to **FUNCTION UNITS** groups equipped with **MXRVO** circuit packs.*

-  **NOTE:**
177A Retainer Cards are used to disconnect the cross-connect wiring associated with unused service DS1 **LOW SPEED** slot locations from the DDM-2000's internal protection bus.

DO ITEMS BELOW IN ORDER LISTED . . . FOR DETAILS, GO TO

Install **177A** Retainer Cards into all unequipped service DS1 slots in **LOW SPEED GROUPS** equipped with protection **DS1/DS1PM** circuit packs and corresponding to **FUNCTION UNITS** groups equipped with **MXRVO** circuit packs.

8. Make the appropriate connection(s) to the DS1 cross-connect point(s) or equivalent connection point(s) for the circuit(s) being added.
-

9. Verify that no LEDs or alarms are activated. If any LEDs or alarms are activated, refer to **Trouble Clearing: IXL-001**.
-

10.  **NOTE 1:**
Ring releases support only manual VT1.5 and STS-1 cross-connections. Linear releases support default cross-connections and manual cross-connections if the shelf is set to manual using the "**set-ne:crs>manual**" command. In ring releases or when a shelf is set for manual cross-connections, manual STS-1 and/or DS1 cross-connections have to be made at each shelf to configure the transmission path for each DS3/DS1 circuit being established. Either terminating (drop) cross-connections or "drop and continue" cross-connections are made at terminating nodes and pass-through cross-connections are made at intermediate nodes.

DO ITEMS BELOW IN ORDER LISTED FOR DETAILS, GO TO

⇒ **NOTE 2:**

In ring configurations, you should use the following rules in establishing cross-connections in each ring:

1. All drop connections (including DRI, if present) from the same STS-1 timeslot must be provisioned the same, either all VT1.5 or STS-1.
2. If all 28 VT1.5s (DS1s) in an STS-1 are being passed through at a node in a VT1.5 path-switched ring, then the cross-connection may be provisioned as either a pass-through STS-1 or VT1.5. However, if you anticipate dropping VT1.5s from the pass-through node in the future, you should provision the pass-throughs as VT1.5 cross-connections. Also, provisioning now as a VT1.5 cross-connect will avoid a hit on traffic if the STS-1 cross-connect has to be converted to 28 VT1.5 cross-connects to drop DS1s at a later time.
3. On STS-1 path-switched rings, all nodes in the ring must be provisioned as STS-1 cross-connections.

⇒ **NOTE 3:**

The following commands may be used to convert, delete, enter, and retrieve cross-connections: "**cnvt-crs**", "**dlt-crs-sts1**", "**dlt-crs-vt1**", "**ent-crs-sts1**", "**ent-crs-vt1**", "**rtrv-crs-sts1**", and "**rtrv-crs-vt1**". See the "Commands and Reports" section of this manual for a description of commands. See "Cross-Connection Provisioning" in the "Administration and Provisioning" section of this manual for more information on cross-connection provisioning.

Determine the necessary cross-connections for each node from the work order or circuit order.

DO ITEMS BELOW IN ORDER LISTED FOR DETAILS, GO TO

11. Make necessary VT1.5/STS1 cross-connections for each node in the network.

A. Linear or Add/Drop Configuration	DLP-545
B. Single Ring Configuration	DLP-546
C. Dual Ring Interworking (DRI) Configuration	DLP-550
D. Single/Dual OC-3/FiberReach Configuration	DLP-557
E. Stand Alone OC-3/FiberReach Configuration	DLP-558
F. Single/Dual OC-3/OC-48 Configuration	DLP-559
G. Single/Dual OC-3/OC-12 Configuration	DLP-560

-
12.  **NOTE:**

For a DS1 circuit in a path protected ring network, the "**sw-path-vt1: address**" command must be used at the terminating nodes [and dual ring interworking (DRI) nodes in a DRI ring network] to switch the active VT1.5 (DS1) path to repeat this test on the other path(s).

Perform DS1 end-to-end transmission test for each circuit being put into service.

A. Linear or Single Ring Configuration	DLP-510
B. Dual Ring Interworking (DRI) Configuration	DLP-554
C. OC-3/FiberReach Configuration	DLP-510

DO ITEMS BELOW IN ORDER LISTED FOR DETAILS, GO TO

13. Use the "**rtrv-state-eqpt**" command to determine the port state of the DS1 port(s) of the circuit being established.

-
14.  **NOTE:**

If a port is in the *nmon* (*n*) state, the signal is not monitored or alarmed. The port will not automatically go to the *in service* (*i*) state when a signal is detected as it will in the *auto* (*a*) state. In the *nmon* state, the port must be returned to the *auto* state, using the "**set-state-t1:**" command, to turn on monitoring of signal failures and before any circuit packs associated with that port can be removed from the equipment list by the "**upd**" command.

Use the "**set-state-t1:**" command to set the port state of the DS1 port(s) of the circuit being established.

-
15. If **BBF3/BBF3B DS1PM** circuit packs are installed and the optional **ds1pm** performance monitoring feature is to be used, use the "**set-feat:feat=ds1pm,act=enable**" command to enable the feature.
-

Convert DS1 Group Service to DS3 Group Service

DO ITEMS BELOW IN ORDER LISTED FOR DETAILS, GO TO

1.  **CAUTION:**
*DDM-2000 circuit packs contain static sensitive components which can be damaged by electrostatic discharge. A static ground wrist strap must be worn when handling the circuit packs. See electrostatic discharge considerations in **Trouble Clearing: TAD-100**.*

 **NOTE 1:**
This procedure assumes that the DDM-2000 is in service and that a DS1 **LOW SPEED GROUP** is being changed to a DS3 **FUNCTION UNITS** group for DS3 service.

 **NOTE 2:**
If, at any point in this procedure, the DDM-2000 fails to respond in the indicated manner, you should refer to **Trouble Clearing: IXL-001**.

Determine which **FUNCTION UNITS** group (**A**, **B**, or **C**) is being converted.

DO ITEMS BELOW IN ORDER LISTED FOR DETAILS, GO TO

2. Use the "**rtrv-alm**" command to verify that no alarms, locks, loops, or switches are present.

-
3. At the DSX-1, remove the DS1 signals associated with the DS1 group being converted. (**FAULT** LED flashes on **DS1/DS1PM** circuit packs with signals removed.)
-

4.  **NOTE:**
The **UPD/INIT** pushbutton on the **SYSCTL** is recessed to prevent its accidental operation. You will need a small pointed object, such as a ball-point pen, to operate it.

On the **SYSCTL**, momentarily depress the **UPD/INIT** button. (**FAULT** LEDs go off.)

5.  **NOTE 1:**
Ring releases support only manual VT1.5 and STS-1 cross-connections. Linear releases support default cross-connections and manual cross-connections if the shelf is set to manual using the "**set-ne:crs>manual**" command. In ring releases or when a shelf is set for manual cross-connections, manual STS-1 and/or DS1 cross-connections have to be made at each shelf to configure the transmission path for each DS3/DS1 circuit being established. Either terminating (drop) cross-connections or "drop and continue" cross-connections are made at terminating nodes and pass-through cross-connections are made at intermediate nodes.

DO ITEMS BELOW IN ORDER LISTED . . . FOR DETAILS, GO TO

⇒ **NOTE 2:**

In ring configurations, you should use the following rules in establishing cross-connections in each ring:

1. All drop connections (including DRI, if present) from the same STS-1 timeslot must be provisioned the same, either all VT1.5 or STS-1.
2. If all 28 VT1.5s (DS1s) in an STS-1 are being passed through at a node in a VT1.5 path-switched ring, then the cross-connection may be provisioned as either a pass-through STS-1 or VT1.5. However, if you anticipate dropping VT1.5s from the pass-through node in the future, you should provision the pass-throughs as VT1.5 cross-connections. Also, provisioning now as a VT1.5 cross-connect will avoid a hit on traffic if the STS-1 cross-connect has to be converted to 28 VT1.5 cross-connects to drop DS1s at a later time.
3. On STS-1 path-switched rings, all nodes in the ring must be provisioned as STS-1 cross-connections.

⇒ **NOTE 3:**

The following commands may be used to convert, delete, enter, and retrieve cross-connections: "**cnvt-crs**", "**dlt-crs-sts1**", "**dlt-crs-vt1**", "**ent-crs-sts1**", "**ent-crs-vt1**", "**rtrv-crs-sts1**", and "**rtrv-crs-vt1**". See the "Commands and Reports" section of this manual for a description of commands. See "Cross-Connection Provisioning" in the "Administration and Provisioning" section of this manual for more information on cross-connection provisioning.

Use the "**dlt-crs-sts1:**" or "**dlt-crs-vt1:**" command to delete cross-connections associated with all **DS1/DS1PM** circuit packs being removed.

DO ITEMS BELOW IN ORDER LISTED FOR DETAILS, GO TO

6. Remove the **DS1/DS1PM** circuit packs from **LOW SPEED GROUP** being converted to DS3.

-
7. Remove the **MXRVO** circuit packs from **FUNCTION UNITS** group being converted to DS3.

-
8. Momentarily depress the **UPD/INIT** button on the **SYSCTL** to update the DDM-2000 internal equipment list.

-
9. Verify that all alarms are off.

-
10.  **NOTE:**
DS1/DS1PM circuit packs **cannot** be installed in a group that is equipped with **DS3/DS3PM** circuit packs.

Set line build out (LBO) option jumpers and install **DS3/DS3PM** circuit packs into **FUNCTION UNITS** group (**A, B, or C**) being put into service.

DO ITEMS BELOW IN ORDER LISTED FOR DETAILS, GO TO

11. Make appropriate connections(s) to the DS3 cross-connect point(s) or equivalent connection point(s) for the channel(s) being added.

-
12. Verify that no LEDs or alarms are activated. If any LEDs or alarms are activated, refer to **Trouble Clearing: IXL-001** and follow the appropriate trouble-clearing procedure.

-
13. Determine the necessary STS-1 cross-connections for each node from the work order or circuit order.

-
14. As required, at each shelf in the end-to-end network, use the "**ent-crs-sts1:**" command at each shelf to make required STS-1 cross-connections for DS3 channel being established.

A. Linear or Add/Drop Configuration	DLP-545
B. Ring Configuration	DLP-546
C. Dual Ring Interworking (DRI) Configuration	DLP-550
D. Single/Dual OC-3/OC-48 Configuration	DLP-559
E. Single/Dual OC-3/OC-12 Configuration	DLP-560

-
15. Perform an end-to-end DS3 low-speed transmission test for each DS3 group being put into service (optional).

A. Linear or Single Ring Configuration	DLP-511
B. Dual Ring Interworking (DRI) Configuration	DLP-553
C. Single/Dual Homing Configuration	DLP-511
-

DO ITEMS BELOW IN ORDER LISTED FOR DETAILS, GO TO

16. Use the "**set-t3:**" command to set the characteristics of the DS3 port.

-
17. Use the "**rtrv-state-eqpt**" command to determine the port state of the DS3 port(s) of the circuit being established.
-

18.  **NOTE:**
If a port is in the *nmon* (*n*) state, the signal is not monitored or alarmed. The port will not automatically go to the *in service* (*i*) state when a signal is detected as it will in the *auto* (*a*) state. In the *nmon* state, the port must be returned to the *auto* state, using the "**set-state-t3:**" command, to turn on monitoring of signal failures and before any circuit packs associated with that port can be removed from the equipment list by the "**upd**" command.

Use the "**set-state-t3:**" command to set the port state of the DS3 port(s) of the circuit being established.

Convert DS3 Group Service to DS1 MXRVO Group Service

DO ITEMS BELOW IN ORDER LISTED FOR DETAILS, GO TO

1.  **CAUTION:**
*DDM-2000 circuit packs contain static sensitive components which can be damaged by electrostatic discharge. A static ground wrist strap must be worn when handling the circuit packs. See electrostatic discharge considerations in **Trouble Clearing: TAD-100**.*

Determine which DS3 group is to be converted.

-
2.  **NOTE:**
The following operation will activate the office major (critical) alarm.
The audible alarm may be suppressed by depressing the **ACO** button.

Remove service (signal) from the DS3 group being discontinued. (**FAULT** LED flashes on **DS3/DS3PM** circuit packs with signal removed.)

-
3. Momentarily depress **UPD/INIT** button on the **SYSCTL** to update the DDM-2000 internal equipment list.
-

DO ITEMS BELOW IN ORDER LISTED FOR DETAILS, GO TO

4. **NOTE 1:**

Ring releases support only manual VT1.5 and STS-1 cross-connections. Linear releases support default cross-connections and manual cross-connections if the shelf is set to manual using the "**set-ne:crs=manual**" command. In ring releases or when a shelf is set for manual cross-connections, manual STS-1 and/or DS1 cross-connections have to be made at each shelf to configure the transmission path for each DS3/DS1 circuit being established. Either terminating (drop) cross-connections or "drop and continue" cross-connections are made at terminating nodes and pass-through cross-connections are made at intermediate nodes.

 NOTE 2:

In ring configurations, you should use the following rules in establishing cross-connections in each ring:

1. All drop connections (including DRI, if present) from the same STS-1 timeslot must be provisioned the same, either all VT1.5 or STS-1.
2. If all 28 VT1.5s (DS1s) in an STS-1 are being passed through at a node in a VT1.5 path-switched ring, then the cross-connection may be provisioned as either a pass-through STS-1 or VT1.5. However, if you anticipate dropping VT1.5s from the pass-through node in the future, you should provision the pass-throughs as VT1.5 cross-connections. Also, provisioning now as a VT1.5 cross-connect will avoid a hit on traffic if the STS-1 cross-connect has to be converted to 28 VT1.5 cross-connects to drop DS1s at a later time.
3. On STS-1 path-switched rings, all nodes in the ring must be provisioned as STS-1 cross-connections.

DO ITEMS BELOW IN ORDER LISTED FOR DETAILS, GO TO

⇒ **NOTE 3:**

The following commands may be used to delete, enter, and retrieve STS1 cross-connections: "**dlt-crs-sts1**", "**ent-crs-sts1**", and "**rtrv-crs-sts1**". See the "Commands and Reports" section of this manual for a description of commands. See "Cross-Connection Provisioning" in the "Administration and Provisioning" section of this manual for more information on cross-connection provisioning.

From the work order or "**rtrv-crs-sts1**" command, determine the cross-connections for circuit being discontinued. Use the "**rtrv-crs-sts1**" command at each node to obtain the "STS-1 Cross Connect Report".

-
5.  **CAUTION:**
Removal of the wrong cross-connect may interrupt service.

⇒ **NOTE:**

DS3 slots cannot be unequipped without an alarm until all cross-connections are removed. The cross-connections must be removed first before removing circuit packs. In ring configurations, remove the cross-connections from the terminating nodes first, then remove the pass-through cross-connections at the non-terminating nodes, if required. A Critical alarm may occur when the first cross-connection at the terminating node is deleted and clear when the other terminating cross-connection is deleted.

DO ITEMS BELOW IN ORDER LISTED . . . FOR DETAILS, GO TO

Use the "**dlt-crs-sts1:**" command to delete the STS-1 cross-connections associated with **DS3/DS3PM** circuit pack being removed.

6. Remove **DS3/DS3PM** circuit packs associated with **FUNCTION UNITS** DS3 group(s) being discontinued, if required.
-

7. Momentarily depress **UPD/INIT** button on the **SYSCTL** to update the DDM-2000 internal equipment list.
-

8. Verify that all alarms go off.
-

9.  **NOTE 1:**

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 terminate 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.

DO ITEMS BELOW IN ORDER LISTED FOR DETAILS, GO TO

⇒ **NOTE 2:**

If the **LOW SPEED GROUP** is to be equipped with any **BBF3/BBF3B DS1PM** circuit packs, both service and protection **MXRVO** circuit packs must be installed.

Install **MXRVO** circuit packs into proper slots of **FUNCTION UNITS** group (**A**, **B**, or **C**) being converted to DS1 service.

DLP-506

-
10. Option and install required service **DS1/DS1PM** circuit packs.

DLP-508

-
11. ⇒ **NOTE:**

If DS1 protection is required and service **DS1PM** circuit packs are installed, a **DS1PM** circuit pack must be installed in the **LOW SPEED** protection **8(P)** slot.

Install protection **DS1/DS1PM** circuit pack into slot **8(P)** of **LOW SPEED GROUP** being put into service, if required.

DLP-508

DO ITEMS BELOW IN ORDER LISTED FOR DETAILS, GO TO

12. Use the "**set - t1:**" command to set the characteristics of the DS1 port.

-
13.  **CAUTION:**
*No service DS1 **LOW SPEED** slots should be left empty in **GROUPs** equipped with protection **DS1/DS1PM** circuit packs and corresponding to **FUNCTION UNITS** groups equipped with **MXRVO** circuit packs.*

 **NOTE:**
177A Retainer Cards are used to disconnect the cross-connect wiring associated with unused service DS1 **LOW SPEED** slot locations from the DDM-2000's internal protection bus.

Install **177A** Retainer Cards into all unequipped service DS1 **LOW SPEED** slots in **GROUPs** equipped with protection **DS1/DS1PM** circuit packs and corresponding to **FUNCTION UNITS** groups equipped with **MXRVO** circuit packs.

-
14. Make appropriate cable connection(s) to DSX-1 cross-connect point(s) or equivalent connection point(s) for DS1 ports(s) being added.

-
15. Verify that no LEDs or alarms are activated. If any LEDs or alarms are activated, refer to **Trouble Clearing: IXL-001**.
-

DO ITEMS BELOW IN ORDER LISTED . . . FOR DETAILS, GO TO

16. **NOTE 1:**

Ring releases support only manual VT1.5 and STS-1 cross-connections. Linear releases support default cross-connections and manual cross-connections if the shelf is set to manual using the "**set-ne:crs=manual**" command. In ring releases or when a shelf is set for manual cross-connections, manual STS-1 and/or DS1 cross-connections have to be made at each shelf to configure the transmission path for each DS3/DS1 circuit being established. Either terminating (drop) cross-connections or "drop and continue" cross-connections are made at terminating nodes and pass-through cross-connections are made at intermediate nodes.

 NOTE 2:

In ring configurations, you should use the following rules in establishing cross-connections in each ring:

1. All drop connections (including DRI, if present) from the same STS-1 timeslot must be provisioned the same, either all VT1.5 or STS-1.
2. If all 28 VT1.5s (DS1s) in an STS-1 are being passed through at a node in a VT1.5 path-switched ring, then the cross-connection may be provisioned as either a pass-through STS-1 or VT1.5. However, if you anticipate dropping VT1.5s from the pass-through node in the future, you should provision the pass-throughs as VT1.5 cross-connections. Also, provisioning now as a VT1.5 cross-connect will avoid a hit on traffic if the STS-1 cross-connect has to be converted to 28 VT1.5 cross-connects to drop DS1s at a later time.
3. On STS-1 path-switched rings, all nodes in the ring must be provisioned as STS-1 cross-connections.

DO ITEMS BELOW IN ORDER LISTED FOR DETAILS, GO TO

⇒ NOTE 3:

The following commands may be used to delete, enter, and retrieve cross-connections: "**dlt-crs-sts1**", "**dlt-crs-vt1**", "**ent-crs-sts1**", "**ent-crs-vt1**", "**rtrv-crs-sts1**", and "**rtrv-crs-vt1**". See the "Commands and Reports" section of this manual for a description of commands. See "Cross-Connection Provisioning" in the "Administration and Provisioning" section of this manual for more information on cross-connection provisioning.

Determine the necessary cross connections for each node from the work order or circuit order.

-
17. If required, use the "**ent-crs-()**:" command(s) at each shelf to make necessary STS-1 and/or DS1 (VT1.5) cross-connections.

A. Linear or Add/Drop Configuration	DLP-545
B. Single Ring Configuration	DLP-546
C. Dual Ring Interworking (DRI) Configuration	DLP-550
D. Single/Dual OC-3/FiberReach Configuration	DLP-557
E. Stand Alone OC-3/FiberReach Configuration	DLP-558
F. Single/Dual OC-3/OC-48 Configuration	DLP-559
G. Single/Dual OC-3/OC-12 Configuration	DLP-560

DO ITEMS BELOW IN ORDER LISTED FOR DETAILS, GO TO

18. Perform an end-to-end DS1 transmission test for each DS1 port being put into service (optional).

A. Linear or Single Ring Configuration	DLP-510
B. Dual Ring Interworking (DRI) Configuration	DLP-554
C. OC-3/FiberReach Configuration	DLP-510

19. Use the "**rtrv-state-eqpt**" command to determine the port state of the DS1 port(s) of the circuit being established.
-

20.  **NOTE:**

If a port is in the *nmon* (*n*) state, the signal is not monitored or alarmed. The port will not automatically go to the *in service* (*i*) state when a signal is detected as it will in the *auto* (*a*) state. In the *nmon* state, the port must be returned to the *auto* state, using the "**set-state-t1:**" command, to turn on monitoring of signal failures and before any circuit packs associated with that port can be removed from the equipment list by the "**upd**" command.

Use the "**set-state-t1:**" command to set the port state of the DS1 port(s) of the circuit being established.

21. If **BBF3/BBF3B DS1PM** circuit packs are installed and the optional **ds1pm** performance monitoring feature is to be used, use the "**set-feat:feat=ds1pm,act=enable**" command to enable the feature.
-

Discontinue End-to-End DS1 Service

DO ITEMS BELOW IN ORDER LISTED FOR DETAILS, GO TO

1.  **CAUTION 1:**
*DDM-2000 circuit packs contain static sensitive components which can be damaged by electrostatic discharge. A static ground wrist strap must be worn when handling the circuit packs. See electrostatic discharge considerations in **Trouble Clearing: TAD-100**.*

-  **CAUTION 2:**
*When a **DS1/DS1PM** circuit pack is switched to protection, removal of any other **DS1/DS1PM** circuit pack or **177A** Retainer Card in the same **LOW SPEED GROUP** will result in a loss of service to the protection **DS1/DS1PM** circuit pack and the removed **DS1/DS1PM** circuit pack.*

-  **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 terminate 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.

DO ITEMS BELOW IN ORDER LISTED FOR DETAILS, GO TO

Determine which DS1 ports are to be discontinued and verify no alarms exist on the system.

2.  **NOTE 1:**
The following operation may activate the office major, minor, or no alarm. The audible alarm may be suppressed by depressing the **ACO** button.

-  **NOTE 2:**
One of the terminating nodes for the DS1 service may be equipped with **STS1E** circuit packs to provide an EC-1 interface for the DS1 service.

At the DSX-1 at the DS1 terminating nodes, remove the DS1 signals associated with the port(s) being discontinued. (**FAULT** LEDs begin flashing on **DS1/DS1PM** circuit pack with signals removed.)

3.  **NOTE:**
The **UPD/INIT** pushbutton on the **SYSCTL** is recessed to prevent its accidental operation. You will need a small pointed object such as a ball-point pen to operate it.

Momentarily depress the **UPD/INIT** button on the **SYSCTL** at the DS1 terminating nodes or use the "**upd**" command to update the equipment list. (Flashing **FAULT** LEDs go off.)

DO ITEMS BELOW IN ORDER LISTED FOR DETAILS, GO TO

4. If a craft interface terminal (CIT) is available, use the "**rtrv-state-eqpt**" command to verify that the right port has been changed from *in-service* (i) to *auto* (a) state.

-
5.  **CAUTION:**
*Removing the wrong cross-connection may cause service interruption. Use the "**rtrv-crs- ()**" command to determine the proper cross-connections.*

From work order or "**rtrv-crs- ()**" command, determine the cross-connections for circuit being discontinued.

-
6.  **NOTE 1:**
DS1 **LOW SPEED** slots cannot be unequipped without an alarm until all port cross-connections are removed. The cross-connections must be removed first before removing circuit packs. In a ring configuration, remove the cross-connections from the terminating nodes first, then remove the pass-through cross-connections at the intermediate nodes. A Major alarm may occur when the first cross-connection at the terminating node is deleted and clear when the other terminating cross-connection is deleted.

DO ITEMS BELOW IN ORDER LISTED . . . FOR DETAILS, GO TO

⇒ NOTE 2:

In ring configurations, the following rules are used in establishing cross-connections in each ring:

1. All drop connections (including DRI, if present) from the same STS-1 timeslot must be provisioned the same, either all VT1.5 or STS-1.
2. If all 28 VT1.5s (DS1s) in an STS-1 are being passed through at a node in a VT1.5 path-switched ring, then the cross-connection may be provisioned as either a pass-through STS-1 or VT1.5. However, if you anticipate dropping VT1.5s from the pass-through node in the future, you should provision the pass-throughs as VT1.5 cross-connections. Also, provisioning now as a VT1.5 cross-connect will avoid a hit on traffic if the STS-1 cross-connect has to be converted to 28 VT1.5 cross-connects to drop DS1s at a later time.
3. On STS-1 path-switched rings, all nodes in the ring must be provisioned as STS-1 cross-connections.

⇒ NOTE 3:

The following commands may be used to convert, delete, enter, and retrieve cross-connections: "**cnvt-crs**", "**dlt-crs-vt1**", "**dlt-crs-sts1**", "**ent-crs-vt1**", "**ent-crs-sts1**", "**rtrv-crs-vt1**", and "**rtrv-crs-sts1**". See the "Commands and Reports" section of this manual for a description of commands. 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

⇒ **NOTE 4:**

If the cross-connection to a group with a DS1 being discontinued is an STS1 cross-connection, removal of the STS1 cross-connection may cause service interruption to other **DS1** circuit packs. In order to remove an individual **DS1**, the "**cnvt -crs**" may have to be used to convert the STS1 cross-connection to 28 individual VT1.5 cross-connections. If the entire group is being discontinued, the STS1 cross-connection may be removed, if required.

Use the "**dlt -crs -vt1:**" command to delete the terminating (drop) node cross-connections for all DS1 service being removed, if required.

-
7. Use the "**dlt -crs -vt1:**" command to delete the pass-through cross-connections at each nonterminating node for all DS1 service being removed, if required.
-
8. If all four DS1 ports on the **DS1/DS1PM** circuit pack are being discontinued, you may remove the **DS1/DS1PM** circuit pack, if required.
-
9. If *all* **DS1/DS1PM** circuit packs in a **LOW SPEED GROUP** are removed, you may remove the **FUNCTION UNITS** group (**MXRVO** or **STS1E**) circuit packs and the protection **DS1/DS1PM** circuit pack, if required.
-
10. If group **MXRVO/STS1E** circuit packs are removed, proceed to Step 12. Otherwise, continue with Step 11.
-

DO ITEMS BELOW IN ORDER LISTED FOR DETAILS, GO TO

11.  **CAUTION:**
*No service DS1 **LOW SPEED** slots should be left empty in **GROUPs** equipped with protection **DS1/DS1PM** circuit packs and corresponding to **FUNCTION UNITS** groups equipped with **MXRVO** or **STS1E** (high speed mode) circuit packs.*

 **NOTE:**
177A Retainer Cards are used to disconnect the cross-connect wiring associated with unused service DS1 **LOW SPEED** slot locations from the DDM-2000's internal protection bus.

Install **177A** Retainer Card(s), as required, into the DS1 **LOW SPEED** slot(s) for the **DS1/DS1PM** circuit pack(s) removed.

-
12.  **NOTE:**
If a port is in the *nmon (n)* state, the signal is not monitored or alarmed. The port will not automatically go to the *in service (i)* state when a signal is detected as it will in the *auto (a)* state. In the *nmon* state, the port must be returned to the *auto* state, using the "**set-state-t1:**" command, to turn on monitoring of signal failures and before any circuit packs associated with that port can be removed from the equipment list by the "**upd**" command.

If circuit packs have been removed, momentarily depress the **UPD/INIT** button on the **SYSCTL** or use the "**upd**" command to update the DDM-2000 internal equipment list.

If circuit packs have *not* been removed, use the "**set-state-t1:**" command to set the port state of the DS1 port(s) to *auto* or *nmon*, as required.

DO ITEMS BELOW IN ORDER LISTED FOR DETAILS, GO TO

13. Verify all alarms are off.

Discontinue End-to-End DS3 Service

DO ITEMS BELOW IN ORDER LISTED FOR DETAILS, GO TO

1.  **CAUTION:**
*DDM-2000 circuit packs contain static sensitive components which can be damaged by electrostatic discharge. A static ground wrist strap must be worn when handling the circuit packs. See electrostatic discharge considerations in **Trouble Clearing: TAD-100**.*

Determine which DS3 group is to be discontinued and verify no alarms exist on the system.

2.  **NOTE 1:**
The following operation may activate the office critical, major, or minor alarm. The audible alarm may be suppressed by depressing the **ACO** button (**opr - aco** command).

-  **NOTE 2:**
One of the terminating (drop) nodes for the DS3 service may be equipped with **STS1E** circuit packs to provide an EC-1 interface for the DS3 service.

At the DSX-3/STSX cable cross-connect point at the terminating (drop) nodes, remove the DS3/EC-1 service (signal) from the DS3 group being discontinued. (**FAULT** LED flashes on **DS3/DS3PM/STS1E** circuit packs with signal removed.)

DO ITEMS BELOW IN ORDER LISTED FOR DETAILS, GO TO

3. **NOTE:**

The **UPD/INIT** pushbutton 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.

At the terminating (drop) nodes, momentarily depress the **UPD/INIT** button on the **SYCTL** circuit pack or use the **upd** command to update the equipment list. (Flashing **FAULT** LEDs go off.)

-
4. If a craft interface terminal (CIT) is available, use the **rtrv-state-eqpt** command to verify that the right port has been changed from *in-service* (i) to *auto* (a) state at the terminating nodes.
-

5. From the work order or **rtrv-crs-sts1** command, determine the cross-connections for circuit being discontinued. Use the **rtrv-crs-sts1** command at each node in the ring network to obtain the "STS-1 Cross Connect Report".
-

DO ITEMS BELOW IN ORDER LISTED FOR DETAILS, GO TO

6.  **CAUTION:**
Removal of the wrong cross-connect may interrupt service.

 **NOTE 1:**
DS3 slots cannot be unequipped without an alarm until all cross-connections are removed. The cross-connections must be removed first before removing circuit packs. In ring configurations, remove the cross-connections from the terminating (drop) nodes first, then remove the pass-through cross-connections at the non-terminating nodes, if required. A Critical alarm may occur when the first cross-connection at the terminating node is deleted and clear when the other terminating cross-connection is deleted.

 **NOTE 2:**
In ring configurations, the following rules are used in establishing cross-connections in each ring:

1. All drop connections (including DRI, if present) from the same STS-1 timeslot must be provisioned the same, either all VT1.5 or STS-1.
2. If all 28 VT1.5s (DS1s) in an STS-1 are being passed through at a node in a VT1.5 path-switched ring, then the cross-connection may be provisioned as either a pass-through STS-1 or VT1.5. However, if you anticipate dropping VT1.5s from the pass-through node in the future, you should provision the pass-throughs as VT1.5 cross-connections. OC-3 ring Releases 7.0 and earlier do not support the command (**cnvt -crs**) for converting an STS-1 to a VT1.5 cross-connect. Also, provisioning now as a VT1.5 cross-connect will avoid a hit on traffic if the STS-1 cross-connect has to be converted to 28 VT1.5 cross-connections to drop DS1s at a later time.
3. On STS-1 path-switched rings, all nodes in the ring must be provisioned as STS-1 cross-connections.

DO ITEMS BELOW IN ORDER LISTED . . . FOR DETAILS, GO TO

⇒ NOTE 3:

The following commands may be used to delete, enter, and retrieve STS-1 cross-connections: **dlt-crs-sts1**, **ent-crs-sts1**, and **rtrv-crs-sts1**. See the "Commands and Reports" section of this manual for a description of commands. See "Cross-Connection Provisioning" in the "Administration and Provisioning" section of this manual for more information on cross-connection provisioning.

At the terminating (drop) nodes, use the **dlt-crs-sts1** command to delete the STS-1 cross-connections for the DS3 service being discontinued, if required.

-
7. Use the **dlt-crs-sts1** command to delete the pass-through STS-1 cross-connections at each non-terminating node for the DS3 service being removed, if required.

-
8. Remove the **DS3/DS3PM/STS1E** circuit packs associated with the group(s) being discontinued, if required.
-

DO ITEMS BELOW IN ORDER LISTED FOR DETAILS, GO TO

9. **NOTE:**

If a port is in the *nmon* (*n*) state, the signal is not monitored or alarmed. The port will not automatically go to the *in service* (*i*) state when a signal is detected as it will in the *auto* (*a*) state. In the *nmon* state, the port must be returned to the *auto* state, using the **set-state-t3:** command, to turn on monitoring of signal failures and before any circuit packs associated with that port can be removed from the equipment list by the **upd** command.

If circuit pack(s) was removed, momentarily depress the **UPD/INIT** button on the **SYSCTL** or use the **upd** command to update the DDM-2000 internal equipment list.

If circuit pack(s) was *not* removed, use **set-state-t3** command to set state of **DS3/DS3PM/STS1E** circuit pack to "not monitored" (*nmon*).

10. Verify that all alarms go off.

Establish EC-1 Dual Ring Interworking DDM-2000 OC-3 to OC-12 or FT-2000 OC-3 Optical Fiber Spans

DO ITEMS BELOW IN ORDER LISTED FOR DETAILS, GO TO

1.  **CAUTION:**
*DDM-2000 circuit packs contain static sensitive components which can be damaged by electrostatic discharge. A static ground wrist strap must be worn when handling the circuit packs. See electrostatic discharge considerations in **Trouble Clearing: TAD-100**.*

 **NOTE:**
This procedure treats the EC-1 Dual Ring Interworking (DRI) configuration as separate components which use the cross-connections to integrate the components into the DRI configuration. The EC-1 DRI configuration is established by first equipping the proper nodes with the EC-1 interfaces and then establishing DS1/DS3 service through the network. The procedures for establishing service reference the proper cross-connection procedure (DLP-550) for making the necessary cross-connections.

Establish Initial Low Speed EC-1 Interface	NTP-034

-
2. Establish Initial End-to-End DS1 Service, if required.	NTP-004

-
3. Establish Initial End-to-End DS3 Service, if required.	NTP-005
-

Add DDM-2000 OC-3 Shelf Linear or Hub Configuration Shelf Added in Middle of Optical Span

DO ITEMS BELOW IN ORDER LISTED FOR DETAILS, GO TO

1.  **CAUTION:**
*DDM-2000 circuit packs contain static sensitive components which can be damaged by electrostatic discharge. A static ground wrist strap must be worn when handling the circuit packs. See electrostatic discharge considerations in **Trouble Clearing: TAD-100**.*

 **NOTE 1:**
This procedure assumes that the DDM-2000 is in service and a new RT site (shelf) is being added in the middle of an optical span. (See Figures 1-4.)

 **NOTE 2:**
It is assumed that the optical loops are installed on the new shelf and that the new shelf has been tested in a looped-back configuration. **[System Turnup: NTP-016]** It is also assumed that options have been set using the **set-ne:** and **set-fecom:** commands.

 **NOTE 3:**
All shelves in the same network must have the same or compatible software releases.

 **NOTE 4:**
If the DDM-2000 fails to respond in the indicated manner, refer to **Trouble Clearing: IXL-001**.

DO ITEMS BELOW IN ORDER LISTED FOR DETAILS, GO TO

Use the **rtrv-alm** command to verify that no alarms, locks, loops, or switches are present.

2. Notify maintenance center that alarms will be generated.
-

DO ITEMS BELOW IN ORDER LISTED FOR DETAILS, GO TO

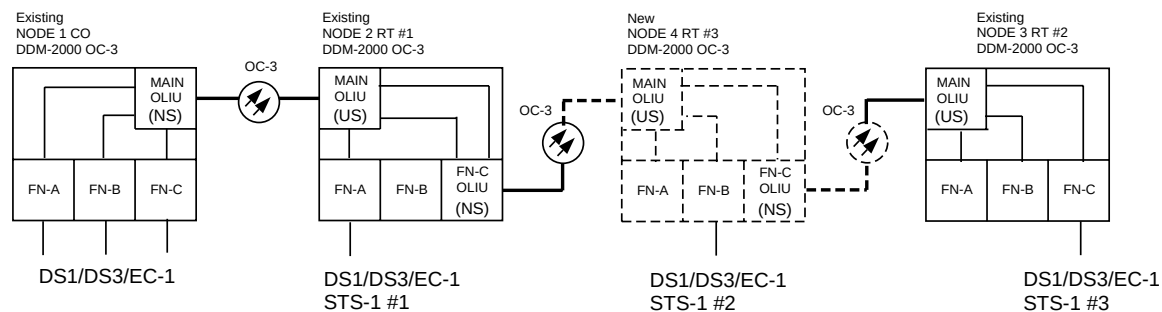


Figure 1. Adding an RT in Middle of an Add/Drop Optical Span

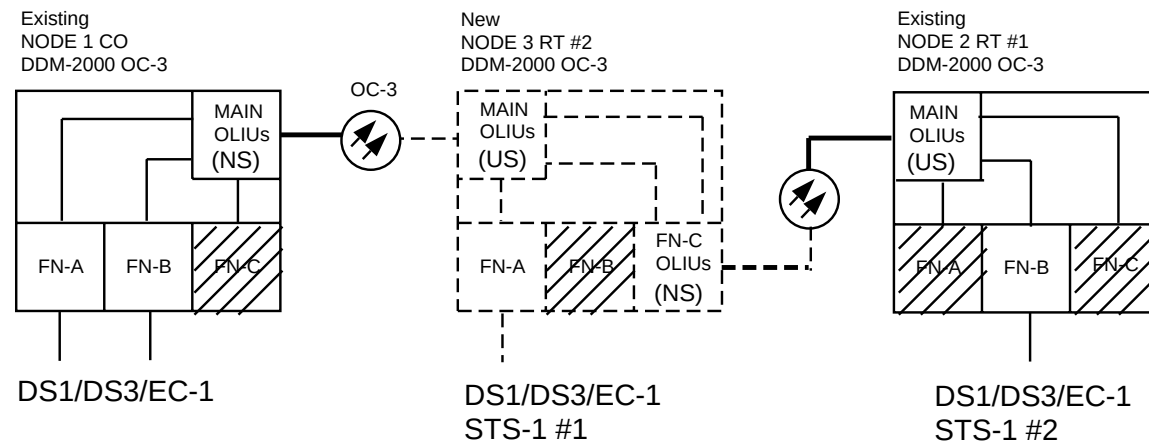


Figure 2. Adding an RT in Middle of a Point-to-Point Optical Span

DO ITEMS BELOW IN ORDER LISTED . . . FOR DETAILS, GO TO

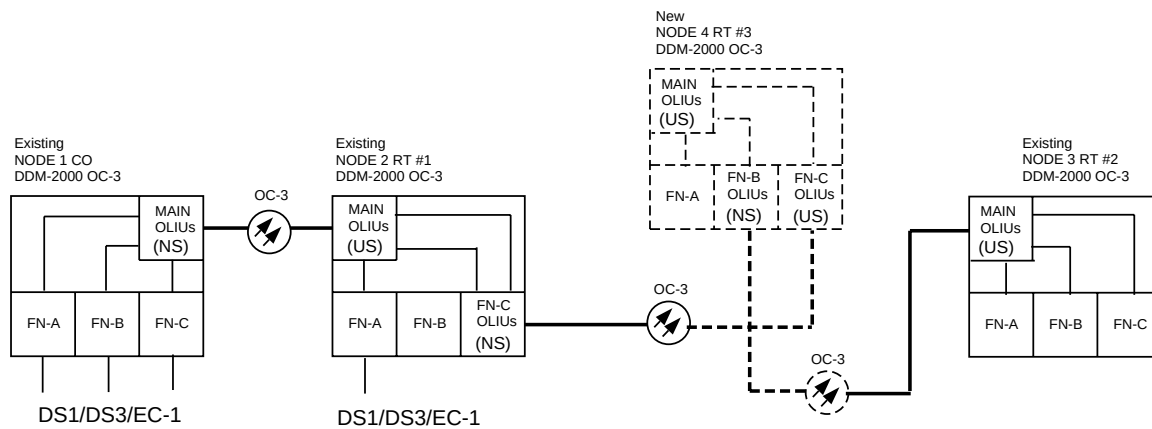


Figure 3. Adding a Release 9 RT in Middle of an Add/Drop Optical Span

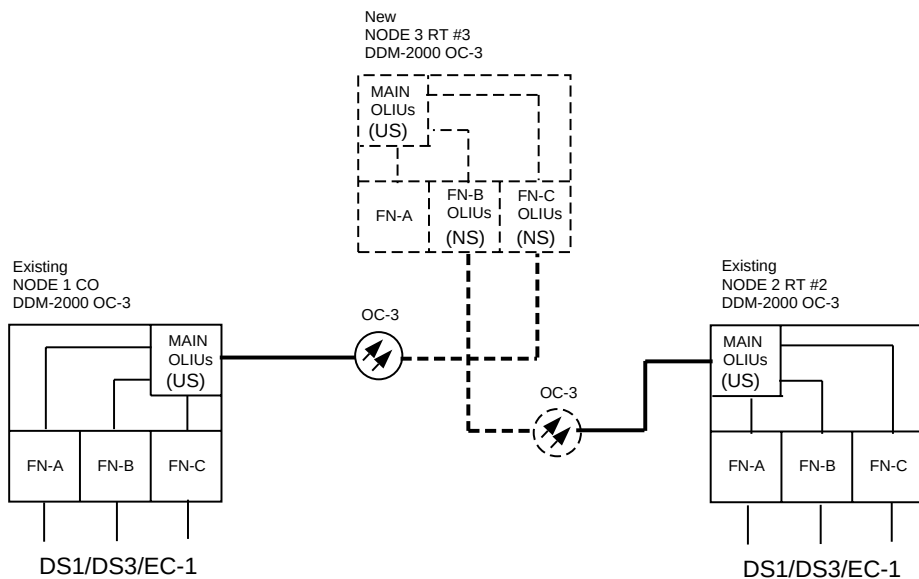


Figure 4. Adding a Release 9 RT in Middle of a Point-to-Point Optical Span

DO ITEMS BELOW IN ORDER LISTED FOR DETAILS, GO TO

3. At **both** shelves on each side of the RT being added (for example, in Figure 1, RT #1 and RT #2), use the **switch-line:address:pri=manual** command to switch to the protection line [slot **2(P)**], if not already on protection.

4. **NOTE:**

The data communication channel (DCC) (far-end communication [fecom]) must be turned off at each shelf before the new shelf is spliced in. For example, if the configuration is as shown in Figure 1, the DCC must be disabled on both **MAIN** and **FUNCTION UNITS C** DCCs at the new shelf using these commands:
set-fecom:dcc-m:com=disabled and
set-fecom:dcc-c:com=disabled.
Also, the DCC must be disabled on **FUNCTION UNITS C** DCCs at RT #1 and on **MAIN** DCC at RT #2. The **set-fecom:** command must be performed individually at each site through a physical CIT connection or through a modem connection. This command cannot be done from within a remote login.

Use **set-fecom:address:com=disabled** command at each shelf to disable the appropriate DCC section communication link.

DO ITEMS BELOW IN ORDER LISTED FOR DETAILS, GO TO

5.  **NOTE:**
Using the **rtrv-crs-vt1/sts1:** command at existing nodes displays the existing cross-connections. For example, in Figure 1, if the new RT is being added between existing RT #1 and existing RT #2, use the **rtrv-crs-vt1/sts1:** command at RT #1 to display the existing DS1 (VT1.5)/STS-1 cross-connections to RT #2.

Use **rtrv-crs-vt1/sts1:** command at existing RTs to retrieve existing cross-connections.

6.  **NOTE:**
If all 28 VT1.5s (DS1s) in an STS-1 are being passed through a linear release node equipped with **22-Type OLIUs** with the cross-connect mode set to manual (**set-ne:tid,crs>manual**), then the cross-connection may be provisioned as either a pass-through STS-1 or VT1.5. However, if you anticipate dropping VT1.5s from the pass-through node in the future, you should provision the pass-throughs as VT1.5 cross-connections. Provisioning now as a VT1.5 cross-connect will avoid a hit on traffic if the STS-1 cross-connect has to be converted to 28 VT1.5 cross-connects to drop DS1s at a later time. Pass-through cross connections between function units in ring releases nodes (for example, Release 9) in a linear configuration (for example, Figures 3 and 4) must be provisioned as VT1.5 cross connections.

At new RT, use **ent-crs-sts1:address,address** or **ent-crs-vt1:address,address** command to cross-connect all in-service STS-1/VT1.5 signals from incoming optical interface to outgoing optical interface. (For example, in Figure 1, use **ent-crs-sts1:m-1,c-1**; **ent-crs-sts1:m-2,c-2**; and **ent-crs-sts1:m-3,c-3**; commands to cross-connect all STS-1 signals from **MAIN** to **FUNCTION UNITS C OLIUs**.)

DO ITEMS BELOW IN ORDER LISTED FOR DETAILS, GO TO

7.  **WARNING:**
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:**
*Use the **rtrv-state-eqpt:** command to ensure system is operating on the protection fiber lines. Cutting the wrong fiber lines will cause a service interruption.*

Use local procedures to cut the **service** (slot 1) fiber line connecting existing shelves and condition the fiber for connection to the new RT shelf.

-
8. At new RT, remove **OLIU** optical loops.
-
9. Determine the optical loss of the optical facility from office records or by making the required measurements.
-
10. If **21G/21G-U OLIUs** are used, set option switch on **OLIUs** to agree with the loss of the optical facility, if required. **DLP-513**
-

DO ITEMS BELOW IN ORDER LISTED FOR DETAILS, GO TO

11.  **NOTE:**
The network elements that terminate on each end of the optical span must have their "Network Side"/"User Side" parameters set to opposite values to avoid an "inconsistent DCC values" alarm. Network Side/User Side parameters [(**set - fecom** command)] must be properly set at each end of OC-3 optical spans. One end is provisioned as "NS" (Network Side) and the other end is provisioned as "US" (User Side).

Use the **rtrv-fecom/set-fecom** commands at existing and new DDM-2000 ends of optical spans to verify/set "Network Side/User Side" parameters to proper values.

-
12.  **NOTE:**
DCC failures will exist on the new RT after the service fibers are connected to the new RT (**MJ** alarm lighted and **FAULT** LED flashing on the **OHCTL**).

Connect **service** line optical fibers to new RT optical interfaces. For example, in Figure 1, **MAIN** and **FUNCTION UNITS C OLIUs**.

DLP-514

DO ITEMS BELOW IN ORDER LISTED FOR DETAILS, GO TO

13. **NOTE 1:**

If line timing mode is specified or external timing mode is specified but the timing reference was not available at new shelf turnup, the new shelf **TGS** option switches are probably set for *free running*. Before the end-to-end system is established, the specified timing mode must be set on the **TGS** circuit pack.

 NOTE 2:

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.

 NOTE 3:

If external timing is selected and the **NE ACTY** LED remains lighted after the **TGS** circuit pack is reinserted, use the CIT and the **rtrv-sync** command to check the operational mode of the system. If the mode is Holdover instead of External, check that the incoming timing references are connected.

Set timing mode on new shelf **TGS** to the timing mode specified in work order or office records.

DLP-513

DO ITEMS BELOW IN ORDER LISTED FOR DETAILS, GO TO

14.  **NOTE:**
Line timing from **FUNCTION UNITS C** slot requires **BBF2B TGS** circuit packs in the shelf.

If new RT is line timed, use **rtrv-sync/set-sync** commands to verify/set sync source to proper value (*main* or *fn-c*).

-
15.  **NOTE:**
The OC-3 optical line tests have to be performed at each physical shelf location associated with the optical spans being tested.

Perform end-to-end OC-3 optical line test locally on service line at **each** shelf in the network associated with new optical spans.

- A. Linear software
B. Ring software

DLP-525
DLP-515

DO ITEMS BELOW IN ORDER LISTED FOR DETAILS, GO TO

16.  **CAUTION:**
*The **switch-line:** command in the following step must be performed in the order given.*

 **NOTE:**
This step will force selection of the service line and place the new RT in the active path and in service.

Use **switch-line:address:pri=lockout** command at the following four locations to force selection of the service line at new and existing shelves (For example, see Figures 5 and 6):

1. New shelf (RT) upstream (toward CO) optical interface. [For example,
Figure 5: **MAIN**, (*address=main*).
Figure 6: **FUNCTION UNITS C**, (*address=fn-c*)].
 2. New shelf (RT) downstream (away from CO) optical interface. [For example,
Figure 5: **FUNCTION UNITS C**, (*address=fn-c*).
Figure 6: **FUNCTION UNITS B**, (*address=fn-b*)].
 3. Existing downstream shelf (RT away from CO) optical interface. (Forces service to downstream line.) [For example,
Figures 5 and 6: **MAIN**, (*address=main*).]
 4. Existing upstream shelf (CO, or RT toward the CO) optical interface. (Forces service to upstream line.) [For example,
Figures 5 and 6: **MAIN**, (*address=main*).]
-

DO ITEMS BELOW IN ORDER LISTED . . . FOR DETAILS, GO TO

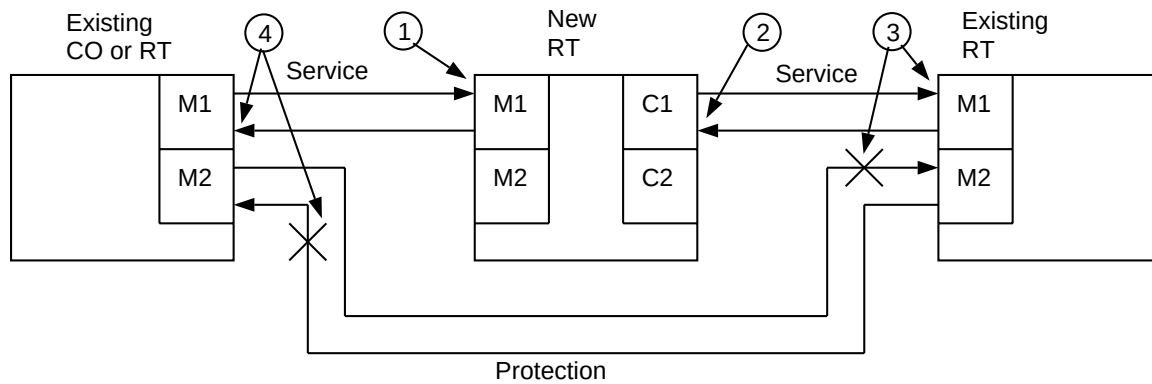


Figure 5. Example of Use of switch-line Command

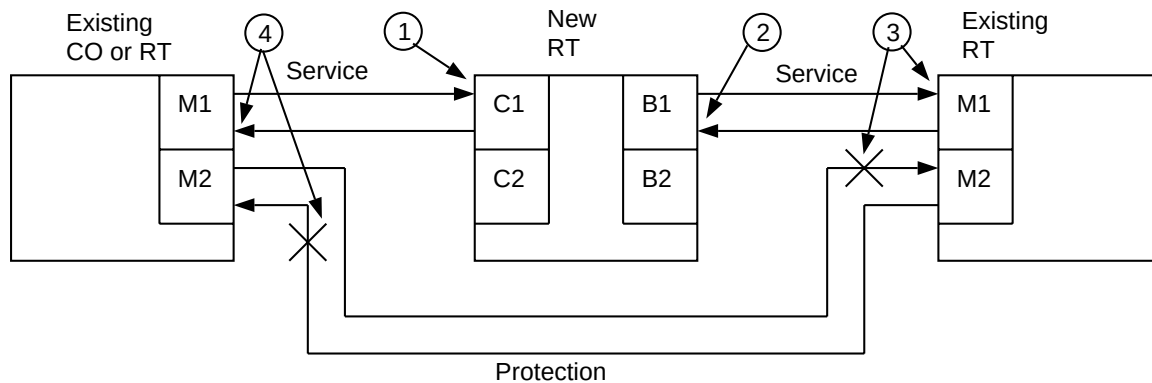


Figure 6. Example of Use of switch-line Command

DO ITEMS BELOW IN ORDER LISTED FOR DETAILS, GO TO

17.  **CAUTION:**
*Use the **rtrv-state-eqpt:** command to ensure system is operating on the service fiber lines. Cutting the wrong fiber lines will cause a service interruption.*

Use local procedures to cut the **protection** fiber line connecting existing shelves and condition the fiber for connection to the new RT shelf.

-
18. Connect **protection** line optical fibers to new RT optical interfaces. For example, in Figure 1, **MAIN** and **FUNCTION UNITS C OLIUs**. **DLP-514**
-

19. Perform end-to-end OC-3 optical line test locally on protection line at **each** shelf in the network.

- A. Linear software **DLP-525**
B. Ring software **DLP-515**
-

DO ITEMS BELOW IN ORDER LISTED FOR DETAILS, GO TO

20. At the following locations, use **switch-line:address:pri=reset** command in the following order to return system to normal state with no external switch requests (For example, see Figures 7 and 8):
1. Existing upstream shelf (CO, or RT toward CO) optical interface. [For example, Figures 7 and 8: **MAIN**, (*address*=main).]
 2. New shelf (RT) downstream (away from CO) optical interface. [For example, Figure 7: **FUNCTION UNITS C**, (*address*=fn-c). Figure 8: **FUNCTION UNITS B**, (*address*=fn-b).]
 3. New shelf (RT) upstream (toward CO) optical interface. [For example, Figure 7: **MAIN**, (*address*=main). Figure 8: **FUNCTION UNITS C**, (*address*=fn-c).]
 4. Existing downstream shelf (RT away from CO) optical interface. [For example, Figures 7 and 8: **MAIN**, (*address*=main).]
-

DO ITEMS BELOW IN ORDER LISTED FOR DETAILS, GO TO

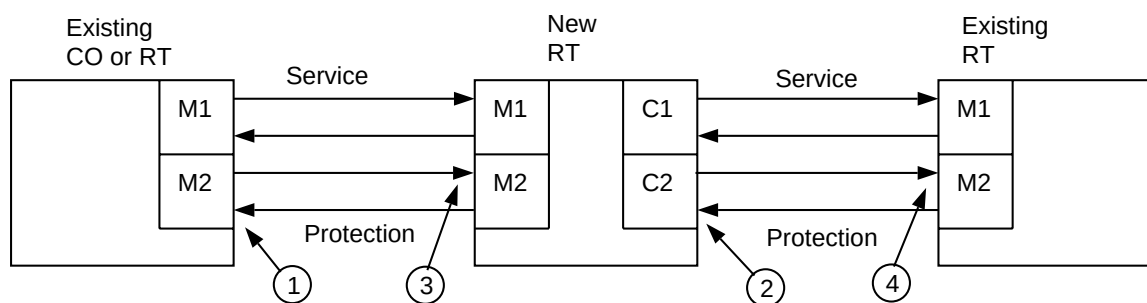


Figure 7. Use of switch-line Command to Return System to Normal

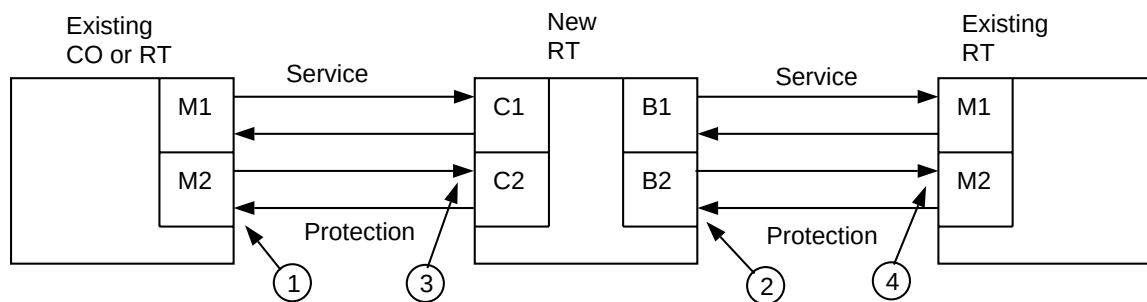


Figure 8. Use of switch-line Command to Return System to Normal

DO ITEMS BELOW IN ORDER LISTED FOR DETAILS, GO TO

21. Use **set-fecom:address:com=enabled** command at each shelf to enable the DCC section communication link for each optical interface. Allow two or three minutes for alarms to stabilize.

-
22. Perform end-to-end DS1 transmission test for DS1s being added, as required. **DLP-510**
-

23. The system is ready for service to be established.
-

Add DDM-2000 OC-3 Shelf and/or New Optical Span Shelf and/or Span Added as Extension to DDM-2000 OC-3 Ring, Hub, Point-to-Point, Linear Add/Drop Configuration

DO ITEMS BELOW IN ORDER LISTED FOR DETAILS, GO TO

1.  **CAUTION:**
*DDM-2000 circuit packs contain static sensitive components which can be damaged by electrostatic discharge. A static ground wrist strap must be worn when handling the circuit packs. See electrostatic discharge considerations in **Trouble Clearing: TAD-100**.*

 **NOTE 1:**
This procedure assumes that the DDM-2000 is in service and a new DDM-2000 OC-3 shelf and/or new optical span are being added. See Figures 1, 2, 3, and 4.

 **NOTE 2:**
If a new shelf is being added, it is assumed that it has been tested in a looped-back mode [**System Turnup: NTP-016**] and configured for the type of shelf required, STS1 drop (default) or DS1 add/drop [**System Turnup: NTP-020**].

 **NOTE 3:**
If the DDM-2000 fails to respond in the indicated manner, refer to **Trouble Clearing: IXL-001**.

Use "**rtrv-alm**" command to verify that no alarms, locks, loops, or switches are present.

DO ITEMS BELOW IN ORDER LISTED . . . FOR DETAILS, GO TO

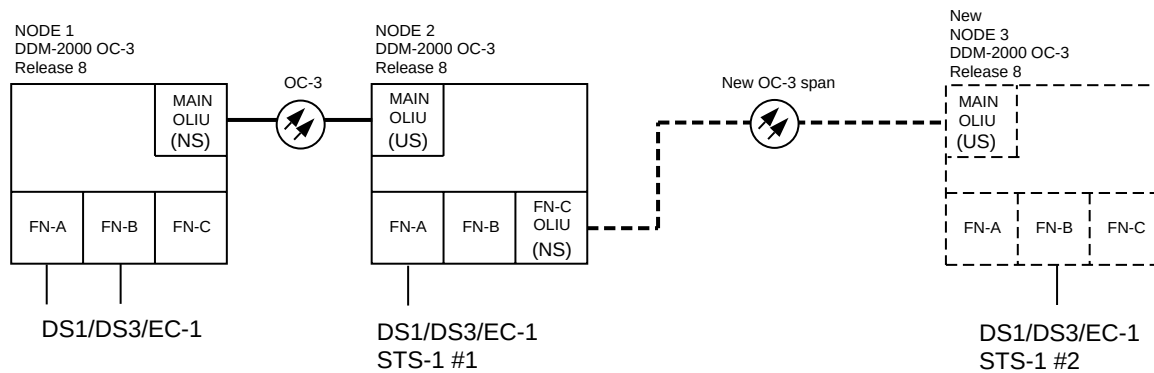


Figure 1. Adding RT and Optical Span to Point-to-Point Configuration

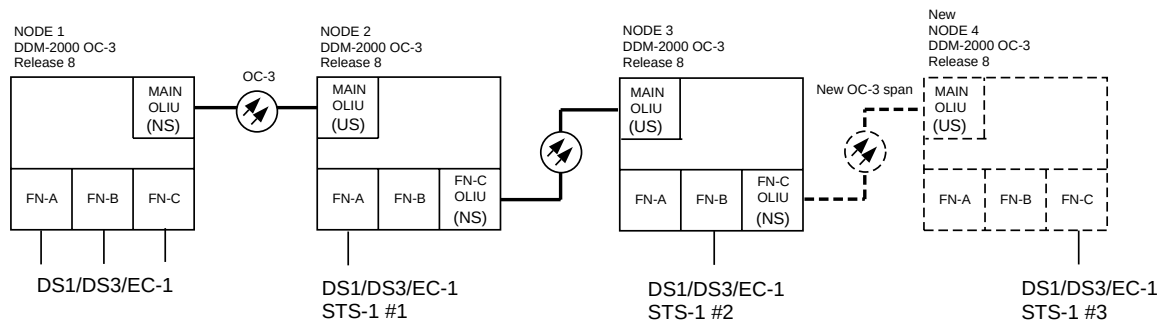


Figure 2. Adding RT and Optical Span to End of STS-1 Drop Configuration

DO ITEMS BELOW IN ORDER LISTED FOR DETAILS, GO TO

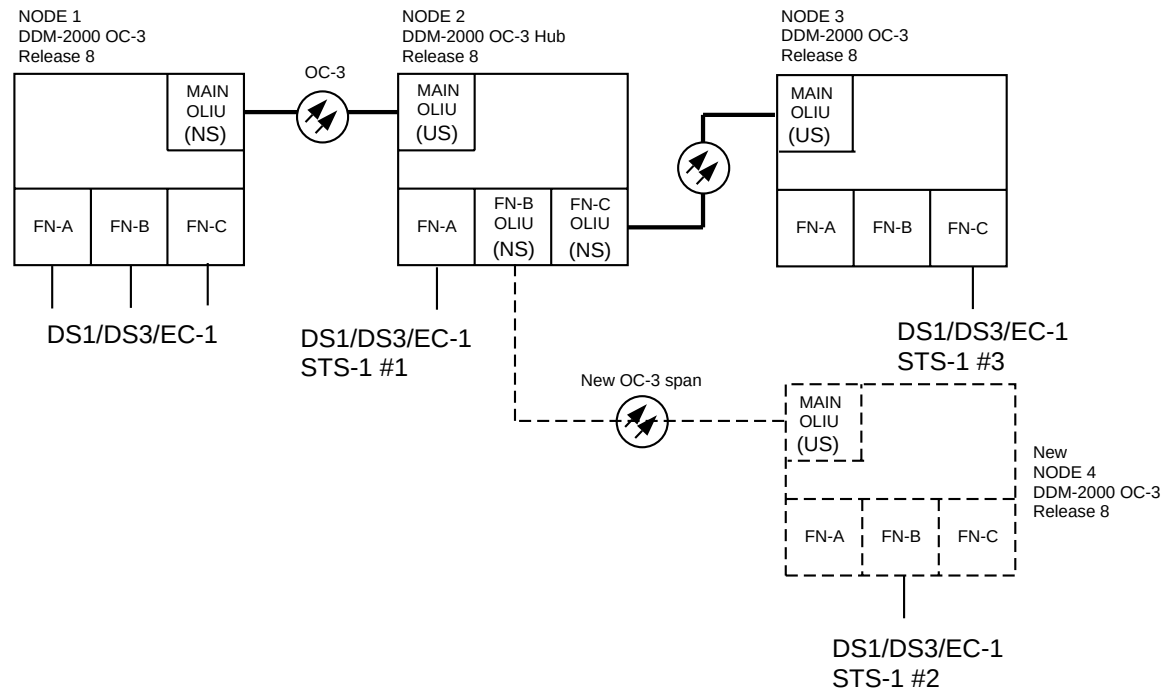


Figure 3. Adding RT and Optical Span to Hub Location

DO ITEMS BELOW IN ORDER LISTED . . . FOR DETAILS, GO TO

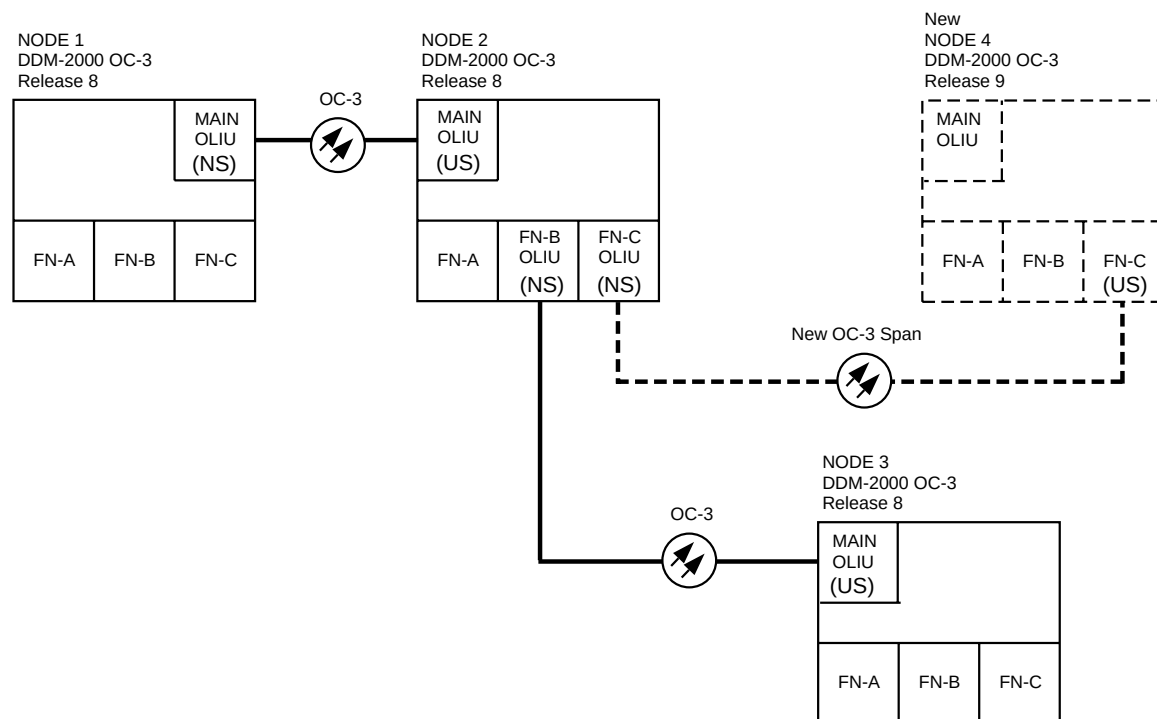


Figure 4. Adding Release 9 RT and Optical Span to Hub Location

DO ITEMS BELOW IN ORDER LISTED . . . FOR DETAILS, GO TO

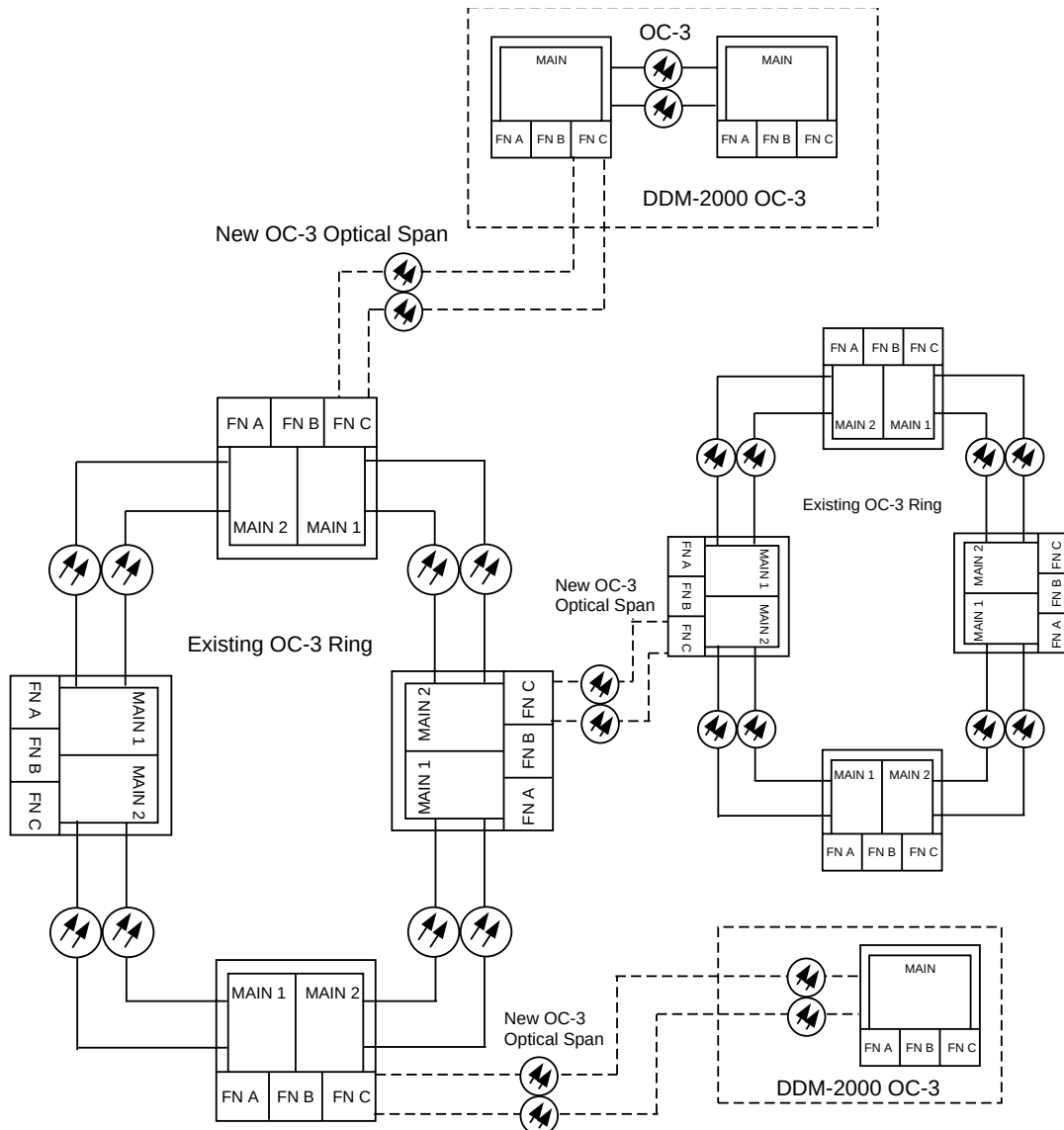


Figure 5. Adding New Shelf and/or Optical Span to OC-3 Ring

DO ITEMS BELOW IN ORDER LISTED . . . FOR DETAILS, GO TO

2. Notify maintenance center that alarms will be generated.

-
3. If this is a linear system and the existing RT is going to be a DS1 add/drop shelf and is not yet converted, convert it using the procedures of **NTP-020**, then return to this procedure.
-

4.  **WARNING:**
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.

At existing RT, install **OLIU** circuit packs in slots being used for the new extension, if not already performed.

DLP-504

-
5.  **NOTE:**
If **21G/21G-U OLIU** circuit packs are used, the **HIGH/LOW POWER** switch must be set to **LOW** before connecting the optical loops. **22G-U OLIUs** require a 10 dB LBO. **21G2-U** and **22G2-U/22G3-U OLIUs** require **no** attenuation when looped on themselves.

At existing RT, connect optical loops to the new **OLIUs**.

DLP-505

-
6. After new **OLIU** alarm LEDs go off, remove **OLIU** optical loops at both existing and new RTs.
-

DO ITEMS BELOW IN ORDER LISTED FOR DETAILS, GO TO

7. Determine the optical loss of the optical facility from office records or by making the required measurements.

-
8.  **NOTE:**
The Network Side/User Side parameters of the "**set - fecom:**" command must be set opposite at each end of the optical spans.

Use the "**rtrv - fecom/set - fecom**" command to verify/set "Network Side/User Side" parameters at each end of optical span being established.

-
9. If **21G/21G-U OLIUs** are used, set option switch on each **21G/21G-U OLIU** to agree with the loss of the optical facility. **DLP-513**

-
10.  **NOTE:**
The section data communication channel (DCC), used for far end communications, must be enabled at each network element (shelf) optical interface being tested in order for the end-to-end line tests to work. Default condition for the DCC channel is "enabled". If it has been disabled, use the "**set - fecom:**" command **at each shelf** to enable far end communications.

At each shelf, use the "**set - fecom: address: com=enabled**" command to ensure far end communications (fecom) is enabled.

DO ITEMS BELOW IN ORDER LISTED . . . FOR DETAILS, GO TO

11. **⇒ NOTE:**
If option switch setting is changed, an update must be performed by momentarily depressing the **UPD/INIT** button on the **SYSCTL** after the **OLIU** is reinstalled.

Reinstall **OLIUs** (if removed) and connect each **OLIU** to the new optical facility. **DLP-514**

12. **⇒ NOTE 1:**
If line timing mode is specified or external timing mode is specified but the timing reference was not available at new shelf turnup, the **TGS** option switches are probably set for *free running*. Before the end-to-end system is established, the specified timing mode must be set on the **TGS** circuit pack.

⇒ NOTE 2:
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.

⇒ NOTE 3:
If external timing is selected and the **NE ACTY** LED remains lighted after the **TGS** circuit pack is reinserted, use the CIT and the "**rtrv-sync**" command to check the operational mode of the system. If the mode is **Holdover** instead of **External**, check that the incoming timing references are connected.

Set timing mode on **TGS** to the timing mode specified in work order or office records. **DLP-513**

DO ITEMS BELOW IN ORDER LISTED FOR DETAILS, GO TO

13. **NOTE 1:**

The "**set -ne:**" command designates a shelf as the directory service network element (DSNE). **One**, and only one, shelf in the subnetwork **must** be provisioned as a DSNE. If there is no DSNE in the network, all DCC communication can become disabled. If more than one shelf is provisioned as DSNE, a "duplicate DSNE" alarm will occur. Multiple GNEs are allowed and a shelf is automatically provisioned as a GNE when connected to an active X.25 interface.

 NOTE 2:

Shelves may be designated as an alarm gateway network element (AGNE) and assigned an alarm group number. (Default alarm group number is 255.) At least one AGNE is required per alarm group. One primary AGNE and one backup per alarm group is recommended. For a network greater than 16 nodes, the AGNE and TL1 GNE should be on separate nodes.

Use the "**set -ne:**" command to designate ONE shelf as the DSNE, if not already done. Use the "**set -ne:**" to designate the AGNE(s) and alarm group number, as required.

DO ITEMS BELOW IN ORDER LISTED FOR DETAILS, GO TO

14. Perform automatic end-to-end OC-3 line test at new or existing RT.
- | | |
|---|----------------|
| A. Linear configuration with linear extension | DLP-525 |
| B. Ring configuration with linear extension | DLP-515 |
-

15. Use "**rtrv-crs-sts1**" or "**rtrv-crs-vt1**" commands at existing RT to see if required cross-connections have been made to new RT. If required, use "**ent-crs- ()**" commands at existing RT to make required cross-connections.
-

16. Perform end-to-end DS1 transmission test for added low speed group, as required. **DLP-510**
-

17. Perform end-to-end DS3 transmission test for added low speed group, as required. **DLP-511**
-

18. The system is ready for service to be established.
-

Equip DDM-2000 OC-3 Shelf (Looped-Back)

DO ITEMS BELOW IN ORDER LISTED FOR DETAILS, GO TO

1.  **WARNING:**
Unterminated optical connectors may emit invisible laser radiation. Avoid direct exposure to the beam. Do not view beam with optical instruments. Use of controls or adjustments or performance of procedures other than those specified herein may result in hazardous radiation exposure.

 **CAUTION:**
*DDM-2000 circuit packs contain static sensitive components which can be damaged by electrostatic discharge. A static ground wrist strap must be worn when handling the circuit packs. See electrostatic discharge considerations in **Trouble Clearing: TAD-100**.*

 **NOTE 1:**
This procedure is **not** used to equip a shelf as an EC-1 electrical multiplexer or for OC-3c service. See **System Turnup: IXL-001** for proper procedures.

 **NOTE 2:**
This procedure assumes that all hardwired installation and testing of the unequipped DDM-2000 shelf has been done. It also assumes that power is applied to the shelf (**PWR ON** LED(s) lighted on User Panel).

 **NOTE 3:**
Some of the circuit packs have option switches which must be set before they are installed.

DO ITEMS BELOW IN ORDER LISTED . . . FOR DETAILS, GO TO

Check –48 V DC office battery, if required. **DLP-524**

2. Install **BBG9 OHCTL** circuit pack. **DLP-500**

3.  **NOTE:**
If system software has not been previously installed in the **OHCTL** and **SYCTL**, it must be installed [**DLP-561**] after the **SYCTL** is installed.
If the DDM-2000 OC-3 Multiplexer is being used as a DDM-2000 FiberReach host shelf, Release 9 or later ring software **must** be installed.

Install **BBG8/BBG8B SYCTL** circuit pack. **DLP-549**

4.  **NOTE 1:**
As additional circuit packs are installed, office alarms may be activated, accompanied by flashing **FAULT** LEDs on some of the circuit packs. This is a normal condition at this stage of the procedure. You can momentarily depress the **ACO/TST** pushbutton to retire office alarms.

DO ITEMS BELOW IN ORDER LISTED FOR DETAILS, GO TO

⇒ **NOTE 2:**

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* if either of the following is true:

- DS1 external timing is specified but the DS1 timing reference is not yet available.
- Line timing mode is specified but the **OLIUs** will be optically looped back at the shelf.

When the DS1 external timing references become available or when the end-to-end system is established, the timing mode must be changed to the specified timing mode. If external timing is the specified timing mode and external timing is available to the shelf, the timing mode may be set for external timing.

Install **TGS** timing circuit packs.

DLP-503

5. ⇒ **NOTE:**

The **BBF5 JMPR** jumper circuit pack connects signals between slots of a **FUNCTION UNITS** group equipped with **27G-U/27G2-U OLIUs**. In Group 1 or Group 3 shelves, **BBF5 JMPR** circuit packs must be installed in slot **8(P)** of **LOW SPEED GROUPs** associated with **FUNCTION UNITS** groups that have both slots equipped with **27G-U OLIUs**. In Group 1 or Group 3 shelves, **BBF5 JMPR** circuit packs must be installed in slots **4** and **8(P)** of **LOW SPEED GROUPs** associated with **FUNCTION UNITS** groups that have both slots equipped with **27G2-U OLIUs**. The **BBF5 JMPR** circuit pack is not needed in Group 4 shelves in any application.

DO ITEMS BELOW IN ORDER LISTED FOR DETAILS, GO TO

Install **BBF5 JMPR** jumper circuit pack.

6.  **NOTE 1:**
OC-3 add/drop and ring configurations require **22-Type OLIUs**. DDM-2000 FiberReach host OC-1 applications require **26G2-U** or **27G-U/27G2-U OLIUs**. OC-3 shelves configured for OC-12 ring configurations require **24G-U OLIUs**. For other configurations, if **21G/21G-U OLIUs** are used, the **HIGH/LOW POWER** switch is set to **LOW** for shelf loopback.

-  **NOTE 2:**
OC-12 ring applications require **24G-U OLIUs** in the **MAIN** slots. 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 connector (ribbon cable) is not yet installed. To clear the alarm, install the OC-12 connector on the **24G-U OLIUs** seated in the **MAIN 1** and **MAIN 2(P)** slots.

Install **OLIU** circuit packs.

DLP-504

7.  **CAUTION:**
*Before looping a shelf, verify/set DSNE parameter of the "rtrv-ne:/set-ne:" command to **no**. This parameter will be set as required when the shelf is integrated into a network. Only one DSNE is allowed in a network.*

-  **NOTE 1:**
The **22G-U**, **24G-U**, **26G2-U** and **27G-U/27G2-U OLIUs** require a 10 dB LBO for loopback testing. The **22G2-U** and **22G3-U OLIUs** do **not** require an LBO for loopback testing.

DO ITEMS BELOW IN ORDER LISTED FOR DETAILS, GO TO

⇒ **NOTE 2:**

Unused optical connectors on the **27G-U/27G2-U OLIUs** should remain looped back or use the "**set-state-oc1**" command to set the state of the unused OC-1 ports to **nmon**.

⇒ **NOTE 3:**

If fecom is enabled, an "inconsistent DCC values" alarm will occur when the **OLIUs** are looped back. Normally, the alarm occurs when the "Network side/User side" parameters at both ends of the DCC are set the same. To clear the alarm during a fiber loopback, use the "**set-fecom:address:com=disable**" command to disable the DCC.

⇒ **NOTE 4:**

An "AGNE communication failure" alarm will also occur when the **OLIUs** are looped back. This alarm occurs because at least one shelf in the network must be set as an AGNE but the default for the shelf is AGNE=**no**. To clear the alarm during a fiber loopback, use the "**set-ne:tid:agne=yes**" command.

Install **OLIU** optical loops.

DLP-505

8. ⇒ **NOTE:**

BBG2 MXRVO circuit packs must be installed in both **FUNCTION UNITS** group slots **1** and **2(P)** if **BBF3/BBF3B DS1PM** circuit packs are going to be installed.

Install **BBG2 MXRVO** circuit packs (if required).

DLP-506

DO ITEMS BELOW IN ORDER LISTED FOR DETAILS, GO TO

9. Install **BBG4/BBG4B/BBG19 DS3** circuit packs (if required). **DLP-507**

10. Install **BBG20 TMUX** circuit packs (if required). **DLP-507**

11. Install **BBG6 STS1E** (optioned for LOW SPEED) circuit packs (if required). **DLP-502**

12. **⇒ NOTE 1:**
Do not install **BBF1/BBF1B DS1** or **BBF3/BBF3B DS1PM** interface circuit packs in a **LOW SPEED GROUP** corresponding to a **FUNCTION UNITS** group that is not going to be equipped with **MXRVO** circuit packs.

⇒ NOTE 2:
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 terminate 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.

DO ITEMS BELOW IN ORDER LISTED FOR DETAILS, GO TO

⇒ **NOTE 3:**

177A Retainer Cards must be installed in all empty **DS1/DS1PM** circuit pack slots in **LOW SPEED GROUPS** corresponding to **FUNCTION UNITS** groups equipped with **MXRVO** circuit packs. This is generally performed when initial service is established. [**System Turnup: NTP-004**] All **DS1/DS1PM** slots must be empty in **LOW SPEED GROUPS** that are unequipped or corresponding to **FUNCTION UNITS** groups that are not equipped with **MXRVO** circuit packs.

⇒ **NOTE 4:**

If **BBF3/BBF3B DS1PM** circuit packs are installed in service slots, then a **BBF3/BBF3B DS1PM** circuit pack must be installed in the protection slot, if protection is required.

Install service and protection **BBF1/BBF1B DS1** or **BBF3/BBF3B DS1PM** circuit packs (if required).

DLP-508

13. ⇒ **NOTE:**

A maximum of three **BBF8 HDSL** circuit packs, including a protection circuit pack, can be installed in any one **FUNCTION UNITS** group. Both service and protection **MXRVO** circuit packs must also be installed.

Install **BBF8 HDSL** circuit packs (if required).

DLP-567

DO ITEMS BELOW IN ORDER LISTED FOR DETAILS, GO TO

14.  **CAUTION:**
*The command "**init-sys:all**" may affect service. It should never be used on an in-service system. It should be used only after a shelf has been equipped to reset all provisionable parameters and cross-connections to their default values.*

 **NOTE 1:**
An "inconsistent DCC values" alarm will occur when the "**init-sys:all**" command is executed because "fecom" becomes enabled again. To clear the alarm, use the "**set-fecom:address:com=disable**" to disable the DCC.

 **NOTE 2:**
An "AGNE communication failure" alarm will also occur when the "**init-sys:all**" command is executed because the AGNE parameter of the "**set-ne:**" command is set to **no** again. To clear the alarm, use the "**set-ne:tid:agne=yes**" command.

Use the "**init-sys:all**" command to initialize all provisionable parameters to their original default values. It may take approximately 2 minutes after "**init-sys:all**" command for alarms to stabilize.

-
15. Perform an LED test.

DLP-509

DO ITEMS BELOW IN ORDER LISTED FOR DETAILS, GO TO

16. **⇒ NOTE:**

This procedure assumes that the DDM-2000 high speed signals are looped back [manual optical (OLIU) loopback]. Automatic local tests (looped back) using the "**test-auto**" command are not available for Rings.

Perform automatic local (looped back) transmission test.

A. DS1/EC-1 Transmission Test (Rings)	DLP-510
B. DS3/EC-1 Transmission Test (Rings)	DLP-511
C. Automatic Local Transmission Test (Linear)	DLP-528

17. **⇒ NOTE:**

This procedure assumes that the DDM-2000 has been connected to the low-speed DSX cross-connection as required. Automatic cross-connect tests (looped back) using the "**test-auto**" command are not available for Rings.

Perform automatic local cross-connect wiring test (looped back).

A. DS1/EC-1 Transmission Test (Rings)	DLP-510
B. DS3/EC-1 Transmission Test (Rings)	DLP-511
C. Automatic Cross-Connect Wiring Test (Linear)	DLP-529

-
18. Perform DDM-2000 OC-3 receiver sensitivity test (if required). Optional test.	DLP-547
-

DO ITEMS BELOW IN ORDER LISTED FOR DETAILS, GO TO

19. Check office alarm interface as required. **DLP-516**

20. Check telemetry interface as required.

- A. Parallel telemetry
- B. Serial telemetry

DLP-517
DLP-518

21. Test protection switching function, if required. **DLP-519**

22.  **CAUTION:**
*The command "**init-sys:all**" may affect service. It should never be used on an in-service system. It should be used only after a shelf has been equipped to reset all provisionable parameters and cross-connections to their default values.*

 **NOTE 1:**
An "inconsistent DCC values" alarm will occur when the "**init-sys:all**" command is executed because "fecom" becomes enabled again. To clear the alarm, use the "**set-fecom:address:com=disable**" to disable the DCC.

DO ITEMS BELOW IN ORDER LISTED FOR DETAILS, GO TO

⇒ **NOTE 2:**

An "AGNE communication failure" alarm will also occur when the "**init-sys:all**" command is executed because the AGNE parameter of the "**set-ne:**" command is set to **no** again. To clear the alarm, use the "**set-ne:tid:agne=yes**" command.

Use the "**init-sys:all**" command to initialize all provisionable parameters to their original default values.

23. ⇒ **NOTE 1:**

A craft interface terminal (CIT) is required to access optional features of the DDM-2000 OC-3 Multiplexer, such as system name (tid); site, ne, and shelf number; DSNE, alarm groups and AGNE; security and logins; date and time; far end communications (fecom); etc.

⇒ **NOTE 2:**

Alarm activity will result when optical fiber loops are removed for end-to-end system testing.

Activate optional features as required from work order or office records.

DLP-512

24. ⇒ **NOTE:**

The procedures referenced in this step are used to establish basic configurations. For other configurations requiring connections with other systems (FT-2000, OC-12, etc.) or networks, refer to the **System Turnup/Circuit Order: IXL-001** for procedures on how to connect OC-3/IS-3/EC-1 spans (for example, establishing dual ring interworking, adding new spans or shelves, etc.).

DO ITEMS BELOW IN ORDER LISTED . . . FOR DETAILS, GO TO

After all shelves in the network have been tested, you can establish the end-to-end DDM-2000 OC-3 subnetwork.

A. DDM-2000 OC-3 Point-to-Point	NTP-003
B. DDM-2000 OC-3 Linear or Hub	NTP-017
C. DDM-2000 Path Switched Rings	NTP-022
D. OC-3/IS-3 Dual Ring Interworking — DDM-2000 OC-3 to OC-12 or FT-2000 Ring	NTP-041
E. EC-1 Dual Ring Interworking — DDM-2000 OC-3 to OC-12 or FT-2000 Ring	NTP-013
F. DDM-2000 OC-3 Single-Homed OC-3 Access via DDM-2000 OC-12 Backbone Ring	NTP-040
G. DDM-2000 OC-3 Dual Homed OC-3 Access via DDM-2000 OC-12 Backbone Ring	NTP-050
H. FiberReach Access via DDM-2000 OC-3 Ring Release 9 or 11 Host Shelf in OC-3 Release 8 Linear Configuration	NTP-052
I. Single-Homed FiberReach Access via DDM-2000 OC-3 Backbone Ring	NTP-043
J. Dual-Homed FiberReach Access via DDM-2000 OC-3 Backbone Ring	NTP-044
K. Stand-Alone FiberReach OC-1 Ring/Hub Network	NTP-045
L. Single-Homed OC-3 Access via FT-2000 OC-48 Backbone Ring	NTP-047
M. Dual-Homed OC-3 Access via FT-2000 OC-48 Backbone Ring	NTP-048
-

Establish End-to-End DDM-2000 OC-3 System OC-3 Optical Fiber Spans Linear or Hub Configuration

DO ITEMS BELOW IN ORDER LISTED FOR DETAILS, GO TO

1.  **WARNING:**
Unterminated optical connectors may emit invisible laser radiation. Avoid direct exposure to the beam. Do not view beam with optical instruments. Use of controls or adjustments or performance of procedures other than those specified herein may result in hazardous radiation exposure.

 **CAUTION:**
*DDM-2000 circuit packs contain static sensitive components which can be damaged by electrostatic discharge. A static ground wrist strap must be worn when handling the circuit packs. See electrostatic discharge considerations in **Trouble Clearing: TAD-100**.*

 **NOTE 1:**
If the DDM-2000 fails to respond in the indicated manner, refer to **Trouble Clearing: IXL-001**.

 **NOTE 2:**
It is assumed that all DDM-2000s in the system have passed the looped transmission test(s). [**System Turnup: NTP-016**]

DO ITEMS BELOW IN ORDER LISTED FOR DETAILS, GO TO

From work order or circuit order, determine the **MAIN** and **FUNCTION UNITS** slots being used to establish the final system configurations. Note that the connections are different, depending on the configuration. For example, see Figures 1, 2, and 3. Nodes being used for FiberReach hosts must be loaded with Release 9 or later software and connected to the timing source either externally or line timed through the **FUNCTION UNITS C** slot. (See **set-sync:src={main,fn-c}**; command in the Commands and Reports section of Volume 1 of this manual.)

2. Determine the optical loss of each optical span from office records or by making the required measurements.
-

3.  **NOTE:**
The Network Side/User Side parameters of the **set-fecom:** command must be set opposite at each end of the optical spans.

Use the **rtrv-fecom/set-fecom:nsus=ns/us** command to verify/set "Network Side (ns)/User Side (us)" parameters at each end of optical span being established. For example, see Figures 1, 2, and 3.

DO ITEMS BELOW IN ORDER LISTED FOR DETAILS, GO TO

4. **NOTE 1:**

If line timing mode is specified or external timing mode is specified but the timing reference was not available at shelf turnup, the **TGS** option switches are probably set for *free running*. Before the end-to-end system is established, the specified timing mode must be set on the **TGS** circuit packs.

 NOTE 2:

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.

 NOTE 3:

If external timing is selected and the **NE ACTY** LED remains lighted after the **TGS** circuit pack is reinserted, use the CIT and the **rtrv-sync** command to check the operational mode of the system. If the mode is Holdover instead of External, check that the incoming timing references are connected. Also check Mode Switching (revertive or nonrevertive) and the external DS1 Line Code/Format switch settings.

Set timing mode on **TGS** circuit packs to the timing mode specified in work order or office records.

DLP-513

DO ITEMS BELOW IN ORDER LISTED FOR DETAILS, GO TO

5.  **NOTE 1:**
If Kbyte (Release 9.0 and earlier) or Sbyte (Releases 8.1, 9.1, and later) (sync messaging) is enabled for any optical interfaces at any node, it is recommended that it be enabled at all nodes of the system.

-  **NOTE 2:**
The **rtrv-oc3:** command retrieves the "OC-3 Line Provisioning Report". This report displays the provisioned configuration of OC-3 lines. See the "Commands and Reports" section of this manual for a description of the **rtrv-oc3:** command format.

Use the **rtrv-oc3:** command to obtain the "OC-3 Line Provisioning Report" and verify if Kbyte/Sbyte is enabled or disabled. Use the **set-oc3:** command to enable or disable the Kbyte/Sbyte parameter, as required.

-
6.  **NOTE 1:**
If Sync Autoreconfiguration is enabled, Kbyte/Sbyte must also be enabled.

-  **NOTE 2:**
If Sync Autoreconfiguration is enabled at any line-timed node (not available for external timed or free-running nodes), it **must** be enabled at all line-timed nodes.

DO ITEMS BELOW IN ORDER LISTED . . . FOR DETAILS, GO TO

⇒ NOTE 3:

The **rtrv-sync:** command retrieves the "Synchronization Report". This report displays the provisioning and operational information on the synchronization attributes of the DDM-2000. See the "Commands and Reports" section of this manual for a description of the **rtrv-sync:** command format.

Use the **rtrv-sync:** command to obtain the "Synchronization Report" and verify if Sync Autoreconfiguration is enabled or disabled at any line-timed node. Use the **set-sync:** command to enable or disable the Sync Autoreconfiguration parameter, as required.

7. ⇒ NOTE:

Two or more shelves in the same network with the same TBOS display number (set by the **set-ne** command) will cause a "duplicate TBOS display" alarm. Two or more shelves in the same network with the same site/ne address (set by the **set-ne** command) will cause a "duplicate site/ne address" alarm. Two or more shelves in the same network with the same system name or TID (set by the **set-ne** command) will cause a "duplicate TID" alarm.

Verify no duplicate TBOS, site/ne, or TID settings exist. The **rtrv-ne:** command may be used at each shelf in the network to display settings. If duplicates exist, determine new settings and use the **set-ne** command to make new settings.

DO ITEMS BELOW IN ORDER LISTED FOR DETAILS, GO TO

8. **NOTE 1:**

The **set-ne:** command designates a shelf as the directory service network element (DSNE). **One**, and only one, shelf in the subnetwork **must** be provisioned as a DSNE. If there is no DSNE in the network, all DCC communication can become disabled. If more than one shelf is provisioned as DSNE, a "duplicate DSNE" alarm will occur. Multiple GNEs are allowed and a shelf is automatically provisioned as a GNE when connected to an active X.25 interface.

 NOTE 2:

Shelves may be designated as an alarm gateway network element (AGNE) and assigned an alarm group number. (Default alarm group number is 255.) At least one AGNE is required per alarm group. One primary AGNE and one backup per alarm group is recommended. For a network greater than 16 nodes, the AGNE and TL1 GNE should be on separate nodes.

Use the **set-ne:** command to designate ONE shelf as the DSNE.

Use the **set-ne:** to designate the AGNE(s) and alarm group number, as required.

9. **NOTE:**

It is suggested this procedure establish the OC-3 optical spans starting from the DSNE node and continuing to an adjacent node, then to the next node, etc.

Remove optical loops from **OLIUs** in the OC-3 optical span being established.

DO ITEMS BELOW IN ORDER LISTED FOR DETAILS, GO TO

10. **NOTE:**

The section data communication channel (DCC), used for far end communications, must be enabled at each network element (shelf) optical interface being tested in order for the end-to-end line tests to work. Default condition for the DCC channel is "enabled". If it has been disabled, use the **set - fecom:** command **at each shelf** to enable far end communications.

At each shelf, use the
set - fecom: address:com=enabled command to
ensure far end communications (fecom) is enabled.

-
11. If **21G/21G-U OLIUs** are used, set the option switches on **DLP-513**
the **21G/21G-U OLIUs** to agree with the loss of the
optical facility.
-

12. **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) and connect the optical
span being established to the **OLIUs** at each end. **DLP-514**

DO ITEMS BELOW IN ORDER LISTED FOR DETAILS, GO TO

13. Perform automatic end-to-end OC-3 line test on OC-3 optical span established. **DLP-525**

14. (Optional test). Perform end-to-end DS1 transmission test for DS1 group being dropped at end of span being established, if required. **DLP-510**

15. (Optional test). Perform end-to-end DS3 transmission test for DS3 group being dropped at end of span being established, if required. **DLP-511**

16. Repeat this procedure from Step 3 for each OC-3 optical span being established in the DDM-2000 OC-3 network.

17. The system is now ready for initial DS1, DS3, or EC-1 service to be established.
[System Turnup: NTP-004] (DS1)
[System Turnup: NTP-005] (DS3)
[System Turnup: NTP-034] (EC-1)

DO ITEMS BELOW IN ORDER LISTED . . . FOR DETAILS, GO TO

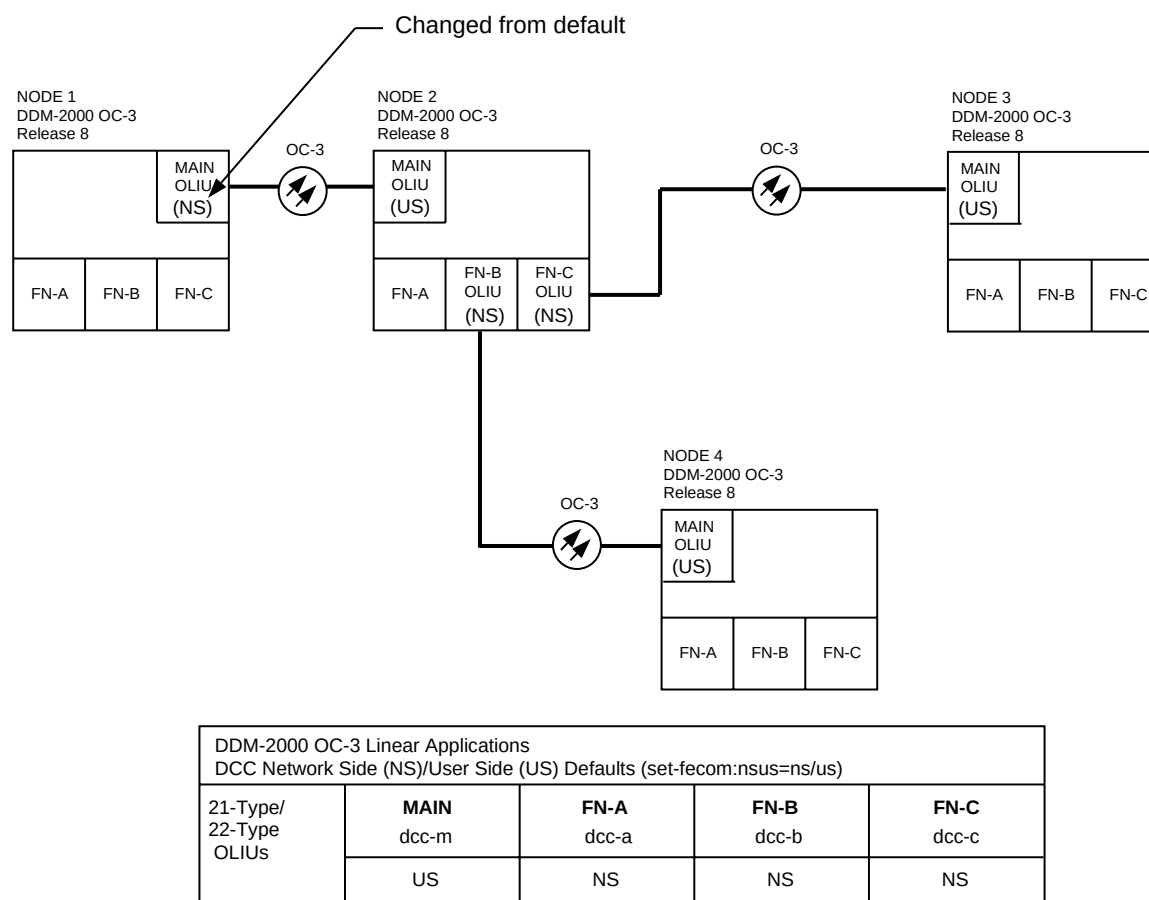
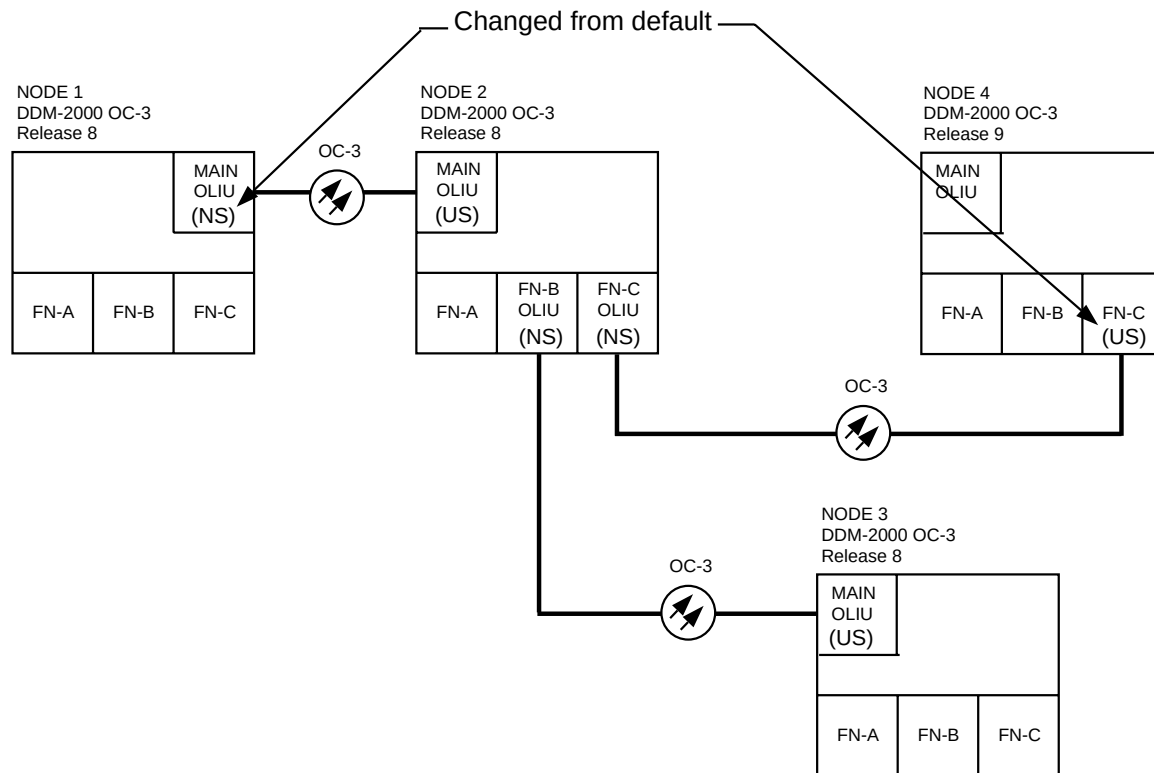


Figure 1. Example of Release 8 Linear/Hub Configuration

DO ITEMS BELOW IN ORDER LISTED . . . FOR DETAILS, GO TO



DDM-2000 OC-3 Linear Applications DCC Network Side (NS)/User Side (US) Defaults (set-fecom:nsus=ns/us)				
21-Type/ 22-Type OLIUs	MAIN dcc-m	FN-A dcc-a	FN-B dcc-b	FN-C dcc-c
	US	NS	NS	NS

Figure 2. Example of Release 8 Linear/Hub Configuration with Release 9 FiberReach Host

DO ITEMS BELOW IN ORDER LISTED FOR DETAILS, GO TO

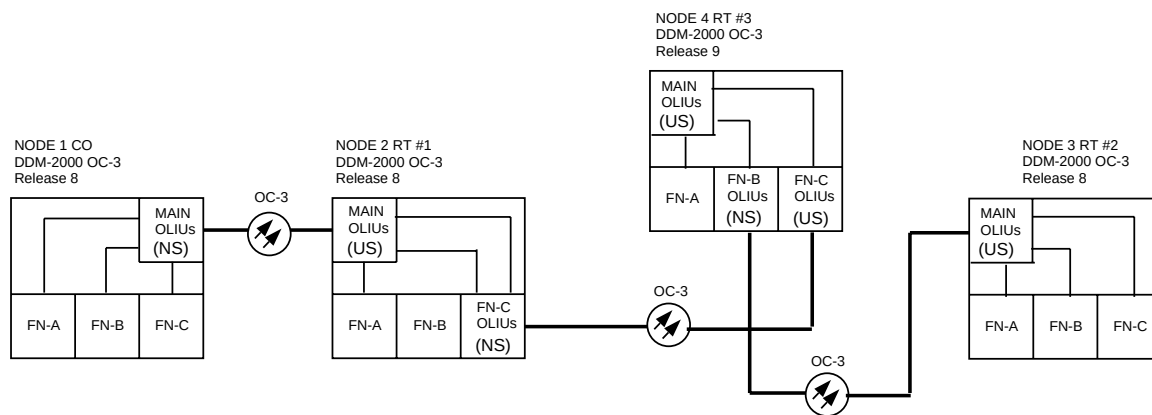


Figure 3. Example of Release 8 Linear Configuration with Release 9 FiberReach Host

Establish OC-3 Optical Span Extension Between DDM-2000 OC-12 Ring and DDM-2000 OC-3

DO ITEMS BELOW IN ORDER LISTED FOR DETAILS, GO TO

1.  **WARNING:**
Unterminated optical connectors may emit invisible laser radiation. Avoid direct exposure to the beam. Do not view beam with optical instruments. Use of controls or adjustments or performance of procedures other than those specified herein may result in hazardous radiation exposure.

 **CAUTION:**
*DDM-2000 circuit packs contain static sensitive components which can be damaged by electrostatic discharge. A static ground wrist strap must be worn when handling the circuit packs. See electrostatic discharge considerations in **Trouble Clearing: TAD-100**.*

 **NOTE 1:**
This procedure assumes that the DDM-2000 OC-12 ring is in service and an OC-3 1+1 optical span is being added between this OC-12 ring and an OC-3 system. See Figures 1 through 3.

 **NOTE 2:**
If the DDM-2000 fails to respond in the indicated manner, refer to **Trouble Clearing: IXL-001**.

Use "**rtrv-alm**" command to verify that no alarms, locks, loops, or switches are present.

DO ITEMS BELOW IN ORDER LISTED . . . FOR DETAILS, GO TO

2. Notify maintenance center that alarms will be generated.

3.  **NOTE 1:**

The "**rtrv-eqpt**:" command retrieves the "Equipage and Version Report". This report lists the circuit pack type and version information for one or more slots. See the "Commands and Reports" section of this manual for a description of the "**rtrv-eqpt**:" command format.

 **NOTE 2:**

If work order or office records do not specify **OLI** types, refer to 363-206-200, *DDM-2000 OC-3 and OC-12 Multiplexers, Applications, Planning, and Ordering Guide* and/or 363-206-280, *DDM-2000 OC-3 Multiplexer, Releases 8.0 through 11.1, User/Service Manual—Volume I*, for a description of **OLI** circuit packs and applications. Optical line power measurements and/or office records must be used to verify that the span length can be supported.

At OC-12 node, verify/install **OLI** circuit packs in (**FUNCTION UNITS A, B, C, or D**) slots being used for the new OC-3 extension. (OC-12 Reference: 363-206-290, *DDM-2000 OC-12 Multiplexer, Release 5 and Higher, User/Service Manual (TOP)—Volume II, DLP-503*)

DO ITEMS BELOW IN ORDER LISTED FOR DETAILS, GO TO

4. **NOTE 1:**

If **21G/21G-U OLIU** circuit packs are used, the **HIGH/LOW POWER** switch must be set to **LOW** before connecting the optical loops.

 NOTE 2:

If fecom is enabled, an "inconsistent DCC values" alarm will occur when the **OLIUs** are looped back. Normally, the alarm occurs when the user/network parameters on the **OHCTLs** at both ends of the DCC are set the same. To clear the alarm during a fiber loopback, use the "**set-fecom:address:com=disable**" command to disable the DCC.

Connect optical loops for **FUNCTION UNITS OLIUs** just installed.

5. **NOTE:**

The "**rtrv-oc3:**" command retrieves the "OC-3 Line Provisioning Report". This report lists information about each OC-3 line. This information includes attributes set by the OC-12 "**set-oc3:**" command. The applications (*app*) parameter of the "**set-oc3**" command must be set to *1+1* for the **FUNCTION UNITS** slots being used for the OC-3 extension in the OC-12 shelf. See the "Commands and Reports" section of 363-206-290, *DDM-2000 OC-12 Multiplexer, Release 5 and Higher, User/Service Manual—Volume I*, for a description of the "**rtrv-oc3:**" command format.

Use the "**rtrv-oc3/set-oc3:**" command at the OC-12 shelf to verify/set the applications parameter to *1+1*.

(For example,

" **set-oc3:fn-{a,b,c,d,all},app=1+1**")

DO ITEMS BELOW IN ORDER LISTED FOR DETAILS, GO TO

6. **NOTE:**

DDM-2000 OC-3 shelves must be connected through the **MAIN** or **FUNCTION UNITS C** slots if the shelf or network is deriving timing from the OC-3 optical links to the OC-12 network. See description of the **src** parameter in "**set -sync:**" command in 363-206-280, *DDM-2000 OC-3 Multiplexer, Releases 8.0 through 11.1, User/Service Manual—Volume I*.

Ensure the DDM-2000 OC-3 subnetwork and/or shelf has been properly equipped with **OLIUs** to accept the new OC-3 optical extension. Use **System Turnup: NTP-016** to equip a new DDM-2000 OC-3 shelf. If the new extension to be established is an OC-3c extension use **System Turnup: NTP-002** or procedure in 363-206-290, *DDM-2000 OC-12 Multiplexer, Release 5 and Higher, User/Service Manual (TOP)—Volume II, System Turnup: NTP-006* to establish OC-3c (STS-3c) service.

-
7. Determine the optical loss of the optical facility from office records or by making the required measurements.
-

DO ITEMS BELOW IN ORDER LISTED FOR DETAILS, GO TO

8. **NOTE:**

The Network Side (NS)/User Side (US) parameters of the "**set - fecom:**" command must be set opposite at each end of the optical spans.

Use the "**rtrv - fecom/set - fecom**" command to verify/set "Network Side/User Side" parameters at each end of optical span being established. See Figure 4.

-
9. If **21G/21G-U OLIUs** are used, set option switch on each **21G/21G-U OLIU** to agree with the loss of the optical facility.

DLP-513

10. **NOTE:**

If option switch setting is changed, an update must be performed by momentarily depressing the **UPD/INIT** button on the **SYCTL** after the **OLIU** is reinstalled.

Reinstall **OLIUs** (if removed) and momentarily depress the **UPD/INIT** button on the **SYCTL** or use the **UPD** command.

-
11. Use "**set - fecom:address:com=enabled**" command to enable DCC communications on the new OC-3 optical extension.
-

DO ITEMS BELOW IN ORDER LISTED FOR DETAILS, GO TO

12. Perform OC-3 optical fiber connections and verification of the optical facility. **DLP-514**
-

13.  **NOTE 1:**
If Kbyte (Release 9.0 and earlier) or Sbyte (Releases 8.1, 9.1, and later) (sync messaging) is enabled for the OC-3 optical interfaces at any node in the OC-3 ring, it **must** be enabled at all nodes in the OC-3 ring and in the **FUNCTION UNITS** slots of the host OC-12 shelf.

 **NOTE 2:**
The "**rtrv-oc3:**" command retrieves the "OC-3 Line Provisioning Report". This report displays the provisioned configuration of OC-3 lines. See the "Commands and Reports" section of 363-206-280, *DDM-2000 OC-3 Multiplexer, Releases 8.0 through 11.1, User/Service Manual—Volume I* and 363-206-290, *DDM-2000 OC-12 Multiplexer, Release 5 and Higher, User/Service Manual—Volume I*, for a description of the "**rtrv-oc3:**" command format.

Use the "**rtrv-oc3:**" command to obtain the "OC-3 Line Provisioning Report" and verify if Kbyte/Sbyte is enabled or disabled. Use "**set-oc3:fn-{a,b,c, or d}:kbyte=enabled**" or "**set-oc3:fn-{a,b,c, or d}:syncmsg=Kbyte/Sbyte**" command at the OC-12 shelf to enable Kbyte/Sbyte sync messaging for the **FUNCTION UNITS** group used for the new OC-3 optical extension.

DO ITEMS BELOW IN ORDER LISTED FOR DETAILS, GO TO

14. **NOTE 1:**

If Sync Autoreconfiguration is enabled, Kbyte/Sbyte must also be enabled.

 NOTE 2:

If Sync Autoreconfiguration is enabled at any line-timed node (not available for external timed or free-running nodes), it **must** be enabled at all line-timed nodes.

 NOTE 3:

The "**rtrv-sync:**" command retrieves the "Synchronization Report". This report displays the provisioning and operational information on the synchronization attributes of the DDM-2000. See the "Commands and Reports" section of 363-206-280, *DDM-2000 OC-3 Multiplexer, Releases 8.0 through 11.1, User/Service Manual—Volume I* and 363-206-290, *DDM-2000 OC-12 Multiplexer, Release 5 and Higher, User/Service Manual—Volume I*, for a description of the "**rtrv-sync:**" command format.

Use the "**rtrv-sync:**" command to obtain the "Synchronization Report" and verify if Sync Autoreconfiguration is enabled or disabled at any line-timed node. Use the "**set-sync:**" command to enable or disable the Sync Autoreconfiguration parameter, as required.

DO ITEMS BELOW IN ORDER LISTED FOR DETAILS, GO TO

15. **NOTE 1:**

The "**set -ne:**" command designates a shelf as the directory service network element (DSNE). **One**, and only one, shelf in the subnetwork **must** be provisioned as a DSNE. If there is no DSNE in the network, all DCC communication can become disabled. If more than one shelf is provisioned as DSNE, a "duplicate DSNE" alarm will occur and one of the DSNEs must be disabled. Multiple GNEs are allowed and a shelf is automatically provisioned as a GNE when connected to an active X.25 interface.

 NOTE 2:

It may take 5 minutes or more for the network to stabilize after one of the DSNEs is discontinued. The remaining DSNE must record and map all the new network elements in the network.

Use the "**set -ne:TID=tid:dsne=no**" command to discontinue one of DSNEs, if not already done. Use the "**reset**" command at the remaining DSNE to reset the node.

16. **NOTE:**

Shelves may be designated as an alarm gateway network element (AGNE) and assigned an alarm group number. (Default alarm group number is 255.) At least one AGNE is required per alarm group. One primary AGNE and one backup per alarm group is recommended. For a network greater than 16 nodes, the AGNE and TL1 GNE should be on separate nodes.

Use the "**set -ne:**" command to designate the AGNE(s) and alarm group numbers, as required.

DO ITEMS BELOW IN ORDER LISTED FOR DETAILS, GO TO

17. **NOTE:**

Two or more shelves in the same network with the same TBOS display number (set using the "**set -ne**" command) will cause a "duplicate TBOS display" alarm. Two or more shelves in the same network with the same site/ne address will cause a "duplicate site/ne address" alarm. Two or more shelves in the same network with the same system name or TID (set by the "**set -ne**" command) will cause a "duplicate TID" alarm.

Verify no duplicate TBOS, site/ne, or TID settings exist. The "**rtrv-ne:**" command may be used at each shelf in the network to display settings. If duplicates exist, determine new settings and use the "**set -ne**" command to make new settings.

18. Perform automatic end-to-end OC-3 line test on new OC-3 optical extension.	DLP-515

19. Perform end-to-end DS1 transmission test for each low speed group, if required.	DLP-510

DO ITEMS BELOW IN ORDER LISTED FOR DETAILS, GO TO

20. Perform end-to-end DS3 transmission test for each low speed group, if required. **DLP-511**

21. The network is ready for service to be established. Use procedures from both 363-206-280, *DDM-2000 OC-3 Multiplexer, Releases 8.0 through 11.1, User/Service Manual (TOP)—Volume II* and 363-206-290, *DDM-2000 OC-12 Multiplexer, Release 5 and Higher, User/Service Manual (TOP)—Volume II*, to establish the type of service required.

DO ITEMS BELOW IN ORDER LISTED FOR DETAILS, GO TO

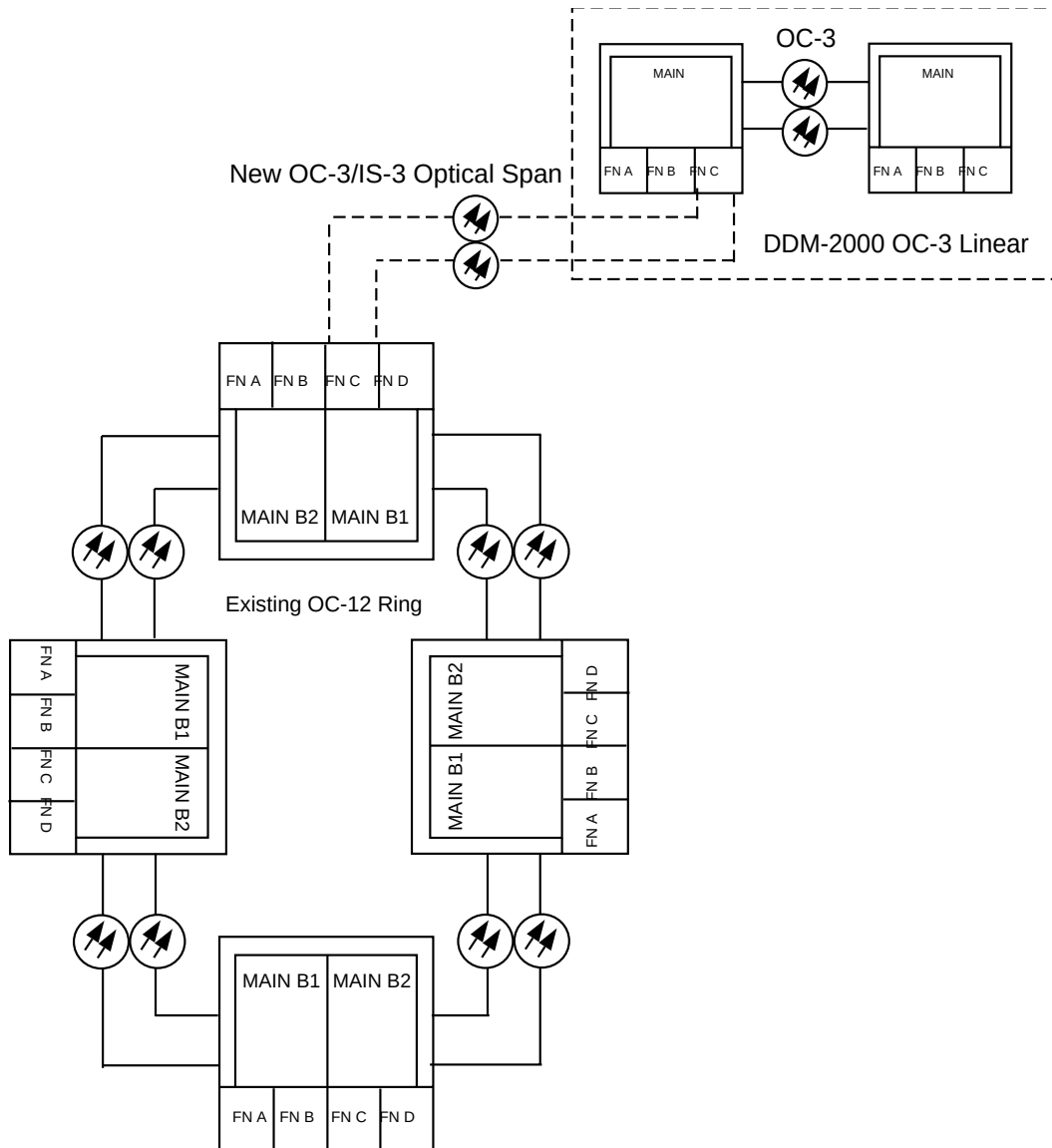


Figure 1. Adding New OC-3 Optical Span Extension — Linear OC-3 Network to OC-12 Ring

DO ITEMS BELOW IN ORDER LISTED FOR DETAILS, GO TO

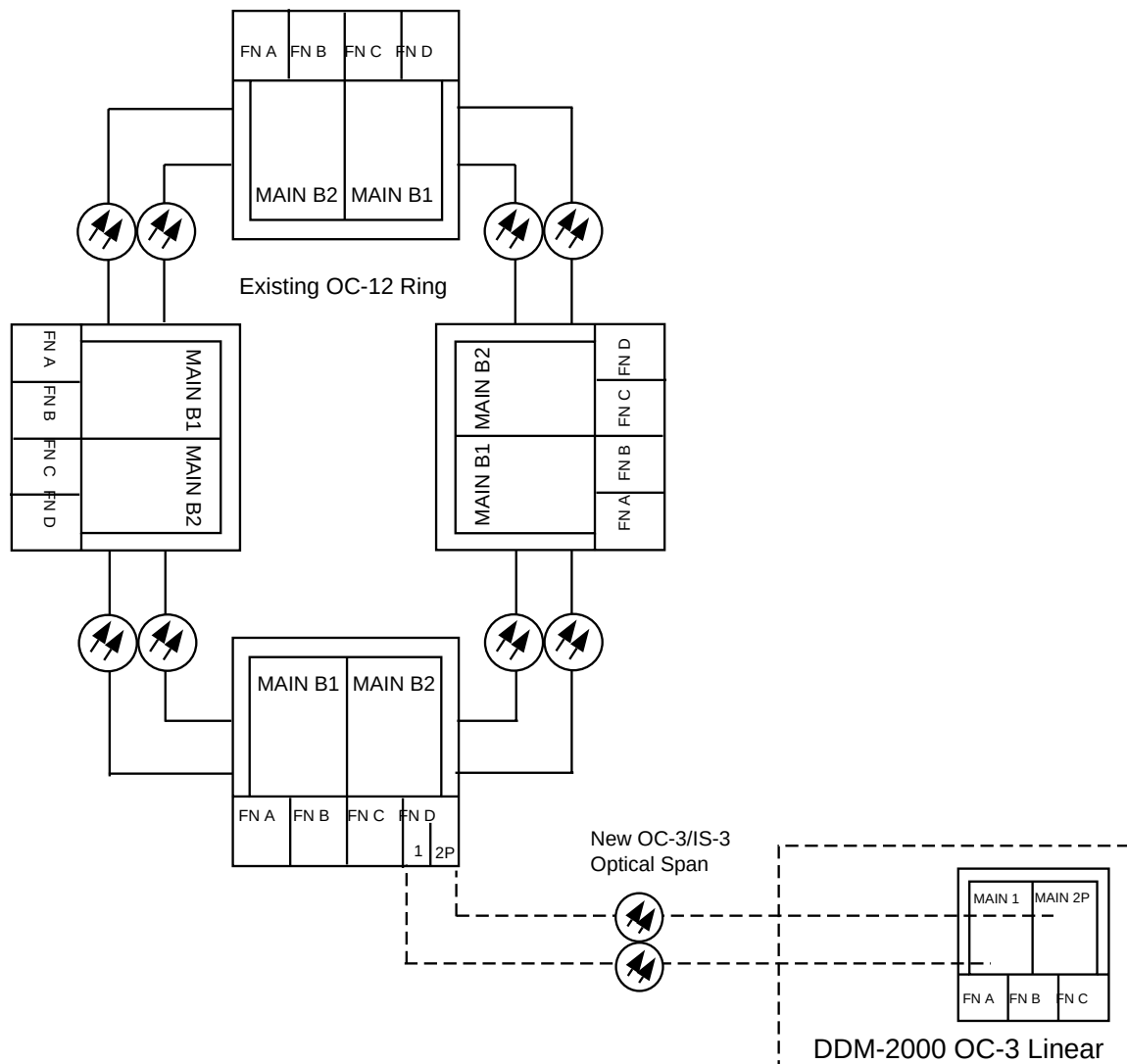


Figure 2. Adding New OC-3 Optical Span Extension — Linear OC-3 Shelf to OC-12 Ring

DO ITEMS BELOW IN ORDER LISTED . . . FOR DETAILS, GO TO

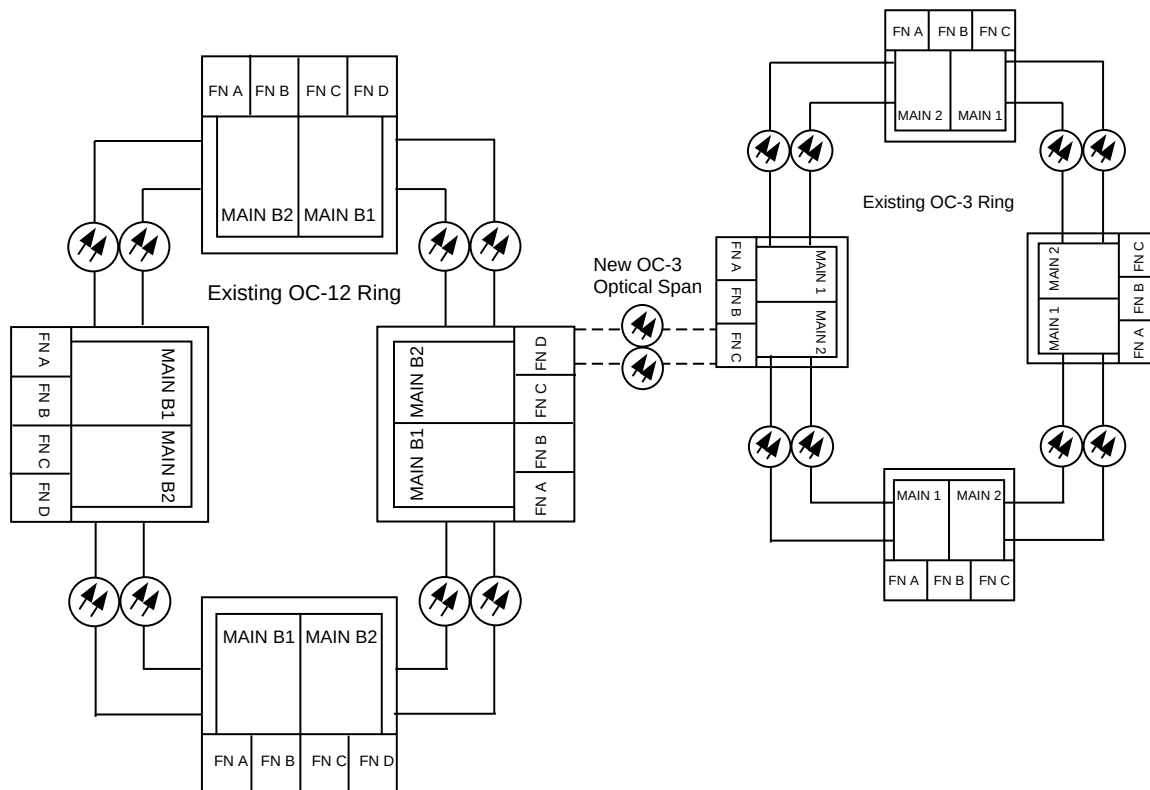


Figure 3. Adding New OC-3 Optical Span Extension — OC-3 Ring to OC-12 Ring

DO ITEMS BELOW IN ORDER LISTED . . . FOR DETAILS, GO TO

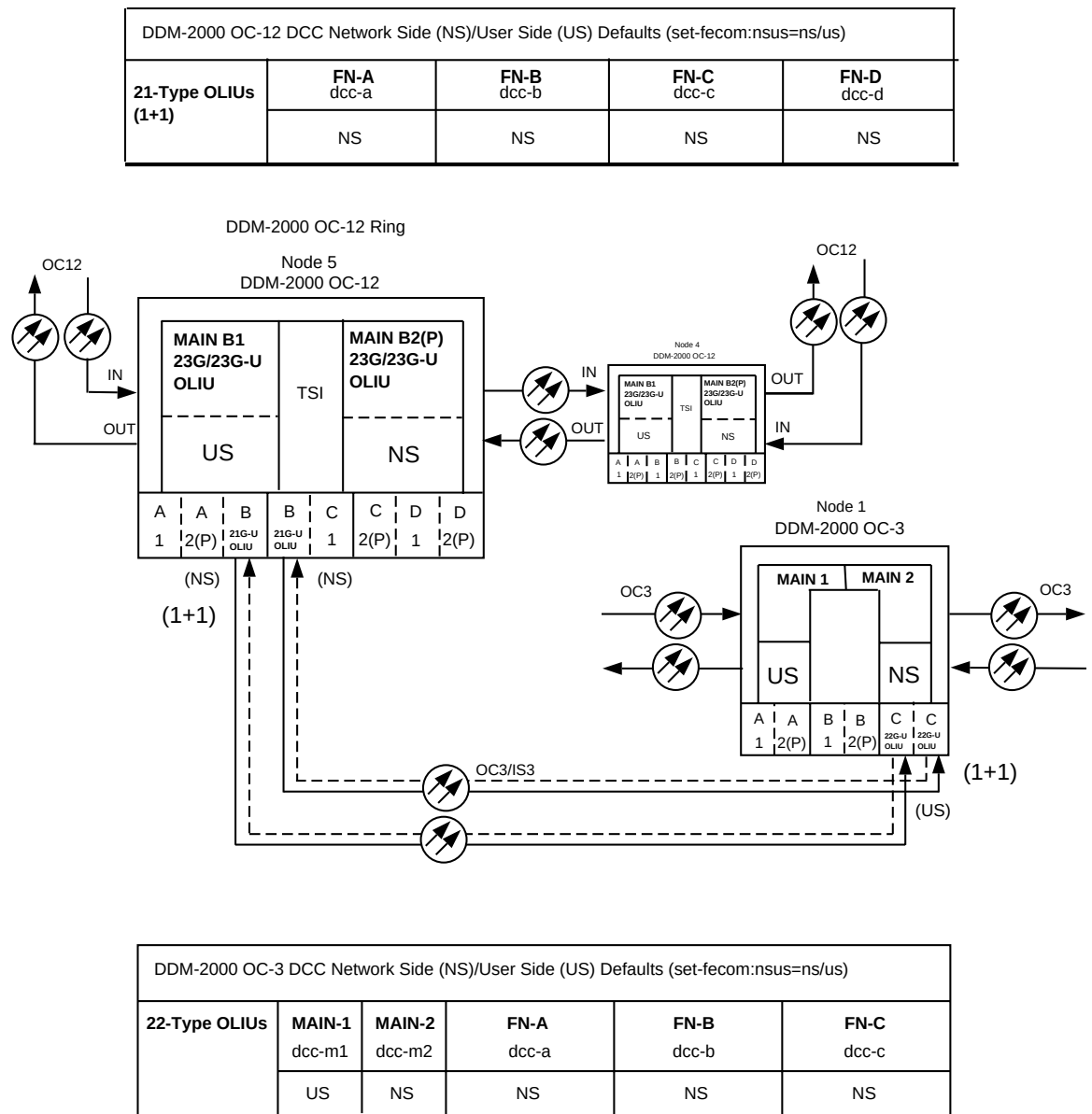


Figure 4. Adding New OC-3 Optical Span Extension to OC-12 Ring

Discontinue OC-3 Optical Span Extension

DO ITEMS BELOW IN ORDER LISTED FOR DETAILS, GO TO

1.  **CAUTION:**
*DDM-2000 circuit packs contain static sensitive components which can be damaged by electrostatic discharge. A static ground wrist strap must be worn when handling the circuit packs. See electrostatic discharge considerations in **Trouble Clearing: TAD-100**.*

 **NOTE:**
The craft interface terminal (CIT) **rtrv-map-network:** command may be used to retrieve a map of the SONET network, including a list of the systems in the network and how they are connected. The **rtrv-crs- ():** command may be used to retrieve STS-1/VT1.5 cross-connections within the DDM-2000 OC-3 system.

Determine which optical span(s) is being discontinued.

-
2. Ensure service (signals) has been removed from the DS1/DS3/EC-1 groups in the span(s) being discontinued [**NTP-011** (DS1), **NTP-012** (DS3), and/or **NTP-036** (EC-1)].
-

DO ITEMS BELOW IN ORDER LISTED FOR DETAILS, GO TO

3. **NOTE 1:**

The **set-ne:** command also designates a shelf as an alarm gateway network element (AGNE). Shelves may be assigned an alarm group number (default alarm group number is 255). At least one AGNE is required per alarm group. One primary AGNE and one backup per alarm group is recommended. For a network greater than 16 nodes, the AGNE and TL1 GNE should be on separate nodes.

 NOTE 2:

It may take several minutes for the network to stabilize after the AGNE has been changed.

If a shelf being discontinued is an AGNE, use the **set-ne:TID=tid:agne=yes** command to establish the AGNE on another shelf, if required. Use the **set-ne:TID=tid:agne=no** command to disable the AGNE at the shelf being removed.

DO ITEMS BELOW IN ORDER LISTED FOR DETAILS, GO TO

4. **NOTE 1:**

The **set-ne:** command designates a shelf as the directory service network element (DSNE). **One**, and only one, shelf in the subnetwork **must** be provisioned as a DSNE. If there is no DSNE in the network, all DCC communication can become disabled. If more than one shelf is provisioned as DSNE, a "duplicate DSNE" alarm will occur and one of the DSNEs must be disabled.

 NOTE 2:

It is recommended that a DDM-2000 OC-3 shelf be assigned as the DSNE.

 NOTE 3:

It may take 6 minutes or more for the network to stabilize after the DSNE has been discontinued.

If the DSNE is being discontinued and another DDM-2000 OC-3 shelf is going to be designated as the DSNE, use the **set-ne:TID=tid:dsne=yes** command to establish the DSNE on another DDM-2000 OC-3 shelf. Use the **set-ne:TID=tid:dsne=no** command to disable the DSNE at the shelf being removed.

If the DSNE is being discontinued and a FT-2000 node is going to be designated as the DSNE, use the **SECURITY-Set-Network Element-DSNE:yes** command at the FT-2000 to designate the DSNE, Use the **set-ne:TID=tid:dsne=no** command to disable the DSNE at the shelf being removed.

DO ITEMS BELOW IN ORDER LISTED . . . FOR DETAILS, GO TO

5.  **CAUTION:**
*Removal of wrong fiber connections will result in a service interruption.
Ensure you remove only the fiber connections for the optical span
being discontinued.*

 **NOTE:**
The following operations will activate office alarms. The audible alarm
may be suppressed by depressing the **ACO** button.

Remove optical fiber connections from all **OLIUs**
associated with optical span(s) being discontinued.

-
6. Remove **OLIU(s)** associated with optical span being
discontinued, if required.

-
7.  **NOTE:**
The **UPD/INIT** pushbutton on the **SYSCTL** is recessed to prevent its
accidental operation. You will need a small pointed object, such as a
ball-point pen to operate it.

If **OLIU** circuit pack(s) was removed, momentarily
depress the **UPD/INIT** button on the **SYSCTL** or use the
upd command to update the DDM-2000 internal
equipment list.

If **OLIU** circuit pack(s) was *not* removed, connect optical
fiber loops to **OLIU(s)**.

DLP-505

DO ITEMS BELOW IN ORDER LISTED FOR DETAILS, GO TO

8. **NOTE 1:**

When a shelf is removed from a DDM-2000 network and one of the other DDM-2000 nodes is designated as a DSNE, the **dlt-tadrmmap:tid=tid** command must be used to delete the TID of the removed shelf from the directory services data base. This prevents that TID from appearing in **rtrv-map-network** or **rtrv-map-neighbor** reports and will retire the "communication failure" alarms at all shelves in the network.

 NOTE 2:

The **dlt-tadrmmap:tid=tid** command is valid only at a DDM-2000 DSNE. The **rtrv-map-network** command may be used to determine which shelf is the DSNE.

 NOTE 3:

If the DSNE is other than a DDM-2000/SLC-2000 shelf, the DSNE will automatically delete the node(s) from its inventory. Wait at least 6 minutes for alarms to settle.

If the DSNE is a DDM-2000 node, wait at least one minute then use the **dlt-tadrmmap:tid=tid** command at the DSNE to delete the TID of the removed shelf from the directory services data base.

9. Verify that all alarms go off.

Convert (Upgrade) DDM-2000 OC-3 Shelf to DS1 Add/Drop Shelf

DO ITEMS BELOW IN ORDER LISTED FOR DETAILS, GO TO

1.  **CAUTION:**
*DDM-2000 circuit packs contain static sensitive components which can be damaged by electrostatic discharge. A static ground wrist strap must be worn when handling the circuit packs. See electrostatic discharge considerations in **Trouble Clearing: TAD-100**.*

 **NOTE 1:**
This procedure is used to convert/upgrade a DDM-2000 OC-3 shelf to a DS1 Add/Drop shelf. It requires replacing all **OLI** circuit packs in a shelf with **22-Type OLI** circuit packs which require Release 3 or later software. If Release 3 or later software is not installed, a software upgrade must be done before the **OLI**s are installed. After the software and **OLI**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.

 **NOTE 2:**
If the DDM-2000 fails to respond in the indicated manner, refer to **Trouble Clearing: IXL-001**.

Use **rtrv-alm** command to verify that no alarms, locks, loops, or switches are present.

DO ITEMS BELOW IN ORDER LISTED FOR DETAILS, GO TO

2. Notify maintenance center that alarms will be generated.

-
3. Install generic program Release 3 or later, if not already installed. **DLP-532**
-

4. Replace existing **OLIUs** with **22-Type OLIUs**, if not already performed. **DLP-542**
-

5.  **NOTE:**
The "Commands and Reports" section of this manual gives a description of commands.

Use the **set-ne:TID:crs>manual** command to set shelf cross-connect mode to manual.

6.  **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.*

DO ITEMS BELOW IN ORDER LISTED FOR DETAILS, GO TO

⇒ **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.

Use the **cnvt-crs:address1, address2** command to convert the required STS-1 cross-connections to DS1 cross-connections.

7. ⇒ **NOTE:**

The shelf is now a DS1 add/drop shelf. Individual DS1 cross-connections may now be made using the **ent-crs-vt1** command. The command description in the "Commands and Reports" section of this manual lists the valid cross-connections. See *Cross-Connection Provisioning* in the "Administration and Provisioning" section of this manual for more information on cross-connection provisioning.

See **System Turnup/Circuit Order: IXL-001** for procedures to add DS1 service.

Convert (Upgrade) DDM-2000 OC-3 System to OC-12 System Linear or Hub Configuration

DO ITEMS BELOW IN ORDER LISTED FOR DETAILS, GO TO

1.  **WARNING:**
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:**
*DDM-2000 circuit packs contain static sensitive components which can be damaged by electrostatic discharge. A static ground wrist strap must be worn when handling the circuit packs. See electrostatic discharge considerations in **Trouble Clearing: TAD-100**.*

 **NOTE 1:**
This procedure is used to upgrade/convert from an in-service DDM-2000 OC-3 point-to-point system to a DDM-2000 OC-12 point-to-point system. It assumes that timing arrangements and cabling have been engineered and installed to satisfy the timing requirements of the new network arrangement.

Basically, this procedure first establishes an end-to-end DDM-2000 OC-12 system with **FUNCTION UNITS** slots equipped with proper **OLIU** circuit packs. Then, the optical fibers from the OC-3 **MAIN** slots are removed and connected to the OC-12 **MAIN-B** slots if the OC-12 system is going to use the removed fibers. If extra fiber pairs exist, the OC-12 system may be established and end-to-end tests performed before the upgrade begins. Protection circuit packs must be available in the OC-3 **MAIN 2(P)** slots to allow service to switch to the protection **OLIU** when the optical fibers are removed. After the OC-12 system is established, new optical fiber connections are made between the OC-3 **MAIN** slots and the OC-12 **FUNCTION UNITS** slots.

DO ITEMS BELOW IN ORDER LISTED FOR DETAILS, GO TO

This procedure requires craft to be at both ends of the OC-3/OC-12 optical span.

⇒ **NOTE 2:**

It is assumed that the OC-12 shelves have been established and have passed local tests.

⇒ **NOTE 3:**

Any **FUNCTION UNITS** slot of the OC-12 system may be used to connect the OC-3 shelf to the OC-12 shelf. **21D/21D-U** or **21G/21G-U/21G2-U** OLIUs may be used in the OC-12 system. **21D/21D-U**, **21G/21G-U/21G2-U**, **22G-U/22G2-U/22G3-U**, **22D-U**, or **22F/22F2-U** OLIUs may be used in the OC-3 system. **21G/21G-U/21G2-U** and **22F/22F2-U** OLIUs use single-mode or multimode fiber connections in the both directions. **21D/21D-U** OLIUs use multimode fiber connections in both directions.

⇒ **NOTE 4:**

All shelves in the same network must have compatible software releases. A network is defined as all shelves tied together through optical fiber connections with communication among all shelves.

⇒ **NOTE 5:**

This procedure assumes that the optical fibers from **MAIN 1** at one end of the OC-3 system connect to **MAIN 1** at the other end of the OC-3 system. This upgrade requires technicians at both ends of the system to remove and make fiber connections.

DO ITEMS BELOW IN ORDER LISTED . . . FOR DETAILS, GO TO

⇒ **NOTE 6:**

Different system configurations may require different timing arrangements. Before performing this upgrade, work orders and/or office records must be available to determine the new timing arrangements. Depending on the timing mode used and the availability of external timing, timing cables may have to be installed or moved and/or different timing modes set for the OC-3 and/or OC-12 shelves.

⇒ **NOTE 7:**

If timing upgrades are required, perform the timing upgrades before performing this procedure.

⇒ **NOTE 8:**

If the DDM-2000 fails to respond in the indicated manner, refer to **Trouble Clearing: IXL-001**.

Verify that the shelf timing cabling and timing modes are provided as required. If external timing is being used, verify that the external timing inputs are good.

A. OC-3 Shelf

DLP-513

B. OC-12 Shelf [363-206-290]

DLP-510

-
2. Ensure that OC-3 software is compatible with the OC-12 system to be turned up.
-

DLP-532

DO ITEMS BELOW IN ORDER LISTED FOR DETAILS, GO TO

3. Establish an end-to-end OC-12 system. [**363-206-290, NTP-003**]

-
4. Use the "**rtrv-alm**" and "**rtrv-state**" commands to verify that no alarms, locks, loops, or switches are present.

-
5. Notify maintenance center that alarms will be generated.

-
6.  **NOTE:**
Two or more shelves in the same network with the same TBOS display number (determined by **SYSCTL** switch settings) will cause a "duplicate TBOS display" alarm. Two or more shelves in the same network with the same site/ne address (determined by **SYSCTL** SITE ID switch settings and **OHCTL** network element number switch settings) will cause a "duplicate site/ne address" alarm. Two or more shelves in the same network with the same system name or TID (set by the "**set-ne**" command) will cause a "duplicate TID" alarm.

Verify no duplicate TBOS, site/ne, or TID settings exist. The "**rtrv-ne:**" command may be used at each shelf in the network to display settings. If duplicates exist, determine new settings and set **SYSCTL** and **OHCTL** switches or use the "**set-ne**" command to make new settings.

DLP-513

DO ITEMS BELOW IN ORDER LISTED FOR DETAILS, GO TO

7. **NOTE 1:**

For OC-3 Release 6 or later, the **OHCTL** must be a series **S2:3** or later to support the open systems interconnection (OSI) protocol. Switches **S2-1** through **S2-4** must be set to control the identification of the DCC for OSI interworking. **S2:3** or later **OHCTLs** are factory-programmed with a unique sequence number which is used as part of the network services access point (NSAP) for the shelf. If an **S2:2** or earlier **OHCTL** is installed and Release 6 or later software is installed, the software will be inoperable, and an **E** will be displayed in the **FE ID** display on the **SYSCTL**.

 NOTE 2:

The **FAULT** LED on the **OHCTL** will flash, and the **MJ** LED will be lighted until the other end is upgraded.

If required, set switches on **OHCTL**.

DLP-513

8. **NOTE:**

In OC-3 Release 6 or later software, the "**set -ne : TID : gne=yes**" command designates a shelf as the X.25 gateway network element (GNE) and as the directory service network element (DS-NE). **One**, and only one, shelf in the network **must** be provisioned as a GNE. If there is no GNE (DS-NE) in the network, all DCC communication can become disabled. If more than one shelf is provisioned as GNE (DS-NE), a "duplicate GNE" alarm will occur. In Release 6 or later software, one shelf must be provisioned as the GNE even if the X.25 operations support interface is unused.

DO ITEMS BELOW IN ORDER LISTED FOR DETAILS, GO TO

If Release 6 or later software is installed and the GNE is to be in the OC-3 system, use the "set-ne:TI D:gne=yes" command to designate ONE OC-3 shelf as the GNE.

9. Ensure that OC-3 shelves are equipped with both **MAIN 1** and **MAIN 2(P) OLIUs** so that service can be switched from service slot **MAIN 1** to protection slot **MAIN 2(P)**.
-

10. At each OC-12 shelf, use "set-fecom:address:com=disable" command to disable DCC communications for the **FUNCTION UNITS** slot being used in the OC-12 system.

For example, if **FUNCTION UNITS** slot **A** in the OC-12 is being used to connect the OC-3 system, the command "set-fecom:dcc-a:com=disable" disables communication for **FUNCTION UNITS** slot **A**.

11. At each OC-3 shelf, use "set-fecom:dcc-m:com=disable" to disable DCC communications for OC-3 **MAIN** slots.
-

DO ITEMS BELOW IN ORDER LISTED FOR DETAILS, GO TO

12.  **NOTE:**
Service must be switched to the protection slot [**MAIN 2(P)**] at both ends of the OC-3 system being upgraded. If only the service **MAIN OLIUs** have **ACTIVE** LEDs lighted, the "**switch-line:main:pri>manual**" command must be performed at both ends of the system. If both service and protection **MAIN OLIUs** have the **ACTIVE** LEDs lighted, use the "**rtrv-state:main-all**" command to determine the switch state of the main **OLIUs**. The "**switch-line:main:pri>manual**" command must be performed at the end of system that shows active-rx for **MAIN 1**.

At **both** ends of the OC-3 system, use the "**switch-line:main:pri>manual**" command to switch to the protection line, if required.

Response: Only **OLIUs** in the protection slot have **ACTIVE** LEDs lighted.

-
13.  **CAUTION:**
*Disconnecting the wrong fiber will cause service interruption. After the **MAIN 1** fiber is disconnected, the OC-3 system will continue service unprotected on **MAIN 2(P)**.*

At each end of the OC-3 system, disconnect the optical fiber from **MAIN 1 OLIU**.

Response: Incoming OC-3 loss of signal alarm for **MAIN 1** fiber.

DO ITEMS BELOW IN ORDER LISTED FOR DETAILS, GO TO

14. If the optical fiber just removed from OC-3 **MAIN 1** is to be used for the OC-12 system, connect the fiber to the **OLIU** in **MAIN-B-1** at each end of the OC-12 system [363-206-290, NTP-003].
-

15.  **NOTE:**
When a circuit pack is removed, a "CP removed" alarm is activated. When a different circuit pack is installed or one is reinstalled with different switches, an "unexpected CP type/switches" alarm is activated.

At both ends of the OC-3 system, if **21G/21G-U/21G2-U OLIUs** are used, remove **OLIUs** from **MAIN 1** slots, set optical power switches to proper position, then reinstall **OLIUs**.

DLP-513

If a different type of **OLIU** is to be used in the OC-3 **MAIN** slots, remove existing **OLIUs** from **MAIN 1** slots, and install new **OLIUs**.

16. One at a time, at both ends of the OC-12 system, connect new optical fiber from the OC-12 **OLIU** in **FUNCTION UNITS** service slot **1** to OC-3 **OLIU** in **MAIN 1** slot [363-206-290, DLP-551].
-

DO ITEMS BELOW IN ORDER LISTED FOR DETAILS, GO TO

17. One at a time, at both ends of the OC-3 system, momentarily depress the **UPD/INIT** button on the **SYSCTL**. Verify that **FAULT** LEDs go off on all **OLIUs**.

-
18. At **both** ends of the OC-3 system, use the "**switch-line:main:pri>manual**" command to switch to the **MAIN 1** service line, if not already switched (**ACTIVE** LED lighted on only the **OLIU** in **MAIN 1** slot).

-
19. At both ends of the OC-3 system, disconnect the optical fiber from **OLIU** in **MAIN 2(P)** slot.

Response: Incoming OC-3 loss of signal
alarm for **MAIN 2(P)** fiber.

-
20. If the optical fiber just removed from OC-3 **MAIN 2(P)** is to be used for the OC-12 system, connect the fiber at each end of the OC-12 system to the **OLIU** in **MAIN-B-2(P)** [363-206-290, DLP-511].

-
21. At both ends of the OC-3 system, remove OC-3 **OLIU** from **MAIN 2(P)** and momentarily depress **UPD/INIT** button on the **SYSCTL**.
-

DO ITEMS BELOW IN ORDER LISTED FOR DETAILS, GO TO

22. At both ends of the OC-3 system, install in **MAIN 2(P)** the same type **OLIU** with same switch settings as used in **MAIN 1**.

23. One at a time, at both ends of the OC-12 system, connect new optical fiber from OC-12 **OLIU** in **FUNCTION UNITS** protection slot **2(P)** to OC-3 **OLIU** in **MAIN 2** slot. Verify that **FAULT** LEDs go off on all **OLIUs** [363-206-290, DLP-551].

24. At each OC-3 shelf, use
"set - fecom: dcc - m : com=enable" to enable DCC communications for OC-3 **MAIN** slots.

25. At each OC-12 shelf, use
"set - fecom: address : com=enable" to enable DCC communications for the **FUNCTION UNITS** slot being used in the OC-12 system.

For example, if **FUNCTION UNITS** slot **A** in the OC-12 system is being used to connect the OC-3 system, the command "set - fecom: dcc - a : com=enable" enables communication for **FUNCTION UNITS** slot **A**.

DO ITEMS BELOW IN ORDER LISTED FOR DETAILS, GO TO

26. The upgrade is now complete. Maintenance operations may need to be moved from the OC-3 shelf to the OC-12 shelf. This may include setting **SYSCTL** switches to enable TBOS on the OC-12 and disable it on the OC-3 **[DLP-513]**. It may also include using the "**set -ne:**" command to indicate which system is a gateway network element (GNE).
-

Establish End-to-End DDM-2000 OC-3 System Optical Fiber Spans Path Switched Ring Network

DO ITEMS BELOW IN ORDER LISTED FOR DETAILS, GO TO

1.  **WARNING:**
Unterminated optical connectors may emit invisible laser radiation. Avoid direct exposure to the beam. Do not view beam with optical instruments. Use of controls or adjustments or performance of procedures other than those specified herein may result in hazardous radiation exposure.

 **CAUTION:**
*DDM-2000 circuit packs contain static sensitive components which can be damaged by electrostatic discharge. A static ground wrist strap must be worn when handling the circuit packs. See electrostatic discharge considerations in **Trouble Clearing: TAD-100**.*

 **NOTE 1:**
If the DDM-2000 fails to respond in the indicated manner, refer to **Trouble Clearing: IXL-001**.

 **NOTE 2:**
It is assumed that all DDM-2000s in the system have been equipped and passed the looped transmission test(s) [**System Turnup: NTP-016**].

Determine the optical loss of each optical span from office records or by making the required measurements.

DO ITEMS BELOW IN ORDER LISTED FOR DETAILS, GO TO

2. ➤ **NOTE:**

The Network Side/User Side parameters of the **set-fecom:** command must be set opposite at each end of the optical spans.

Use the **rtrv-fecom/set-fecom** command to verify/set "Network Side/User Side" parameters at each end of optical span being established.

3. ➤ **NOTE 1:**

If line timing mode is specified or external timing mode is specified but the timing reference was not available at shelf turnup, the **TGS** option switches are probably set for *free running*. Before the end-to-end system is established, the specified timing mode must be set on the **TGS** circuit packs.

➤ **NOTE 2:**

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.

➤ **NOTE 3:**

If external timing is selected and the **NE ACTY** LED remains lighted after the **TGS** circuit pack is reinserted, use the CIT and the **rtrv-sync** command to check the operational mode of the system. If the mode is Holdover instead of External, check that the incoming timing references are connected. Also check Mode Switching (revertive or nonrevertive) and the external DS1 Line Code/Format switch settings.

DO ITEMS BELOW IN ORDER LISTED FOR DETAILS, GO TO

Set timing mode on **TGS** circuit packs to the timing mode specified in work order or office records. **DLP-513**

4. **⇒ NOTE 1:**
If Kbyte (Release 9.0 and earlier) or Sbyte (Releases 8.1, 9.1, and later) (sync messaging) is enabled for the **main-1** and **main-2** optical interfaces at any node in a ring, it **must** be enabled at all nodes of the ring.

⇒ NOTE 2:
The **rtrv-oc3:** or **rtrv-oc12:** command retrieves the or "OC-12 Line Provisioning Report". This report displays the provisioned configuration of OC-3 or OC-12 lines. See the "Commands and Reports" section of this manual for a description of the **rtrv-oc3:** or **rtrv-oc12:** command format.

Use the **rtrv-oc3:** or **rtrv-oc12:** command to obtain the "OC-3 Line Provisioning Report" or "OC-12 Line Provisioning Report" and verify if Kbyte/Sbyte is enabled or disabled. Use the **set-oc3:** or **set-oc12:** command to enable or disable the Kbyte/Sbyte parameter, as required.

DO ITEMS BELOW IN ORDER LISTED FOR DETAILS, GO TO

5. **NOTE 1:**

If Sync Autoreconfiguration is enabled, Kbyte/Sbyte must also be enabled.

 NOTE 2:

If Sync Autoreconfiguration is enabled at any line-timed node (not available for external timed or free-running nodes), it **must** be enabled at all line-timed nodes.

 NOTE 3:

The **rtrv-sync:** command retrieves the "Synchronization Report". This report displays the provisioning and operational information on the synchronization attributes of the DDM-2000. See the "Commands and Reports" section of this manual for a description of the **rtrv-sync:** command format.

Use the **rtrv-sync:** command to obtain the "Synchronization Report" and verify if Sync Autoreconfiguration is enabled or disabled at any line-timed node. Use the **set-sync:** command to enable or disable the Sync Autoreconfiguration parameter and to set sync source, as required.

6. **NOTE:**

Two or more shelves in the same network with the same TBOS display number (set by the **set-ne** command) will cause a "duplicate TBOS display" alarm. Two or more shelves in the same network with the same site/ne address (set by the **set-ne** command) will cause a "duplicate site/ne address" alarm. Two or more shelves in the same network with the same system name or TID (set by the **set-ne** command) will cause a "duplicate TID" alarm.

DO ITEMS BELOW IN ORDER LISTED FOR DETAILS, GO TO

Verify no duplicate TBOS, site/ne, or TID settings exist. The **rtrv-ne:** command may be used at each shelf in the network to display settings. If duplicates exist, determine new settings and use the **set-ne** command to make new settings.

7. **NOTE 1:**

The **set-ne:** command designates a shelf as the directory service network element (DSNE). **One**, and only one, shelf in the subnetwork **must** be provisioned as a DSNE. If there is no DSNE in the network, all DCC communication can become disabled. If more than one shelf is provisioned as DSNE, a "duplicate DSNE" alarm will occur. Multiple GNEs are allowed and a shelf is automatically provisioned as a GNE when connected to an active X.25 interface.

 NOTE 2:

Shelves may be designated as an alarm gateway network element (AGNE) and assigned an alarm group number. (Default alarm group number is 255.) At least one AGNE is required per alarm group. One primary AGNE and one backup per alarm group is recommended. For a network greater than 16 nodes, the AGNE and TL1 GNE should be on separate nodes.

Use the **set-ne:** command to designate ONE shelf as the DSNE. Use the **set-ne:** to designate the AGNE(s) and alarm group number, as required.

DO ITEMS BELOW IN ORDER LISTED FOR DETAILS, GO TO

8. **NOTE:**

A ring configuration requires that the **MAIN 1 OLIU** at one shelf (node) connect to the **MAIN 2(P) OLIU** at an adjacent OC-3 shelf (node). See Figure 1. It is suggested that this procedure establish the ring configuration starting from the DSNE node (near end) and continuing to an adjacent node, then to the next node until the final connection is made from the last node back to the first node.

At the near end, remove the optical loop from ONE **OLIU** (for example, **MAIN 2(P)**) 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.

9. **NOTE:**

The section data communication channel (DCC), used for far end communications, must be enabled at each network element (shelf) optical interface being tested in order for the end-to-end line tests to work. Default condition for the DCC channel is "enabled". If it has been disabled, use the **set - fecom:** command **at each shelf** to enable far end communications.

At each shelf, use the **set - fecom: address: com=enabled** command to ensure far end communications (fecom) is enabled.

DO ITEMS BELOW IN ORDER LISTED FOR DETAILS, GO TO

10. **NOTE:**

One ring node must be designated as the DSNE for proper DCC communications and in order to verify that the proper nodes have been interconnected using the **rtrv-map-network** command. You should start ring node interconnections at the node designated as the DSNE.

Perform optical fiber connections and verification of the integrity of the optical span being established.

DLP-514

11. **NOTE:**

The **rtrv-pm-line** command in the following procedure displays performance monitoring data associated with the OC-3 or OC-12 lines terminated on the system.

Perform end-to-end line test.

DLP-515

-
12. Repeat this procedure from Item 2 for each optical span being established in the DDM-2000 OC-3 network.

-
13. The system is now ready for initial service to be established.

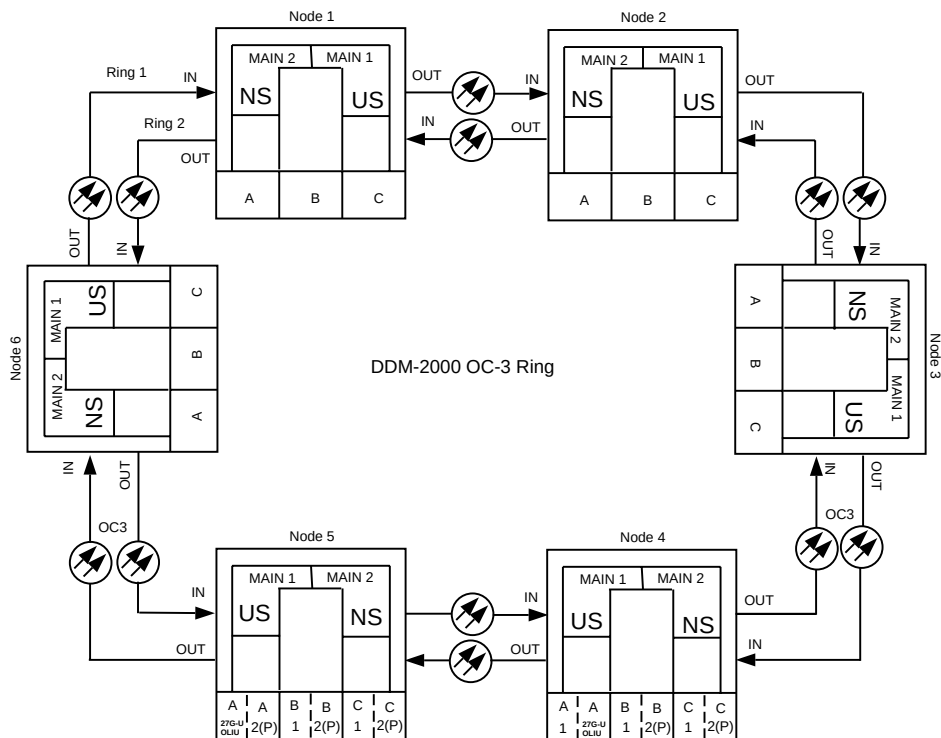
Initial DS1 Service [System Turnup: NTP-004]

Initial DS3 Service [System Turnup: NTP-005]

Initial EC-1 Interface [System Turnup: NTP-034]

Initial HDSL Interface [System Turnup: NTP-025]

DO ITEMS BELOW IN ORDER LISTED . . . FOR DETAILS, GO TO



DDM-2000 OC-3 DCC Network Side (NS)/User Side (US) Defaults (set-fecom:nsus=ns/us)								
22-Type OLIUs	MAIN-1	MAIN-2	FN-A		FN-B		FN-C	
	dcc-m1	dcc-m2	dcc-a		dcc-b		dcc-c	
	US	NS	NS		NS		NS	
27-Type OLIUs	MAIN-1	MAIN-2	FN-A-1	FN-A-2	FN-B-1	FN-B-2	FN-C-1	FN-C-2
	dcc-m1-1	dcc-m2-1	dcc-a1-1	dcc-a2-1	dcc-b1-1	dcc-b2-1	dcc-c1-1	dcc-c2-1
	dcc-m1-2	dcc-m2-2	dcc-a1-2	dcc-a2-2	dcc-b1-2	dcc-b2-2	dcc-c1-2	dcc-c2-2
	US	NS	NS	US	NS	US	NS	US

Figure 1. Example Ring Configuration Connections

Upgrade DDM-2000 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

1. **⇒ NOTE 1:**
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 DDM-2000 OC-3 shelves only. If an OC-12 shelf is being added to the ring fibers to support single-homing the original OC-3 shelf at the CO, use the procedures of **NTP-024** instead of this procedure. 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.

⇒ NOTE 2:
This procedure uses a 4-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. Local procedures will have to be written, using the concepts of this procedure, to upgrade the particular configuration that you have.

⇒ NOTE 3:
OC-3 Release 11 software must be installed in the OC-3 shelves.

⇒ NOTE 4:
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.

Use the **rtrv-alm:** command at the OC-3 ring to verify that no alarms, locks, or switches are present.

DO ITEMS BELOW IN ORDER LISTED . . . FOR DETAILS, GO TO

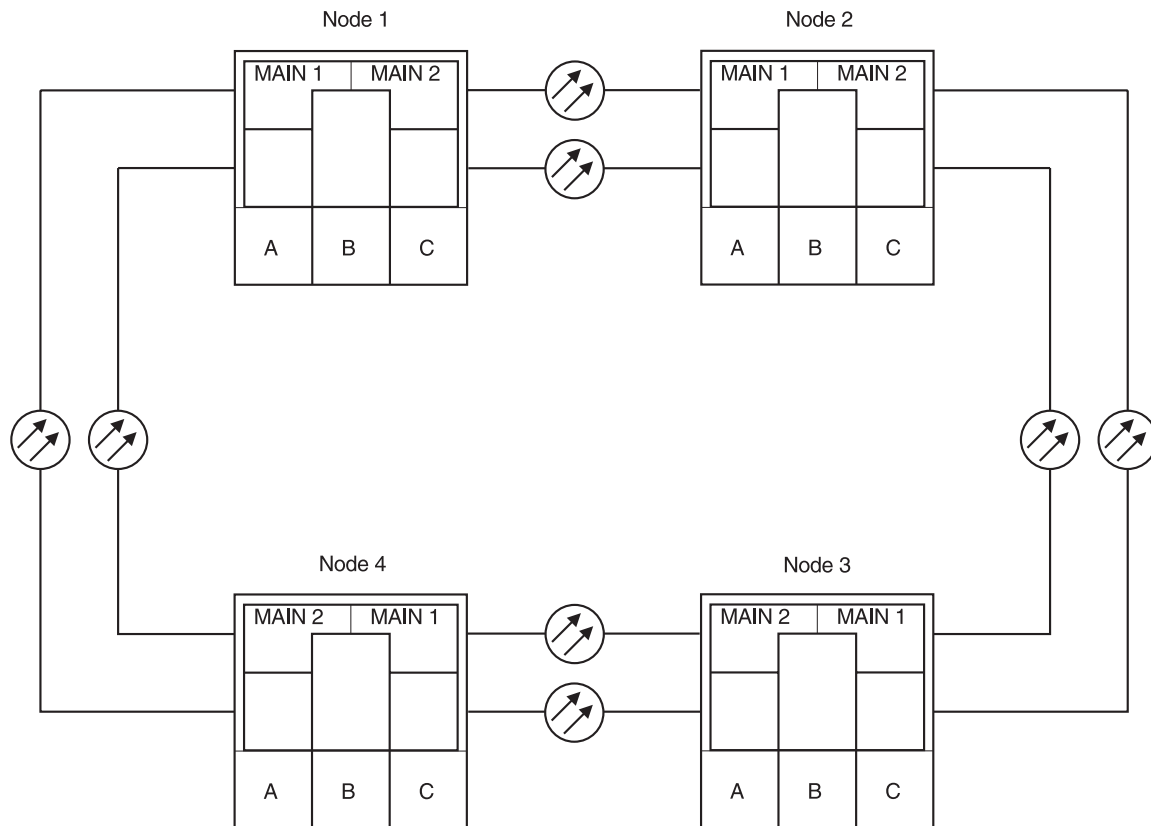


Figure 1. Example of OC-3 to OC-12 Ring Upgrade

DO ITEMS BELOW IN ORDER LISTED FOR DETAILS, GO TO

2. Notify maintenance center that alarms will be generated.

3. 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.

4. 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**.

5. Upgrade all nodes to OC-3 Release 11 or later software.

- A. In-Service Local Software Download
B. In-Service Remote Software Download

DLP-532
DLP-562

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 line-timed node in the network, use
set-oc3:syncmsg=Kbyte/Sbyte command to set
Kbyte or Sbyte sync messages. Use
set-sync:auto=enabled command to enable Sync
auto-reconfiguration.

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(P) OLIU**, then remove **MAIN
2(P) OLIU**.

DO ITEMS BELOW IN ORDER LISTED FOR DETAILS, GO TO

8. **NOTE:**

When the **24G-U OLIU** is installed in this step, an "unexpected CP type" status and "inc. OC-12 LOS" alarm will occur. At the connecting node, an "inc. OC-3 LOS" alarm will occur. When fibers are reconnected, the "unexpected CP type" status is still present at this Node and an "inc. OC-12 LOF" alarm will occur. An "inc. OC-3 LOF" alarm will occur at the connecting Node.

At the starting Node, install a **24G-U OLIU** into **MAIN 2(P) OLIU** slot and reconnect optical fibers.

9. **NOTE:**

A "CP removed" alarm will occur in this step when the **MAIN 1 OLIU** is removed. A "inc. OC12 LOS" alarm will occur at the connecting Node with the **24G-U 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**.

DO ITEMS BELOW IN ORDER LISTED FOR DETAILS, GO TO

10. **⇒ NOTE:**

When the **24G-U OLIU** is installed, an "unexpected CP type" status alarm will occur. The "inc. OC-12 LOS" alarm clears at both ends of the span. The "inc. VT and STS AIS" alarms clear downstream.

Install a **24G-U 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(P) OLIU** is removed from this Node. Other nodes will receive "inc. VT and STS AIS" alarms.

Remove optical fibers from **MAIN 2(P) OLIU** for next span being established, then remove **MAIN 2(P) OLIU**.

12. **⇒ NOTE:**

When the **24G-U OLIU** is installed an "unexpected CP type" status and "OC12 connector failed" alarm will occur. An "inc. OC-12 LOF" alarm will occur at the Node connected to this **OLIU**.

Install a **24G-U OLIU** into **MAIN 2(P) OLIU** slot and reconnect optical fibers.

DO ITEMS BELOW IN ORDER LISTED FOR DETAILS, GO TO

13. Connect the OC12 faceplate connector between **MAIN 1** and **MAIN 2(P) 24G-U OLIUs**. Wait until "OC12 connector failed" alarm clears.

-
14.  **CAUTION:**
The update (UPD) command must be executed at the Node with both 24G-U OLIUs installed.

 **NOTE:**
After the update at this node, the "inc. OC-12 LOF" alarm remains until the **24G-U OLIU** is installed at the connecting Node.

Momentarily depress the **UPD** button on the **SYSCTL** or execute the update (**UPD**) command at the Node with both **24G-U 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 **24G-U OLIU** is installed, an "unexpected CP type" status and "OC12 connector failed" alarm will occur. The "inc. OC-12 LOS" alarm should clear at both ends of the span. The "inc. VT and STS AIS" alarms clear downstream.

Install a **24G-U OLIU** into **MAIN 1 OLIU** slot and reconnect optical fibers.

18. At the starting Node, connect the OC-12 faceplate connector between **MAIN 1** and **MAIN 2(P) 24G-U OLIUs**.
-

DO ITEMS BELOW IN ORDER LISTED FOR DETAILS, GO TO

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 of **NTP-021** in 363-206-290, *DDM-2000 OC-12 Multiplexer, Release 5 and Higher, User/Service Manual (TOP)—Volume II*.
-

Upgrade DDM-2000 OC-3 Ring Network to OC-12 Ring Network Using OC-3/OC-12 Shelves In Service

DO ITEMS BELOW IN ORDER LISTED . . . FOR DETAILS, GO TO

1. **⇒ NOTE 1:**

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 DDM-2000 OC-3 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.

⇒ NOTE 2:

This procedure uses a 4-node OC-3 ring as an example for the OC-3 optics to OC-12 optics ring upgrade (Figure 1). This procedure also adds an OC-12 shelf at the CO and single-homes the existing OC-3 shelf to the OC-12 shelf. If only the OC-3 optics are being upgraded to OC-12 optics, use the procedures of **NTP-023**. This upgrade starts at the Node adjacent to the CO connected to **MAIN 2(P)** of the existing CO OC-3 shelf and proceeds clockwise. Local procedures will have to be written, using the concepts of this procedure, to upgrade the particular configuration that you have.

⇒ NOTE 3:

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.

Use the "**rtrv-alm:**" command at the OC-3 ring to verify that no alarms, locks, or switches are present.

DO ITEMS BELOW IN ORDER LISTED . . . FOR DETAILS, GO TO

2. Before beginning this procedure, verify ring integrity and path protection switching function. At the start node (Node 1), 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 OC-3 nodes to OC-3 Release 11 or later software.

- A. In-Service Local Software Download
- B. In-Service Remote Software Download

DLP-532
DLP-562

DO ITEMS BELOW IN ORDER LISTED FOR DETAILS, GO TO

6. Install and equip the OC-12 shelf at the CO using procedures of NTP-002 in 363-206-290, *DDM-2000 OC-12 Multiplexer, Release 5 and Higher, User/Service Manual (TOP)—Volume II*. Install OLIUs in OC-12 **FUNCTION UNITS ()** slots that are going to be used for connecting the existing CO OC-3 shelf.

-
7.  **CAUTION:**
*Sync Autoreconfiguration must be enabled at each **line-timed** node in the network. Not available for external timed or free-running nodes.*

At each line-timed node in the network, use
"**set-oc3:syncmsg=Kbyte/Sbyte**" command to set
Kbyte or Sbyte sync messages. Use
"**set-sync:auto=enabled**" command to enable Sync
Autoreconfiguration at each line-timed node.

-
8.  **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(P) OLIU**, then remove **MAIN
2(P) OLIU**.

DO ITEMS BELOW IN ORDER LISTED FOR DETAILS, GO TO

9. **NOTE:**

When the **24G-U OLIU** is installed in this step, an "unexpected CP type" status and "inc. OC-12 LOS" alarm will occur. At the connecting node, an "inc. OC-3 LOS" alarm will occur. When fibers are reconnected, the "unexpected CP type" status is still present at this Node and an "inc. OC-12 LOF" alarm will occur. An "inc. OC-3 LOF" alarm will occur at the connecting Node.

At the starting Node, install a **24G-U OLIU** into **MAIN 2(P) OLIU** slot and reconnect optical fibers.

10. **NOTE:**

A "CP removed" alarm will occur in this step when the **MAIN 1 OLIU** is removed. A "inc. OC12 LOS" alarm will occur at the connecting Node with the **24G-U OLIU** installed.

At the other end of the OC-12 optical span being established, remove optical fibers from **MAIN 1 OLIU**, then remove **MAIN 1 OLIU**.

DO ITEMS BELOW IN ORDER LISTED FOR DETAILS, GO TO

11.  **NOTE:**
When the **24G-U OLIU** is installed, an "unexpected CP type" status alarm will occur. The "inc. OC-12 LOS" alarm clears at both ends of the span. The "inc. VT and STS AIS" alarms clear downstream.

Install a **24G-U OLIU** into **MAIN 1 OLIU** slot and reconnect optical fibers. **Wait until the blinking FAULT LED goes off before continuing.**

12.  **NOTE:**
A "CP removed" alarm will occur and an "inc. OC-3 LOS" alarm will occur at the connecting Node when the **MAIN 2(P) OLIU** is removed from this Node. Other nodes will receive "inc. VT and STS AIS" alarms.

Remove optical fibers from **MAIN 2(P) OLIU** for next span being established, then remove **MAIN 2(P) OLIU**.

13.  **NOTE:**
When the **24G-U OLIU** is installed an "unexpected CP type" status and "OC12 connector failed" alarm will occur. An "inc. OC-12 LOF" alarm will occur at the Node connected to this **OLIU**.

Install a **24G-U OLIU** into **MAIN 2(P) OLIU** slot and reconnect optical fibers.

DO ITEMS BELOW IN ORDER LISTED FOR DETAILS, GO TO

14. Connect the OC-12 faceplate connector between **MAIN 1** and **MAIN 2(P) 24G-U OLIUs**. Wait until "OC12 connector failed" alarm clears.
-

15.  **CAUTION:**
The update (UPD) command must be executed at the Node with both 24G-U OLIUs installed.

 **NOTE:**
After the update at this node, the "inc. OC-12 LOF" alarm remains until the **24G-U OLIU** is installed at the connecting Node.

Momentarily depress the **UPD** button on the **SYSCTL** or execute the update (**UPD**) command at the Node with both **24G-U OLIUs** installed.

16. Repeat Steps 9 through 15 for all Nodes until you have equipped all nodes outside the CO with **24G-U OLIUs**, except for **MAIN 1** at starting Node 1 (it will be done at the end of this procedure).
-

DO ITEMS BELOW IN ORDER LISTED FOR DETAILS, GO TO

17.  **NOTE:**
The "**rtrv-eqpt:**" command retrieves the "Equipage and Version Report". This report lists the circuit pack type and version information for one or more slots. See the "Commands and Reports" section of this manual for a description of the "**rtrv-eqpt:**" command format.

At OC-12 node, verify/install
21G/21G-U/21G2-U/21D/21D-U OLIU circuit packs in
FUNCTION UNITS (A, B, C, or D) slots being used for
the new OC-3/IS-3 extension.

DLP-503

-
18.  **NOTE 1:**
If **21G/21G-U OLIU** circuit packs are used, the **HIGH/LOW POWER** switch must be set to **LOW** before connecting the optical loops.

 **NOTE 2:**
If fecom is enabled, an "inconsistent DCC values" alarm will occur when the **OLIUs** are looped back. Normally, the alarm occurs when the user/network parameters on the **OHCTLs** at both ends of the DCC are set the same. To clear the alarm during a fiber loopback, use the "**set - fecom: address: com=disable**" command to disable the DCC.

Connect optical loops for **FUNCTION UNITS OLIUs** just
installed in the OC-12 shelf, if not already connected.

DLP-504

DO ITEMS BELOW IN ORDER LISTED FOR DETAILS, GO TO

19.  **NOTE:**
The Network Side (NS)/User Side (US) parameters of the
"set-fecom:" command must be set opposite at each end of the
optical spans.

Use the "rtrv-fecom/set-fecom" command to
verify/set "Network Side/User Side" parameters at each
end of optical span being established.

-
20. Use the "rtrv-oc3/set-oc3" command at the OC-12
shelf to verify/set application (*app*) parameter for the
OC-12 **FUNCTION UNITS** slots being used for this
single-homed configuration. For example,
"set-oc3:fn-a,app=0X1".
-

DO ITEMS BELOW IN ORDER LISTED FOR DETAILS, GO TO

21.  **NOTE 1:**
If Kbyte/Sbyte (sync messaging) is enabled for the OC-3 **MAIN 1** and **MAIN 2(P)** optical interfaces at any node in the OC-3 ring, it **must** be enabled at all nodes in the OC-3 ring and in the **FUNCTION UNITS** slots of the host OC-12 shelf.

-  **NOTE 2:**
The "**rtrv-oc3:**" command retrieves the "OC-3 Line Provisioning Report". This report displays the provisioned configuration of OC-3 lines. See the "Commands and Reports" section of 363-206-290, *DDM-2000 OC-12 Multiplexer, Release 5 and Higher, User/Service Manual—Volume I* and 363-206-280, *DDM-2000 OC-3 Multiplexer, Releases 8.0 through 11.1, User/Service Manual—Volume I*, for a description of the "**rtrv-oc3:**" command format.

Use the "**rtrv-oc3:**" command to obtain the "OC-3 Line Provisioning Report" and verify if Kbyte/Sbyte is enabled or disabled. Use the "**set-oc3:**" command to enable or disable the Kbyte/Sbyte parameter, as required.

DO ITEMS BELOW IN ORDER LISTED FOR DETAILS, GO TO

22. ➤ **NOTE 1:**
If Sync Autoreconfiguration is enabled, Kbyte/Sbyte must also be enabled.
- **NOTE 2:**
If Sync Autoreconfiguration is enabled at any line-timed OC-3 node in a ring (not available for external timed or free-running nodes), it **must** be enabled at all line-timed OC-3 nodes of a ring.
- **NOTE 3:**
The "**rtrv-sync:**" command retrieves the "Synchronization Report". This report displays the provisioning and operational information on the synchronization attributes of the DDM-2000. See the "Commands and Reports" section of 363-206-290, *DDM-2000 OC-12 Multiplexer, Release 5 and Higher, User/Service Manual—Volume I* and 363-206-280, *DDM-2000 OC-3 Multiplexer, Releases 8.0 through 11.1, User/Service Manual—Volume I*, for a description of the "**rtrv-sync:**" command format.

Use the "**rtrv-sync:**" command to obtain the "Synchronization Report" and verify if Sync Autoreconfiguration is enabled or disabled at any line-timed node. Use the "**set-sync:**" command to enable or disable the Sync Autoreconfiguration parameter, as required.

DO ITEMS BELOW IN ORDER LISTED FOR DETAILS, GO TO

23.  **NOTE:**
Two or more shelves in the same network with the same TBOS display number (determined by **SYCTL** switch settings) will cause a "duplicate TBOS display" alarm. Two or more shelves in the same network with the same site/ne address (determined by **SYCTL** SITE ID switch settings and **OHCTL** network element number switch settings) will cause a "duplicate site/ne address" alarm. Two or more shelves in the same network with the same system name or TID (set by the "**set -ne**" command) will cause a "duplicate TID" alarm.

Verify no duplicate TBOS, site/ne, and/or TID settings exist. The "**rtrv-ne:**" command may be used at each shelf in the network to display settings. If duplicates exist, determine new settings and use the "**set -ne**" command to make new settings.

-
24. From office records or by using the "**rtrv-crs-sts1:all**" command at any site, determine **ALL** existing cross-connections.
-

25.  **CAUTION:**
Critical or Major alarms will be generated if cross-connections are not made on the new OC-12 shelf before splicing it into the network.

DO ITEMS BELOW IN ORDER LISTED FOR DETAILS, GO TO

⇒ **NOTE 1:**

In ring configurations, you should use the following rules in establishing cross-connections in each ring:

1. All drop connections (including DRI, if present) from the same STS-1 timeslot must be provisioned the same, all STS-1.
2. On STS-1 path-switched rings, all nodes in the ring must be provisioned as STS-1 cross-connections.

⇒ **NOTE 2:**

Up to 12 DS3/EC-1s, 4 OC-3s, or 8 STS-3cs may be terminated in an OC-12 ring network. Once a DS3/EC-1/OC-3/STS-3c is terminated, that timeslot must be reserved in both directions around the ring to the far end. Therefore, if a DS3/EC-1/OC-3/STS-3c is terminated (cross-connected) to a **FUNCTION UNITS** group on a near-end and far-end terminating shelf, it must also be pass-through cross-connected in every shelf in the network. See "Cross-Connection Provisioning" in the "Administration and Provisioning" section of this manual for more information on cross connections.

Use the or "**ent-crs-sts1:**" command at the new OC-12 shelf to make all required cross-connections, including pass-through cross-connections and cross-connections for the CO OC-3 shelf to be added to this OC-12 shelf (for example, "**ent-crs-sts1:m-1,m-1**"). Pass-through cross-connections must be made at the new OC-12 shelf to correspond to each terminating cross-connection present on every shelf in the OC-12 ring network. Terminating cross-connections must be made at the new OC-12 shelf to correspond to each terminating cross-connection present on the existing CO OC-3 shelf.

DO ITEMS BELOW IN ORDER LISTED FOR DETAILS, GO TO

26.  **WARNING:**
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:**
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 DDM-2000 OC-12 shelf will be added, use local procedures to cut the two fiber lines connecting the existing OC-3 shelf at the CO with the adjacent OC-3 shelf equipped with both **24G-U OLIUs**. Condition the fiber for connection to the new shelf.

DO ITEMS BELOW IN ORDER LISTED . . . FOR DETAILS, GO TO

27. ➤ **NOTE 1:**

If line timing mode is specified or external timing mode is specified but the timing reference was not available at the OC-3 shelf turnup, the **TGS** option switches are probably set for *free running*. Before this configuration is established, the specified timing mode must be set on the **TGS** circuit packs.

➤ **NOTE 2:**

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.

➤ **NOTE 3:**

If external timing is selected and the **NE ACTY** LED remains lighted after the **TGS** circuit pack is reinserted, use the CIT and the "**rtrv-sync**" command to check the operational mode of the system. If the mode is Holdover instead of External, check that the incoming timing references are connected. Also check Mode Switching (revertive or nonrevertive) and the external DS1 Line Code/Format switch settings.

Set timing mode on **TGS** circuit packs to the timing mode specified in work order or office records. (OC-3 Reference: 363-206-280, *DDM-2000 OC-3 Multiplexer, Releases 8.0 through 11.1, User/Service Manual (TOP)*—Volume II, **DLP-513**).

DLP-510

DO ITEMS BELOW IN ORDER LISTED FOR DETAILS, GO TO

28. At new OC-12 shelf, remove **OLIU** optical loops from
MAIN-B-1 slot.

29. Determine the optical loss of the optical facility from
office records or by making the required measurements.

30. Connect optical fibers from adjacent OC-3 shelf **MAIN
2(P) 24G-U OLIU** to new OC-12 shelf **MAIN-B-1 OLIU**.

31.  **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-map-neighbor:**" command to verify proper
fiber connections have been made to the adjacent node.

DO ITEMS BELOW IN ORDER LISTED FOR DETAILS, GO TO

32.  **NOTE:**
This single-homed ring configuration requires that the **FUNCTION UNITS-()-1 OLIU** on the OC-12 shelf connect to the **MAIN 1 OLIU** at the first OC-3 shelf from the OC-12 shelf. **MAIN 2(P) OLIU** at the OC-3 shelf connects to **FUNCTION UNITS-()-2(P) OLIU** on the host OC-12 shelf.

At the near end, remove the optical loop from the OC-12 shelf **OLIU** in **FUNCTION UNITS-()-1** slot being used.

-
33. At CO OC-3 shelf, connect optical fibers from CO OC-3 shelf **MAIN 1** slots to OC-12 **FUNCTION UNITS-()-1** slot being used for CO OC-3 extension. Ensure that the fibers are connected to the correct **OLIU**.

-
34.  **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-map-neighbor:**" command to verify proper fiber connections have been made to the adjacent node.

-
35. Perform end-to-end OC-12 optical line test on optical spans being established. **DLP-515**
-

DO ITEMS BELOW IN ORDER LISTED FOR DETAILS, GO TO

36. Remove optical fibers from CO OC-3 shelf **MAIN 2(P) OLIU** and connect to OC-12 **MAIN-B-2(P) OLIU**.

37. Connect optical fibers from CO OC-3 shelf **MAIN 2(P) OLIU** to OC-12 **FUNCTION UNITS-()-2(P) OLIU** being used for OC-3 extension.

38. At the starting node (Node 1), Remove optical fibers from OC-3 shelf **MAIN 1 OLIU**

39. At starting OC-3 node, install a **24G-U OLIU** into **MAIN 1 OLIU** slot and reconnect optical fibers.

40. At the starting node, connect the OC-12 faceplate connector between **MAIN 1** and **MAIN 2(P) 24G-U OLIUs**. Wait until "OC12 connector failed" alarm clears.

DO ITEMS BELOW IN ORDER LISTED FOR DETAILS, GO TO

41.  **CAUTION:**
*The update ("upd") command must be executed at the Node with both
24G-U OLIUs installed.*

 **NOTE:**
After the update at this node, the "inc . 0C-12 LOF" alarm remains
until the **24G-U OLIU** is installed at the connecting Node.

Momentarily depress the **UPD/INIT** button on the
SYSCTL or execute the update ("upd") command at the
Node with both **24G-U OLIUs** installed.

DO ITEMS BELOW IN ORDER LISTED FOR DETAILS, GO TO

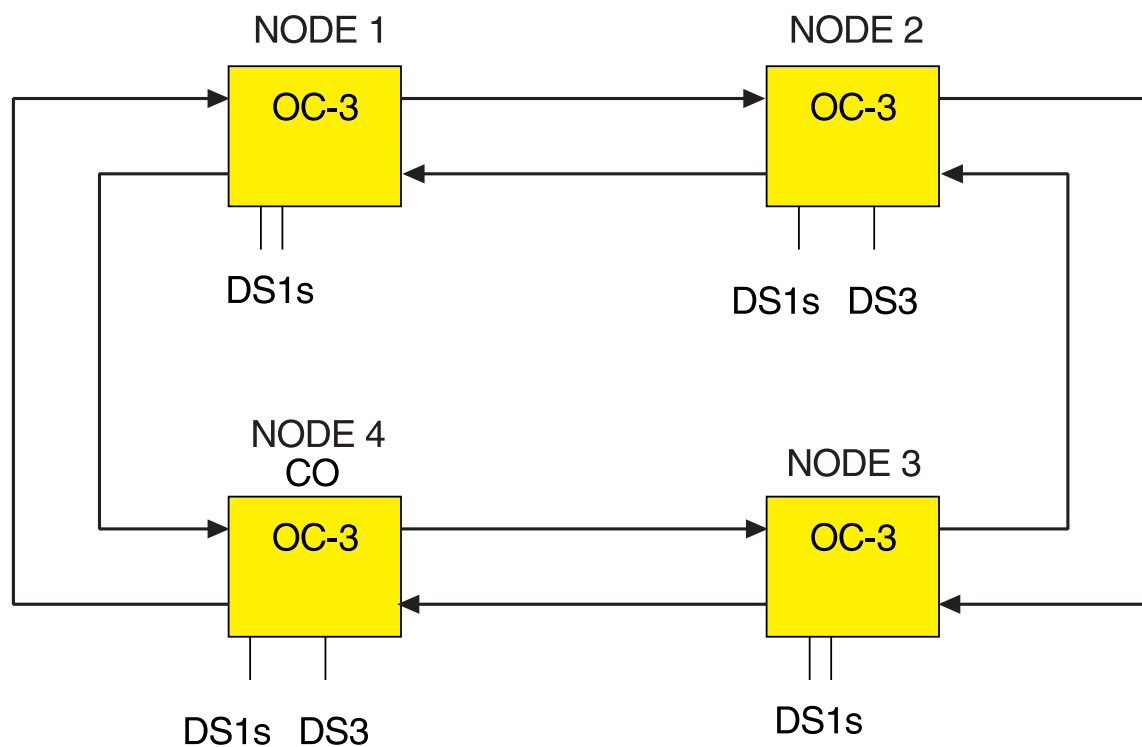


Figure 1. Basic 4-Node OC-3 Ring for OC-3 to OC-12 Ring Upgrade

DO ITEMS BELOW IN ORDER LISTED FOR DETAILS, GO TO

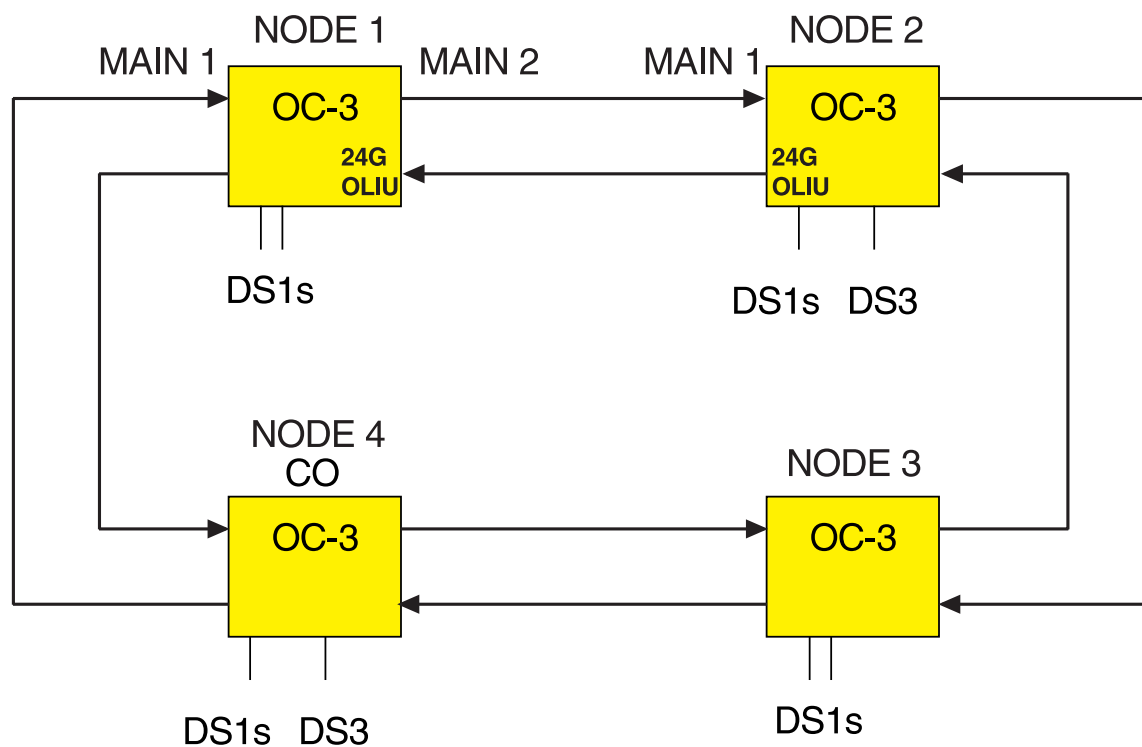


Figure 2. Basic 4-Node OC-3 Ring for OC-3 to OC-12 Ring Upgrade

DO ITEMS BELOW IN ORDER LISTED FOR DETAILS, GO TO

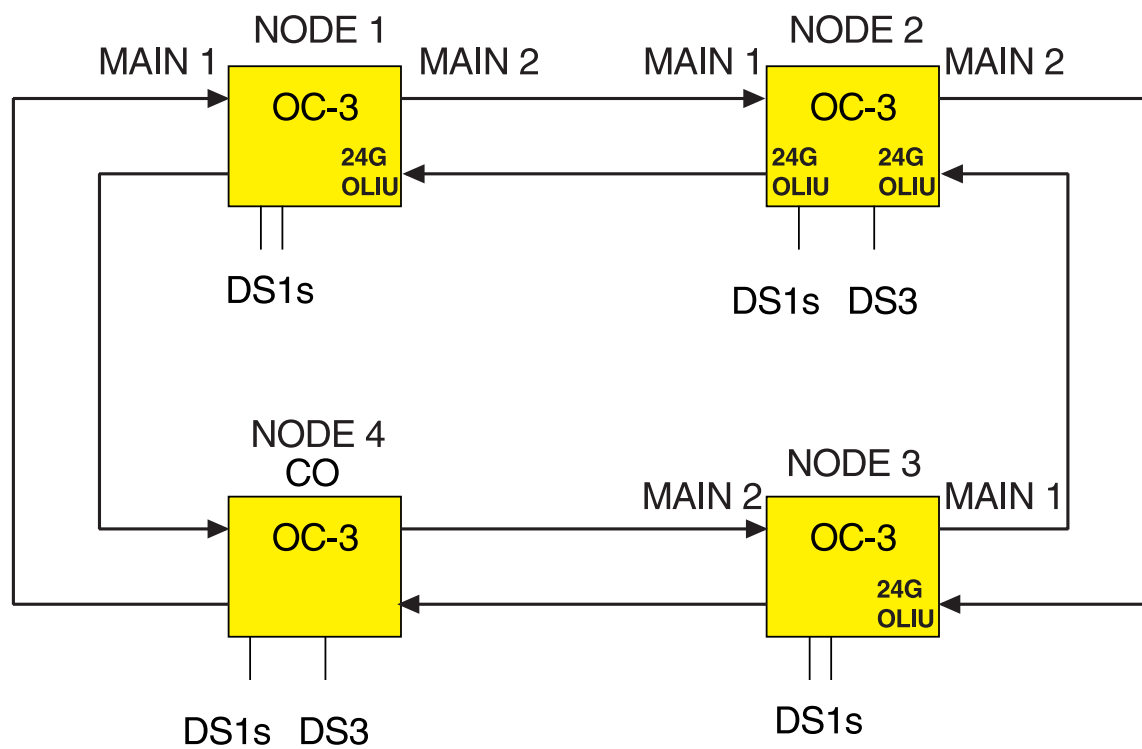


Figure 3. Basic 4-Node OC-3 Ring for OC-3 to OC-12 Ring Upgrade

DO ITEMS BELOW IN ORDER LISTED FOR DETAILS, GO TO

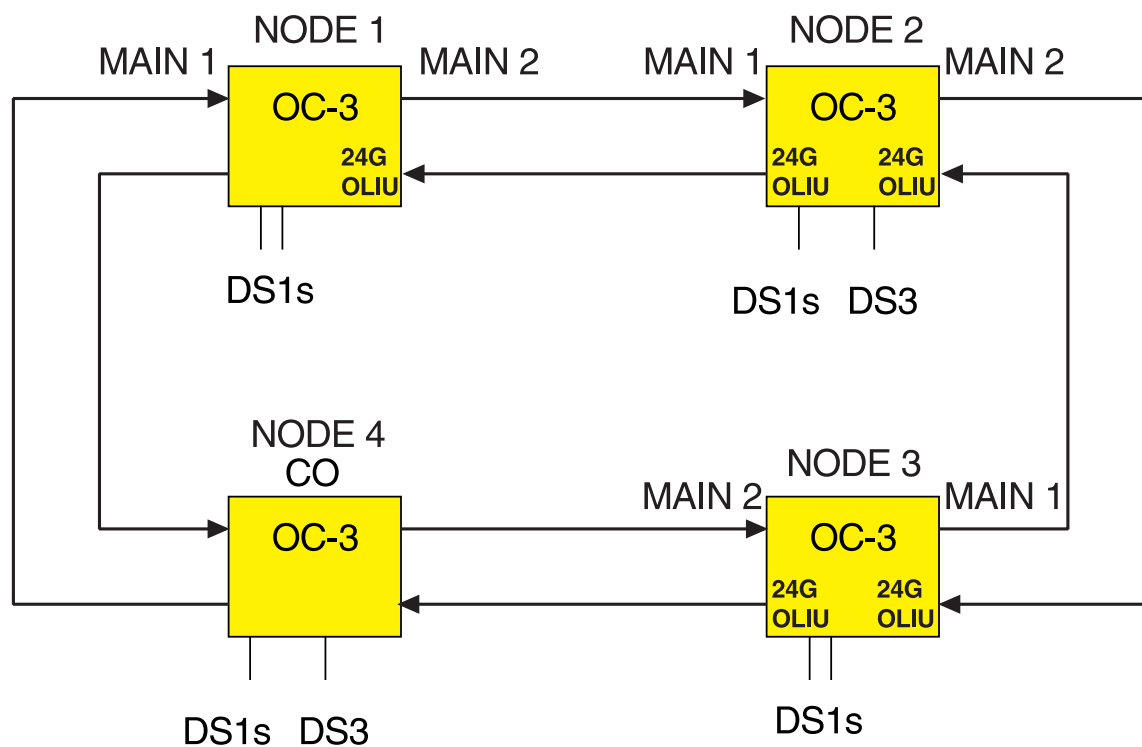


Figure 4. Basic 4-Node OC-3 Ring for OC-3 to OC-12 Ring Upgrade

DO ITEMS BELOW IN ORDER LISTED FOR DETAILS, GO TO

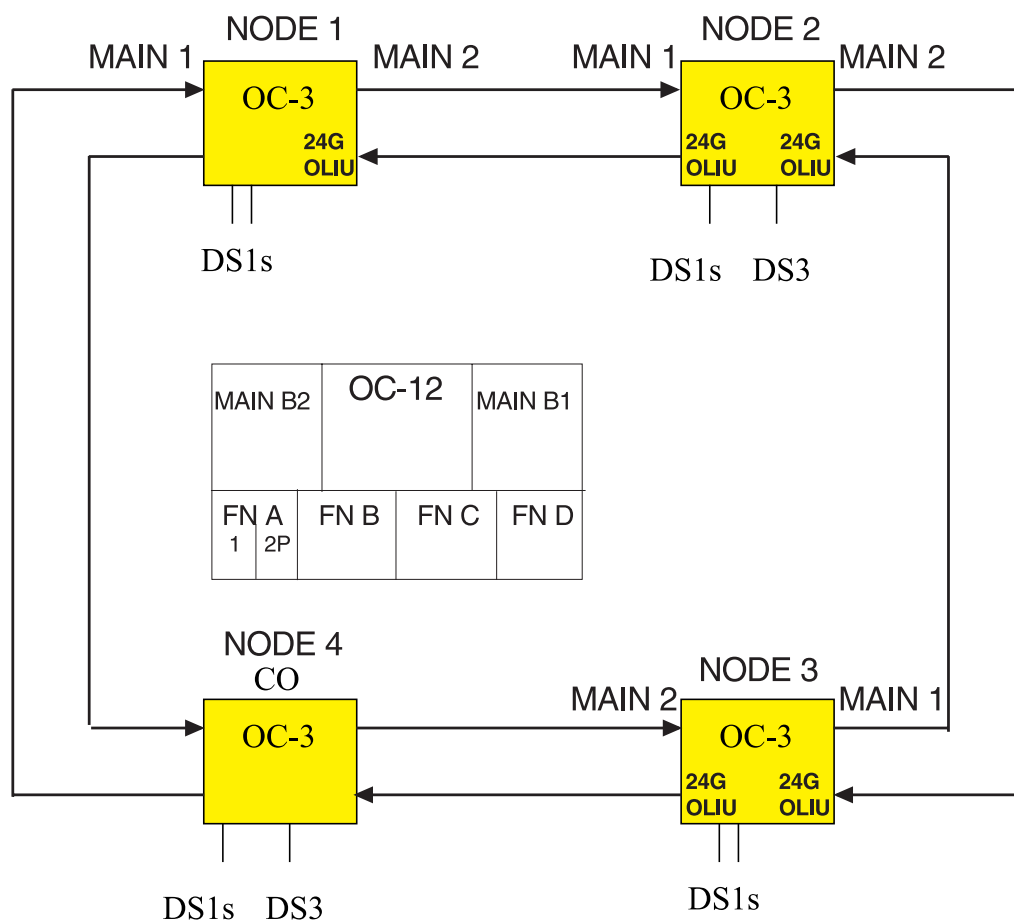


Figure 5. Basic 4-Node OC-3 Ring for OC-3 to OC-12 Ring Upgrade

Figure 6. Basic 4-Node OC-3 Ring for OC-3 to OC-12 Ring Upgrade

Figure 7. Basic 4-Node OC-3 Ring for OC-3 to OC-12 Ring Upgrade

DO ITEMS BELOW IN ORDER LISTED FOR DETAILS, GO TO

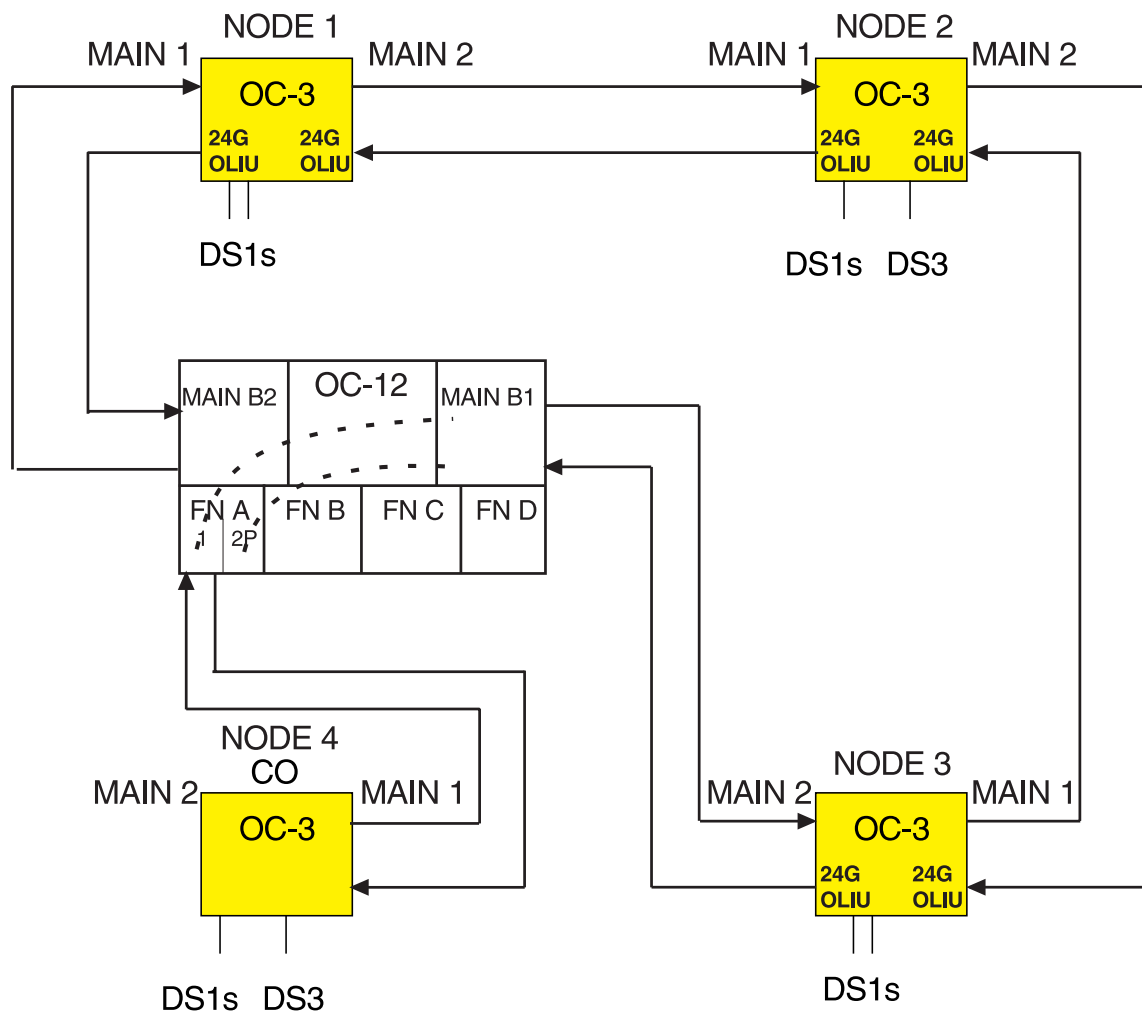


Figure 8. Basic 4-Node OC-3 Ring for OC-3 to OC-12 Ring Upgrade

DO ITEMS BELOW IN ORDER LISTED FOR DETAILS, GO TO

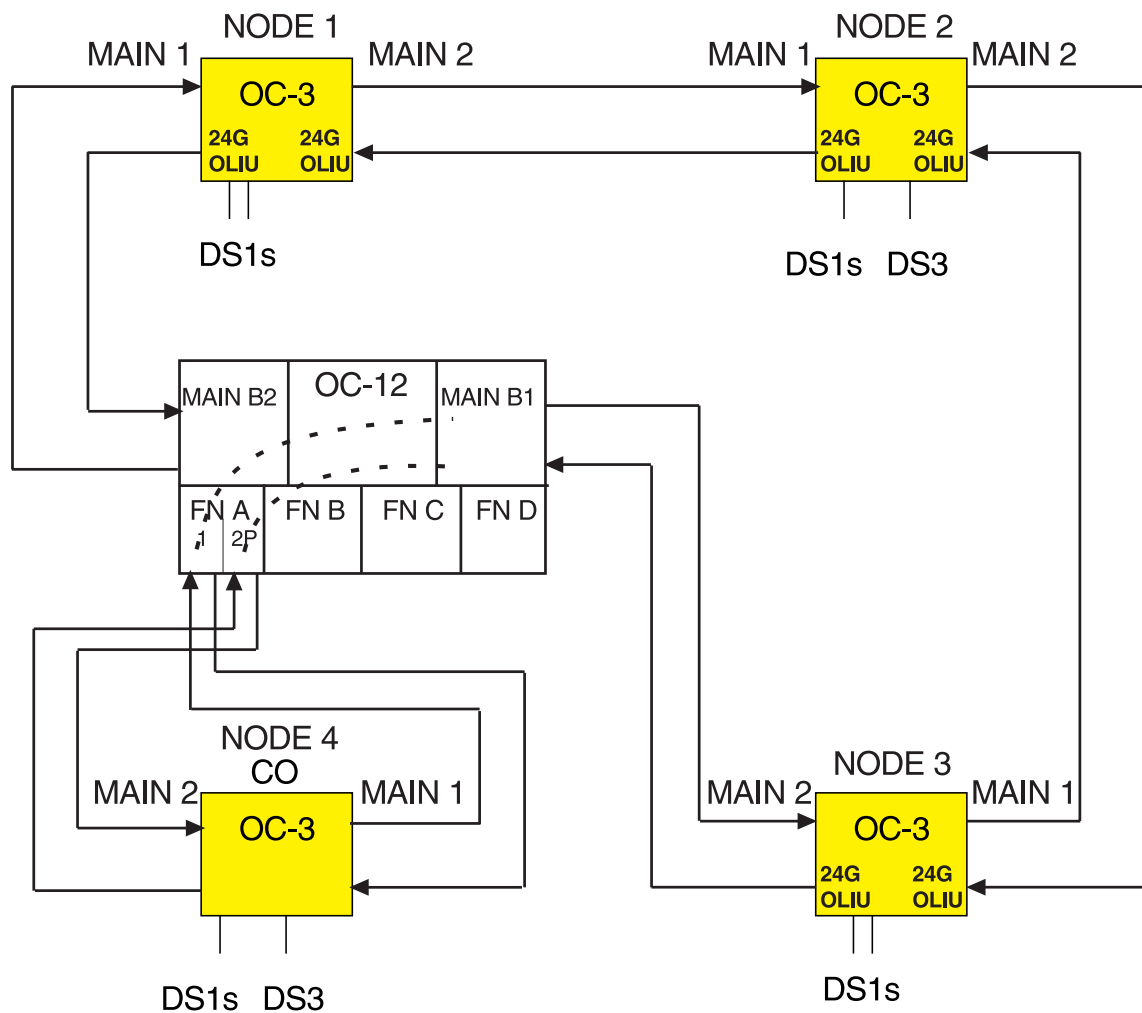


Figure 9. Basic 4-Node OC-3 Ring for OC-3 to OC-12 Ring Upgrade

Establish Initial HDSL Service Group Equipped But Not In Service

DO ITEMS BELOW IN ORDER LISTED FOR DETAILS, GO TO

1.  **CAUTION 1:**
*DDM-2000 circuit packs contain static sensitive components which can be damaged by electrostatic discharge. A static ground wrist strap must be worn when handling the circuit packs. See electrostatic discharge considerations in **Trouble Clearing: TAD-100**.*

-  **CAUTION 2:**
In addition to primary lightning protection, an external Lightning and Surge Secondary Protection Assembly (ED-8C783-30 or equivalent) is required for HDSL circuits used in outside plant applications.

-  **NOTE 1:**
The OC-3 system must be established before continuing with this procedure. If all the nodes of the network have not been equipped and installed, refer to **System Turnup/Circuit Order: IXL-001** for procedures to equip the DDM-2000 shelves and establish the system.

-  **NOTE 2:**
If the DS1 terminating end(s) are in a DDM-2000 OC-3, this procedure assumes that **MXRVO** circuit packs have already been installed during initial shelf turnup and either **MXRVO** or **STS1E** circuit packs have been installed during initial shelf turnup at the other DDM-2000 OC-3 terminating end(s) of the circuit. If the terminating end is in another system, it is assumed that the appropriate installation and connections have been made to that system. If the appropriate circuit packs have not been installed and the system is in service on other groups, refer to **DLP-506** for procedures to install new **MXRVO** circuit packs and **DLP-567** for procedures to install new **HDSL** circuit packs.

DO ITEMS BELOW IN ORDER LISTED FOR DETAILS, GO TO

⇒ **NOTE 3:**

A maximum of three **BBF8 HDSL** circuit packs, including a protection circuit pack, can be installed in any one **LOW SPEED GROUP**. Both service and protection **MXRVO** circuit packs must also be installed in the corresponding **FUNCTION UNITS** group.

⇒ **NOTE 4:**

If the DDM-2000 fails to respond in the indicated manner, refer to **Trouble Clearing: IXL-001**.

Verify that no LEDs or alarms are activated. If any LEDs or alarms are activated, refer to **Trouble Clearing: IXL-001** and follow the appropriate trouble-clearing procedure.

2. ⇒ **NOTE:**

The "**rtrv-eqpt:**" command retrieves the "Equipage and Version Report". This report lists the circuit pack type and version information for one or more slots. See the "Commands and Reports" section of this manual for a description of the "**rtrv-eqpt:**" command format.

At each DDM-2000 OC-3 terminating end, use the "**rtrv-eqpt:**" command to obtain the "Equipage and Version Report" and verify that the proper service and protection (if required) **MXRVO (STS1E)** circuit packs have been installed in **FUNCTION UNITS** group(s) (**A**, **B**, or **C**) being put into service.

DO ITEMS BELOW IN ORDER LISTED FOR DETAILS, GO TO

3. At the HDSL terminating node(s) of the circuit being established, determine which HDSL port(s) is to be put into service and what options are to be selected.

-
4.  **NOTE:**
Both service and protection **MXRVO** circuit packs must be installed in the **FUNCTION UNITS** group corresponding to the **LOW SPEED GROUP** equipped with **HDSL** circuit packs.

At each HDSL terminating node, set option switches and install **HDSL** circuit pack(s), as required.

DLP-567

-
5.  **CAUTION 1:**
*No service **LOW SPEED DS1** slot locations should be left empty in **GROUPs** equipped with protection **HDSL** circuit packs and corresponding to **FUNCTION UNITS** groups equipped with **MXRVO** circuit packs.*

-  **CAUTION 2:**
*When a **HDSL** circuit pack is switched to protection, removal of any other **HDSL** circuit pack or **177A** Retainer Card in the same **LOW SPEED GROUP** will result in a loss of service to the protected **HDSL** and the removed **HDSL** circuit pack.*

-  **NOTE:**
177A Retainer Cards are used to disconnect the cross-connect wiring associated with unused service DS1 slot locations from the DDM-2000's internal protection bus.

DO ITEMS BELOW IN ORDER LISTED FOR DETAILS, GO TO

Install **177A** Retainer Cards into all unused service **DS1** slots in **LOW SPEED GROUPS** equipped with protection **HDSL** circuit packs and corresponding to **FUNCTION UNITS** groups equipped with **MXRVO** circuit packs.

6. Use the "**set - t1:**" command to set the characteristics of the DS1 port of the circuit being established.
 7. At each HDSL terminating node, make the appropriate cable connection(s) to the HDSL cross-connect point(s) or equivalent connection point(s) for the circuit being added.
 8. Verify that no LEDs or alarms are activated. If any LEDs or alarms are activated, refer to **Trouble Clearing: IXL-001** and follow the appropriate trouble-clearing procedure.
 9. If one of the terminating nodes is equipped with **STS1E** circuit packs for an EC-1 interface to support services being established, establish initial EC-1 low speed interface [**NTP-034**].
-

DO ITEMS BELOW IN ORDER LISTED FOR DETAILS, GO TO

10. **NOTE 1:**

Ring releases support only manual VT1.5 and STS-1 cross-connections. Manual STS-1 and/or DS1 cross-connections have to be made at each shelf to configure the transmission path for each circuit being established. Either terminating (drop) cross-connections or "drop and continue" cross-connections are made at terminating nodes and pass-through cross-connections are made at intermediate nodes.

 NOTE 2:

In ring configurations, you should use the following rules in establishing cross-connections in each ring:

1. All drop connections (including DRI, if present) from the same STS-1 timeslot must be provisioned the same, either all VT1.5 or STS-1.
2. If all 28 VT1.5s (DS1s) in an STS-1 are being passed through at a node in a VT1.5 path-switched ring, then the cross-connection may be provisioned as either a pass-through STS-1 or VT1.5. However, if you anticipate dropping VT1.5s from the pass-through node in the future, you should provision the pass-throughs as VT1.5 cross-connections. OC-3 ring Releases 7.0 and earlier do not support the command ("**cnvt -crs**") for converting an STS-1 to a VT1.5 cross-connect. Also, provisioning now as a VT1.5 cross-connect will avoid a hit on traffic if the STS-1 cross-connect has to be converted to 28 VT1.5 cross-connects to drop DS1s at a later time.
3. On STS-1 path-switched rings, all nodes in the ring must be provisioned as STS-1 cross-connections.

DO ITEMS BELOW IN ORDER LISTED FOR DETAILS, GO TO

⇒ **NOTE 3:**

The following commands may be used to convert, delete, enter, and retrieve cross-connections: "**cnvt-crs**", "**dlt-crs-sts1**", "**dlt-crs-vt1**", "**ent-crs-sts1**", "**ent-crs-vt1**", "**rtrv-crs-sts1**", and "**rtrv-crs-vt1**". See the "Commands and Reports" section of this manual for a description of commands. See "Cross-Connection Provisioning" in the "Administration and Provisioning" section of this manual for more information on cross-connection provisioning.

Determine the necessary cross-connections for each node from the work order or circuit order.

-
11. Make necessary VT1.5/STS1 cross-connections at each node in the network.

A. Single Ring Configuration	DLP-546
B. Dual Ring Interworking (DRI) Configuration	DLP-550
C. Single/Dual OC-3/FiberReach Configuration	DLP-557
D. Stand Alone OC-3/FiberReach Configuration	DLP-558
E. Single/Dual OC-3/OC-48 Configuration	DLP-559
F. Single/Dual OC-3/OC-12 Configuration	DLP-560

12. ⇒ **NOTE:**

For a DS1 circuit in a path protected ring network, the "**sw-path- () :address**" command must be used at the terminating nodes [and dual ring interworking (DRI) nodes in a DRI ring network] to switch the active VT1.5 (DS1) path to repeat this test on the other path(s).

DO ITEMS BELOW IN ORDER LISTED FOR DETAILS, GO TO

Perform DS1 end-to-end transmission test for each circuit being put into service, as required.

A. Ring Configuration	DLP-510
B. Dual Ring Interworking (DRI) Configuration	DLP-554
C. OC-3/FiberReach Configuration	DLP-510
-

13. Use the "**rtrv-state-eqpt:**" command to determine the port state of the DS1 port(s) of the circuit being established.
-

14.  **NOTE:**
If a port is in the *nmon* (*n*) state, the signal is not monitored or alarmed. The port will not automatically go to the *in service* (*i*) state when a signal is detected as it will in the *auto* (*a*) state. In the *nmon* state, the port must be returned to the *auto* state, using the "**set-state-t1:**" command, to turn on monitoring of signal failures and before any circuit packs associated with that port can be removed from the equipment list by the "**upd**" command.

Use the "**set-state-t1:**" command to set the port state of the DS1 port(s) of the circuit being established.

15. Use PairGain* Technologies procedures to access the faceplate RS-232 interface and set HDSL link management features for each port being provisioned.
-

* Trademark pending.

Add New DDM-2000 OC-3, OC-12, or FiberReach Node (Shelf) To DDM-2000 OC-3/OC-12 Path Switched Ring

DO ITEMS BELOW IN ORDER LISTED FOR DETAILS, GO TO

1.  **CAUTION:**
*DDM-2000 circuit packs contain static sensitive components which can be damaged by electrostatic discharge. A static ground wrist strap must be worn when handling the circuit packs. See electrostatic discharge considerations in **Trouble Clearing: TAD-100**.*

 **NOTE 1:**
This procedure assumes that the DDM-2000 is in service and a new RT node (shelf) is being added to the Path Switched OC-3 or OC-12 Ring configuration. (See Figure 1.)

 **NOTE 2:**
It is assumed that optical loops are installed on the new shelf, that the new shelf has been properly equipped and tested in a looped-back configuration, and that the proper release of software has been loaded. (DDM-2000 OC-3 **System Turnup: NTP-016** or 363-206-301, *DDM-2000 FiberReach Multiplexer, Wideband/Narrowband Shelf, User/Service Manual* or 363-206-290, *DDM-2000 OC-12 Multiplexer, Release 5 and Higher, User/Service Manual (TOP)—Volume II.*)

 **NOTE 3:**
All shelves in the same network must have the same or compatible software releases.

DO ITEMS BELOW IN ORDER LISTED FOR DETAILS, GO TO

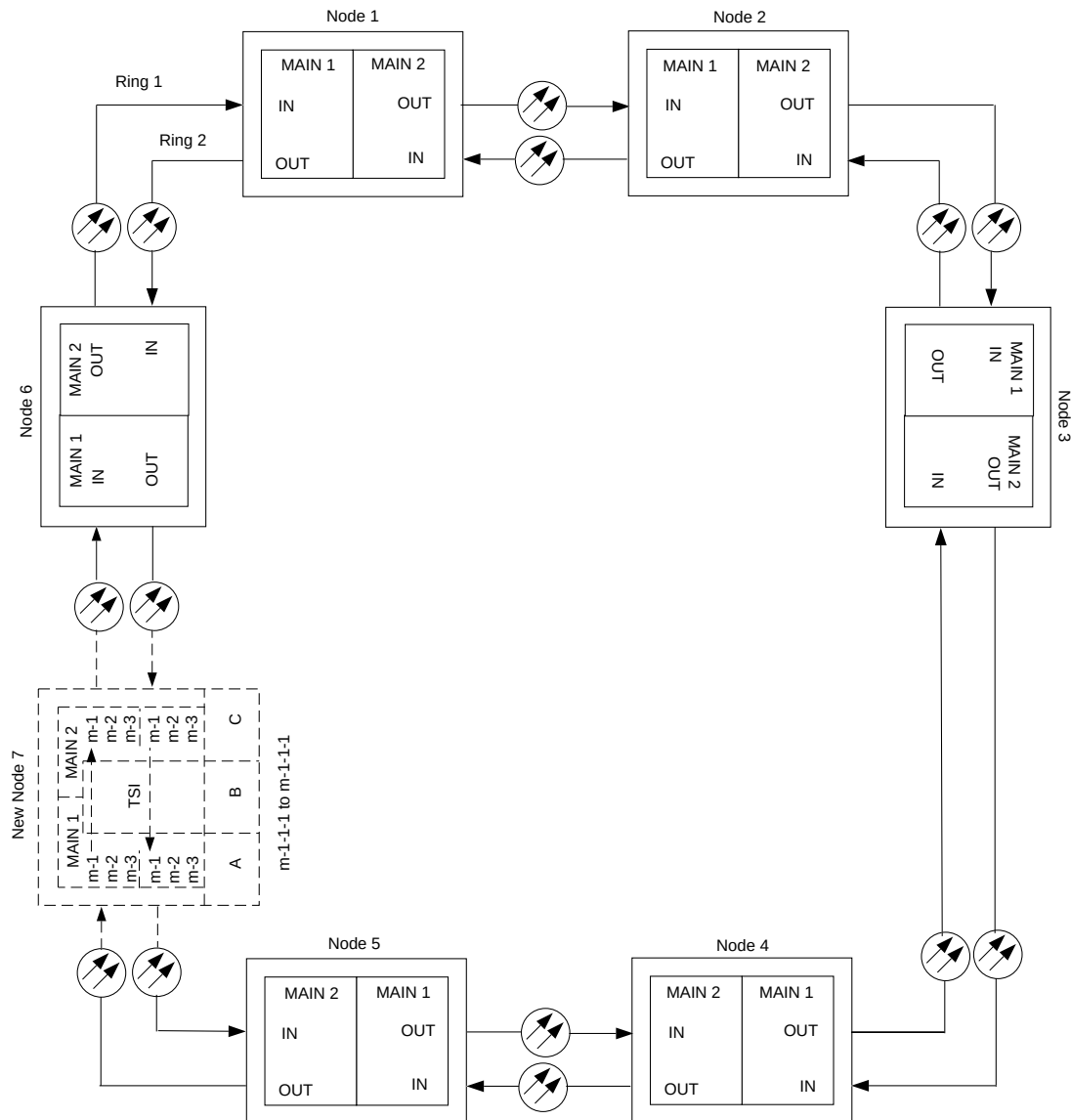


Figure 1. Adding an RT (Node) to an Existing Ring Network

DO ITEMS BELOW IN ORDER LISTED FOR DETAILS, GO TO

⇒ **NOTE 4:**

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 5:**

If the DDM-2000 fails to respond in the indicated manner, refer to **Trouble Clearing: IXL-001**.

Use the "**rtrv-alm**" command to verify that no alarms, locks, loops, or switches are present.

-
2. Notify maintenance center that alarms will be generated.
-

3. ⇒ **NOTE:**

It may be helpful to make a sketch of the network to visualize the cross-connections required.

Use "**rtrv-map-network:**" and "**rtrv-map-neighbor:**" commands to determine systems (sites) in the network and how they are connected to each other.

DO ITEMS BELOW IN ORDER LISTED FOR DETAILS, GO TO

4. **NOTE 1:**

The "**set -ne:**" command designates a shelf as the directory service network element (DSNE). **One**, and only one, shelf in the subnetwork **must** be provisioned as a DSNE. If there is no DSNE in the network, all DCC communication can become disabled. If more than one shelf is provisioned as DSNE, a "duplicate DSNE" alarm will occur. Multiple GNEs are allowed and a shelf is automatically provisioned as a GNE when connected to an active X.25 interface.

 NOTE 2:

Shelves may be designated as an alarm gateway network element (AGNE) and assigned an alarm group number. (Default alarm group number is 255.) At least one AGNE is required per alarm group. One primary AGNE and one backup per alarm group is recommended. For a network greater than 16 nodes, the AGNE and TL1 GNE should be on separate nodes.

 NOTE 3:

Two or more shelves in the same network with the same TBOS display number will cause a "duplicate TBOS display" alarm. Two or more shelves in the same network with the same site/ne address will cause a "duplicate site/ne address" alarm. Two or more shelves in the same network with the same system name or TID will cause a "duplicate TID" alarm.

DO ITEMS BELOW IN ORDER LISTED FOR DETAILS, GO TO

Use the "**rtrv-ne**" command at each site to verify no duplicate DSNE, TBOS, site/ne, or TID settings exist. If duplicates exist, determine new settings and use "**set-ne**" command to make new settings.

Use the "**set-ne:**" command to set the alarm group number for this shelf, if required. (Default alarm group number is 255.) If the shelf is an AGNE, use the "**set-ne:**" command to designate the shelf as an AGNE. One primary AGNE and one backup per alarm group is recommended.

-
5. From office records or by using the "**rtrv-crs-vt1:all**" or "**rtrv-crs-sts1:all**" command at any site, determine the existing cross-connections.

-
6.  **CAUTION:**
Critical or Major alarms will be generated if pass-through cross-connections are not made on the new shelf before splicing it into the network.

DO ITEMS BELOW IN ORDER LISTED FOR DETAILS, GO TO

⇒ **NOTE 1:**

In ring configurations, you should use the following rules in establishing cross-connections in each ring:

1. All drop connections (including DRI, if present) from the same STS-1 timeslot must be provisioned the same, either all VT1.5 or STS-1.
2. If all 28 VT1.5s (DS1s) in an STS-1 are being passed through at a node in a VT1.5 path-switched ring, then the cross-connection may be provisioned as either a pass-through STS-1 or VT1.5. However, if you anticipate dropping VT1.5s from the pass-through node in the future, you should provision the pass-throughs as VT1.5 cross-connections. Also, provisioning now as a VT1.5 cross-connect will avoid a hit on traffic if the STS-1 cross-connect has to be converted to 28 VT1.5 cross-connects to drop DS1s at a later time.
3. On STS-1 path-switched rings, all nodes in the ring must be provisioned as STS-1 cross-connections.

⇒ **NOTE 2:**

Up to 84 DS1s may be terminated in a ring network. Once a DS1 is terminated, that timeslot must be reserved in both directions around the ring to the far end. Therefore, if a DS1 is terminated (cross-connected) to a **FUNCTION UNITS** group on a near-end and far-end terminating shelf, it must also be pass-through cross-connected in every shelf 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:**" or "**ent-crs-sts1:**" 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**" or "**ent-crs-sts1:m-1,m-1**"). Pass-through cross-connections must be made at the new shelf to correspond to each terminating cross-connection present on every shelf in the ring network. (See Figure 1.)

7.  **NOTE 1:**
If Kbyte or Sbyte (sync messaging) is enabled for the **main-1** and **main-2** optical interfaces at any node in a ring, it **must** be enabled at all nodes of the ring.

 **NOTE 2:**
The "**rtrv-oc3:**" or "**rtrv-oc12:**" command retrieves the "OC-3 Line Provisioning Report" or "OC-12 Line Provisioning Report". This report displays the provisioned configuration of OC-3 or OC-12 lines. See the "Commands and Reports" section of this manual for a description of the "**rtrv-oc3:**" or "**rtrv-oc12:**" command format.

Use the "**rtrv-oc3:**" or "**rtrv-oc12:**" command to obtain the "OC-3 Line Provisioning Report" or "OC-12 Line Provisioning Report" and verify if Kbyte/Sbyte is enabled or disabled. Use the "**set-oc3:**" or "**set-oc12:**" command to enable or disable the Kbyte/Sbyte parameter, as required.

DO ITEMS BELOW IN ORDER LISTED . . . FOR DETAILS, GO TO

8. **NOTE 1:**

If Sync Autoreconfiguration is enabled, Kbyte/Sbyte must also be enabled.

 NOTE 2:

If Sync Autoreconfiguration is enabled at any line-timed node (not available for external timed or free-running nodes), it **must** be enabled at all line-timed nodes.

 NOTE 3:

The "**rtrv-sync:**" command retrieves the "Synchronization Report". This report displays the provisioning and operational information on the synchronization attributes of the DDM-2000. See the "Commands and Reports" section of this manual for a description of the "**rtrv-sync:**" command format.

Use the "**rtrv-sync:**" command to obtain the "Synchronization Report" and verify if Sync Autoreconfiguration is enabled or disabled at any line-timed node. Use the "**set-sync:**" command to enable or disable the Sync Autoreconfiguration parameter, as required.

9. **WARNING:**

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.

DO ITEMS BELOW IN ORDER LISTED FOR DETAILS, GO TO



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 DDM-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.

10. **NOTE:**

Cutting the main sync source will cause the line-timed node to go into *holdover*.

Verify that only "minor nsa OC-3 LOS" or "minor nsa OC-12 LOS" and "nsa inc. VT/STS1 AIS" alarms are present at each end of the fiber cut.

11. **NOTE 1:**

For DDM-2000 OC-3 or OC-12 shelves, if line timing mode is specified, or external timing mode is specified but the timing reference was not available at new shelf turnup, the new shelf **TGS** option switches are probably set for *free running*. Before the end-to-end system is established, the specified timing mode must be set on the **TGS** circuit pack. This step is not applicable to the DDM-2000 FiberReach shelf.

DO ITEMS BELOW IN ORDER LISTED FOR DETAILS, GO TO

⇒ **NOTE 2:**

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.

⇒ **NOTE 3:**

If external timing is selected and the **NE ACTY** LED remains lighted after the **TGS** circuit pack is reinserted, use the CIT and the "**rtrv-sync**" command to check the operational mode of the system. If the mode is Holdover instead of External, check that the incoming timing references are connected.

Set timing mode on new shelf **TGS** to the timing mode specified in work order or office records.

DLP-513

12. ⇒ **NOTE:**

The Network Side/User Side parameters of the "**set - fecom:**" command must be set opposite at each end of the optical spans.

Use the "**rtrv-fecom/set-fecom**" command to verify/set "Network Side/User Side" parameters at each end of optical span being established.

DO ITEMS BELOW IN ORDER LISTED . . . FOR DETAILS, GO TO

13. At new shelf, remove **OLIU** optical loops.

14. Determine the optical loss of the optical facility from office records or by making the required measurements.

15. Connect one pair of optical fibers from an adjacent shelf to new shelf **MAIN 1 OLIU**. Ensure that you connect the fibers correctly [From adjacent OC-3 shelf **MAIN 2(P) OLIU**, OC-12 shelf **MAIN B 2(P) OLIU**, or FiberReach shelf **MAIN-2 OLIU** to new OC-3 shelf **MAIN 1 OLIU**, OC-12 shelf **MAIN B 1 OLIU**, or FiberReach **MAIN-1 OLIU**]. **DLP-514**

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-map-neighbor:**" command to verify proper fiber connections have been made to the adjacent node.

DO ITEMS BELOW IN ORDER LISTED FOR DETAILS, GO TO

17. Connect one pair of optical fibers from an adjacent shelf to new shelf **MAIN 2(P) OLIU**. Ensure that you connect the fibers correctly [From adjacent OC-3 shelf **MAIN 1 OLIU**, OC-12 shelf **MAIN B 1 OLIU**, or FiberReach **MAIN-1 OLIU**. to new OC-3 shelf **MAIN 2(P) OLIU**, OC-12 shelf **MAIN B 2(P) OLIU**, or FiberReach shelf **MAIN-2 OLIU**]. **DLP-514**
-

18.  **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-map-neighbor:**" command to verify proper fiber connections have been made to the adjacent node.

19. Verify that all alarm and status conditions clear. If "nsa inc. VT AIS" alarm is present and no "inc. OC-3 LOS" or "inc. OC-12 LOS" alarm, check that all pass-through cross-connections have been properly made using the "**rtrv-crs-vt1:**" command. If "nsa inc. STS AIS" alarm is present and no "inc. OC-3 LOS" or "inc. OC-12 LOS" alarm, check that all pass-through cross-connections have been properly made using the "**rtrv-crs-sts1:**" command.
-

DO ITEMS BELOW IN ORDER LISTED FOR DETAILS, GO TO

20. Perform end-to-end OC-3 or OC-12 optical line test on optical spans being established. **DLP-515**
-

21.  **NOTE:**
Proper cross-connections must be made at each shelf to establish the complete end-to-end path for the DS1/DS3/EC-1 port being tested. After one path (ring1 or ring2) has been tested, use the "sw-path-():" command at both ends to test the other ring path.

Perform appropriate end-to-end transmission test for the circuits being added, as required.

A. Single Ring DS1 Test	DLP-510
B. Dual Ring Interworking (DRI) DS1 Test	DLP-554
C. Single Ring DS3 Test	DLP-511
D. Dual Ring Interworking (DRI) DS3 Test	DLP-553
-

22. The system is ready for service to be established.
Initial DS1 Service [**System Turnup: NTP-004**]
Initial DS3 Service [**System Turnup: NTP-005**]
Initial EC-1 Service [**System Turnup: NTP-034**]
Initial HDSL Service [**System Turnup: NTP-025**]
-

Discontinue DDM-2000 Node (Shelf) From DDM-2000 OC-3 Path Switched Ring Network

DO ITEMS BELOW IN ORDER LISTED FOR DETAILS, GO TO

1.  **CAUTION:**
*DDM-2000 circuit packs contain static sensitive components which can be damaged by electrostatic discharge. A static ground wrist strap must be worn when handling the circuit packs. See electrostatic discharge considerations in **Trouble Clearing: TAD-100**.*

 **NOTE:**
The craft interface terminal (CIT) "**rtrv-map-network:**" and "**rtrv-map-neighbor:**" commands may be used to retrieve a map of the SONET network, including a list of the systems in the network and how they are connected. The "**rtrv-crs-vt1:**" command may be used to retrieve VT1.5 (DS1) cross-connections within the DDM-2000 OC-3 system. The "**rtrv-crs-sts1:**" command may be used to retrieve STS-1 cross-connections within the DDM-2000 OC-3 system.

Use "**rtrv-alm**" command to verify no alarms, locks, loops, or switches are present.

-
2. Determine which DDM-2000 node (shelf) is being discontinued.
-
3. Verify that optical line loss budget will not be exceeded by removing this node.
-

DO ITEMS BELOW IN ORDER LISTED FOR DETAILS, GO TO

4. At the shelf being discontinued and all associated terminating shelves and extensions, ensure service (signals) has been removed from the **FUNCTION UNITS** groups being discontinued.
Discontinue DS1 Service [**System Turnup: NTP-011**]
Discontinue DS3 Service [**System Turnup: NTP-012**]
Discontinue EC-1 Interface [**System Turnup: NTP-036**]
Discontinue HDSL Interface [**System Turnup: NTP-037**]
-

5. **NOTE 1:**

The "**set-ne:**" command designates a shelf as an alarm gateway network element (AGNE). Shelves may be assigned an alarm group number (default alarm group number is 255). At least one AGNE is required per alarm group. One primary AGNE and one backup per alarm group is recommended. For a network greater than 16 nodes, the AGNE and TL1 GNE should be on separate nodes.

 NOTE 2:

It may take several minutes for the network to stabilize after the AGNE has been changed.

If a shelf being discontinued is an AGNE, use the "**set-ne:TID=tid:agne=yes**" command to establish the AGNE on another shelf, if required. Use the "**set-ne:TID=tid:agne=no**" command to disable the AGNE at the shelf being removed.

DO ITEMS BELOW IN ORDER LISTED FOR DETAILS, GO TO

6. **NOTE 1:**

The "**set-ne:**" command also designates a shelf as the directory service network element (DSNE). **One**, and only one, shelf in the subnetwork **must** be provisioned as a DSNE. If there is no DSNE in the network, all DCC communication can become disabled. If more than one shelf is provisioned as DSNE, a "duplicate DSNE" alarm will occur and one of the DSNEs must be disabled.

 NOTE 2:

It is recommended that a DDM-2000 OC-3 shelf be assigned as the DSNE.

 NOTE 3:

It may take 6 minutes or more for the network to stabilize after the DSNE has been discontinued.

If the DSNE is being discontinued and another DDM-2000 OC-3 shelf is going to be designated as the DSNE, use the "**set-ne:TID=tid:dsne=yes**" command to establish the DSNE on another DDM-2000 OC-3 shelf. Use the "**set-ne:TID=tid:dsne=no**" command to disable the DSNE at the shelf being removed.

If the DSNE is being discontinued and a FT-2000 node is going to be designated as the DSNE, use the "**SECURITY-Set-Network Element-DSNE:yes**" command at the FT-2000 to designate the DSNE, Use the "**set-ne:TID=tid:dsne=no**" command to disable the DSNE at the shelf being removed.

DO ITEMS BELOW IN ORDER LISTED FOR DETAILS, GO TO

7.  **CAUTION:**
Removal of wrong fiber connections will result in a service interruption. Ensure you remove only the fiber connections for the optical span being discontinued.

 **NOTE:**
The following operations will activate office alarms. The audible alarm may be suppressed by depressing the **ACO** button.

Remove optical fiber connections from **MAIN OLIUs** in node (shelf) being discontinued.

-
8. Reconnect the optical fibers, bypassing the node just removed. Ensure all alarms in the ring configuration are off. If alarms are present, verify fiber connections and integrity.

-
9. If the removed shelf is not to be left powered, power down the shelf per local procedures then continue with Step 12. Otherwise, continue with Step 10.

-
10. If **OLIU** circuit packs are *not* removed, connect optical fiber loops to **OLIUs**.
-

DLP-505

DO ITEMS BELOW IN ORDER LISTED FOR DETAILS, GO TO

11. **NOTE:**

The **UPD/INIT** pushbutton on the **SYSCCTL** is recessed to prevent its accidental operation. You will need a small pointed object, such as a ball-point pen to operate it.

If any circuit packs were removed, momentarily depress the **UPD/INIT** button on the **SYSCCTL** or use the "**upd**" command to update the DDM-2000 internal equipment list.

12. **NOTE 1:**

When a shelf is removed from a DDM-2000 network and one of the DDM-2000 nodes is designated as a DSNE, the "**dlt-tadmap:tid=tid**" command must be used to delete the TID of the removed shelf from the directory services data base used for routing messages over the DCC. This prevents that TID from appearing in "**rtrv-map-network**" and "**rtrv-map-neighbor**" reports and will retire the "communication failure" alarms at all shelves in the network.

 NOTE 2:

The "**dlt-tadmap:tid=tid**" command is valid only at the DDM-2000 DSNE. The "**rtrv-map-network**" command may be used to determine which shelf is the DSNE.

DO ITEMS BELOW IN ORDER LISTED FOR DETAILS, GO TO

⇒ **NOTE 3:**

If the DSNE is other than a DDM-2000 shelf, the DSNE will automatically delete the node(s) from its inventory. Wait at least 6 minutes for alarms to settle.

Wait at least one minute, then at the DDM-2000 DSNE, use the "**dlt-tadrmapi:tid=tid**" command to delete the TID of the removed shelf from the directory services data base, if required.

13. Verify that all alarms go off.

Add New HDSL Service Group Already In Service

DO ITEMS BELOW IN ORDER LISTED FOR DETAILS, GO TO

1.  **CAUTION:**
*DDM-2000 circuit packs contain static sensitive components which can be damaged by electrostatic discharge. A static ground wrist strap must be worn when handling the circuit packs. See electrostatic discharge considerations in **Trouble Clearing: TAD-100**.*

 **NOTE 1:**
This procedure assumes that the DDM-2000 is in service and that a new HDSL port or **HDSL** circuit pack is being added to a **LOW SPEED GROUP** that is already in service and corresponding to a **FUNCTION UNITS** group that is equipped with **MXRVO** circuit packs at the DS1 terminating end(s). It also assumes that **STS1E** circuit packs have been installed if the other terminating end is an EC-1 interface. If proper circuit packs have not been installed and the system is in service on other groups, refer to **System Turnup/Circuit Order: IXL-001** for procedures to add a new group (**MXRVO** or **STS1E**).

 **NOTE 2:**
A maximum of three **BBF8 HDSL** circuit packs, including a protection circuit pack, can be installed in any one **LOW SPEED GROUP**. Both service and protection **MXRVO** circuit packs must also be installed in the corresponding **FUNCTION UNITS** group.

DO ITEMS BELOW IN ORDER LISTED FOR DETAILS, GO TO

⇒ **NOTE 3:**

If the DDM-2000 fails to respond in the indicated manner, refer to
Trouble Clearing: IXL-001.

Determine which HDSL ports/slots are to be put into
service and what options are to be selected.

-
2. Verify that no LEDs or alarms are activated. If any LEDs
or alarms are activated, refer to **Trouble Clearing:**
IXL-001 and follow the appropriate trouble-clearing
procedure.

-
3.  **CAUTION:**
*No service **LOW SPEED DS1** slot locations should be left empty in
GROUPs equipped with protection **HDSL** circuit packs and
corresponding to **FUNCTION UNITS** groups equipped with **MXRVO**
circuit packs.*

If a new **HDSL** circuit pack is being installed, remove
177A Retainer Card from DS1 slot being equipped, then
set option switches and install new **HDSL** circuit pack.

DLP-567

DO ITEMS BELOW IN ORDER LISTED . . . FOR DETAILS, GO TO

4. At each HDSL terminating node, use the "**set -t1:**" command to set the characteristics of the DS1 port being established, if not already performed.
5. At each HDSL terminating node, make the appropriate cable connection(s) to the cross-connect point(s) or equivalent connection point(s) for the circuit(s) being added.
6. Verify that no LEDs or alarms are activated. If any LEDs or alarms are activated, refer to **Trouble Clearing: IXL-001** and follow the appropriate trouble-clearing procedure.
7.  **NOTE 1:**
Ring releases support only manual VT1.5 and STS-1 cross-connections. Manual STS-1 and/or DS1 cross-connections have to be made at each shelf to configure the transmission path for each DS1 circuit being established. Either terminating (drop) cross-connections or "drop and continue" cross-connections are made at terminating nodes and pass-through cross-connections are made at intermediate nodes.

DO ITEMS BELOW IN ORDER LISTED FOR DETAILS, GO TO

⇒ **NOTE 2:**

In ring configurations, you should use the following rules in establishing cross-connections in each ring:

1. All drop connections (including DRI, if present) from the same STS-1 timeslot must be provisioned the same, either all VT1.5 or STS-1.
2. If all 28 VT1.5s (DS1s) in an STS-1 are being passed through at a node in a VT1.5 path-switched ring, then the cross-connection may be provisioned as either a pass-through STS-1 or VT1.5. However, if you anticipate dropping VT1.5s from the pass-through node in the future, you should provision the pass-throughs as VT1.5 cross-connections. Also, provisioning now as a VT1.5 cross-connect will avoid a hit on traffic if the STS-1 cross-connect has to be converted ("**cnvt -crs**") to 28 VT1.5 cross-connects to drop DS1s at a later time.
3. On STS-1 path-switched rings, all nodes in the ring must be provisioned as STS-1 cross-connections.

⇒ **NOTE 3:**

The following commands may be used to convert, delete, enter, and retrieve cross-connections: "**cnvt -crs**", "**dlt -crs-sts1**", "**dlt -crs-vt1**", "**ent -crs-sts1**", "**ent -crs-vt1**", "**rtrv -crs-sts1**", and "**rtrv -crs-vt1**". See the "Commands and Reports" section of this manual for a description of commands. See "Cross-Connection Provisioning" in the "Administration and Provisioning" section of this manual for more information on cross-connection provisioning.

Determine the necessary cross-connections for each node from the work order or circuit order.

DO ITEMS BELOW IN ORDER LISTED FOR DETAILS, GO TO

8. Make necessary VT1.5/STS1 cross-connections for each node in the network.

A. Single Ring Configuration	DLP-546
B. Dual Ring Interworking (DRI) Configuration	DLP-550
C. Single/Dual OC-3/FiberReach Configuration	DLP-557
D. Stand Alone OC-3/FiberReach Configuration	DLP-558
E. Single/Dual OC-3/OC-48 Configuration	DLP-559
F. Single/Dual OC-3/OC-12 Configuration	DLP-560

9.  **NOTE:**

For a DS1 circuit in a path protected ring network, the "**sw-path-vt1: address**" command must be used at the terminating nodes [and dual ring interworking (DRI) nodes in a DRI ring network] to switch the active VT1.5 (DS1) path to repeat this test on the other path.

Perform DS1 end-to-end transmission test for each circuit being put into service.

A. Single Ring Configuration	DLP-510
B. Dual Ring Interworking (DRI) Configuration	DLP-554
C. OC-3/FiberReach Configuration	DLP-510

10. Use the "**rtrv-state-eqpt**" command to determine the port state of the DS1 port(s) of the circuit being established.
-

DO ITEMS BELOW IN ORDER LISTED FOR DETAILS, GO TO

11.  **NOTE:**
If a port is in the *nmon* (*n*) state, the signal is not monitored or alarmed. The port will not automatically go to the *in service* (*i*) state when a signal is detected as it will in the *auto* (*a*) state. In the *nmon* state, the port must be returned to the *auto* state, using the "**set-state-t1:**" command, to turn on monitoring of signal failures and before any circuit packs associated with that port can be removed from the equipment list by the "**upd**" command.

Use the "**set-state-t1:**" command to set the port state of the DS1 port(s) of the circuit being established.

-
12. Use PairGain* Technologies procedures to access the faceplate RS-232 interface and set HDSL link management features for each port being provisioned.
-

* Trademark pending.

Upgrade DDM-2000 OC-3 Point-to-Point Network to Path Switched Ring In Service

DO ITEMS BELOW IN ORDER LISTED FOR DETAILS, GO TO

1.  **CAUTION 1:**
*This procedure requires **22-Type OLIU** circuit packs in all shelves. If existing **OLIUs** will be replaced in this procedure [DLP-542], you must determine if the **22-Type OLIUs** will support the existing span length. For example, **22F/22F-U/22F2-U OLIU** circuit packs will not support span lengths as long as **21G/21G-U/21G2-U OLIU** circuit packs will support. Optical line power measurements and/or office records must be used to verify that the existing span length can be supported.*

-  **CAUTION 2:**
This procedure requires an optical splitter and fiber couplers to connect the splitter to the optical line. This procedure has been tested using a Gould fiber splitter which introduces 3 dB of loss into the fiber span. The amount of loss may differ for the type of splitter used and must be considered when doing an upgrade. If there is not enough excess loss budget in the optical spans between the CO and first RT to allow the use of a splitter and fiber couplers, the upgrade may be performed out of service. Optical fiber switches which introduce no loss may also be used, but require extra steps in the upgrade procedure which are not documented. Fiber splitters and/or switches are available from manufacturers such as Gould, Fibercell, Corning, DiCon, ADC, and others.

DO ITEMS BELOW IN ORDER LISTED FOR DETAILS, GO TO

 **CAUTION 3:**
*DDM-2000 circuit packs contain static sensitive components which can be damaged by electrostatic discharge. A static ground wrist strap must be worn when handling the circuit packs. See electrostatic discharge considerations in **Trouble Clearing: TAD-100**.*

 **NOTE 1:**
This procedure assumes that the DDM-2000 is in service and the optical line connections are going to be changed to a ring configuration. It also assumes that Release 8 is initially installed in each shelf to support **22-Type OLIUs**. Release 9 or later software is required for the final ring configuration.

 **NOTE 2:**
All shelves in the same network must have the same or compatible software releases.

 **NOTE 3:**
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.

Use the **rtrv-alm:** command to verify that no alarms, locks, loops, or switches are present.

-
2. Notify maintenance center that alarms will be generated.
-

DO ITEMS BELOW IN ORDER LISTED FOR DETAILS, GO TO

3.  **NOTE:**
The Network Side/User Side parameters of the **set-fecom:**
command must be set opposite at each end of the optical spans.

Use the **rtrv-fecom/set-fecom** command to
verify/set "Network Side/User Side" parameters at each
end of optical span being established.

-
4. Verify software in each DDM-2000 shelf is Release 8 or
later which supports **22-Type OLIUs**.

-
5.  **NOTE:**
Mixing of **21-Type OLIUs** and **22-Type OLIUs** in one shelf is not
allowed in ring software.

Replace **OLIUs** in each shelf with proper **22-Type
OLIUs**, if not already done. (Protection **OLIUs** are
required.)

DLP-542

-
6. **All** shelves in the network being upgraded must have the
cross-connect mode set to manual. Use the
rtrv-ne/set-ne command to verify/set the cross-
connect mode (**set-ne:tid=tid:crs>manual**).
-

DO ITEMS BELOW IN ORDER LISTED FOR DETAILS, GO TO

7. **NOTE 1:**

In ring configurations, you should use the following rules in establishing cross-connections in each ring:

1. All drop connections (including DRI, if present) from the same STS-1 timeslot must be provisioned the same, either all VT1.5 or STS-1.
2. If all 28 VT1.5s (DS1s) in an STS-1 are being passed through at a node in a VT1.5 path-switched ring, then the cross-connection may be provisioned as either a pass-through STS-1 or VT1.5. However, if you anticipate dropping VT1.5s from the pass-through node in the future, you should provision the pass-throughs as VT1.5 cross-connections. Also, provisioning now as a VT1.5 cross-connect will avoid a hit on traffic if the STS-1 cross-connect has to be converted to 28 VT1.5 cross-connects to drop DS1s at a later time.
3. On STS-1 path-switched rings, all nodes in the ring must be provisioned as STS-1 cross-connections.

 NOTE 2:

If STS-1 cross-connections exist presently and VT1.5 cross-connections will be required, conversion of STS-1 cross-connections to VT1.5 cross-connections must be performed before ring software is loaded into the system.

If required, at all shelves in the network, use the **cnvt -crs: address1, address2** command to convert all low-speed DS1 STS-1 cross-connections to corresponding VT1.5 cross-connections.

DO ITEMS BELOW IN ORDER LISTED FOR DETAILS, GO TO

8. Use **rtrv-sync:** command to check timing mode and parameters for proper provisioning. If necessary, use **set-sync:** command to change timing provisioning to that specified on the work order.

-
9.  **CAUTION:**
***TIMING** slot 2 should always be equipped with a **TGS** circuit pack and be active prior to software download. To clear a "C" condition from the **SYSCTL FE ID** display, procedures will require removal of the **TGS** circuit pack from **TIMING** slot 1 to force the system to run the new software. See Table A.*

Before performing this procedure, ensure that both **TGS** circuit packs are installed in the shelf, then use the **switch-sync:s=circuitpack,pri>manual** command to switch to the protection **TGS** circuit pack in **TIMING** slot 2 if not already **ACTIVE**. Use **rtrv-sync:** command to verify that the **TGS** circuit pack in **TIMING** slot 2 is **ACTIVE**.

DO ITEMS BELOW IN ORDER LISTED FOR DETAILS, GO TO

10. At Node 1 and Node 2, use the
switch-line:main:pri=manual command to switch
to the protection line. Use the
rtrv-state-eqpt:main-all command to check
switch state (main-2 OLIU active). (See Figure 1.)
 11. Use **set-fecom:dcc-m:com=disabled** command to
disable far-end communications (fecom) at Node 1.
-

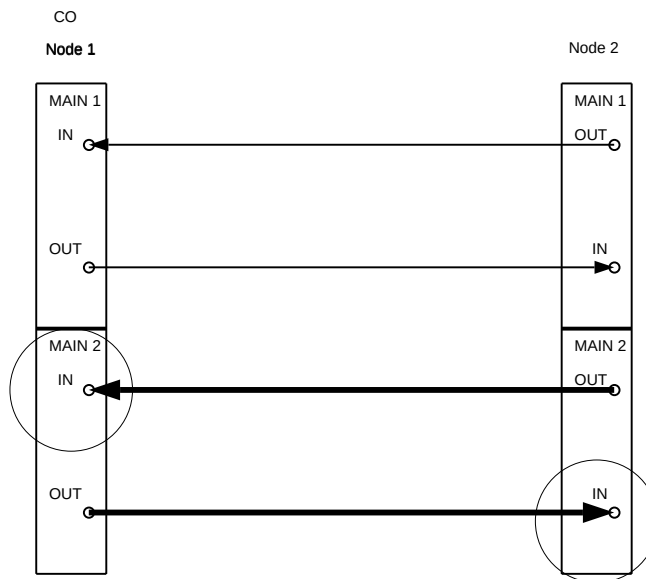


Figure 1. DDM-2000 OC-3 Point-to-Point to Ring Upgrade

DO ITEMS BELOW IN ORDER LISTED FOR DETAILS, GO TO

12. At Node 1, install optical splitter in optical line between Node 1 **MAIN 1 OUT** and Node 2 **MAIN 1 IN** as shown in Figure 2.
-

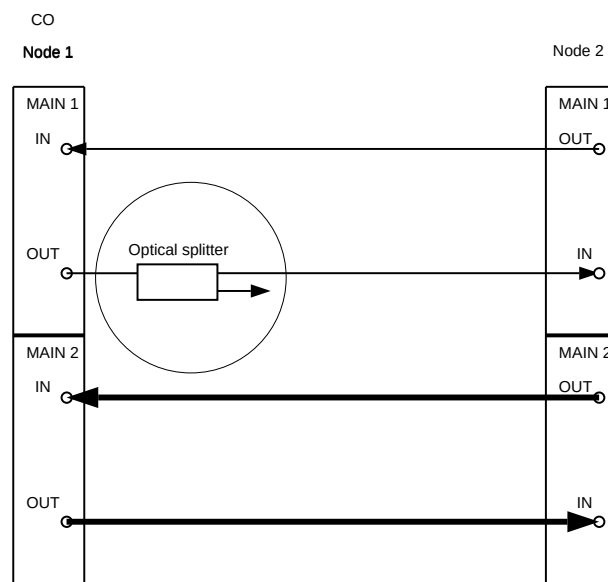


Figure 2. DDM-2000 OC-3 Point-to-Point to Ring Upgrade

DO ITEMS BELOW IN ORDER LISTED FOR DETAILS, GO TO

13.  **NOTE:**
Wait until **FAULT** LED on **MAIN OLIU** extinguishes before attempting switch.

At Node 2 only, use the
switch-line:main:pri>manual command to switch
to the service (MAIN 1) line (main-1 OLIU active-
rx). (See Figure 3.)

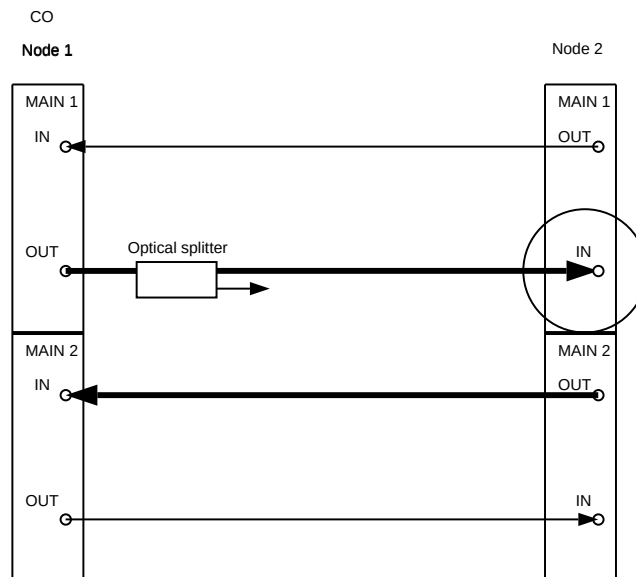


Figure 3. DDM-2000 OC-3 Point-to-Point to Ring Upgrade

DO ITEMS BELOW IN ORDER LISTED FOR DETAILS, GO TO

14. At Node 1, remove optical fiber from **OLIU MAIN 2(P)**
OUT and connect it to the other output of the optical
splitter. (See Figure 4.)
-

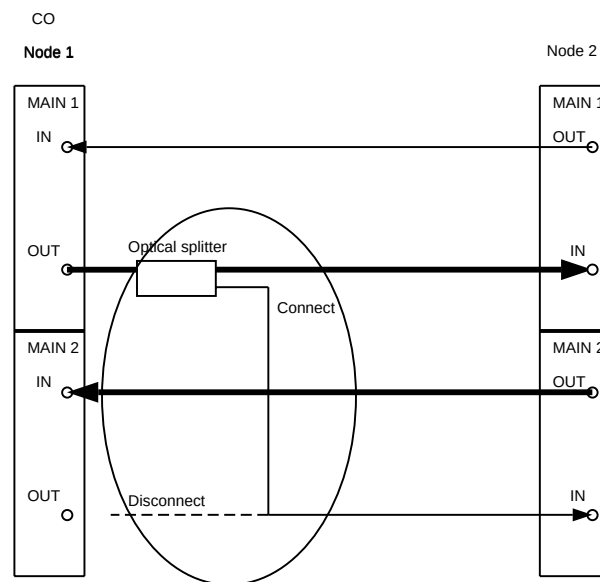


Figure 4. DDM-2000 OC-3 Point-to-Point to Ring Upgrade

DO ITEMS BELOW IN ORDER LISTED FOR DETAILS, GO TO

15.  **NOTE:**
Wait until **FAULT** LED on **MAIN OLIU** extinguishes before attempting switch.

At Node 2 only, use the
switch-line:main:pri=manual command to switch
service to the protection line (main-2 OLIU active-
rx at Node 2). (See Figure 5.)

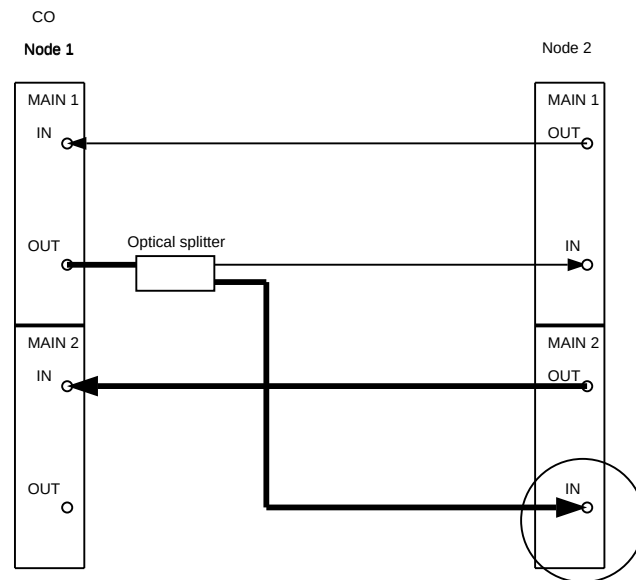


Figure 5. DDM-2000 OC-3 Point-to-Point to Ring Upgrade

DO ITEMS BELOW IN ORDER LISTED FOR DETAILS, GO TO

16. Disconnect the fiber from the optical splitter output going to Node 2 **MAIN 1 IN**. Connect the fiber from Node 2 **MAIN 1 IN** to Node 1 **MAIN 2(P) OUT**. (See Figure 6.)
-

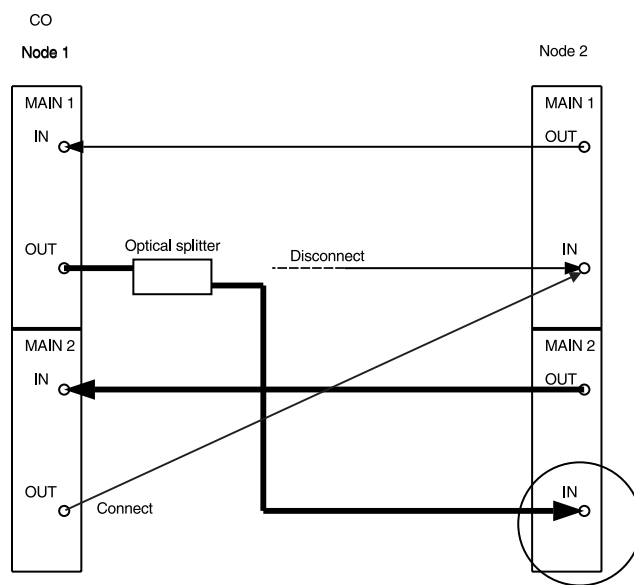


Figure 6. DDM-2000 OC-3 Point-to-Point to Ring Upgrade

DO ITEMS BELOW IN ORDER LISTED FOR DETAILS, GO TO

17.  **NOTE:**
Wait until **FAULT** LED on **MAIN OLIU** extinguishes before attempting switch.

At Node 2 only, use the
switch-line:main:pri>manual command to switch
service to the service line (main-1 OLIU active-rx
at Node 2). (See Figure 7.)

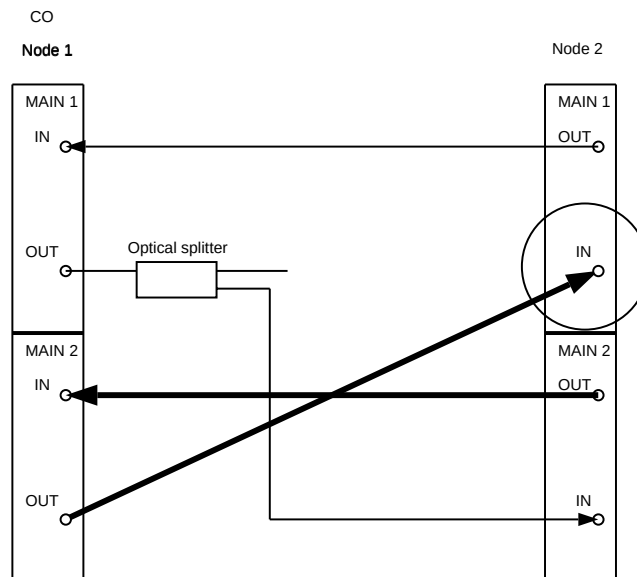


Figure 7. DDM-2000 OC-3 Point-to-Point to Ring Upgrade

18. Remove optical splitter from Node 1 **MAIN 1 OUT** and Node 2 **MAIN 2(P) IN**. Connect optical fiber from Node 1 **MAIN 1 OUT** to Node 2 **MAIN 2(P) IN**. (See Figure 8.)

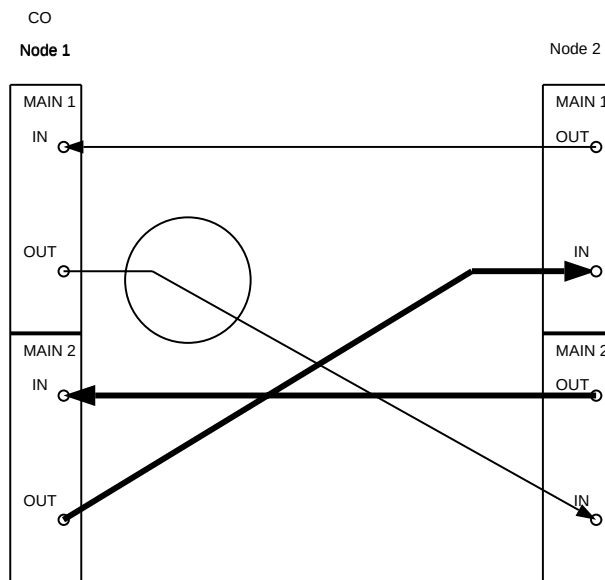


Figure 8. DDM-2000 OC-3 Point-to-Point to Ring Upgrade

DO ITEMS BELOW IN ORDER LISTED FOR DETAILS, GO TO

19. At Node 1, install optical splitter in optical line between Node 1 **MAIN 1 IN** and Node 2 **MAIN 1 OUT** as shown in Figure 9.
-

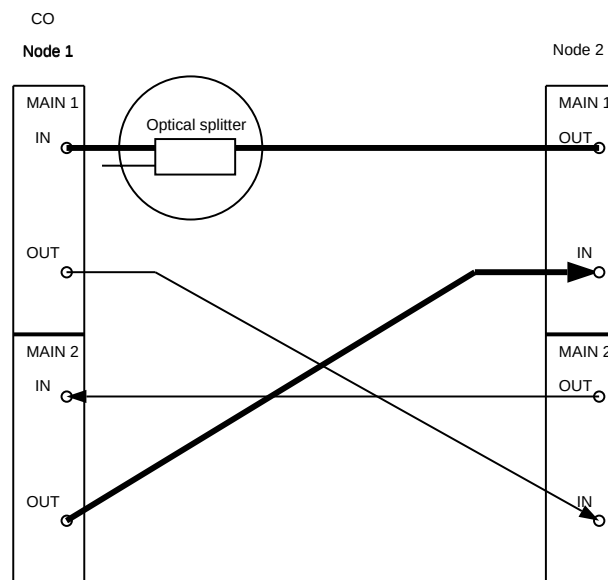


Figure 9. DDM-2000 OC-3 Point-to-Point to Ring Upgrade

DO ITEMS BELOW IN ORDER LISTED FOR DETAILS, GO TO

20.  **NOTE:**
Wait until **FAULT LED** on **MAIN OLIU** extinguishes before attempting switch.

At Node 1 only, use the
switch-line:main:pri=manual command to switch
service to the service line (main-1 OLIU active-rx
at Node 1). (See Figure 10.)

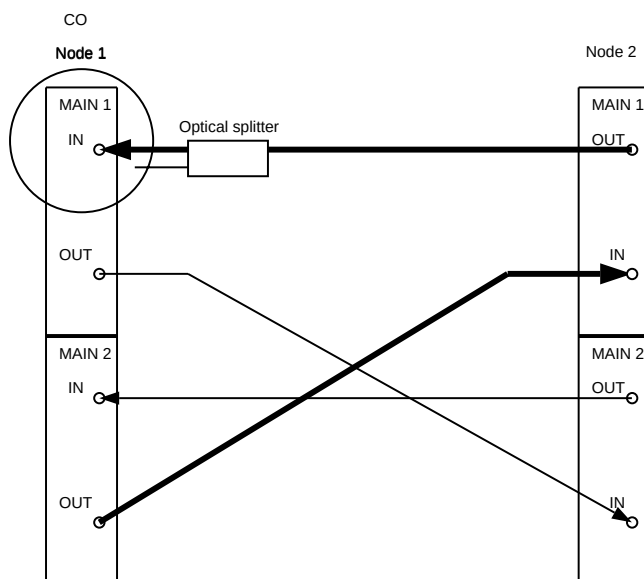


Figure 10. DDM-2000 OC-3 Point-to-Point to Ring Upgrade

DO ITEMS BELOW IN ORDER LISTED FOR DETAILS, GO TO

21. Disconnect optical fiber from Node 1 **MAIN 2(P) IN** and connect remaining optical splitter output to **MAIN 2(P) IN**.
(See Figure 11.)
-

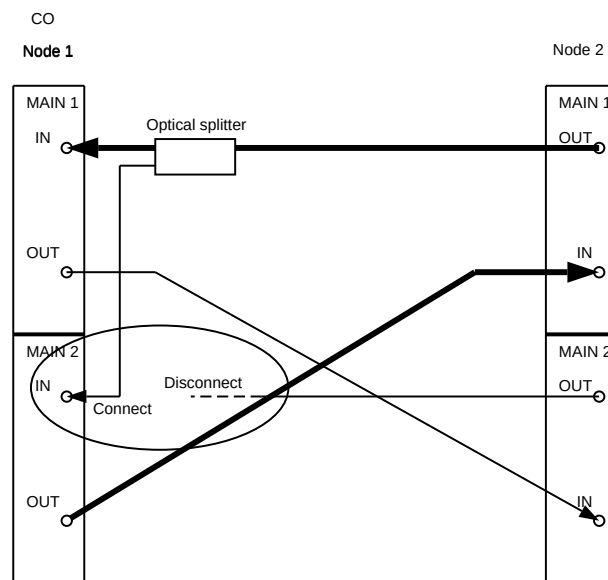


Figure 11. DDM-2000 OC-3 Point-to-Point to Ring Upgrade

DO ITEMS BELOW IN ORDER LISTED FOR DETAILS, GO TO

22.  **NOTE:**
Wait until **FAULT LED** on **MAIN OLIU** extinguishes before attempting switch.

At Node 1, use the **switch-line:main:pri=manual** command to switch service to the protection line (main-2 OLIU active-rx at Node 1). (See Figure 12.)

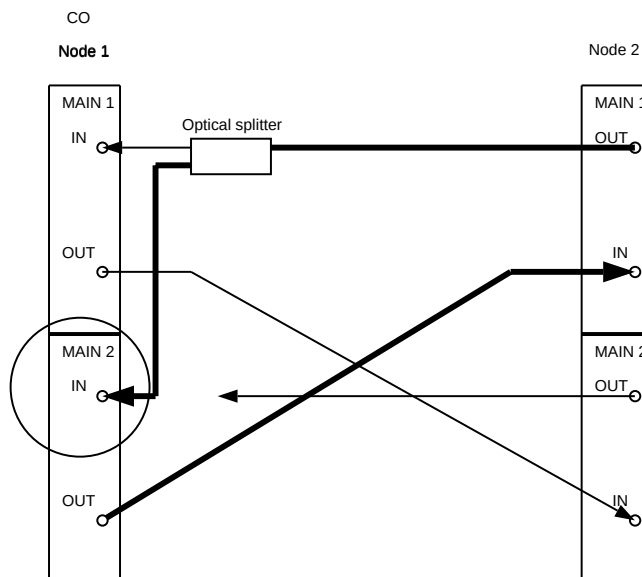


Figure 12. DDM-2000 OC-3 Point-to-Point to Ring Upgrade

DO ITEMS BELOW IN ORDER LISTED FOR DETAILS, GO TO

23. At Node 1, remove optical splitter output from **MAIN 1 IN** and connect optical fiber from Node 2 **MAIN 2(P) OUT** to Node 1 **MAIN 1 IN**. (See Figure 13.)
-

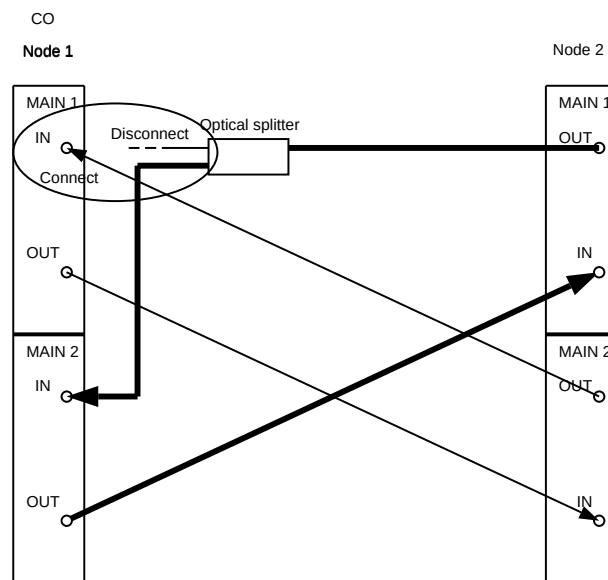


Figure 13. DDM-2000 OC-3 Point-to-Point to Ring Upgrade

DO ITEMS BELOW IN ORDER LISTED FOR DETAILS, GO TO

24.  **NOTE:**
Wait until **FAULT** LED on **MAIN OLIU** extinguishes before attempting switch.

At Node 1, use the **switch-line:main:pri=manual** command to switch service to the service line (main-1 OLIU active-rx) at Node 1. (See Figure 14.)

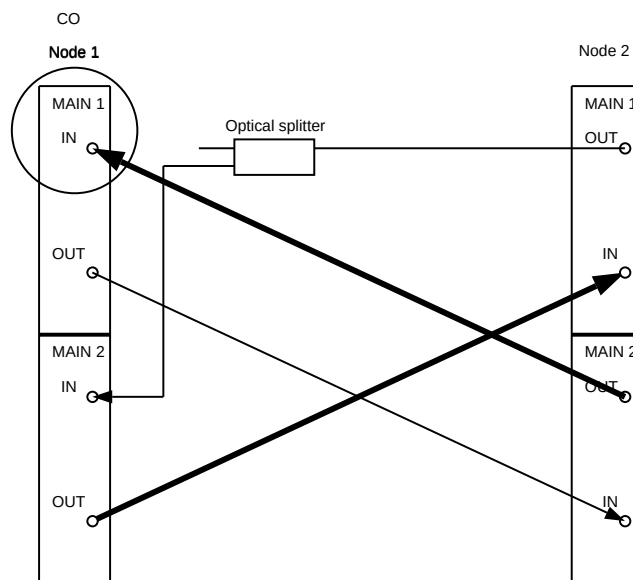


Figure 14. DDM-2000 OC-3 Point-to-Point to Ring Upgrade

DO ITEMS BELOW IN ORDER LISTED FOR DETAILS, GO TO

25. Remove optical splitter from Node 1 **MAIN 2(P) IN** and Node 2 **MAIN 1 OUT**. Connect optical fiber from Node 2 **MAIN 1 OUT** to Node 1 **MAIN 2(P) IN**. (See Figure 15.)
-

26.  **NOTE:**
Wait until **FAULT** LED on **MAIN OLIU** extinguishes before attempting switch.

At Node 2, use the **switch-line:main:pri>manual** command to switch service to the protection line (main-2 OLIU active) at Node 2. (See Figure 15.)

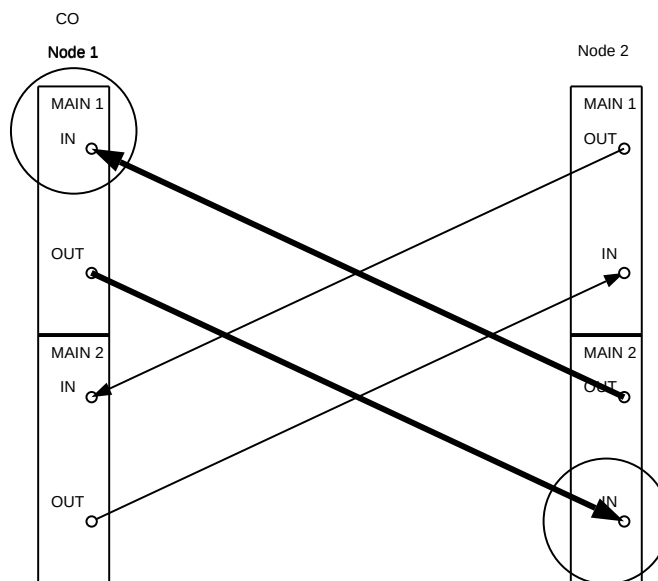


Figure 15. DDM-2000 OC-3 Point-to-Point to Ring Upgrade

DO ITEMS BELOW IN ORDER LISTED FOR DETAILS, GO TO

27. Upgrade both nodes (shelves) with Release 9 or later software. (Software upgrades must be made locally at each shelf.) **DLP-532**

28. Reinstall **TGS** circuit pack into **TIMING** slot **1**.

29. Use **set-fecom:dcc-all:com=enabled** command at both ends to enable far-end communications (fecom).

30.  **NOTE 1:**
The **set-ne:** command designates a shelf as the directory service network element (DSNE). **One**, and only one, shelf in the subnetwork **must** be provisioned as a DSNE. If there is no DSNE in the network, all DCC communication can become disabled. If more than one shelf is provisioned as DSNE, a "duplicate DSNE" alarm will occur. Multiple GNEs are allowed and a shelf is automatically provisioned as a GNE when connected to an active X.25 interface.

DO ITEMS BELOW IN ORDER LISTED FOR DETAILS, GO TO

⇒ **NOTE 2:**

Shelves may be designated as an alarm gateway network element (AGNE) and assigned an alarm group number. (Default alarm group number is 255.) At least one AGNE is required per alarm group. One primary AGNE and one backup per alarm group is recommended. For a network greater than 16 nodes, the AGNE and TL1 GNE should be on separate nodes.

Use the **set-ne:** command to designate ONE shelf as the DSNE. Use the **set-ne:** to designate the AGNE(s) and alarm group number, as required.

31. ⇒ **NOTE 1:**

If Kbyte (Release 9.0 and earlier) or Sbyte (Releases 8.1, 9.1, and later) (sync messaging) is enabled for the **main-1** and **main-2** optical interfaces at any node in a ring, it **must** be enabled at all nodes of the ring.

⇒ **NOTE 2:**

The **rtrv-oc3:** command retrieves the "OC-3 Line Provisioning Report". This report displays the provisioned configuration of OC-3 lines. See the "Commands and Reports" section of this manual for a description of the **rtrv-oc3:** command format.

Use the **rtrv-oc3:** command to obtain the "OC-3 Line Provisioning Report" and verify if Kbyte/Sbyte is enabled or disabled. Use the **set-oc3:** command to enable or disable the Kbyte/Sbyte parameter, as required.

DO ITEMS BELOW IN ORDER LISTED FOR DETAILS, GO TO

32.  **NOTE 1:**
If Sync Autoreconfiguration is enabled, Kbyte/Sbyte must also be enabled.
-  **NOTE 2:**
If Sync Autoreconfiguration is enabled at any line-timed node (not available for external timed or free-running nodes), it **must** be enabled at all line-timed nodes.
-  **NOTE 3:**
The **rtrv-sync:** command retrieves the "Synchronization Report". This report displays the provisioning and operational information on the synchronization attributes of the DDM-2000. See the "Commands and Reports" section of this manual for a description of the **rtrv-sync:** command format.

Use the **rtrv-sync:** command to obtain the "Synchronization Report" and verify if Sync Autoreconfiguration is enabled or disabled any any line-timed node. Use the **set-sync:** command to enable or disable the Sync Autoreconfiguration parameter, as required.

-
33. The ring configuration is now complete and new nodes may be added as required [**NTP-026**].
-

Upgrade DDM-2000 OC-3 Point-to-Point to Path Switched Ring Out of Service

DO ITEMS BELOW IN ORDER LISTED FOR DETAILS, GO TO

1.  **CAUTION 1:**
*This procedure requires **22-Type OLIU** circuit packs in all shelves. If existing **OLIUs** will be replaced in this procedure, you must determine if the **22-Type 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 2:**
*DDM-2000 circuit packs contain static sensitive components which can be damaged by electrostatic discharge. A static ground wrist strap must be worn when handling the circuit packs. See electrostatic discharge considerations in **Trouble Clearing: TAD-100**.*

 **NOTE 1:**
This procedure requires that the system be taken out of service long enough to change **OLIU** optical fiber connections to the ring configuration. It is assumed that Release 8 software is initially installed in each shelf to support **22-Type OLIUs**. It is assumed that Release 9 or later software is required for the final ring configuration.

 **NOTE 2:**
All shelves in the same network must have the same software release.

DO ITEMS BELOW IN ORDER LISTED FOR DETAILS, GO TO

⇒ **NOTE 3:**

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.

Use the **rtrv-alm:** command to verify that no alarms, locks, loops, or switches are present.

2. Notify maintenance center that alarms will be generated.
-

3. ⇒ **NOTE:**

The Network Side/User Side parameters of the **set-fecom:** command must be set opposite at each end of the optical spans.

Use the **rtrv-fecom/set-fecom** command to verify/set "Network Side/User Side" parameters at each end of optical span being established.

DO ITEMS BELOW IN ORDER LISTED FOR DETAILS, GO TO

4.	Verify software in each DDM-2000 shelf is Release 8 that supports 22-Type OLIUs , if not already performed.	DLP-532
-

5.	Replace OLIUs in each shelf with 22-Type OLIUs , if not already done. (Protection OLIUs are required.)	DLP-542
-

6.	At each shelf, use set-ne:tid=tid:crs>manual command to set cross-connect mode to manual.	
-

7. **NOTE 1:**

In ring configurations, you should use the following rules in establishing cross-connections in each ring:

1. All drop connections (including DRI, if present) from the same STS-1 timeslot must be provisioned the same, either all VT1.5 or STS-1.
2. If all 28 VT1.5s (DS1s) in an STS-1 are being passed through at a node in a VT1.5 path-switched ring, then the cross-connection may be provisioned as either a pass-through STS-1 or VT1.5. However, if you anticipate dropping VT1.5s from the pass-through node in the future, you should provision the pass-throughs as VT1.5 cross-connections. Also, provisioning now as a VT1.5 cross-connect will avoid a hit on traffic if the STS-1 cross-connect has to be converted to 28 VT1.5 cross-connects to drop DS1s at a later time.
3. On STS-1 path-switched rings, all nodes in the ring must be provisioned as STS-1 cross-connections.

DO ITEMS BELOW IN ORDER LISTED FOR DETAILS, GO TO

⇒ NOTE 2:

If STS-1 cross-connections exist presently and VT1.5 cross-connections will be required, conversion of STS-1 cross-connections to VT1.5 cross-connections must be performed before ring software is loaded into the system.

If required, at all shelves in the network, use the **cnvt -crs: address1, address2** command to convert all low-speed DS1 STS-1 cross-connections to corresponding VT1.5 cross-connections.

-
8. Use **rtrv-sync:** command to check timing mode and parameters for proper provisioning. If necessary, use **set-sync:** command to change timing provisioning.

-
9. Use **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 **TIMING** 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 will be necessary to remove the **TGS** circuit pack in **TIMING** 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 will 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** circuit pack, if not already **ACTIVE**. Use **rtrv-sync:** command to verify that the **TGS** circuit pack in **TIMING** slot **2** is **ACTIVE**. Unplug the **TGS** circuit pack in **TIMING** slot **1**.

-
11.  **CAUTION:**
This step will interrupt service until the optical lines have been properly reconnected. Notify maintenance center and other required personnel that service will be interrupted.

DO ITEMS BELOW IN ORDER LISTED . . . FOR DETAILS, GO TO

⇒ NOTE:
In the ring configuration, optical fibers from **MAIN 1** at one node connect to **MAIN 2(P)** at the adjacent node.

At Node 1, remove and reconnect the optical fibers as shown in Figure 1.

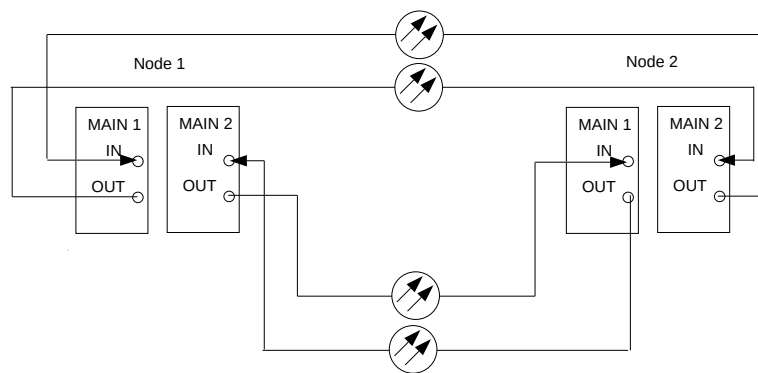


Figure 1. DDM-2000 OC-3 Point-to-Point to Ring Upgrade

12. Upgrade both nodes (shelves) with Release 9 or later software. (Software upgrades must be made locally at each shelf.)

DLP-532

DO ITEMS BELOW IN ORDER LISTED FOR DETAILS, GO TO

13. **NOTE 1:**

The **set-ne:** command designates a shelf as the directory service network element (DSNE). **One**, and only one, shelf in the subnetwork **must** be provisioned as a DSNE. If there is no DSNE in the network, all DCC communication can become disabled. If more than one shelf is provisioned as DSNE, a "duplicate DSNE" alarm will occur. Multiple GNEs are allowed and a shelf is automatically provisioned as a GNE when connected to an active X.25 interface.

 NOTE 2:

Shelves may be designated as an alarm gateway network element (AGNE) and assigned an alarm group number. (Default alarm group number is 255.) At least one AGNE is required per alarm group. One primary AGNE and one backup per alarm group is recommended. For a network greater than 16 nodes, the AGNE and TL1 GNE should be on separate nodes.

Use the **set-ne:** command to designate ONE shelf as the DSNE, if required. Use the **set-ne:** to designate the AGNE(s) and alarm group number, as required.

DO ITEMS BELOW IN ORDER LISTED FOR DETAILS, GO TO

14. Use **set-fecom:dcc-all:com=enabled** command at both ends to enable far-end communications (fecom).
-

15. ➤ **NOTE 1:**
If Kbyte (Release 9.0 and earlier) or Sbyte (Releases 8.1, 9.1, and later) (sync messaging) is enabled for the **main-1** and **main-2** optical interfaces at any node in a ring, it **must** be enabled at all nodes of the ring.

- **NOTE 2:**
The **rtrv-oc3:** command retrieves the "OC-3 Line Provisioning Report". This report displays the provisioned configuration of OC-3 lines. See the "Commands and Reports" section of this manual for a description of the **rtrv-oc3:** command format.

Use the **rtrv-oc3:** command to obtain the "OC-3 Line Provisioning Report" and verify if Kbyte/Sbyte is enabled or disabled. Use the **set-oc3:** command to enable or disable the Kbyte/Sbyte parameter, as required.

DO ITEMS BELOW IN ORDER LISTED FOR DETAILS, GO TO

16.  **NOTE 1:**
If Sync Autoreconfiguration is enabled, Kbyte/Sbyte must also be enabled.
-  **NOTE 2:**
If Sync Autoreconfiguration is enabled at any line-timed node (not available for external timed or free-running nodes), it **must** be enabled at all line-timed nodes.
-  **NOTE 3:**
The **rtrv-sync:** command retrieves the "Synchronization Report". This report displays the provisioning and operational information on the synchronization attributes of the DDM-2000. See the "Commands and Reports" section of this manual for a description of the **rtrv-sync:** command format.

Use the **rtrv-sync:** command to obtain the "Synchronization Report" and verify if Sync Autoreconfiguration is enabled or disabled at any line-timed node. Use the **set-sync:** command to enable or disable the Sync Autoreconfiguration parameter, as required.

-
17. The ring configuration is now complete and new nodes may be added as required [**NTP-026**].
-

Equip DDM-2000 EC-1 Electrical Multiplexer Shelf Looped-Back

DO ITEMS BELOW IN ORDER LISTED FOR DETAILS, GO TO

1.  **CAUTION:**
*DDM-2000 circuit packs contain static sensitive components which can be damaged by electrostatic discharge. A static ground wrist strap must be worn when handling the circuit packs. See electrostatic discharge considerations in **Trouble Clearing: TAD-100**.*

 **NOTE 1:**
This procedure assumes that all hardwired installation and testing of the unequipped DDM-2000 shelf has been done. It also assumes that power is applied to the shelf (**PWR ON** LED lighted on User Panel).

 **NOTE 2:**
Many of the circuit packs have numerous option switches which must be set before they are installed.

Check -48 V DC office battery, if required. **DLP-524**

-
2. Install **BBG9 OHCTL** circuit pack. **DLP-500**

-
3. Install **BBG8/BBG8B SYSCTL** circuit pack. **DLP-549**
-

DO ITEMS BELOW IN ORDER LISTED FOR DETAILS, GO TO

4. **NOTE 1:**

As additional circuit packs are installed, office alarms may be activated, accompanied by flashing **FAULT** LEDs on some of the circuit packs. This is a normal condition at this stage of the procedure. You can momentarily depress the **ACO/TST** button to retire office alarms.

 NOTE 2:

To avoid timing alarms before the end-to-end system has been established, the **TGS** option switches must be *temporarily* set to *free running* if DS1 external timing is specified but the DS1 timing reference is not yet available. When the DS1 external timing references become available or when the end-to-end system is established, the timing mode must be changed to the specified timing mode. If external timing is the specified timing mode and external timing is available to the shelf, the timing mode may be set for external timing.

Install **TGS** timing circuit packs.

DLP-503

-
5. Install **BBG6 STS1E** circuit packs (as required) with option switches set for high speed.

DLP-502

-
6. At the cross-connect point or backplane connectors [**J38-J39** (Group A), **J40-J41** (Group B), **J42-J43** (Group C)], loop back the EC-1 signal associated with **FUNCTION UNITS** slots equipped with **STS1E** circuit packs.
-

DO ITEMS BELOW IN ORDER LISTED FOR DETAILS, GO TO

7. Use "**set-ec1**" command to set the characteristics of the EC-1 port(s).

8. **NOTE 1:**

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 terminate 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.

 NOTE 2:

177A Retainer Cards must be installed in all empty **LOW SPEED** DS1 slots in **GROUPs** equipped with protection **DS1/DS1PM** circuit packs and corresponding to **FUNCTION UNITS** groups equipped with **STS1E** circuit packs.

Install service and protection **DS1/DS1PM** circuit packs, as required.

DLP-508

DO ITEMS BELOW IN ORDER LISTED FOR DETAILS, GO TO

9.  **CAUTION:**
*The command "**init-sys:all**" may affect service. It should never be used on an in-service system. It should only be used after a shelf has been equipped to reset all provisionable parameters and cross-connections to their default values.*

If a CIT is available, use the "**init-sys:all**" command to initialize all provisionable parameters to their original default values.

-
10. Perform an LED test. **DLP-509**
-

11.  **NOTE:**
This procedure assumes that the DDM-2000 high speed signals are looped back (as required) at the backplane coaxial connectors (**J38-J39, J40-J41, J42-J43**) or at a cross-connect point.

Perform automatic local (looped back) transmission test. **DLP-528**

DO ITEMS BELOW IN ORDER LISTED FOR DETAILS, GO TO

12. **NOTE:**

This procedure assumes that the DDM-2000 has been connected to the low-speed DSX-1 cross-connection as required.

Perform automatic local wiring cross-connect test (looped back).

DLP-529

13. Check office alarm interface as required.

DLP-516

14. Check telemetry interface as required.

- A. Parallel telemetry
- B. Serial telemetry

DLP-517

DLP-518

15. Test protection switching function, if required.

DLP-519

16. **NOTE:**

A craft interface terminal (CIT) is required to access the optional features of the DDM-2000, such as security, date and time, logins, etc.

Activate optional features as required.

DLP-512

DO ITEMS BELOW IN ORDER LISTED FOR DETAILS, GO TO

17. This shelf is now equipped to provide DS1 service through an EC-1 high speed electrical interface.

18. When the EC-1 electrical interface is required, remove the required EC-1 loopback, make appropriate cable connections to the coaxial connectors, and set the required **TGS** timing options [**DLP-513**].

Add New STS1E High Speed Group for DS1 Service EC-1 Electrical Multiplexer Shelf System In Service

DO ITEMS BELOW IN ORDER LISTED FOR DETAILS, GO TO

1.  **WARNING:**
*DDM-2000 circuit packs contain static sensitive components which can be damaged by electrostatic discharge. A static ground wrist strap must be worn when handling the circuit packs. See electrostatic discharge considerations in **Trouble Clearing: TAD-100.***

 **NOTE 1:**
This procedure assumes that the DDM-2000 is equipped as a DDM-2000 EC-1 electrical multiplexer shelf. It is also assumed that the shelf is in service and that a new **FUNCTION UNITS** group is being equipped with **STS1E** circuit packs for DS1 service. If the group is already equipped with **STS1E** circuit packs, refer to **Circuit Order: NTP-006.**

 **NOTE 2:**
If the DDM-2000 fails to respond in the indicated manner, refer to **Trouble Clearing: IXL-001.**

Determine which **FUNCTION UNITS** group (**A**, **B**, or **C**) is being equipped.

DO ITEMS BELOW IN ORDER LISTED FOR DETAILS, GO TO

2. Use the "**rtrv-alm**" command to verify that no alarms, locks, loops, or switches are present.

-
3.  **NOTE:**
If the **LOW SPEED GROUP** is to be equipped with any **BBF3/BBF3B DS1PM** circuit packs, both service and protection **STS1E** circuit packs must be installed.

Install **STS1E** circuit packs (high speed mode) into proper slots of **FUNCTION UNITS** group (**A, B, or C**) being equipped.

DLP-502

-
4. Use the "**set-ec1**" command to set the characteristics of the EC-1 port.

-
5.  **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 terminate 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.

DO ITEMS BELOW IN ORDER LISTED FOR DETAILS, GO TO

Option and install required service **DS1/DS1PM** circuit packs. **DLP-508**

6.  **NOTE:**
If **BBF3/BBF3B DS1PM** circuit packs are installed and DS1 protection is required, a **BBF3/BBF3B DS1PM** circuit pack must be installed in the protection slot.

Install protection **DS1/DS1PM** circuit pack into slot **8(P)** of the **LOW SPEED GROUP** being put into service, if required. **DLP-508**

7. Use the "**set - t1**" command to set the characteristics of the DS1 ports.
-

8.  **CAUTION:**
*No service DS1 **LOW SPEED** slots should be left empty in **GROUPs** equipped with protection **DS1/DS1PM** circuit packs and corresponding to **FUNCTION UNITS** groups equipped with **STS1E** circuit packs.*

-  **NOTE:**
177A Retainer Cards are used to disconnect the cross-connect wiring associated with unused service DS1 slot locations from the DDM-2000's internal protection bus.

DO ITEMS BELOW IN ORDER LISTED FOR DETAILS, GO TO

Install **177A** Retainer Cards into all unequipped service DS1 slots in **LOW SPEED GROUPS** equipped with protection **DS1/DS1PM** circuit packs and corresponding to **FUNCTION UNITS** groups equipped with **STS1E** circuit packs.

9. Make the appropriate connection(s) to the DS1 cross-connect point(s) or equivalent connection point(s) for the circuit(s) being added.
 10. Verify that no LEDs or alarms are activated. If any LEDs or alarms are activated, refer to **Trouble Clearing: IXL-001**.
 11. Make EC-1 coaxial connections to proper backplane connectors [**J38-J39** (Group A), **J40-J41** (Group B), **J42-J43** (Group C)].
 12. If **BBF3/BBF3B DS1PM** circuit packs are installed and the optional *ds1pm* performance monitoring feature is used, use the "**set-feat:feat=ds1pm,act=enable**" command to enable the feature.
 13. After terminating end is established, perform an end-to-end DS1 transmission test for each DS1 circuit being put into service (optional).
-

DLP-510

Discontinue STS1E High Speed Group EC-1 Electrical Multiplexer Shelf

DO ITEMS BELOW IN ORDER LISTED FOR DETAILS, GO TO

1.  **CAUTION 1:**
*DDM-2000 circuit packs contain static sensitive components which can be damaged by electrostatic discharge. A static ground wrist strap must be worn when handling the circuit packs. See electrostatic discharge considerations in **Trouble Clearing: TAD-100**.*

-  **CAUTION 2:**
*When a **DS1** is switched to protection, removal of any other **DS1** circuit pack or **177A** Retainer Card in the same group will result in a loss of service to the protected **DS1** and the removed **DS1** circuit pack.*

-  **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 terminate 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.

DO ITEMS BELOW IN ORDER LISTED FOR DETAILS, GO TO

Determine which DS1 group is to be discontinued and verify no alarms exist on the system.

2.  **NOTE:**
The following operation may activate the office major or minor alarm.
The audible alarm may be suppressed by depressing the **ACO** button.

At the DSX-1, remove the DS1 signals associated with the group(s) being discontinued. (**FAULT** LEDs begin flashing on **DS1** circuit pack with signals removed.)

3.  **NOTE:**
The **UPD/INIT** pushbutton on the **SYSCTL** is recessed to prevent its accidental operation. You will need a small pointed object, such as a ball-point pen to operate it.

On the **SYSCTL**, momentarily depress the **UPD/INIT** button to update the equipment list. (**FAULT** LEDs go off.)

4. Remove **DS1/DS1PM** circuit packs, if required.
-

DO ITEMS BELOW IN ORDER LISTED FOR DETAILS, GO TO

5. Remove the group **STS1E** circuit packs, if required.

6. If circuit packs are removed, momentarily depress the
UPD/INIT button on the **SYSCTL** to update the
DDM-2000 internal equipment list.

7. Verify all alarms are off.

Establish Initial Low Speed EC-1 Interface Group Equipped But Not In Service

DO ITEMS BELOW IN ORDER LISTED FOR DETAILS, GO TO

1.  **CAUTION:**
*DDM-2000 circuit packs contain static sensitive components which can be damaged by electrostatic discharge. A static ground wrist strap must be worn when handling the circuit packs. See electrostatic discharge considerations in **Trouble Clearing: TAD-100**.*

 **NOTE 1:**
The end-to-end network must be established before continuing with this procedure. If all the nodes of the network have not been equipped and installed, refer to **System Turnup/Circuit Order: IXL-001** for procedures to equip the DDM-2000 shelves, and to establish the end-to-end network.

 **NOTE 2:**
This procedure assumes that **STS1E** circuit packs, optioned for low speed, have been installed during the initial shelf turnup at the EC-1 terminating end(s) of the circuit. The other terminating end(s) may be equipped with **DS3**, **STS1E**, or **MXRVO** and **DS1/DS1PM** circuit packs. If the appropriate circuit packs have not been installed and the system is in service on other groups, refer to **System Turnup/Circuit Order: IXL-001** for procedures to equip the new groups.

 **NOTE 3:**
If the DDM-2000 fails to respond in the indicated manner, refer to **Trouble Clearing: IXL-001**.

DO ITEMS BELOW IN ORDER LISTED FOR DETAILS, GO TO

At the EC-1 terminating (drop) node(s), determine which **STS1E** circuit pack is to be put into service and what options are to be selected.

2. **NOTE:**

The "**rtrv-eqpt:**" command retrieves the "Equipage and Version Report". This report lists the circuit pack type and version information for one or more slots. See the "Commands and Reports" section of this manual for a description of the "**rtrv-eqpt:**" command format.

Use the "**rtrv-eqpt:**" command to obtain the "Equipage and Version Report" and verify that the service and protection (if required) **STS1E** circuit packs have been installed in proper **FUNCTION UNITS** group (**A**, **B**, or **C**) being put into service.

3. **NOTE:**

The "**rtrv-ec1:**" command retrieves the "EC1 Port Provisioning Report". This report lists information about each EC-1 port. This information includes attributes set by the "**set-ec1:**" command and parameters set by switches on the circuit pack. See the "Commands and Reports" section of this manual for a description of the "**rtrv-ec1:**" command format.

Use the "**rtrv-ec1:**" command to obtain the "EC1 Port Provisioning Report" and verify the hardware and software option settings.

DO ITEMS BELOW IN ORDER LISTED FOR DETAILS, GO TO

4.  **NOTE:**
DS1/DS1PM circuit packs *cannot* be installed in a shelf **LOW SPEED GROUP** corresponding to a **FUNCTION UNITS** group equipped with **STS1E** circuit packs optioned for LOW SPEED mode.

Verify/set line build out (LBO) option jumpers on **STS1E** **DLP-513**
circuit pack(s), as required.

5.  **NOTE:**
If the option switch setting is changed, an update must be done by momentarily depressing the **UPD/INIT** button on the **SYSCTL** circuit pack after the **STS1E** circuit pack is reinstalled.

If necessary, set the **STS1E** circuit pack option switch to **DLP-513**
LOW SPEED and reinstall the **STS1E** circuit pack(s).

6. Use the "**set -ec1:**" command to set the characteristics of the EC-1 port at the EC-1 terminating node(s) of the circuit being established.
-

DO ITEMS BELOW IN ORDER LISTED FOR DETAILS, GO TO

7. Make the appropriate backplane cable connection(s) [J38-J39 (**FUNCTION UNITS A**), J40-J41 (**FUNCTION UNITS B**), or J42-J43 (**FUNCTION UNITS C**)] to the EC-1 cross-connect point(s) or equivalent connection point(s) for the circuit being added.
-

8. Verify that no LEDs or alarms are activated. If any LEDs or alarms are activated, refer to **Trouble Clearing: IXL-001** and follow the appropriate trouble-clearing procedure.
-

9. If both terminating nodes are equipped with **STS1E** circuit packs to terminate the EC-1, continue with Step 10. Otherwise, refer to **System Turnup/Circuit Order: IXL-001** for procedures to establish initial end-to-end DS1/DS3 service.
-

10.  **NOTE 1:**
Ring releases support only manual VT1.5 and STS-1 cross-connections. Linear releases support default cross-connections and manual cross-connections if the shelf is set to manual using the "**set-ne:crs>manual**" command. In ring releases or when a shelf is set for manual cross-connections, manual STS-1 and/or DS1 cross-connections have to be made at each shelf to configure the transmission path for each DS3/DS1 circuit being established. Either terminating (drop) cross-connections or "drop and continue" cross-connections are made at terminating nodes and pass-through cross-connections are made at intermediate nodes.

DO ITEMS BELOW IN ORDER LISTED FOR DETAILS, GO TO

⇒ **NOTE 2:**

In ring configurations, you should use the following rules in establishing cross-connections in each ring:

1. All drop connections (including DRI, if present) from the same STS-1 timeslot must be provisioned the same, either all VT1.5 or STS-1.
2. If all 28 VT1.5s (DS1s) in an STS-1 are being passed through at a node in a VT1.5 path-switched ring, then the cross-connection may be provisioned as either a pass-through STS-1 or VT1.5. However, if you anticipate dropping VT1.5s from the pass-through node in the future, you should provision the pass-throughs as VT1.5 cross-connections. Also, provisioning now as a VT1.5 cross-connect will avoid a hit on traffic if the STS-1 cross-connect has to be converted to 28 VT1.5 cross-connects to drop DS1s at a later time.
3. On STS-1 path-switched rings, all nodes in the ring must be provisioned as STS-1 cross-connections.

⇒ **NOTE 3:**

The following commands may be used to convert, delete, enter, and retrieve cross-connections: "**cnvt-crs**", "**dlt-crs-sts1**", "**dlt-crs-vt1**", "**ent-crs-sts1**", "**ent-crs-vt1**", "**rtrv-crs-sts1**" and "**rtrv-crs-vt1**". See the "Commands and Reports" section of this manual for a description of commands. See "Cross-Connection Provisioning" in the "Administration and Provisioning" section of this manual for more information on cross-connection provisioning.

Determine the necessary cross-connections for each node from the work order or office records.

DO ITEMS BELOW IN ORDER LISTED . . . FOR DETAILS, GO TO

11. Make necessary VT1.5/STS-1 cross-connections for each node.
- | | |
|---|----------------|
| A. Linear or Add/Drop Configuration | DLP-545 |
| B. Single Ring Configuration | DLP-546 |
| C. Dual Ring Interworking (DRI) Configuration | DLP-550 |
| D. Single/Dual OC-3/FiberReach Configuration | DLP-557 |
| E. Stand Alone OC-3/FiberReach Configuration | DLP-558 |
| F. Single/Dual OC-3/OC-48 Configuration | DLP-559 |
| G. Single/Dual OC-3/OC-12 Configuration | DLP-560 |
-
12. Perform the appropriate end-to-end transmission test for circuit(s) being put into service. For a circuit in a path-protected single OC-3 ring network, use the "**sw-path- () :address**" command at both terminating nodes to switch the active path and repeat this test on the other path.
- | | |
|-----------------------------|----------------|
| A. DS1 Single Ring Test | DLP-510 |
| B. DS1 Dual Ring (DRI) Test | DLP-554 |
| C. DS3 Single Ring Test | DLP-511 |
| D. DS3 Dual Ring (DRI) Test | DLP-553 |
-
13. Use the "**rtrv-state-eqpt**" command to determine the port state of the EC-1 port of the circuit being established.
-

DO ITEMS BELOW IN ORDER LISTED FOR DETAILS, GO TO

14. **NOTE:**

If a port is in the *nmon* (*n*) state, the signal is not monitored or alarmed. The port will not automatically go to the *in service* (*i*) state when a signal is detected as it will in the *auto* (*a*) state. In the *nmon* state, the port must be returned to the *auto* state, using the "**set-state-ec1:**" command, to turn on monitoring of signal failures and before any circuit packs associated with that port can be removed from the equipment list by the "**upd**" command.

Use the "**set-state-ec1:**" command to set the port state of the EC-1 port of the circuit being established.

Add New STS1E Low Speed Group for EC-1 Interface System In Service

DO ITEMS BELOW IN ORDER LISTED FOR DETAILS, GO TO

1.  **CAUTION:**
*DDM-2000 circuit packs contain static sensitive components which can be damaged by electrostatic discharge. A static ground wrist strap must be worn when handling the circuit packs. See electrostatic discharge considerations in **Trouble Clearing: TAD-100**.*

 **NOTE 1:**
This procedure assumes that the DDM-2000 is in service and that a new group is being equipped with **STS1E** circuit packs for an EC-1 interface.

 **NOTE 2:**
If the DDM-2000 fails to respond in the indicated manner, refer to **Trouble Clearing: IXL-001**.

At the EC-1 terminating end(s), determine which **FUNCTION UNITS** group (**A**, **B**, or **C**) is being equipped.

2. Use the "**rtrv-alm**" command to verify that no alarms, locks, loops, or switches are present.
-

DO ITEMS BELOW IN ORDER LISTED FOR DETAILS, GO TO

3. Verify no **DS1/DS1PM** circuit packs are installed in **LOW SPEED GROUP** slots associated with new **STS1E FUNCTION UNITS** group being added.

-
4. Set line build out (LBO) option jumpers and LOW SPEED mode, then install **STS1E** circuit packs into proper slots of **FUNCTION UNITS** group (**A, B, or C**) being equipped. **DLP-502**
-

5. Use the "**set -ec1:**" command to set the characteristics of the EC-1 port.

-
6. Make the appropriate backplane cable connection(s) [**J38-J39 (FUNCTION UNITS A)**, **J40-J41 (FUNCTION UNITS B)**, or **J42-J43 (FUNCTION UNITS C)**] to the EC-1 cross-connect point(s) or equivalent connection point(s) for the circuit being added.
-

7. Verify that no LEDs or alarms are activated. If any LEDs or alarms are activated, refer to **Trouble Clearing: IXL-001**.

-
8. If both terminating nodes are equipped with **STS1E** circuit packs to terminate the EC-1, continue with Step 9. Otherwise, refer to **System Turnup/Circuit Order: IXL-001** for procedures to add DS1/DS3 service.
-

DO ITEMS BELOW IN ORDER LISTED . . . FOR DETAILS, GO TO

9. **NOTE 1:**

Ring releases support only manual VT1.5 and STS-1 cross-connections. Linear releases support default cross-connections and manual cross-connections if the shelf is set to manual using the "**set-ne:crs=manual**" command. In ring releases or when a shelf is set for manual cross-connections, manual STS-1 and/or DS1 cross-connections have to be made at each shelf to configure the transmission path for each DS3/DS1 circuit being established. Either terminating (drop) cross-connections or "drop and continue" cross-connections are made at terminating nodes and pass-through cross-connections are made at intermediate nodes.

 NOTE 2:

In ring configurations, you should use the following rules in establishing cross-connections in each ring:

1. All drop connections (including DRI, if present) from the same STS-1 timeslot must be provisioned the same, either all VT1.5 or STS-1.
2. If all 28 VT1.5s (DS1s) in an STS-1 are being passed through at a node in a VT1.5 path-switched ring, then the cross-connection may be provisioned as either a pass-through STS-1 or VT1.5. However, if you anticipate dropping VT1.5s from the pass-through node in the future, you should provision the pass-throughs as VT1.5 cross-connections. Also, provisioning now as a VT1.5 cross-connect will avoid a hit on traffic if the STS-1 cross-connect has to be converted to 28 VT1.5 cross-connects to drop DS1s at a later time.
3. On STS-1 path-switched rings, all nodes in the ring must be provisioned as STS-1 cross-connections.

DO ITEMS BELOW IN ORDER LISTED FOR DETAILS, GO TO

⇒ NOTE 3:

The following commands may be used to convert, delete, enter, and retrieve cross-connections: "**cnvt-crs**", "**dlt-crs-sts1**", "**dlt-crs-vt1**", "**ent-crs-sts1**", "**ent-crs-vt1**", "**rtrv-crs-sts1**", and "**rtrv-crs-vt1**". See the "Commands and Reports" section of this manual for a description of commands. See "Cross-Connection Provisioning" in the "Administration and Provisioning" section of this manual for more information on cross-connection provisioning.

Determine the necessary cross-connections for each node from the work order or office records.

-
10. Make necessary VT1.5/STS1 cross-connections for each node.

A. Linear or Add/Drop Configuration	DLP-545
B. Single Ring Configuration	DLP-546
C. Dual Ring Interworking (DRI) Configuration	DLP-550
D. Single/Dual OC-3/FiberReach Configuration	DLP-557
E. Stand Alone OC-3/FiberReach Configuration	DLP-558
F. Single/Dual OC-3/OC-48 Configuration	DLP-559
G. Single/Dual OC-3/OC-12 Configuration	DLP-560

DO ITEMS BELOW IN ORDER LISTED FOR DETAILS, GO TO

11. Perform the appropriate end-to-end transmission test for circuit being put into service. For a circuit in a path protected ring network, use the "**sw-path- () : address**" command at both terminating nodes to switch the active path and repeat this test on the other path.

A. DS1 Single Ring Test	DLP-510
B. DS1 Dual Ring (DRI) Test	DLP-554
C. DS3 Single Ring Test	DLP-511
D. DS3 Dual Ring (DRI) Test	DLP-553
E. DS1 Single/Dual Homing Test	DLP-510
F. DS3 Single/Dual Homing Test	DLP-511

12. Use the "**rtrv-state-ecpt**" command to determine the port state of the EC-1 port(s) of the circuit being established.
-

13.  **NOTE:**
If a port is in the *nmon (n)* state, the signal is not monitored or alarmed. The port will not automatically go to the *in service (i)* state when a signal is detected as it will in the *auto (a)* state. In the *nmon* state, the port must be returned to the *auto* state, using the "**set-state-ec1:**" command, to turn on monitoring of signal failures and before any circuit packs associated with that port can be removed from the equipment list by the "**upd**" command.

Use the "**set-state-ec1:**" command to set the port state of the EC-1 port(s) of the circuit being established.

Discontinue EC-1 Interface

DO ITEMS BELOW IN ORDER LISTED FOR DETAILS, GO TO

1.  **CAUTION:**
*DDM-2000 circuit packs contain static sensitive components which can be damaged by electrostatic discharge. A static ground wrist strap must be worn when handling the circuit packs. See electrostatic discharge considerations in **Trouble Clearing: TAD-100**.*

 **NOTE:**
This procedure assumes that **STS1E** circuit packs are installed at one terminating node in the circuit and either **STS1E**, **DS3**, or **MXRVO** circuit packs are installed at the other terminating node(s) of the circuit. It further assumes that the EC-1 interface is being discontinued, not just an individual DS1. If DS1/DS3 service is being discontinued, see **System Turnup/Circuit Order: IXL-001** for procedures to discontinue DS1/DS3 service.

At the EC-1 terminating node, determine which EC-1 port is to be discontinued, verify service has been removed, and verify no alarms exist on the system.

DO ITEMS BELOW IN ORDER LISTED FOR DETAILS, GO TO

2. **NOTE:**

The following operation may activate the office major or minor alarm.
The audible alarm may be suppressed by depressing the **ACO** button.

At the EC-1 cable cross-connect panel at the terminating nodes, remove the EC-1 signal(s) associated with the port(s) being discontinued. (**FAULT** LEDs begin flashing on **STS1E** circuit pack with signals removed.)

3. **NOTE:**

The **UPD/INIT** pushbutton 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.

At the terminating nodes, momentarily depress the **UPD/INIT** button on the **SYCTL** circuit pack or use the "**upd**" command to update the equipment list. (Flashing **FAULT** LEDs go off.)

-
4. If a craft interface terminal (CIT) is available, use the "**rtrv-state-eqpt**" command to verify that the right port has been changed from *in-service* (i) to *auto* (a) state at the terminating nodes.
-

DO ITEMS BELOW IN ORDER LISTED FOR DETAILS, GO TO

5. **NOTE:**

If the other terminating node for the EC-1 interface is equipped with **DS3** circuit packs, then STS1 cross-connections will be present. If the other terminating node(s) for the EC-1 interface is equipped with **DS1** circuit packs, then either STS1 or VT1.5 cross-connections will be present. The "**rtrv-crs-sts1:**" command retrieves the "STS-1 Cross Connect Report". The "**rtrv-crs-vt1:**" command retrieves the "VT1 Cross Connect Report".

From the work order or "**rtrv-crs-()**" command, determine the cross-connections for circuit being discontinued. Use the "**rtrv-crs-()**" command at each node in the network to obtain the "STS-1 or VT1 Cross Connect Report".

6. **CAUTION:**

Deleting wrong cross-connections may interrupt service.

 NOTE 1:

STS1E slots cannot be unequipped without an alarm until all cross-connections are removed. The cross-connections must be removed first before removing circuit packs. Remove the cross-connections from the terminating nodes first, then remove the pass-through cross-connections at the non-terminating nodes. A Critical or Major alarm may occur when the first cross-connection at the terminating node is deleted and clear when the other terminating cross-connection is deleted.

DO ITEMS BELOW IN ORDER LISTED FOR DETAILS, GO TO

⇒ NOTE 2:

The following commands may be used to delete, enter, and retrieve VT1.5 cross-connections: "**dlt-crs-vt1**", "**ent-crs-vt1**", and "**rtrv-crs-vt1**". The following commands may be used to delete, enter, and retrieve STS-1 cross-connections: "**dlt-crs-sts1**", "**ent-crs-sts1**", and "**rtrv-crs-sts1**". See the "Commands and Reports" section of this manual for a description of commands. See "Cross-Connection Provisioning" in the "Administration and Provisioning" section of this manual for more information on cross-connections.

Use the "**dlt-crs-vt1:**" or "**dlt-crs-sts1:**" command to delete the terminating node cross-connections for all service being removed, if required.

-
7. Use the "**dlt-crs-vt1:**" or "**dlt-crs-sts1:**" command to delete the pass-through cross-connections at each non-terminating node for all service being discontinued, if required.

-
8. If **STS1E** circuit packs are at the other terminating node, remove the service and protection **STS1E** circuit packs, if required.
-

DO ITEMS BELOW IN ORDER LISTED FOR DETAILS, GO TO

9. Use the "**rtrv-state-eqpt**" command to determine the port state of the EC-1 port(s) of the circuit being established.

-
10.  **NOTE:**
If a port is in the *nmon* (*n*) state, the signal is not monitored or alarmed. The port will not automatically go to the *in service* (*i*) state when a signal is detected as it will in the *auto* (*a*) state. In the *nmon* state, the port must be returned to the *auto* state, using the "**set-state-ec1:**" command, to turn on monitoring of signal failures and before any circuit packs associated with that port can be removed from the equipment list by the "**upd**" command.

Use the "**set-state-ec1:**" command to set the port state of the EC-1 port(s) of the circuit being established.

-
11. If the other terminating node(s) is equipped with **DS1/DS1PM** or **DS3** circuit packs, discontinue the DS1/DS3 service at those nodes as required.

- A. Discontinue DS1 Service.
B. Discontinue DS3 Service.

NTP-011
NTP-012

-
12. Verify all alarms are off.
-

Discontinue End-to-End HDSL Service

DO ITEMS BELOW IN ORDER LISTED FOR DETAILS, GO TO

1.  **CAUTION:**
*DDM-2000 circuit packs contain static sensitive components which can be damaged by electrostatic discharge. A static ground wrist strap must be worn when handling the circuit packs. See electrostatic discharge considerations in **Trouble Clearing: TAD-100.***

Determine which HDSL ports are to be discontinued and verify no alarms exist on the system.

-
2.  **NOTE:**
The following operation may activate the office major, minor, or no alarm. The audible alarm may be suppressed by depressing the **ACO** button.

At the cross-connect point for the HDSL terminating nodes, remove the HDSL signals associated with the port(s) being discontinued. (**FAULT** LEDs begin flashing on **HDSL** circuit pack with signals removed.)

DO ITEMS BELOW IN ORDER LISTED FOR DETAILS, GO TO

3. **NOTE:**

The **UPD/INIT** pushbutton 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.

Momentarily depress the **UPD/INIT** button on the **SYCTL** at the HDSL terminating nodes or use the "**upd**" command to update the equipment list. (Flashing **FAULT** LEDs go off.)

-
4. Use the "**rtrv-state-eqpt**" command to verify that the right port has been changed from *in-service* (i) to *auto* (a) state.

5. **CAUTION:**

*Removing the wrong cross-connection may cause service interruption. Use the "**rtrv-crs- ()**" command to determine the proper cross-connections.*

From work order or "**rtrv-crs- ()**" command, determine the DS1 (VT1.5) cross-connections for circuit being discontinued.

DO ITEMS BELOW IN ORDER LISTED FOR DETAILS, GO TO

6. ➤ **NOTE 1:**

DS1 **LOW SPEED** slots cannot be unequipped without an alarm until all port cross-connections are removed. The cross-connections must be removed first before removing circuit packs. In a ring configuration, remove the cross-connections from the terminating nodes first, then remove the pass-through cross-connections at the intermediate nodes. A Major alarm may occur when the first cross-connection at the terminating node is deleted and clear when the other terminating cross-connection is deleted.

➤ **NOTE 2:**

In ring configurations, the following rules are used in establishing cross-connections in each ring:

1. All drop connections (including DRI, if present) from the same STS-1 timeslot must be provisioned the same, either all VT1.5 or STS-1.
2. If all 28 VT1.5s (DS1s) in an STS-1 are being passed through at a node in a VT1.5 path-switched ring, then the cross-connection may be provisioned as either a pass-through STS-1 or VT1.5. However, if you anticipate dropping VT1.5s from the pass-through node in the future, you should provision the pass-throughs as VT1.5 cross-connections. Also, provisioning now as a VT1.5 cross-connect will avoid a hit on traffic if the STS-1 cross-connect has to be converted to 28 VT1.5 cross-connects to drop DS1s at a later time.
3. On STS-1 path-switched rings, all nodes in the ring must be provisioned as STS-1 cross-connections.

DO ITEMS BELOW IN ORDER LISTED FOR DETAILS, GO TO

⇒ NOTE 3:

The following commands may be used to convert, delete, enter, and retrieve cross-connections: "**cnvt-crs**", "**dlt-crs-vt1**", "**dlt-crs-sts1**", "**ent-crs-vt1**", "**ent-crs-sts1**", "**rtrv-crs-vt1**", and "**rtrv-crs-sts1**". See the "Commands and Reports" section of this manual for a description of commands. See "Cross-Connection Provisioning" in the "Administration and Provisioning" section of this manual for more information on cross-connections.

Use the "**dlt-crs-vt1**:" command to delete the terminating (drop) node cross-connections for all HDSL service being removed, if required.

-
7. Use the "**dlt-crs-vt1**:" command to delete the pass-through cross-connections at each nonterminating node for all DS1/HDSL service being removed, if required.

-
8. If both HDSL ports on the **HDSL** circuit pack are being discontinued, you may remove the **HDSL** circuit pack, if required.

-
9. If *all* **HDSL** circuit packs in a **LOW SPEED GROUP** are removed, you may remove the **FUNCTION UNITS** group **MXRVO** circuit packs and the protection **HDSL** circuit pack, if required.
-

DO ITEMS BELOW IN ORDER LISTED FOR DETAILS, GO TO

10. If group **MXRVO/STS1E** circuit packs are removed, proceed to Step 12. Otherwise, continue with Step 11.

-
11.  **CAUTION:**
*No service DS1 **LOW SPEED** slots should be left empty in **GROUPs** equipped with protection **HDSL** circuit packs and corresponding to **FUNCTION UNITS** groups equipped with **MXRVO** or **STS1E** (high speed mode) circuit packs.*

-  **NOTE:**
177A Retainer Cards are used to disconnect the cross-connect wiring associated with unused service DS1 slot locations from the DDM-2000's internal protection bus.

Install **177A** Retainer Card(s), as required, into the DS1 slot(s) for the **HDSL** circuit pack(s) removed.

-
12.  **NOTE:**
If a port is in the *nmon* (*n*) state, the signal is not monitored or alarmed. The port will not automatically go to the *in service* (*i*) state when a signal is detected as it will in the *auto* (*a*) state. In the *nmon* state, the port must be returned to the *auto* state, using the "**set-state-t1:**" command, to turn on monitoring of signal failures and before any circuit packs associated with that port can be removed from the equipment list by the "**upd**" command.

DO ITEMS BELOW IN ORDER LISTED FOR DETAILS, GO TO

If circuit packs have been removed, momentarily depress the **UPD/INIT** button on the **SYSCTL** or use the "**upd**" command to update the DDM-2000 internal equipment list.

If circuit packs have *not* been removed, use the "**set-state-t1:**" command to set the port state of the DS1 port(s) to *auto* or *nmon*, as required.

13. Verify all alarms are off.

Convert DS1 Group Service to EC-1 Group Service

DO ITEMS BELOW IN ORDER LISTED FOR DETAILS, GO TO

1.  **CAUTION:**
*DDM-2000 circuit packs contain static sensitive components which can be damaged by electrostatic discharge. A static ground wrist strap must be worn when handling the circuit packs. See electrostatic discharge considerations in **Trouble Clearing: TAD-100**.*

 **NOTE 1:**
This procedure assumes that the DDM-2000 is in service and that a DS1 group is being changed to an EC-1 group to provide an EC-1 interface.

 **NOTE 2:**
If, at any point in this procedure, the DDM-2000 fails to respond in the indicated manner, you should refer to **Trouble Clearing: IXL-001**.

Determine which **FUNCTION UNITS** group (**A**, **B**, or **C**) is being converted.

-
2. Use the "**rtrv-alm**" command to verify that no alarms, locks, loops, or switches are present.
-

DO ITEMS BELOW IN ORDER LISTED FOR DETAILS, GO TO

3. At the DSX-1, remove the DS1 signals associated with the DS1 **LOW SPEED GROUP** being converted. (**FAULT** LED flashes on **DS1/DS1PM** circuit packs with signals removed.)

-
4.  **NOTE:**
The **UPD/INIT** pushbutton on the **SYSCCTL** is recessed to prevent its accidental operation. You will need a small pointed object, such as a ball-point pen, to operate it.

On the **SYSCCTL**, momentarily depress the **UPD/INIT** button. (**FAULT** LEDs go off.)

-
5.  **NOTE:**
Ring releases support only manual VT1.5 and STS-1 cross-connections. Linear releases support default cross-connections and manual cross-connections if the shelf is set to manual using the "**set-ne:crs>manual**" command. In ring releases or when a shelf is set for manual cross-connections, manual STS-1 and/or DS1 cross-connections have to be made at each shelf to configure the transmission path for each DS3/DS1 circuit being established. Either terminating (drop) cross-connections or "drop and continue" cross-connections are made at terminating nodes and pass-through cross-connections are made at intermediate nodes.

From work order or "**rtrv-crs-()**" command, determine the cross-connections for circuit being discontinued.

DO ITEMS BELOW IN ORDER LISTED FOR DETAILS, GO TO

6.  **CAUTION:**
*Removing the wrong cross-connection may cause service interruption.
Use the "rtrv-crs-()" command to determine the proper
cross-connections.*

 **NOTE 1:**
DS1 **LOW SPEED** slots cannot be unequipped without an alarm until all port cross-connections are removed. The cross-connections must be removed first before removing circuit packs. In a ring configuration, remove the cross-connections from the terminating nodes first, then remove the pass-through cross-connections at the intermediate nodes. A Major alarm may occur when the first cross-connection at the terminating node is deleted and clear when the other terminating cross-connection is deleted.

 **NOTE 2:**
The following commands may be used to convert, delete, enter, and retrieve cross-connections: "**cnvt-crs**", "**dlt-crs-sts1**", "**dlt-crs-vt1**", "**ent-crs-sts1**", "**ent-crs-vt1**", "**rtrv-crs-sts1**", and "**rtrv-crs-vt1**". See the "Commands and Reports" section of this manual for a description of commands. See "Cross-Connection Provisioning" in the "Administration and Provisioning" section of this manual for more information on cross-connection provisioning.

DO ITEMS BELOW IN ORDER LISTED FOR DETAILS, GO TO

Use the "**dlt-crs-sts1:**" or "**dlt-crs-vt1:**"
command to delete cross-connections associated with all
DS1/DS1PM circuit packs being removed.

7. Remove the **DS1/DS1PM** circuit packs from **LOW SPEED GROUP** being converted to EC-1 service.
-

8. Remove the **MXRVO** circuit packs from **FUNCTION UNITS** group being converted to EC-1 service.
-

9. Momentarily depress the **UPD/INIT** button on the **SYSCTL** to update the DDM-2000 internal equipment list.
-

10. Verify that all alarms are off.
-

11. Set the **S1** switch on the **STS1E** circuit pack to LOW-SPEED operating mode ("**I or III**" position). **DLP-513**
-

12.  **NOTE:**
DS1/DS1PM circuit packs **cannot** be installed in a **LOW SPEED GROUP** corresponding to a **FUNCTION UNITS** group that is equipped with **STS1E** circuit packs.

DO ITEMS BELOW IN ORDER LISTED FOR DETAILS, GO TO

Set line build out (LBO) option jumpers and install **STS1E** circuit packs into **FUNCTION UNITS** group (**A**, **B**, or **C**) being put into service. **DLP-513**

13. Use the "**set -ec1:**" command to set the characteristics of the EC-1 port.
-

14. Make appropriate backplane cable connections(s) [**J38-J39 (FUNCTION UNITS A)**, **J40-J41 (FUNCTION UNITS B)**, or **J42-J43 (FUNCTION UNITS C)**] to the EC-1 cross-connect point or equivalent connection point for the channel being added.
-

15. Verify that no LEDs or alarms are activated. If any LEDs or alarms are activated, refer to **Trouble Clearing: IXL-001** and follow the appropriate trouble-clearing procedure.
-

16. If both terminating nodes are equipped with **STS1E** circuit packs to terminate the EC-1, continue with Step 17. Otherwise, refer to **System Turnup/Circuit Order: IXL-001** for procedures to add DS1/DS3 service.
-

DO ITEMS BELOW IN ORDER LISTED FOR DETAILS, GO TO

17. Determine the necessary cross-connections for each node from the work order or office records.

-
18. Make necessary VT1.5/STS1 cross-connections for each node.

A. Linear or Add/Drop Configuration	DLP-545
B. Single Ring Configuration	DLP-546
C. Dual Ring Interworking (DRI) Configuration	DLP-550
D. Single/Dual OC-3/FiberReach Configuration	DLP-557
E. Stand Alone OC-3/FiberReach Configuration	DLP-558
F. Single/Dual OC-3/OC-48 Configuration	DLP-559
G. Single/Dual OC-3/OC-12 Configuration	DLP-560

-
19. Perform the appropriate end-to-end transmission test for circuit being put into service. For a circuit in a path protected ring network, use the "sw-path- () :address" command at both terminating nodes to switch the active path and repeat this test on the other path.

A. DS1 Single Ring Test	DLP-510
B. DS1 Dual Ring (DRI) Test	DLP-554
C. DS3 Single Ring Test	DLP-511
D. DS3 Dual Ring (DRI) Test	DLP-553

DO ITEMS BELOW IN ORDER LISTED FOR DETAILS, GO TO

20. Use the "**rtrv-state-ecpt**" command to determine the port state of the EC-1 port(s) of the circuit being established.

-
21.  **NOTE:**
If a port is in the *nmon* (*n*) state, the signal is not monitored or alarmed. The port will not automatically go to the *in service* (*i*) state when a signal is detected as it will in the *auto* (*a*) state. In the *nmon* state, the port must be returned to the *auto* state, using the "**set-state-ec1:**" command, to turn on monitoring of signal failures and before any circuit packs associated with that port can be removed from the equipment list by the "**upd**" command.

Use the "**set-state-ec1:**" command to set the port state of the EC-1 port(s) of the circuit being established.

Upgrade DDM-2000 OC-3 Add/Drop Network to Path Switched Ring

DO ITEMS BELOW IN ORDER LISTED FOR DETAILS, GO TO

1.  **CAUTION 1:**
*Three STS-1 channels or 84 VT1.5 channels is the maximum capacity for an OC-3 ring. Before this upgrade is performed, you should verify that there is enough capacity in the ring to carry **ALL CO sourced** channels plus **ALL added** channels coming into the network at any RT.*

-  **CAUTION 2:**
*Ring configurations support 84 timeslots within the ring. A timeslot used for one signal (VT1.5/STS-1) cannot be reused at another location. Before upgrading from a linear system to a ring system, verify that no duplicate timeslot assignments exist. For example in Figure 1, page 7, if timeslot **m-1-1-1** is dropped at Node 2, verify that the same timeslot is not dropped at another node. If duplicates exist, [for example, if timeslot **m-1-1-1** is dropped at Node 2; **m-1-1-2** is cross-connected to **c-1-1-1** (instead of **c-1-1-2**) at Node 2; and then **m-1-1-1** is dropped at Node 3, then you have duplicate (**m-1-1-1**) timeslot assignments] you must rearrange your timeslot assignments to accommodate the new ring configuration.*

-  **CAUTION 3:**
*This procedure requires **22-Type OLIU** circuit packs in all shelves. If existing **OLIUs** will be replaced in this procedure [**DLP-542**], you must determine if the **22-Type OLIUs** will support the existing span length. For example, **22F/22F-U/22F2-U OLIU** circuit packs will not support span lengths as long as **21G/21G-U/21G2-U OLIU** circuit packs will support. Optical line power measurements and/or office records must be used to verify that the existing span length can be supported.*

DO ITEMS BELOW IN ORDER LISTED FOR DETAILS, GO TO



CAUTION 4:

This procedure has been tested using a Gould fiber splitter which introduces 3 dB of loss into the fiber span. The amount of loss may differ for the type of splitter used and must be considered when doing an upgrade. If there is not enough excess loss budget in the optical spans between the CO and first RT to allow the use of a splitter, the upgrade may be performed out of service. Optical fiber switches which introduce no loss may also be used, but require extra steps in the upgrade procedure which are not documented. Fiber splitters and/or switches are available from manufacturers such as Gould, Fibercell, Corning, DiCon, ADC, and others.



CAUTION 5:

Plans, patch facilities, and loss budget calculations must be available for the fiber line to be connected between the CO and the "last" RT to form the ring network.



CAUTION 6:

*DDM-2000 circuit packs contain static sensitive components which can be damaged by electrostatic discharge. A static ground wrist strap must be worn when handling the circuit packs. See electrostatic discharge considerations in **Trouble Clearing: TAD-100**.*



NOTE 1:

This procedure assumes that the DDM-2000 is in service and the optical line connections are going to be changed to a ring configuration. It is also assumed that Release 8 linear software is initially installed in each shelf. Release 9 or later ring software is required for the final ring configuration.

DO ITEMS BELOW IN ORDER LISTED FOR DETAILS, GO TO

⇒ **NOTE 2:**

All shelves in the same network must have the same or compatible software releases.

⇒ **NOTE 3:**

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.

⇒ **NOTE 4:**

This procedure is completed in a series of node upgrades beginning at the near end (Node 1 CO), then going to the last RT Node (RTn) and sequentially upgrading each DDM-2000 to a ring until you get back to the near end Node 1. The first steps of this procedure performed between Node 1 (CO) and Node 2 (the first RT) use an optical splitter to convert the two nodes into a ring configuration. This part of the procedure is similar to a point-to-point to ring upgrade.

Use the "**rtrv-alm:**" command to verify that no alarms, locks, loops, or switches are present.

-
2. Notify maintenance center that alarms will be generated.
-

3. ⇒ **NOTE:**

The Network Side/User Side parameters of the "**set-fecom:**" command must be set opposite at each end of the optical spans.

Use the "**rtrv-fecom/set-fecom**" command to verify/set "Network Side/User Side" parameters at each end of optical span being established.

DO ITEMS BELOW IN ORDER LISTED FOR DETAILS, GO TO

4. Verify software in each DDM-2000 shelf is Release 8 or earlier linear software that supports **22-Type OLIUs**

-
5.  **NOTE:**
Mixing of **21-Type OLIUs** and **22-Type OLIUs** in one shelf is not allowed in ring software.

Replace **OLIUs** in each shelf with proper **22-Type OLIUs**, if not already done. (Protection **OLIUs** are required.)

DLP-542

-
6. At **all** shelves in the network being upgraded, use "**set-ne:tid=tid:crs>manual**" command to set cross-connect mode to manual.

-
7.  **NOTE:**
Ring releases support only manual VT1.5 and STS-1 cross-connections. Linear releases support default cross-connections and manual cross-connections if the shelf is set to manual using the "**set-ne:crs>manual**" command. In ring releases or when a shelf is set for manual cross-connections, manual STS-1 and/or DS1 cross-connections have to be made at each shelf to configure the transmission path for each DS3/DS1 circuit being established. Either terminating (drop) cross-connections or "drop and continue" cross-connections are made at terminating nodes and pass-through cross-connections are made at intermediate nodes.

DO ITEMS BELOW IN ORDER LISTED FOR DETAILS, GO TO

If required, at all shelves in the network, use the
"**cnvt-crs:address1,address2**" command to
convert all low-speed DS1 STS-1 cross-connections to
corresponding VT1.5 cross-connections.

8. Use "**rtrv-sync:**" command to check timing mode and
parameters for proper provisioning. If necessary, use
"**set-sync:**" command to change timing provisioning to
that specified on the work order.
-

9.  **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 system tests or while performing this upgrade), if the
version of software being installed is not compatible with the current
transmission configuration, it will be necessary to remove the **TGS**
circuit pack in **TIMING** 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 will 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** circuit pack, if
not already **ACTIVE**. Use "**rtrv-sync:**" command to
verify that the **TGS** circuit pack in **TIMING** slot 2 is
ACTIVE. Unplug **TGS** circuit pack in **TIMING** slot 1.

DO ITEMS BELOW IN ORDER LISTED FOR DETAILS, GO TO

10. **⇒ NOTE:**

This procedure uses an example configuration as shown in Figure 1. Your configuration may differ, but the procedures are the same for any drop or add/drop configuration. "Add" traffic is defined in relation to a "head-end" node. A head-end node is determined for the network and should be the node that terminates the most traffic. In this procedure, the head-end node is Node 1 (CO) and other nodes are designated as Node 4 [last RT, (RT_n)], Node 3 [next-to-last RT, (RT_n-1)], and Node 2 (RT_n-2). All traffic that does not terminate at the CO is referred to as "Add" traffic. "Drop" traffic is defined as traffic that terminates at the CO. See Figure 1.

This procedure will convert the first two nodes (Node 1 and Node 2) to a ring, then the last (Node 4) and first (Node 1) nodes, and then continue to work back through the network from last node to first.

DO ITEMS BELOW IN ORDER LISTED . . . FOR DETAILS, GO TO

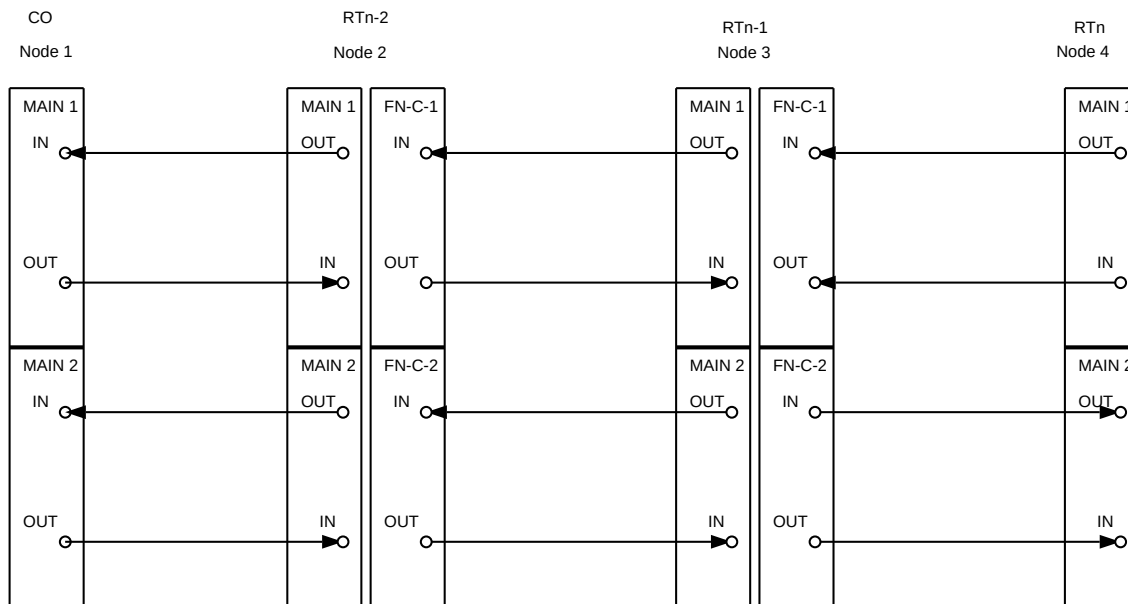
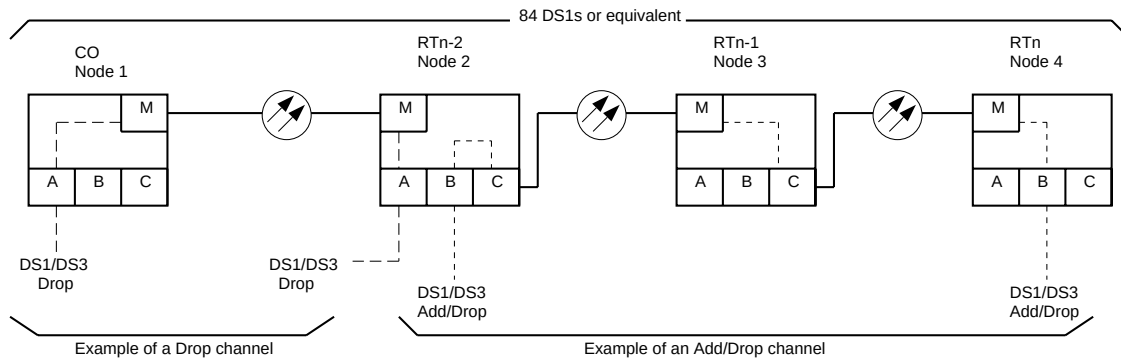


Figure 1. DDM-2000 OC-3 Drop or Add/Drop Network to Ring Upgrade

DO ITEMS BELOW IN ORDER LISTED . . . FOR DETAILS, GO TO

11. **⇒ NOTE:**
Steps 11 through 26 are performed between the CO (Node 1) and the first RT (Node 2). An optical splitter is used to convert the optical span to a ring configuration.

At Node 1 and Node 2, use the
"switch-line:main:pri>manual" command to switch to the protection line. Use the
"rtrv-state-eqpt:main-all" command to check switch state (main-2 OLIU active). (See Figure 2.)

12. Use **"set-fecom:dcc-m:com=disabled"** command to disable far-end communications (fecom) at Node 1.
-

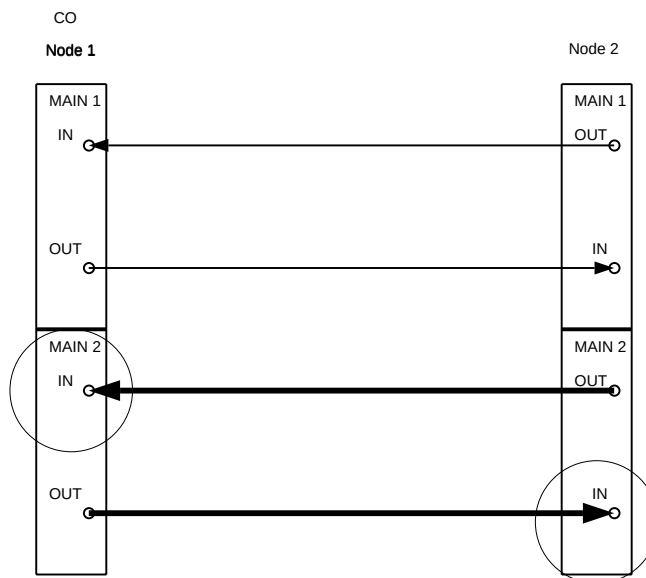


Figure 2. DDM-2000 OC-3 Drop or Add/Drop Network to Ring Upgrade

DO ITEMS BELOW IN ORDER LISTED FOR DETAILS, GO TO

13. At Node 1, install optical splitter in **MAIN 1 OUT** optical line as shown in Figure 3.
-

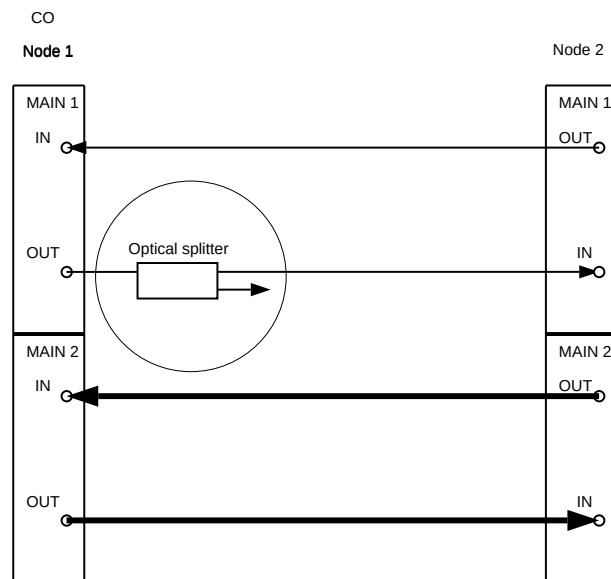


Figure 3. DDM-2000 OC-3 Drop or Add/Drop Network to Ring Upgrade

DO ITEMS BELOW IN ORDER LISTED FOR DETAILS, GO TO

14.  **NOTE:**
Wait until **FAULT** LED on **MAIN OLIU** extinguishes before attempting switch.

At Node 2 only, use the
"switch-line:main:pri>manual" command to
switch to the service (**MAIN 1**) line (main-1 OLIU
active). (See Figure 4.)

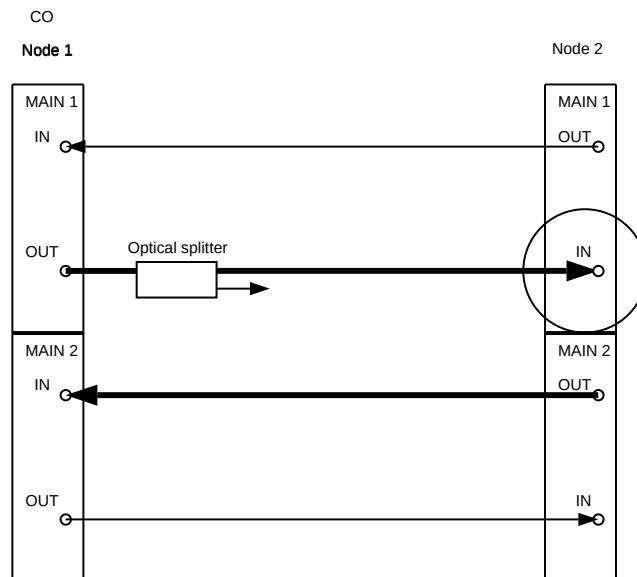


Figure 4. DDM-2000 OC-3 Drop or Add/Drop Network to Ring Upgrade

DO ITEMS BELOW IN ORDER LISTED FOR DETAILS, GO TO

15. At Node 1, remove optical fiber from **OLIU MAIN 2(P) OUT** and connect it to the other output of the optical splitter. (See Figure 5.)
-

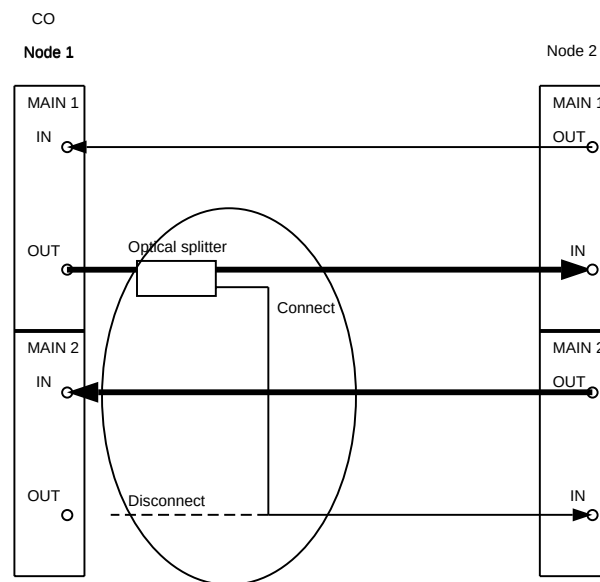


Figure 5. DDM-2000 OC-3 Drop or Add/Drop Network to Ring Upgrade

DO ITEMS BELOW IN ORDER LISTED FOR DETAILS, GO TO

16.  **NOTE:**
Wait until **FAULT** LED on **MAIN OLIU** extinguishes before attempting switch.

At Node 2 only, use the
"switch-line:main:pri>manual" command to
switch service to the protection line (main-2 OLIU
active at Node 2). (See Figure 6.)

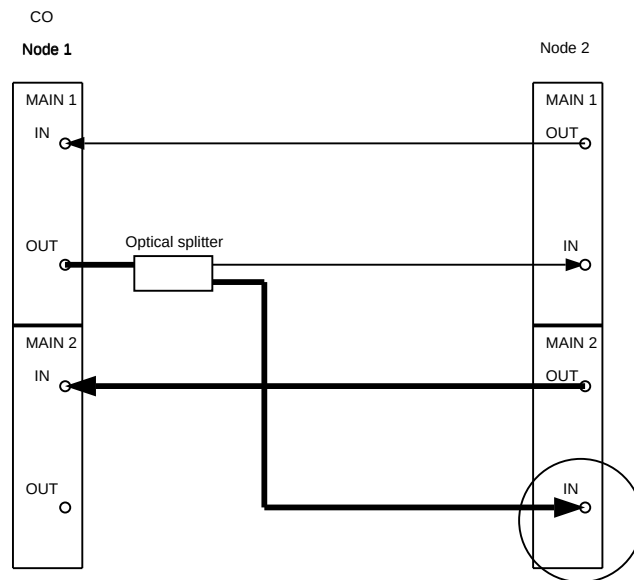


Figure 6. DDM-2000 OC-3 Drop or Add/Drop Network to Ring Upgrade

DO ITEMS BELOW IN ORDER LISTED FOR DETAILS, GO TO

17. Disconnect the optical splitter output from the fiber going to Node 2 **MAIN 1 IN** and connect the fiber to Node 1 **MAIN 2(P) OUT**. (See Figure 7.)
-

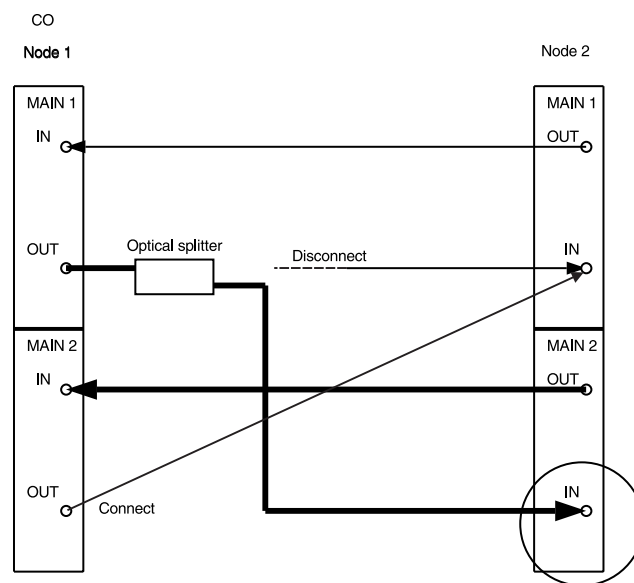


Figure 7. DDM-2000 OC-3 Drop or Add/Drop Network to Ring Upgrade

DO ITEMS BELOW IN ORDER LISTED FOR DETAILS, GO TO

18.  **NOTE:**
Wait until **FAULT** LED on **MAIN OLIU** extinguishes before attempting switch.

At Node 2 only, use the
"switch-line:main:pri>manual" command to
switch service to the service line (main-1 OLIU
active at Node 2). (See Figure 8.)

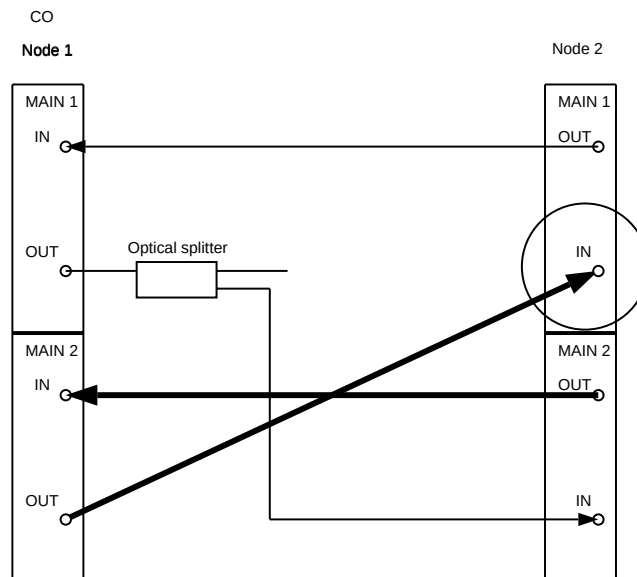


Figure 8. DDM-2000 OC-3 Drop or Add/Drop Network to Ring Upgrade

DO ITEMS BELOW IN ORDER LISTED FOR DETAILS, GO TO

19. At Node 1, remove optical splitter from **MAIN 1 OUT**.
Connect optical fiber from Node 1 **MAIN 1 OUT** to Node
2 **MAIN 2(P) IN**. (See Figure 9.)
-

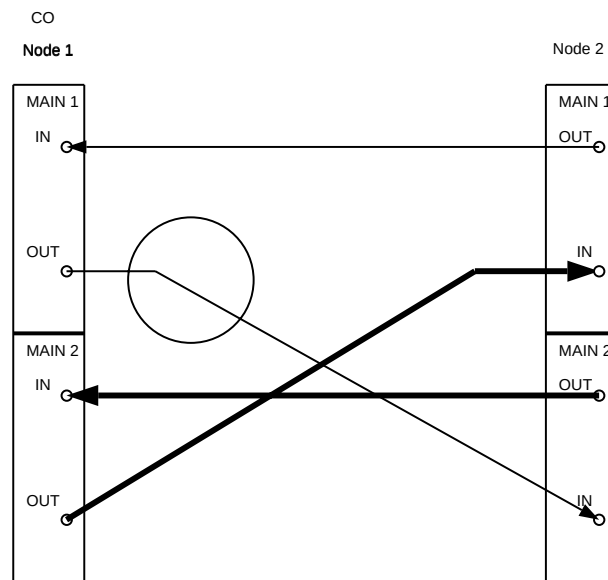


Figure 9. DDM-2000 OC-3 Drop or Add/Drop Network to Ring Upgrade

DO ITEMS BELOW IN ORDER LISTED FOR DETAILS, GO TO

20. Disconnect optical fiber from **MAIN 1 IN** at Node 1 and install optical splitter in **MAIN 1 IN** optical line as shown in Figure 10.
-

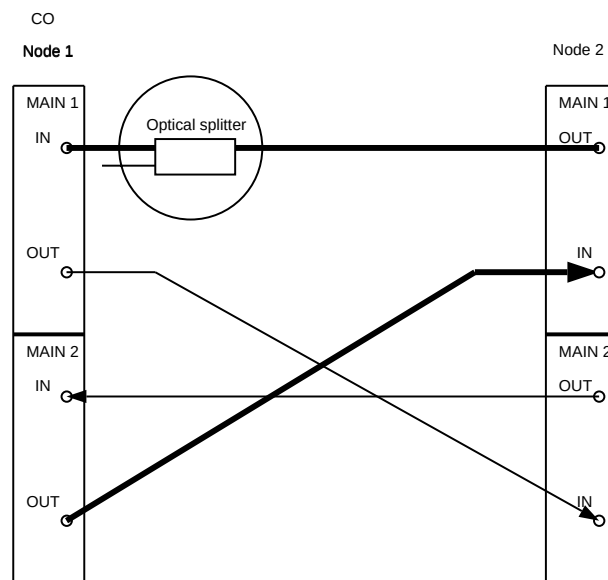


Figure 10. DDM-2000 OC-3 Drop or Add/Drop Network to Ring Upgrade

DO ITEMS BELOW IN ORDER LISTED FOR DETAILS, GO TO

21. ➡ **NOTE:**
Wait until **FAULT LED** on **MAIN OLIU** extinguishes before attempting switch.

At Node 1 only, use the
"switch-line:main:pri>manual" command to
switch service to the service line (main-1 OLIU
active at Node 1). (See Figure 11.)

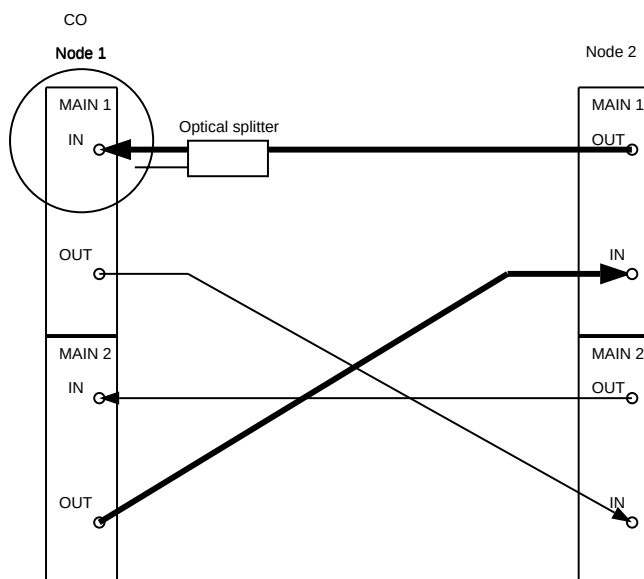


Figure 11. DDM-2000 OC-3 Drop or Add/Drop Network to Ring Upgrade

DO ITEMS BELOW IN ORDER LISTED FOR DETAILS, GO TO

22. Disconnect optical fiber from Node 1 **MAIN 2(P) IN** and connect remaining optical splitter output to **MAIN 2(P) IN**.
(See Figure 12.)
-

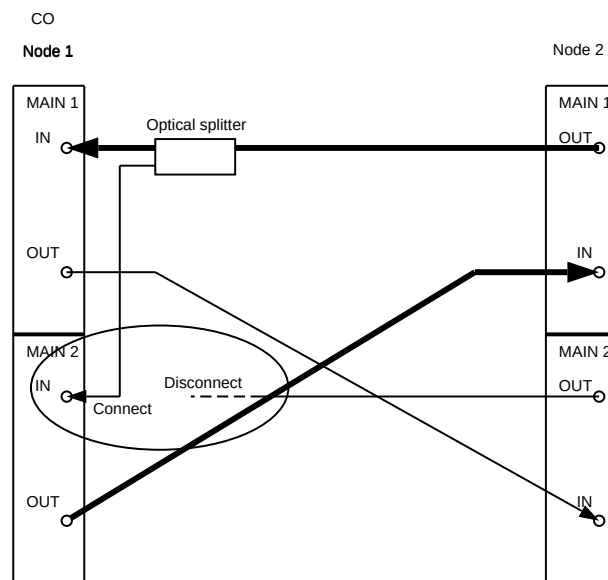


Figure 12. DDM-2000 OC-3 Drop or Add/Drop Network to Ring Upgrade

DO ITEMS BELOW IN ORDER LISTED FOR DETAILS, GO TO

23.  **NOTE:**
Wait until **FAULT LED** on **MAIN OLIU** extinguishes before attempting switch.

At Node 1, use the
"switch-line:main:pri>manual" command to
switch service to the protection line (main-2 OLIU
active at Node 1). (See Figure 13.)

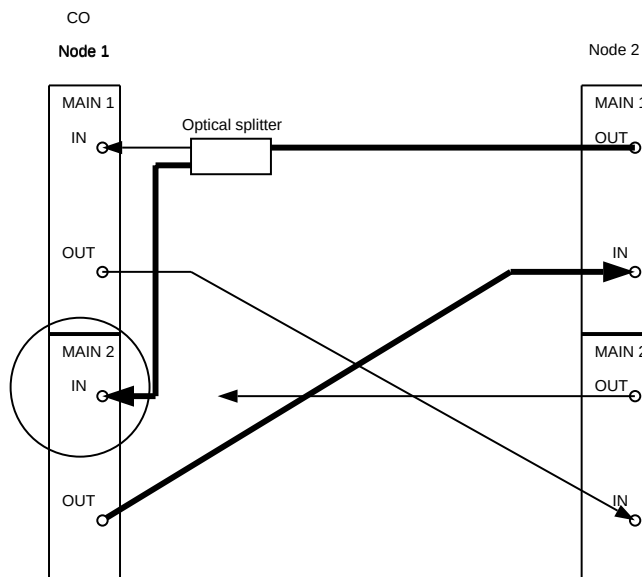


Figure 13. DDM-2000 OC-3 Drop or Add/Drop Network to Ring Upgrade

DO ITEMS BELOW IN ORDER LISTED FOR DETAILS, GO TO

24. At Node 1, remove optical splitter output from **MAIN 1 IN** and connect optical fiber from Node 2 **MAIN 2(P) OUT** to Node 1 **MAIN 1 IN**. (See Figure 14.)
-

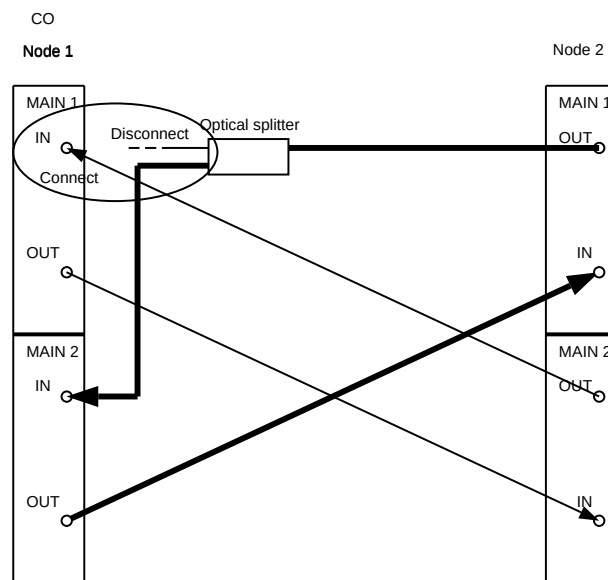


Figure 14. DDM-2000 OC-3 Drop or Add/Drop Network to Ring Upgrade

DO ITEMS BELOW IN ORDER LISTED FOR DETAILS, GO TO

25.  **NOTE:**
Wait until **FAULT LED** on **MAIN OLIU** extinguishes
before attempting switch.

At Node 1, use the "**switch-
line:main:pri>manual**" command to switch service
to the service line (main-1 OLIU active) at Node 1.
(See Figure 15.)

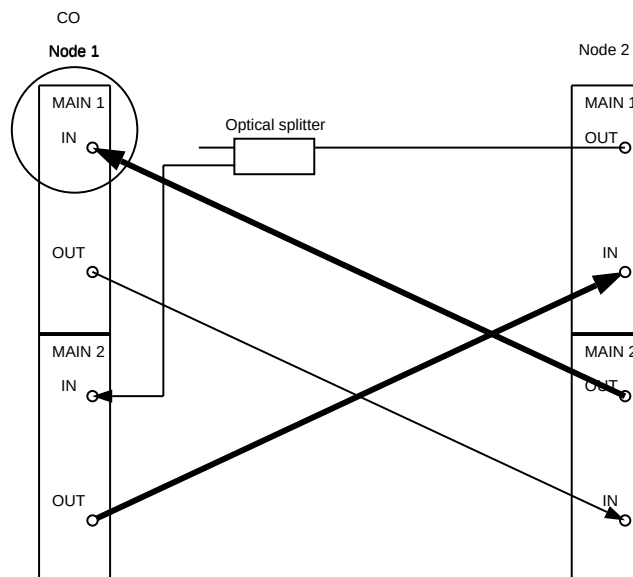


Figure 15. DDM-2000 OC-3 Drop or Add/Drop Network to Ring Upgrade

DO ITEMS BELOW IN ORDER LISTED FOR DETAILS, GO TO

26. At Node 1, remove optical splitter from **MAIN 2(P) IN**.
Connect optical fiber from Node 2 **MAIN 1 OUT** to Node
1 **MAIN 2(P) IN**. (See Figure 16.)
-

27.  **NOTE:**
Wait until **FAULT** LED on **MAIN OLIU** extinguishes before attempting
switch.

At Node 2, use the "**switch-
line:main:pri>manual**" command to switch service
to the protection line (main-2 OLIU active) at Node
2. (See Figure 16.)

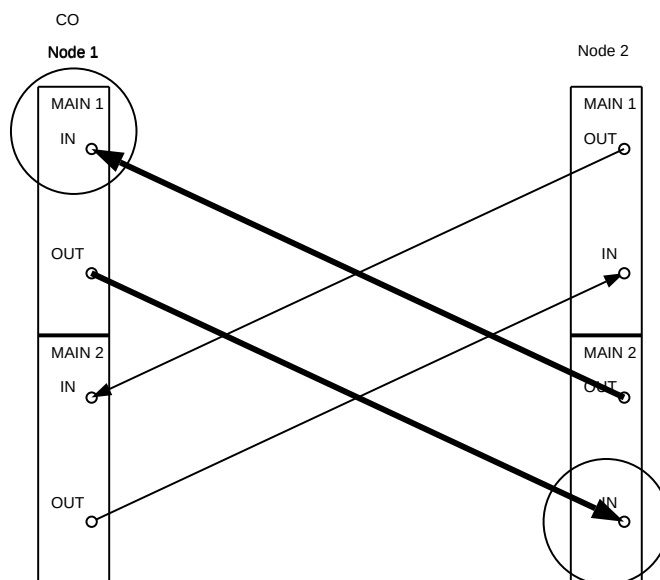


Figure 16. DDM-2000 OC-3 Drop or Add/Drop Network to Ring Upgrade

DO ITEMS BELOW IN ORDER LISTED FOR DETAILS, GO TO

28. The example 4-node configuration now looks like that shown in Figure 17. Steps completed between the last RT and next to last RT are repeated as each span is converted to a ring configuration.
-

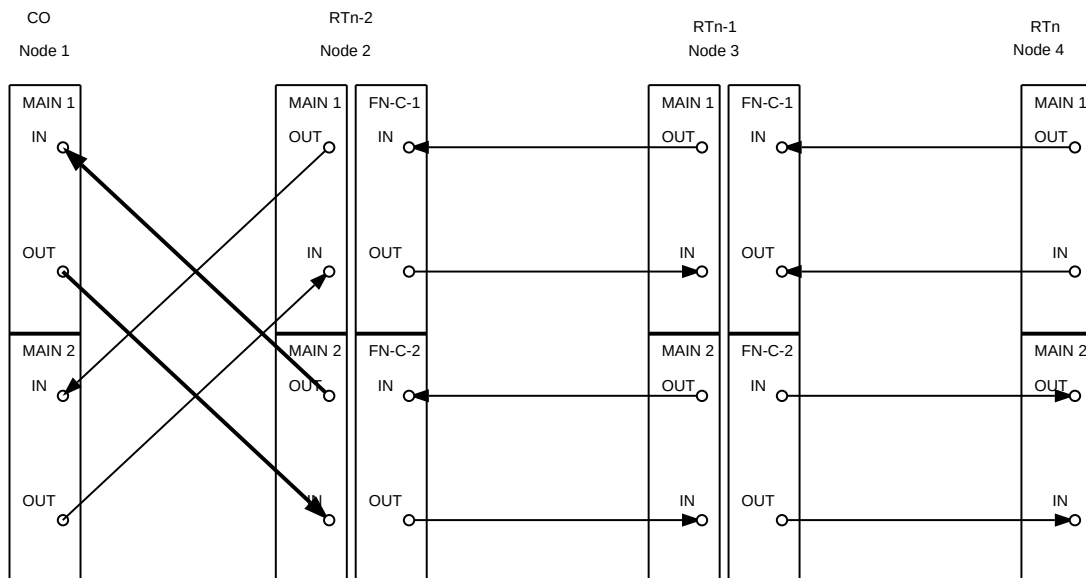


Figure 17. DDM-2000 OC-3 Drop or Add/Drop Network to Ring Upgrade

29. At Node 1 (CO) and Node 2, disconnect fiber from **MAIN 2(P) OUT** at the CO and **MAIN 1 IN** at Node 2. Disconnect fiber from **MAIN 2(P) IN** at the CO and **MAIN 1 OUT** at Node 2. (See Figure 18.)
-

DO ITEMS BELOW IN ORDER LISTED FOR DETAILS, GO TO

30. At the next-to-last Node (Node 3), use the **"switch-line:fn-c:pri>manual"** command to switch service to the protection line (fn-c-2 OLIU active at Node 3). At the last Node (Node 4), use the **"switch-line:main:pri>manual"** command to switch service to the protection line (main-2 OLIU active at Node 4). (See Figure 18.)
-
31. At the last Node (Node 4) and next-to-last Node (Node 3), disconnect optical fiber from **MAIN 1 OUT** at Node 4 and **FUNCTION UNITS C 1 IN** at Node 3. Disconnect fiber from **MAIN 1 IN** at the Node 4 and **FUNCTION UNITS C 1 OUT** at Node 3. (See Figure 18.)
-

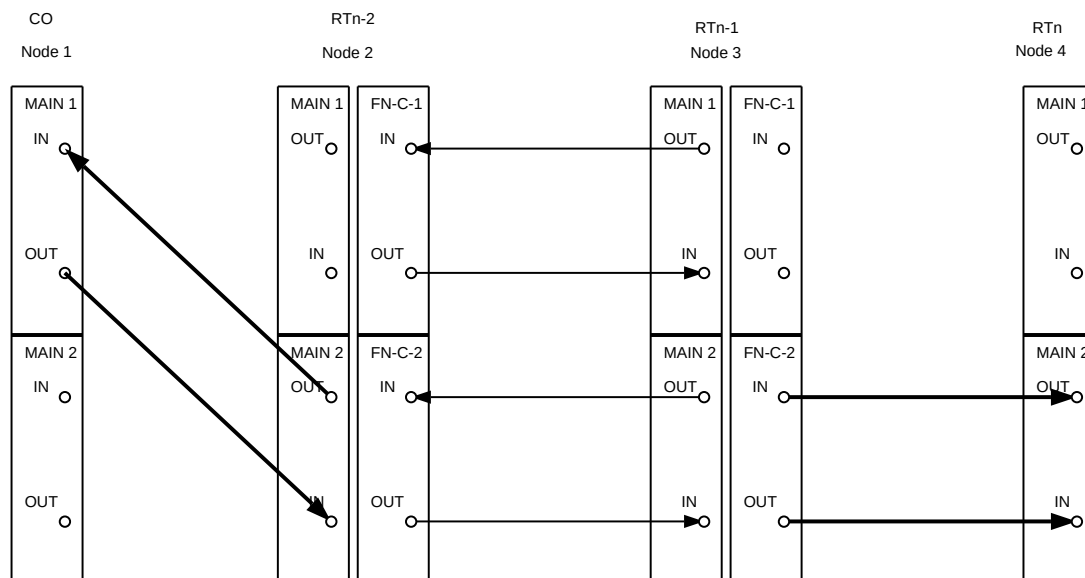


Figure 18. DDM-2000 OC-3 Drop or Add/Drop Network to Ring Upgrade

DO ITEMS BELOW IN ORDER LISTED FOR DETAILS, GO TO

32. At Node 1 (CO), locally download Release 9 or later software. Then use "**set-fecom:dcc=m2:com=disabled**" command to disable DCC at Node 1. **DLP-532**
-

33.  **CAUTION:**
Service interruption will occur if the following step is not performed for all timeslots that terminate at other nodes in the ring network.

 **NOTE:**
"Drop" traffic is defined as traffic that terminates at the CO. All traffic that does not terminate at the CO is referred to as "Add" traffic.

At Node 1 (CO), use the "**ent-crs-vt1**" command or "**ent-crs-sts1**" command to set up main-to-main pass-through cross-connections associated with all STS/VT timeslots that are terminated on other nodes of the ring but are not terminated at the CO.

DO ITEMS BELOW IN ORDER LISTED FOR DETAILS, GO TO

34.  **CAUTION:**
Plans, patch facilities, and loss budget calculations must be available for the fiber line to be connected between the CO and the "last" RT to form the ring network.

Connect optical fiber from Node 1 (CO) **MAIN 2(P) OUT** to last Node 4 (RTn) **MAIN 1 IN**. Connect optical fiber from Node 1 (CO) **MAIN 2(P) IN** to last Node 4 (RTn) **MAIN 1 OUT**. (See Figure 19.)

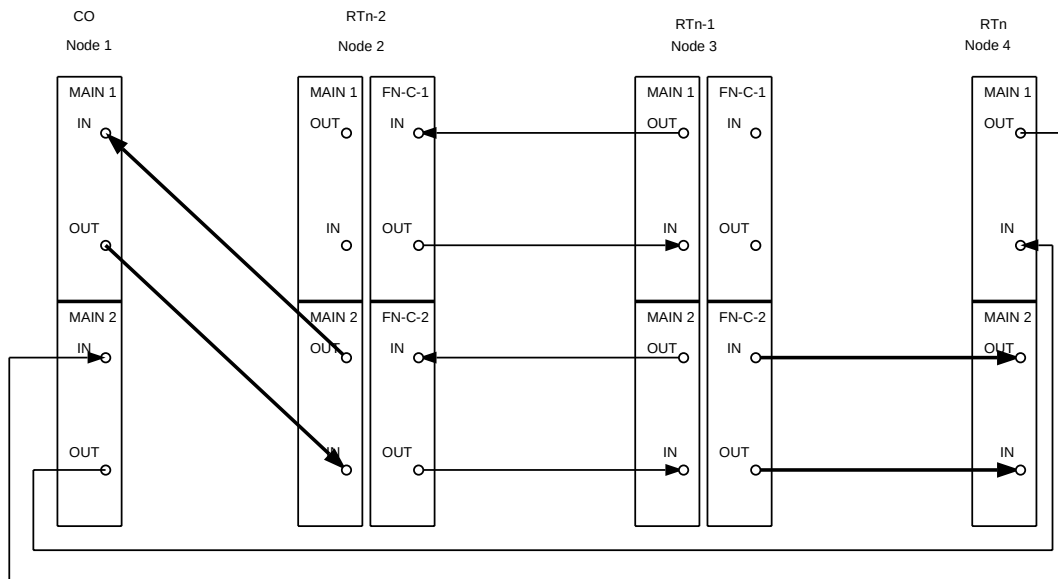


Figure 19. DDM-2000 OC-3 Drop or Add/Drop Network to Ring Upgrade

DO ITEMS BELOW IN ORDER LISTED FOR DETAILS, GO TO

35. At last Node 4 (RTn), locally download Release 9 or later software. **DLP-532**
-

36.  **CAUTION:**
Service interruption will occur if the following step is not performed for all timeslots that terminate at other nodes in the ring network.

At last Node 4 (RTn) use the "**ent-crs-vt1**" command or "**ent-crs-sts1**" command to set up all main-to-main pass-through cross-connections associated with all remaining STS/VT timeslots that are terminated on other nodes of the ring.

37.  **NOTE:**
Traffic is now passing from Node 1 (CO) to Node 4 (RTn) and is accessible to all of the RTs from this direction. The following steps will work back from Node 4 to Node 2, reconfiguring the fibers and upgrading the software at each node.

If this is an add/drop network (with traffic terminating at other nodes but not at the CO), continue with Step 38. If this is a drop network (with traffic terminating only between the CO and another node), continue with Step 41.

DO ITEMS BELOW IN ORDER LISTED FOR DETAILS, GO TO

38.  **CAUTION:**
If this is an add/drop network instead of a drop network and channels are "added" at the node being converted, service interruption will occur when cross-connections are deleted. The following must be performed prior to disconnecting the fibers from this node to the downstream node to minimize out-of-service time. For example, if channels are added and dropped between Node 3 and Node 4, pass-through cross-connections must be established in all remaining nodes to minimize service interruption.

For all added channels, use the "**ent-crs-()**" command(s) to set up pass through cross-connections from fn-c to main at all nodes leading back to Node 1 (CO).

-
39. Ensure main-to-main pass-through cross-connections are made at the CO as specified in Step 33.
-

40. At the node being converted, use the "**dlt-crs-()**" command to delete the cross-connections from **FUNCTION UNITS** group **A** or **B** (fn-a, fn-b) to **FUNCTION UNITS** group **C** (fn-c). Immediately after each cross-connection is deleted, use the "**ent-crs-()**" command to reroute the channel from fn-a or fn-b to main. This routes the added traffic channel back to the CO and over the installed ring nodes to the intended drop points.
-

DO ITEMS BELOW IN ORDER LISTED FOR DETAILS, GO TO

41. At Node 3, use the "**dlt-crs-vt1**" or "**dlt-crs-sts1**" command to delete all "main" to "fn-c" cross-connections.
 42. At Node 3, disconnect the fibers from **FUNCTION UNITS C 2(P) OLIUs**. Remove the **OLIUs** from **FUNCTION UNITS C** slots. Momentarily depress the **UPD/INIT** pushbutton on the **SYSCTL**. (See Figure 20.)
-

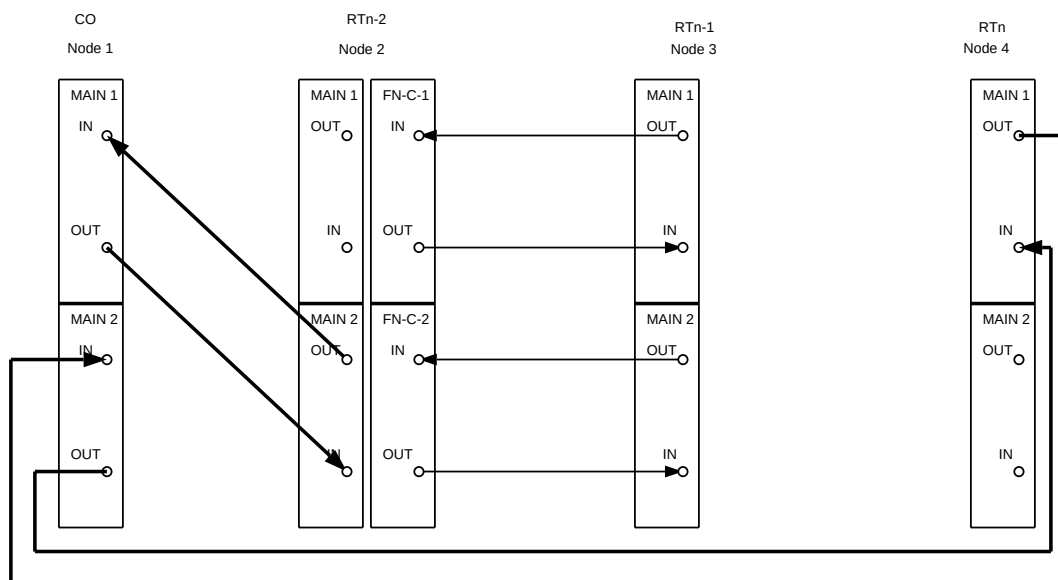


Figure 20. DDM-2000 OC-3 Drop Network to Ring Upgrade

DO ITEMS BELOW IN ORDER LISTED . . . FOR DETAILS, GO TO

43. At Node 2 (RTn-2) and Node 3 (RTn-1), use the **"switch-line:main:pri>manual"** command to switch service to the protection line (main-2 OLIU active). (See Figure 21.)
-
44. At Node 3 (RTn-1), disconnect the optical fibers from **MAIN 1 OLIUs**. At Node 2 (RTn-2), disconnect the optical fibers from **FUNCTION UNITS C 1 OLIUs**. (See Figure 21.)
-
45. Connect optical fiber from Node 3 (RTn-1) **MAIN 1 OUT** to Node 4 (RTn) **MAIN 2(P) IN**. Connect optical fiber from Node 3 (RTn-1) **MAIN 1 IN** to Node 4 (RTn) **MAIN 2(P) OUT**. (See Figure 21.)
-

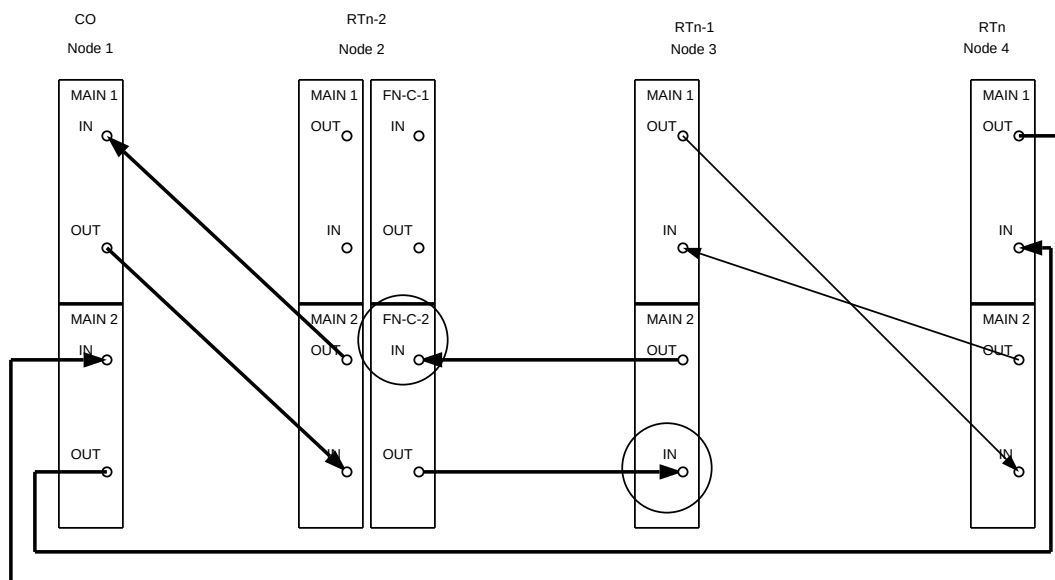


Figure 21. DDM-2000 OC-3 Drop or Add/Drop Network to Ring Upgrade

DO ITEMS BELOW IN ORDER LISTED FOR DETAILS, GO TO

46. At Node 3 (RTn-1), locally download Release 9 or later software. **DLP-532**

47. Reinstall **TGS** circuit pack into **TIMING** slot **1**. Use the **"switch-sync:s=circuitpack,pri=reset"** command to reset the manual protection switch.

48. At Node 3 (RTn-1), use the **"ent-crs-vt1"** command or **"ent-crs-sts1"** command to set up all main-to-main pass-through cross-connections associated with all remaining STS/VT timeslots that are terminated on other nodes of the ring.

DO ITEMS BELOW IN ORDER LISTED FOR DETAILS, GO TO

49. Repeat this procedure from Step 37 for all remaining nodes to be converted. Figure 22 shows the completed ring configuration.
-

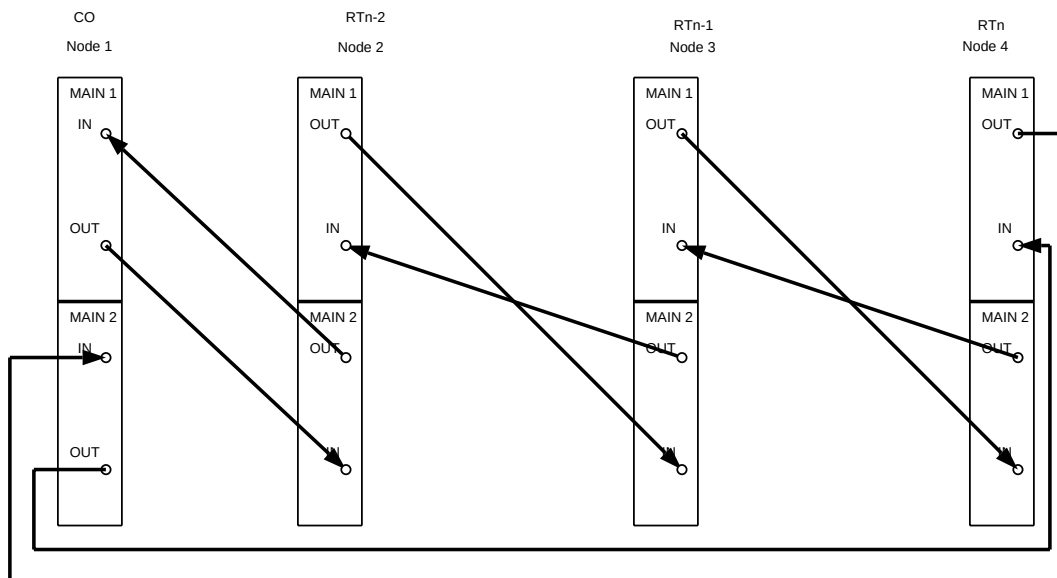


Figure 22. DDM-2000 OC-3 Drop or Add/Drop Network to Ring Upgrade

DO ITEMS BELOW IN ORDER LISTED FOR DETAILS, GO TO

50. **NOTE 1:**

The "**set -ne:**" command designates a shelf as the directory service network element (DSNE). **One**, and only one, shelf in the subnetwork **must** be provisioned as a DSNE. If there is no DSNE in the network, all DCC communication can become disabled. If more than one shelf is provisioned as DSNE, a "duplicate DSNE" alarm will occur.

 NOTE 2:

Shelves may be designated as an alarm gateway network element (AGNE) and assigned an alarm group number. (Default alarm group number is 255.) At least one AGNE is required per alarm group. One primary AGNE and one backup per alarm group is recommended. For a network greater than 16 nodes, the AGNE and TL1 GNE should be on separate nodes.

Use the "**set -ne:**" command to designate ONE shelf as the DSNE, if required. Use the "**set -ne:**" to designate the AGNE(s) and alarm group number, as required.

DO ITEMS BELOW IN ORDER LISTED FOR DETAILS, GO TO

51. Use "**set-fecom:dcc-all:com=enabled**" command at all nodes to enable far-end communications (fecom).

52. Reinstall all **TGS** circuit packs in **TIMING** slots **1**, if still removed.

53. ➤ **NOTE 1:**
If Kbyte (Release 9.0 and earlier) or Sbyte (Releases 8.1, 9.1, and later) (sync messaging) is enabled for the **main-1** and **main-2** optical interfaces at any node in a ring, it **must** be enabled at all nodes of the ring.

➤ **NOTE 2:**
The "**rtrv-oc3:**" command retrieves the "OC-3 Line Provisioning Report". This report displays the provisioned configuration of OC-3 lines. See the "Commands and Reports" section of this manual for a description of the "**rtrv-oc3:**" command format.

Use the "**rtrv-oc3:**" command to obtain the "OC-3 Line Provisioning Report" and verify if Kbyte/Sbyte is enabled or disabled. Use the "**set-oc3:**" command to enable or disable the Kbyte/Sbyte parameter, as required.

DO ITEMS BELOW IN ORDER LISTED . . . FOR DETAILS, GO TO

54.  **NOTE 1:**
If Sync Autoreconfiguration is enabled, Kbyte/Sbyte must also be enabled.
-  **NOTE 2:**
If Sync Autoreconfiguration is enabled at any line-timed node (not available for external timed or free-running nodes), it **must** be enabled at all line-timed nodes.
-  **NOTE 3:**
The "**rtrv-sync:**" command retrieves the "Synchronization Report". This report displays the provisioning and operational information on the synchronization attributes of the DDM-2000. See the "Commands and Reports" section of this manual for a description of the "**rtrv-sync:**" command format.

Use the "**rtrv-sync:**" command to obtain the "Synchronization Report" and verify if Sync Autoreconfiguration is enabled or disabled at any line-timed node. Use the "**set-sync:**" command to enable or disable the Sync Autoreconfiguration parameter, as required.

-
55. The ring configuration is now complete and new nodes may be added as required [**NTP-026**].
-

Establish Single-Homed OC-3 Access via DDM-2000 OC-12 Backbone Ring

DO ITEMS BELOW IN ORDER LISTED . . . FOR DETAILS, GO TO

1.  **WARNING:**
Unterminated optical connectors may emit invisible laser radiation. Avoid direct exposure to the beam. Do not view beam with optical instruments. Use of controls or adjustments or performance of procedures other than those specified herein may result in hazardous radiation exposure.

 **CAUTION:**
*DDM-2000 circuit packs contain static sensitive components which can be damaged by electrostatic discharge. A static ground wrist strap must be worn when handling the circuit packs. See electrostatic discharge considerations in **Trouble Clearing: TAD-100**.*

 **NOTE 1:**
If the DDM-2000 fails to respond in the indicated manner, refer to **Trouble Clearing: IXL-001**.

 **NOTE 2:**
It is assumed that all DDM-2000 OC-12 shelves in the system have passed the looped transmission test(s) (363-206-290, *DDM-2000 OC-12 Multiplexer, Release 5 and Higher, User/Service Manual (TOP)—Volume II*, **System Turnup: NTP-002**) and the DDM-2000 OC-12 ring has been established (363-206-290, *DDM-2000 OC-12 Multiplexer, Release 5 and Higher, User/Service Manual (TOP)—Volume II*, **System Turnup: NTP-020**). It is also assumed the DDM-2000 OC-3 shelves have been equipped and tested, **System Turnup: NTP-016**.

DO ITEMS BELOW IN ORDER LISTED FOR DETAILS, GO TO

Determine the network configuration (for example, see Figure 1.)

2. Verify that the host DDM-2000 OC-12 shelf is equipped with Release 5 or later ring software. If not equipped with Release 5 or later software, upgrade the DDM-2000 OC-12 host shelf with proper software. Verify that the DDM-2000 OC-3 shelf is equipped with Release 9 or later ring software. **DLP-531**
-

3. Determine the optical loss of each optical span from office records or by making the required measurements.
-

4. **⇒ NOTE 1:**
The **rtrv-eqpt:** command retrieves the "Equipage and Version Report". This report lists the circuit pack type and version information for one or more slots. See the "Commands and Reports" section of this manual for a description of the **rtrv-eqpt:** command format.

- ⇒ NOTE 2:**
If work order or office records do not specify **OLI** types, refer to 363-206-200, *DDM-2000 OC-3 and OC-12 Multiplexers, Applications, Planning, and Ordering Guide* and/or 363-206-280, *DDM-2000 OC-3 Multiplexer, Releases 8.0 through 11.1, User/Service Manual—Volume I*, for a description of **OLI** circuit packs and applications. Optical line power measurements and/or office records must be used to verify that the span length can be supported.

At the host OC-12 node, verify/install **OLI** circuit packs in **FUNCTION UNITS (A, B, C, or D)** slots being used for OC-3 access.

DO ITEMS BELOW IN ORDER LISTED FOR DETAILS, GO TO

5. **NOTE:**

If fecom is enabled, an "inconsistent DCC values" alarm will occur when the **OLIUs** are looped back. Normally, the alarm occurs when the user/network parameters on the **OHCTLs** at both ends of the DCC are set the same. To clear the alarm during a fiber loopback, use the **set-fecom:address:com=disable** command to disable the DCC.

At OC-12 shelf, connect optical loops for **FUNCTION UNITS OLIUs** just installed.

6. **NOTE:**

The Network Side (NS)/User Side (US) parameters of the **set-fecom:** command must be set opposite at each end of the optical spans. For example, see Figure 2.

Use the **rtrv-fecom/set-fecom** command to verify/set "Network Side/User Side" parameters at each end of optical span being established.

-
7. Use the **rtrv-oc3/set-oc3** command at the OC-12 shelf to verify/set application (*app*) parameter for the OC-12 **FUNCTION UNITS** slots being used for this single-homed configuration. For example, **set-oc3:fn-a,app=0X1**.
-

DO ITEMS BELOW IN ORDER LISTED FOR DETAILS, GO TO

8. ➤ **NOTE 1:**

If line timing mode is specified or external timing mode is specified but the timing reference was not available at the OC-3 shelf turnup, the **TGS** option switches are probably set for *free running*. Before this configuration is established, the specified timing mode must be set on the **TGS** circuit packs.

➤ **NOTE 2:**

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.

➤ **NOTE 3:**

If external timing is selected and the **NE ACTY** LED remains lighted after the **TGS** circuit pack is reinserted, use the CIT and the **rtrv-sync** command to check the operational mode of the system. If the mode is Holdover instead of External, check that the incoming timing references are connected. Also check Mode Switching (revertive or nonrevertive) and the external DS1 Line Code/Format switch settings.

Set timing mode on **TGS** circuit packs to the timing mode specified in work order or office records. (OC-12 Reference: 363-206-290, *DDM-2000 OC-12 Multiplexer, Release 5 and Higher, User/Service Manual (TOP)*—Volume II, **DLP-510**).

DLP-513

DO ITEMS BELOW IN ORDER LISTED FOR DETAILS, GO TO

9. **NOTE 1:**

If Kbyte or Sbyte (sync messaging) is enabled for the OC-3 **MAIN 1** and **MAIN 2(P)** optical interfaces at any node in the OC-3 ring, it **must** be enabled at all nodes in the OC-3 ring and in the **FUNCTION UNITS** slots of the host OC-12 shelf.

 NOTE 2:

The **rtrv-oc3:** command retrieves the "OC-3 Line Provisioning Report". This report displays the provisioned configuration of OC-3 lines. See the "Commands and Reports" section of 363-206-290, *DDM-2000 OC-12 Multiplexer, Release 5 and Higher, User/Service Manual—Volume I* and 363-206-280, *DDM-2000 OC-3 Multiplexer, Releases 8.0 through 11.1, User/Service Manual—Volume I*, for a description of the **rtrv-oc3:** command format.

Use the **rtrv-oc3:** command to obtain the "OC-3 Line Provisioning Report" and verify if Kbyte/Sbyte is enabled or disabled. Use the **set-oc3:** command to enable or disable the Kbyte/Sbyte parameter, as required.

DO ITEMS BELOW IN ORDER LISTED FOR DETAILS, GO TO

10. **NOTE 1:**

If Sync Autoreconfiguration is enabled, Kbyte/Sbyte must also be enabled.

 NOTE 2:

If Sync Autoreconfiguration is enabled at any OC-3 line-timed node (not available for external timed or free-running nodes), it **must** be enabled at all line-timed OC-3 nodes.

 NOTE 3:

The **rtrv-sync:** command retrieves the "Synchronization Report". This report displays the provisioning and operational information on the synchronization attributes of the DDM-2000. See the "Commands and Reports" section of 363-206-290, *DDM-2000 OC-12 Multiplexer, Release 5 and Higher, User/Service Manual—Volume I* and 363-206-280, *DDM-2000 OC-3 Multiplexer, Releases 8.0 through 11.1, User/Service Manual—Volume I*, for a description of the **rtrv-sync:** command format.

Use the **rtrv-sync:** command to obtain the "Synchronization Report" and verify if Sync Autoreconfiguration is enabled or disabled at any line-timed OC-3 node. Use the **set-sync:** command to enable or disable the Sync Autoreconfiguration parameter, as required.

DO ITEMS BELOW IN ORDER LISTED FOR DETAILS, GO TO

11. **NOTE:**

Two or more shelves in the same network with the same TBOS display number (set using the **set-ne** command) will cause a "duplicate TBOS display" alarm. Two or more shelves in the same network with the same site/ne address (set by the **set-ne** command) will cause a "duplicate site/ne address" alarm. Two or more shelves in the same network with the same system name or TID (set by the **set-ne** command) will cause a "duplicate TID" alarm.

Verify no duplicate TBOS, site/ne, or TID settings exist. The **rtrv-ne:** command may be used at each shelf in the network to display settings. If duplicates exist, determine new settings and use the **set-ne** command to make new settings.

DO ITEMS BELOW IN ORDER LISTED FOR DETAILS, GO TO

12. ➤ **NOTE 1:**

The **set-ne:** command designates a shelf as the directory service network element (DSNE). **One**, and only one, shelf in the network **must** be provisioned as a DSNE. If there is no DSNE in the network, all DCC communication can become disabled. If more than one shelf is provisioned as a DSNE, a "duplicate DSNE" alarm will occur. Multiple GNEs are allowed. A shelf is automatically provisioned as a GNE when connected to an active X.25 interface.

➤ **NOTE 2:**

Shelves may be designated as an alarm gateway network element (AGNE) and assigned an alarm group number. (Default alarm group number is 255.) At least one AGNE is required per alarm group. One primary AGNE and one backup per alarm group is recommended. For a network greater than 16 nodes, the AGNE and TL1 GNE should be on separate nodes. The AGNE parameter of the **set-ne:** command may have been set to **yes** on each new shelf during shelf turnup procedures to suppress an "AGNE communication failure" alarm.

Use the **set-ne:** command to designate ONE shelf in the network as the DSNE, if not already done.

Use the **set-ne:** command to designate the AGNE(s) and alarm group numbers, as required.

DO ITEMS BELOW IN ORDER LISTED FOR DETAILS, GO TO

13. **NOTE:**

This single-homed ring configuration requires that the **FUNCTION UNITS () 1 OLIU** on the OC-12 shelf connect to the **MAIN 1 OLIU** at the first OC-3 shelf from the OC-12 shelf. **MAIN 2(P) OLIU** at the OC-3 shelf (node) connects to the **MAIN 1 OLIU** at an adjacent OC-3 shelf (node). The **MAIN 2(P) OLIU** at the last OC-3 shelf on the OC-3 ring connects to **FUNCTION UNITS () 2(P) OLIU** on the host OC-12 shelf. See Figure 1. This procedure will establish the ring configuration starting from the OC-12 host node (near end) to the first OC-3 node, then continuing to the next node until the final connection is made from the last OC-3 node back to the host OC-12 node.

At the near end, remove the optical loop from the **OLIU** (for example in Figure 1, Node 5 OC-12 shelf **FUNCTION UNITS A 1**) associated with the optical span being established. At the other end of the optical span, remove the optical loop from the associated **OLIU** (for example, in Figure 1, Node 7 OC-3 shelf **MAIN 1 OLIU**).

DO ITEMS BELOW IN ORDER LISTED FOR DETAILS, GO TO

14.  **NOTE:**
The section data communication channel (DCC), used for far end communications, must be enabled at each network element (shelf) optical interface being tested in order for the end-to-end line tests to work. Default condition for the DCC channel is "enabled". If it has been disabled, use the **set - fecom:** command **at each shelf** to enable far end communications.

At each shelf, use the
set - fecom: address:com=enabled command to
ensure far end communications (fecom) is enabled.

-
15. Perform optical fiber connections and verification of the integrity of the optical span being established. **DLP-514**
-

16.  **NOTE:**
The **rtrv-pm-line** command in the following procedure displays performance monitoring data associated with the OC-3 lines terminated on the system.

Perform end-to-end OC-3 line test. **DLP-515**

17. Repeat this procedure from Step 13 for all OC-3 optical spans back to the host OC-12 shelf.
-

DO ITEMS BELOW IN ORDER LISTED FOR DETAILS, GO TO

18. **NOTE:**

Establishing service requires that the proper slots in each terminating node be properly equipped with the correct circuit pack(s) for the type of service being established. It also requires numerous cross connections in each of the nodes representing the path of the required service. Additionally, transmission tests should be performed to verify the continuity and quality of the established circuit.

The single-homed DDM-2000 OC-3 access network is now ready for initial service to be established. For DS3, EC-1, STS-3c, and video terminations on a DDM-2000 OC-12 shelf, use the procedures in 363-206-290, *DDM-2000 OC-12 Multiplexer, Release 5 and Higher, User/Service Manual (TOP)—Volume II*, to establish those services. For DS1, DS3, and/or EC-1 terminations on a DDM-2000 OC-3 shelf, use the procedures in this 363-206-280, *DDM-2000 OC-3 Multiplexer, Releases 8.0 through 11.1, User/Service Manual (TOP)—Volume II*, to establish those services.

DO ITEMS BELOW IN ORDER LISTED . . . FOR DETAILS, GO TO

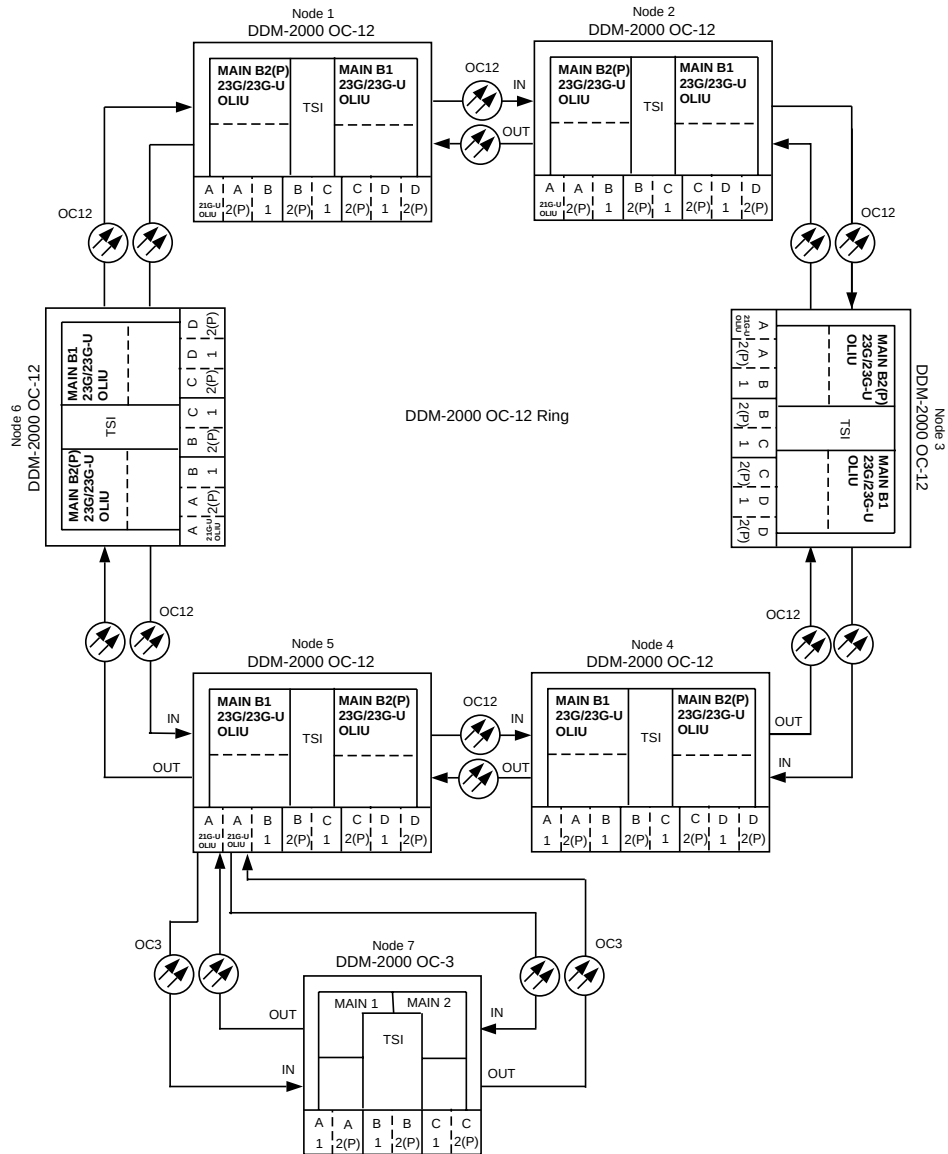
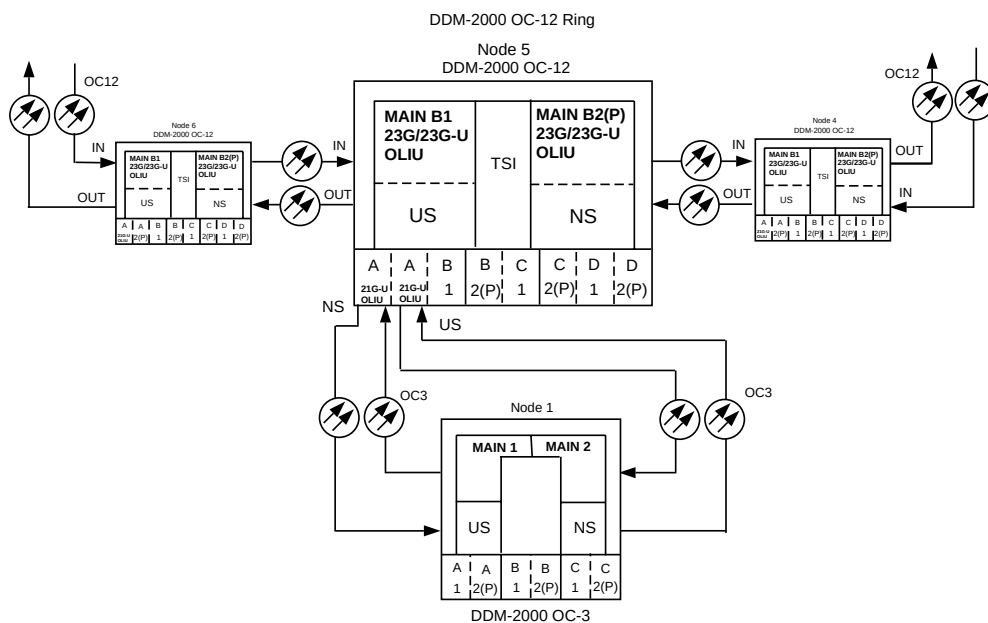


Figure 1. Example Single-Home Ring Configuration Connections

DO ITEMS BELOW IN ORDER LISTED . . . FOR DETAILS, GO TO

DDM-2000 OC-12 DCC Network Side (NS)/User Side (US) Defaults (set-fecom:nsus=ns/us)								
21-Type OLIUs (0X1 or video)	FN-A-1 dcc-a1	FN-A-2 dcc-a2	FN-B-1 dcc-b1	FN-B-2 dcc-b2	FN-C-1 dcc-c1	FN-C-2 dcc-c2	FN-D-1 dcc-d1	FN-D-2 dcc-d2
	NS	US	NS	US	NS	US	NS	US
23-Type OLIUs	MAIN-B-1 dcc-mb1		MAIN-B-2 dcc-mb2					
	US		NS					



DDM-2000 OC-3 DCC Network Side (NS)/User Side (US) Defaults (set-fecom:nsus=ns/us)								
22-Type OLIUs	MAIN-1 dcc-m1	MAIN-2 dcc-m2	FN-A dcc-a		FN-B dcc-b		FN-C dcc-c	
	US	NS	NS		NS		NS	
27-Type OLIUs	MAIN-1	MAIN-2	FN-A-1	FN-A-2	FN-B-1	FN-B-2	FN-C-1	FN-C-2
	dcc-m1-1	dcc-m2-1	dcc-a1-1	dcc-a2-1	dcc-b1-1	dcc-b2-1	dcc-c1-1	dcc-c2-1
	dcc-m1-2	dcc-m2-2	dcc-a1-2	dcc-a2-2	dcc-b1-2	dcc-b2-2	dcc-c1-2	dcc-c2-2
	US	NS	NS	US	NS	US	NS	US

Figure 2. Example of User Side/Network Side Value Settings

Establish OC-3/IS-3 Dual Ring Interworking DDM-2000 OC-3 to OC-12 or FT-2000 Ring Configurations OC-3 Optical Fiber Spans

DO ITEMS BELOW IN ORDER LISTED FOR DETAILS, GO TO

1.  **WARNING:**
Unterminated optical connectors may emit invisible laser radiation. Avoid direct exposure to the beam. Do not view beam with optical instruments. Use of controls or adjustments or performance of procedures other than those specified herein may result in hazardous radiation exposure.

-  **CAUTION:**
*DDM-2000 circuit packs contain static sensitive components which can be damaged by electrostatic discharge. A static ground wrist strap must be worn when handling the circuit packs. See electrostatic discharge considerations in **Trouble Clearing: TAD-100.***

-  **NOTE 1:**
If the DDM-2000 fails to respond in the indicated manner, refer to **Trouble Clearing: IXL-001** in the appropriate DDM-2000/FT-2000 documentation.

DO ITEMS BELOW IN ORDER LISTED FOR DETAILS, GO TO

⇒ **NOTE 2:**

It is assumed that the DDM-2000 or FT-2000 systems have been established in required individual ring configurations. Ring Release 7.2 or later software is required in each DDM-2000 OC-3 shelf. Ring Release 5 or later software is required in each DDM-2000 OC-12 shelf. Ring Release 6 or later software is required in each FT-2000 shelf. If **OLIUS** have already been installed in the **FUNCTION UNITS** slots and the systems established in a DRI configuration using OC-3/IS-3 connections, go to Step 13 to establish new service. Otherwise, continue with this procedure to establish the initial DRI configuration.

⇒ **NOTE 3:**

If the OC-3 ring is to be line timed (no external timing available) from another system or ring, **BBF2B TGS** timing circuit packs must be installed in the node connected to the other system and the **FUNCTION UNITS C** slot must be equipped first to provide a source of synchronization. See the "**set-sync**:" command in the Commands and Reports section of this manual.

Consult office records or work/circuit orders to determine the **OLIUS FUNCTION UNITS** slots in each DRI node that will be used to connect the two systems together in a DRI configuration. See Figure 1.

DO ITEMS BELOW IN ORDER LISTED FOR DETAILS, GO TO

2. **NOTE:**

If work order or office records do not specify **OLI** types, refer to 363-206-200, *DDM-2000 OC-3 and OC-12 Multiplexers, Applications, Planning, and Ordering Guide*, and/or 363-206-280, *DDM-2000 OC-3 Multiplexer, Releases 8.0 through 11.1, User/Service Manual—Volume 1*, for a description of **OLI** circuit packs and applications. Optical line power measurements and/or office records must be used to verify that the span length can be supported.

At the DDM-2000 OC-3 dual ring interworking nodes,
install **OLI** circuit packs in selected **FUNCTION UNITS**
slots.

DLP-504

-
3. If FT-2000 shelves are the dual ring interworking nodes, use FT-2000 procedures in 365-575-102, *FT-2000 OC-48 Lightwave System User/Service Manual*, to **Add OC-3/IS-3 Low Speed Slot(s), NTP-010**. If DDM-2000 OC-12 shelves are the dual ring interworking nodes, use procedures in 363-206-290, *DDM-2000 OC-12 Multiplexer, Release 5 and Higher, User/Service Manual(TOP)—Volume II*, to **Install FUNCTION UNITS OLI Circuit Packs, DLP-503**.
-

DO ITEMS BELOW IN ORDER LISTED FOR DETAILS, GO TO

4.  **NOTE 1:**
22G-U OLIUs require a 10 dB LBO when optically looped. **21G/21G-U OLIUs**, with **POWER** switch set to **HIGH**, require a 10 dB LBO when optically looped. **21G/21G-U OLIUs**, with **POWER** switch set to **LOW**, and **21G2-U** and **22G2-U/22G3-U OLIUs** do not require an LBO.

-  **NOTE 2:**
If fecom is enabled, an "inconsistent DCC values" alarm will occur when the **OLIUs** are looped back. Normally, the alarm occurs when the user/network parameters on the **OHCTLs** at both ends of the DCC are set the same. To clear the alarm during a fiber loopback, use the "**set - fecom:address:com=disable**" command to disable the DCC.

At DDM-2000 nodes, install **OLIU** optical loops.

- A. DDM-2000 OC-3
B. DDM-2000 OC-12 User/Service Manual

DLP-505
DLP-504

-
5. Determine the optical loss of each OC-3 optical span from office records or by making the required measurements.

-
6. Remove optical loops from **OLIUs** in the OC-3 optical span being established.
-

DO ITEMS BELOW IN ORDER LISTED FOR DETAILS, GO TO

7. **NOTE 1:**

The network elements that terminate on each end of the optical span must have their "Network Side"/"User Side" parameters set to opposite values to avoid an "inconsistent DCC values" alarm. Network Side/User Side parameters [**set - fecom** command] must be properly set at each end of OC-3 optical spans. One end is provisioned as "Network" and the other end is provisioned as "User". Both ends of the OC-3 line cannot be the same and it makes no difference which end is "Network".

 NOTE 2:

The section data communication channel (DCC), used for far-end communications, must be enabled at each network element (shelf) for communication and to allow the end-to-end line tests to work when the optical span is established. Default condition in DDM-2000 is "enabled" for the DCC channel. If it has been disabled, use the **"set - fecom:"** command **at the DDM-2000 shelf** to enable far-end communications.

At the DDM-2000 shelf, use the
"set - fecom: address:com=enabled, nsus=ns/us"
command to enable far-end communications (fecom) and
set Network Side (ns)/User Side (us) parameters.

DO ITEMS BELOW IN ORDER LISTED FOR DETAILS, GO TO

8. At each DDM-2000 OC-3/OC-12 node, use the
"set-oc3/oc12:address:kbyte=enabled" or
"set-oc3/oc12:address:syncmsg=Kbyte/Sbyte"
command to enable sync messaging between the DDM-
2000 **FUNCTION UNITS OLIUs** connecting to the other
ring DRI nodes.
 9. At each DDM-2000 OC-3/OC-12 DRI node, use the
"set-oc3/oc12:address:kbyte=disabled" or
"set-oc3/oc12:address:syncmsg=disabled"
command to disable sync messaging between the
DDM-2000 **MAIN OLIUs** connecting the adjacent DRI
nodes of the DDM-2000 OC-3/OC-12 ring. For example
in the top DDM-2000 OC-3 ring in Figure 1, disable sync
messaging between CO 2 **MAIN 1** and CO 4 **MAIN 2(P)**.
 10. At FT-2000 DRI nodes, if only one **OLIU** is used for the
DRI connection, use "**CONFIGURATION-Set-OC3**"
command to set the protection mode to **0 X 1** for the
OC-3 slot used for DRI connections. If two **OLIUs** are
used for the DRI connection, use "**CONFIGURATION-
Set-OC3**" command to set the protection mode to **1 + 1**
for the OC-3 slot used for DRI connections.
 11. At FT-2000 DRI nodes, use "**CONFIGURATION-Enter-
Assignment-DCC**" command to assign a DCC channel
to slot(s) used for DRI connections.
 12. Perform optical fiber connections and verification of the
optical facility.
-

DLP-514

DO ITEMS BELOW IN ORDER LISTED FOR DETAILS, GO TO

13. **NOTE 1:**

The "**set -ne:**" command designates a shelf as the directory service network element (DSNE). **One**, and only one, shelf in the subnetwork **must** be provisioned as a DSNE. If there is no DSNE in the network, all DCC communication can become disabled. If more than one shelf is provisioned as DSNE, a "duplicate DSNE" alarm will occur. In mixed DDM-2000 and FT-2000 networks, it is recommended that the DSNE be provisioned in a DDM-2000. Multiple GNEs are allowed and a shelf is automatically provisioned as a GNE when connected to an active X.25 interface.

 NOTE 2:

Shelves may be designated as an alarm gateway network element (AGNE) and assigned an alarm group number. (Default alarm group number is 255.) At least one AGNE is required per alarm group. One primary AGNE and one backup per alarm group is recommended. For a network greater than 16 nodes, the AGNE and TL1 GNE should be on separate nodes.

 NOTE 3:

It may take 5 minutes or more for the network to stabilize after a DSNE is discontinued. The remaining DSNE must record and map all the new network elements in the network.

Discontinue one of the duplicate DSNEs, if present (DDM-2000, "**set -ne:dsne=no**"). Use the "**reset**" command at the remaining DSNE to reset the DSNE node. Use the "**set -ne:**" command to designate the AGNE(s) and alarm group number, as required.

DO ITEMS BELOW IN ORDER LISTED FOR DETAILS, GO TO

14. Perform end-to-end OC-3 line test at DRI nodes. **DLP-515**

15. The network is now ready for initial DS1, DS3, or EC-1 service to be established.
[System Turnup: NTP-004] (DS1)
[System Turnup: NTP-005] (DS3)
[System Turnup: NTP-034] (EC-1)
[System Turnup: NTP-025] (HDSL)

DO ITEMS BELOW IN ORDER LISTED . . . FOR DETAILS, GO TO

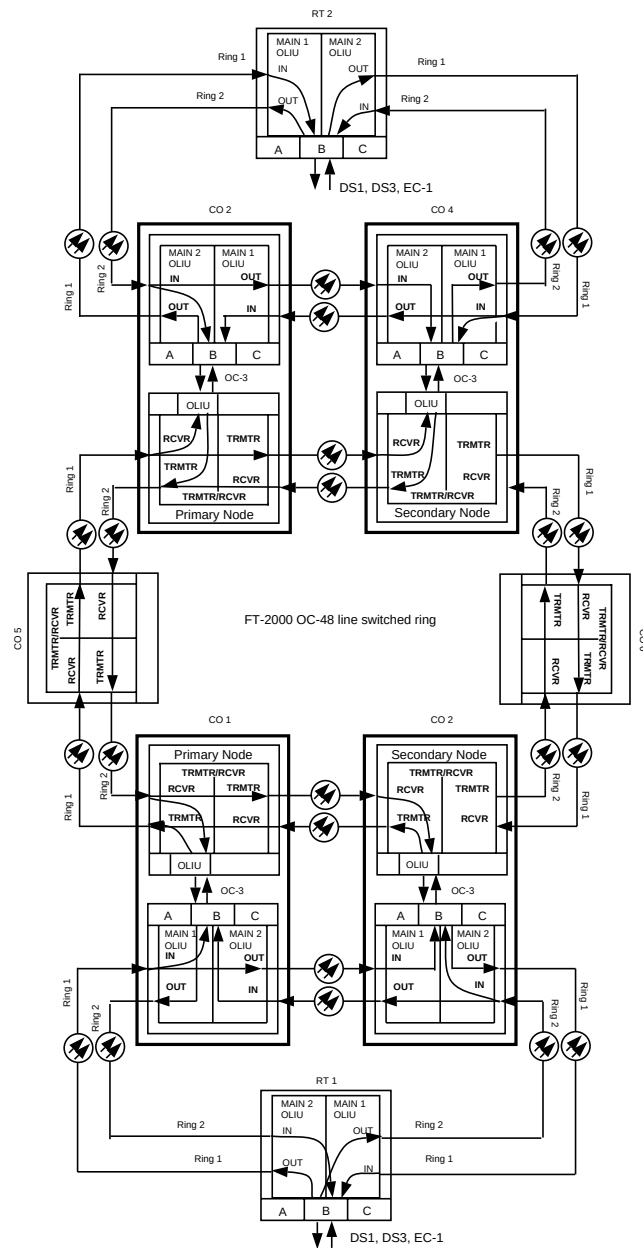


Figure 1. Example of DDM-2000 OC-3/FT-2000 OC-48 Dual Ring Interworking Network

Upgrade DDM-2000 OC-3/FT-2000 Dual Ring Interworking Network from EC-1 to OC-3 In Service

DO ITEMS BELOW IN ORDER LISTED . . . FOR DETAILS, GO TO

1.  **CAUTION:**
*DDM-2000 circuit packs contain static sensitive components which can be damaged by electrostatic discharge. A static ground wrist strap must be worn when handling the circuit packs. See electrostatic discharge considerations in **Trouble Clearing: TAD-100**.*

 **NOTE 1:**
Existing **BBG6 STS1E** circuit packs will be replaced in this procedure with **OLIU** circuit packs to support OC-3/IS-3 applications. If work order or office records do not specify **OLIU** types, refer to 363-206-200, DDM-2000 OC-3 and OC-12 Multiplexers, Applications, Planning, and Ordering Guide and/or 363-206-280, *DDM-2000 OC-3 Multiplexer, Releases 8.0 through 11.1, User/service Manual(emVolume 1*, for a description of **OLIU** circuit packs and applications. Optical line power measurements and/or office records must be used to verify that the span length can be supported.

 **NOTE 2:**
This procedure assumes that the DDM-2000 and FT-2000 systems are in service and ring Release 9 or later software is used in each DDM-2000 OC-3 shelf. Ring Release 6 or later software is required in each FT-2000 shelf.

 **NOTE 3:**
All shelves in the same network must have the same or compatible software releases.

DO ITEMS BELOW IN ORDER LISTED FOR DETAILS, GO TO

⇒ NOTE 4:

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.

Use the "**rtrv-alm:**" command to verify that no alarms, locks, loops, or switches are present.

2. Notify maintenance center that alarms will be generated.

3. Upgrade software in each FT-2000 OC-48 and DDM-2000 OC-3 shelf with a release that supports OC-3 interfaces (Ring Release 6 or later (OC-48), Ring Release 9 or later (OC-3), if not already performed.

DO ITEMS BELOW IN ORDER LISTED FOR DETAILS, GO TO

4.  **CAUTION 1:**
*Ensure traffic is being carried through the FT-2000 **primary** node to prevent unnecessary service hits (for example, node B in Figure 1).*
(FT-2000 command
"**CONFIGURATION-Retrieve-Crossconnection-STS3**")

 **CAUTION 2:**
Removal of the wrong cross-connections may cause service interruption.

 **NOTE 1:**
When signals or circuit packs are removed, alarms will be generated until update procedures are performed.

 **NOTE 2:**
STS1E slots cannot be unequipped without an alarm until all cross-connections are removed. The cross-connections must be removed first before removing circuit packs.

 **NOTE 3:**
If the OC-3 circuit pack is going to be using the same cross-connects as the EC-1 circuit pack that is to be removed, then the only cross-connects that need to be deleted are those at the node where the circuit pack is being replaced. The pass-through cross-connections can remain.

Discontinue the EC-1 interface cross-connections at the OC-3 node associated with the FT-2000 **secondary** node. **Note that only cross-connections at the DRI node are being discontinued when using the procedures of NTP-036.**

NTP-036

DO ITEMS BELOW IN ORDER LISTED FOR DETAILS, GO TO

5. At the OC-3 node associated with the FT-2000 **secondary** dual ring interworking node, remove **BBG6 STS1E** circuit pack(s) from **FUNCTION UNITS** slot(s) being upgraded to **OLIUs** (for example, node D in Figure 1).
 6. Momentarily depress **UPD/INIT** button on **SYSCTL** or use the "**upd**" command from the CIT.
 7. At the FT-2000 **secondary** dual ring interworking node (for example, node A in Figure 1), use FT-2000 procedures in 365-575-102, *FT-2000 OC-48 Lightwave System, User/Service Manual*, **Delete DS3 and/or EC1 Low Speed Port(s), NTP-003**.
 8. At the FT-2000 **secondary** dual ring interworking node, use FT-2000 procedures in 365-575-102, *FT-2000 OC-48 Lightwave System, User/Service Manual*, **Add OC-3/IS-3 Low Speed Slot(s), NTP-010**.
 9. Install required **OLIU(s)** in the OC-3 node associated with the FT-2000 secondary node (for example, node D in Figure 1). **DLP-504**
-

DO ITEMS BELOW IN ORDER LISTED FOR DETAILS, GO TO

10.  **NOTE 1:**
The network elements that terminate on each end of the optical span must have their "Network Side"/"User Side" parameters set to opposite values to avoid an "inconsistent DCC values" alarm. Network Side/User Side parameters [**set - fecom** command] must be properly set at each end of OC-3 optical spans. One end is provisioned as "Network" and the other end is provisioned as "User". Both ends of the OC-3 line cannot be the same and it makes no difference which end is "Network".

-  **NOTE 2:**
The section data communication channel (DCC), used for far-end communications, must be enabled at each network element (shelf) for communication and to allow the end-to-end line tests to work when the optical span is established. Default condition in DDM-2000 is "enabled" for the DCC channel. If it has been disabled, use the "**set - fecom:**" command **at the DDM-2000 shelf** to enable far-end communications.

At the DDM-2000 shelf, use the
"set - fecom: address: com=enabled, nsus=ns/us"
command to enable far-end communications (fecom) and
set Network Side (ns)/User Side (us) parameters.

DO ITEMS BELOW IN ORDER LISTED FOR DETAILS, GO TO

11. At the FT-2000 shelf, use "**CONFIGURATION-Set -OC3**" command to set the protection mode to **0 X 1** for the OC-3 slot used for DRI connections, if only one **OLI**U is used for the DRI connection. If two **OLI**Us are used for the DRI connection, use "**CONFIGURATION-Set -OC3**" command to set the protection mode to **1 + 1** for the OC-3 slot used for DRI connections.

12. At the FT-2000 shelf, use "**CONFIGURATION-Enter - Assignment -DCC**" command to assign a DCC channel to slot(s) used for DRI connections, if required.

13. Perform optical fiber connections and verification of the optical facility.

DLP-514

DO ITEMS BELOW IN ORDER LISTED FOR DETAILS, GO TO

14. **NOTE 1:**

The "**set-ne:**" command designates a shelf as the directory service network element (DSNE). **One**, and only one, shelf in the subnetwork **must** be provisioned as a DSNE. If there is no DSNE in the network, all DCC communication can become disabled. If more than one shelf is provisioned as DSNE, a "duplicate DSNE" alarm will occur. In mixed DDM-2000 and FT-2000 networks, it is recommended that the DSNE be provisioned in a DDM-2000. Multiple GNEs are allowed and a shelf is automatically provisioned as a GNE when connected to an active X.25 interface.

 NOTE 2:

Shelves may be designated as an alarm gateway network element (AGNE) and assigned an alarm group number. (Default alarm group number is 255.) At least one AGNE is required per alarm group. One primary AGNE and one backup per alarm group is recommended. For a network greater than 16 nodes, the AGNE and TL1 GNE should be on separate nodes.

 NOTE 3:

It may take 5 minutes or more for the network to stabilize after the DSNE is discontinued. The remaining DSNE must record and map all the new network elements in the network.

Discontinue one of the duplicate DSNEs, if required. Use the "**reset**" command at the remaining DSNE to reset the DSNE node. Use the "**set-ne:**" to designate the AGNE(s) and alarm group number, as required.

DO ITEMS BELOW IN ORDER LISTED FOR DETAILS, GO TO

15. Perform end-to-end OC-3/IS-3 line test at DRI nodes associated with the FT-2000 secondary node (for example, between nodes A and D in Figure 1). **DLP-515**

16. At the OC-3 DRI node, use the "**ent-crs-sts1**" or "**ent-crs-vt1**" commands to make proper "drop and continue" cross-connections. **DLP-550**

17. At the FT-2000 **primary** node, use the "**FAULT-Switch-Path-STS3**" command to switch the designated tributary from primary node to secondary node. (Switch traffic to secondary node.) See Figure 2.

18.  **NOTE:**
If the OC-3 circuit pack is going to be using the same cross-connects as the EC-1 circuit pack that is to be removed, then the only cross-connects that need to be deleted are those at the node where the circuit pack is being replaced. The pass-through cross-connections can remain.

Discontinue the EC-1 interface cross-connections at the OC-3 node associated with the FT-2000 **primary** node. **NTP-036**
Note that only cross-connections at the DRI node are being discontinued when using the procedures of NTP-036.

DO ITEMS BELOW IN ORDER LISTED FOR DETAILS, GO TO

19. At the OC-3 node associated with the FT-2000 **primary** dual ring interworking node, remove both **BBG6 STS1E** circuit packs from **FUNCTION UNITS** slots being upgraded to **OLIUs** (for example, node C in Figure 2).
 20. Momentarily depress **UPD/INIT** button on **SYSCTL** or use the "**upd**" command from the CIT.
 21. At the FT-2000 **primary** dual ring interworking node (for example, node B in Figure 2), use FT-2000 procedures in 365-575-102, *FT-2000 OC-48 Lightwave System, User/Service Manual*, **Delete DS3 and/or EC-1 Low Speed Port(s), NTP-003**.
 22. At the FT-2000 **primary** dual ring interworking node, use FT-2000 procedures in 365-575-102, *FT-2000 OC-48 Lightwave System, User/Service Manual*, **Add OC-3/IS-3 Low Speed Slot(s), NTP-010**.
-

DO ITEMS BELOW IN ORDER LISTED FOR DETAILS, GO TO

23. Install required **OLI**U(s) in the OC-3 node associated with the FT-2000 primary node (for example, node C in Figure 1). **DLP-504**

24. At the DDM-2000 end of optical span between the FT-2000 primary node and DDM-2000, use the **"set - fecom: address: com=enabled, nsus=ns/us"** command to enable far-end communications (fecom) and set Network Side (ns)/User Side (us) parameters.

25. At the FT-2000 shelf, use **"CONFIGURATION-Set - OC3"** command to set the protection mode to **0 X 1** for the OC-3 slot used for DRI connections, if only one **OLI**U is used for the DRI connection. If two **OLI**Us are used for the DRI connection, use **"CONFIGURATION-Set - OC3"** command to set the protection mode to **1 + 1** for the OC-3 slot used for DRI connections.

26. At the FT-2000 shelf, use **"CONFIGURATION-Enter - Assignment - DCC"** command to assign a DCC channel to slot(s) used for DRI connections.

27. Perform optical fiber connections and verification of the optical facility. **DLP-514**

DO ITEMS BELOW IN ORDER LISTED FOR DETAILS, GO TO

28. Perform end-to-end OC-3/IS-3 line test at DRI nodes associated with the FT-2000 primary node (for example, nodes B and C in Figure 2). **DLP-515**

29. At the OC-3 DRI node, use the "**ent-crs-sts1**" or "**ent-crs-vt1**" commands to make proper "drop and continue" cross-connections. **DLP-550**

30. At FT-2000 primary node, use the "**FAULT-Switch-Path-STs3**" command to switch the designated tributary from secondary node to primary node. (Switch traffic to primary node.)

31. Remove all EC-1/DS3 connections between the nodes with **BBG6 STS1E/LAA4 STS1E** circuit packs removed, if required.

32. The upgrade is now complete.

DO ITEMS BELOW IN ORDER LISTED . . . FOR DETAILS, GO TO

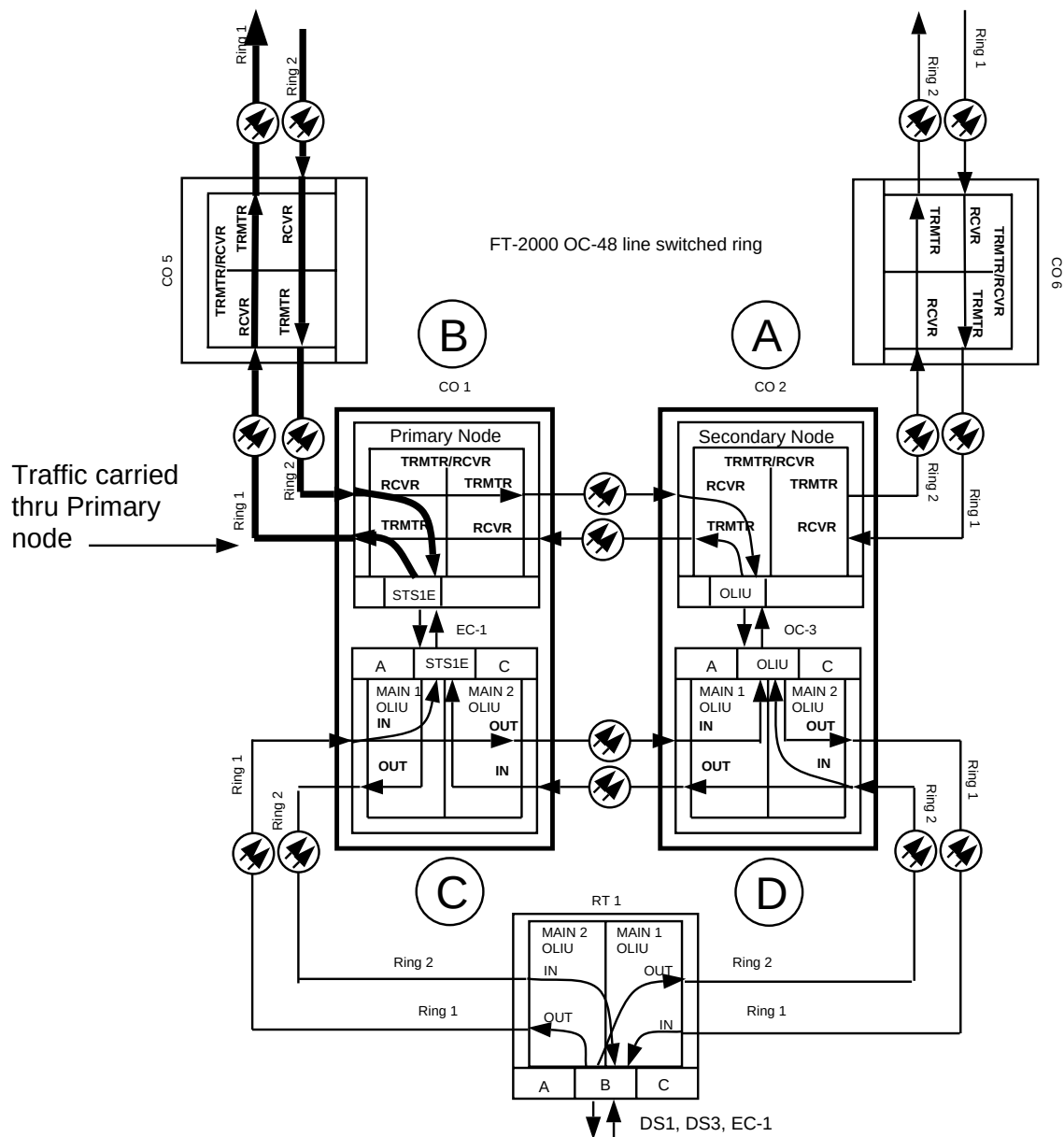


Figure 1. OC-3/OC-48 DRI Interworking

DO ITEMS BELOW IN ORDER LISTED . . . FOR DETAILS, GO TO

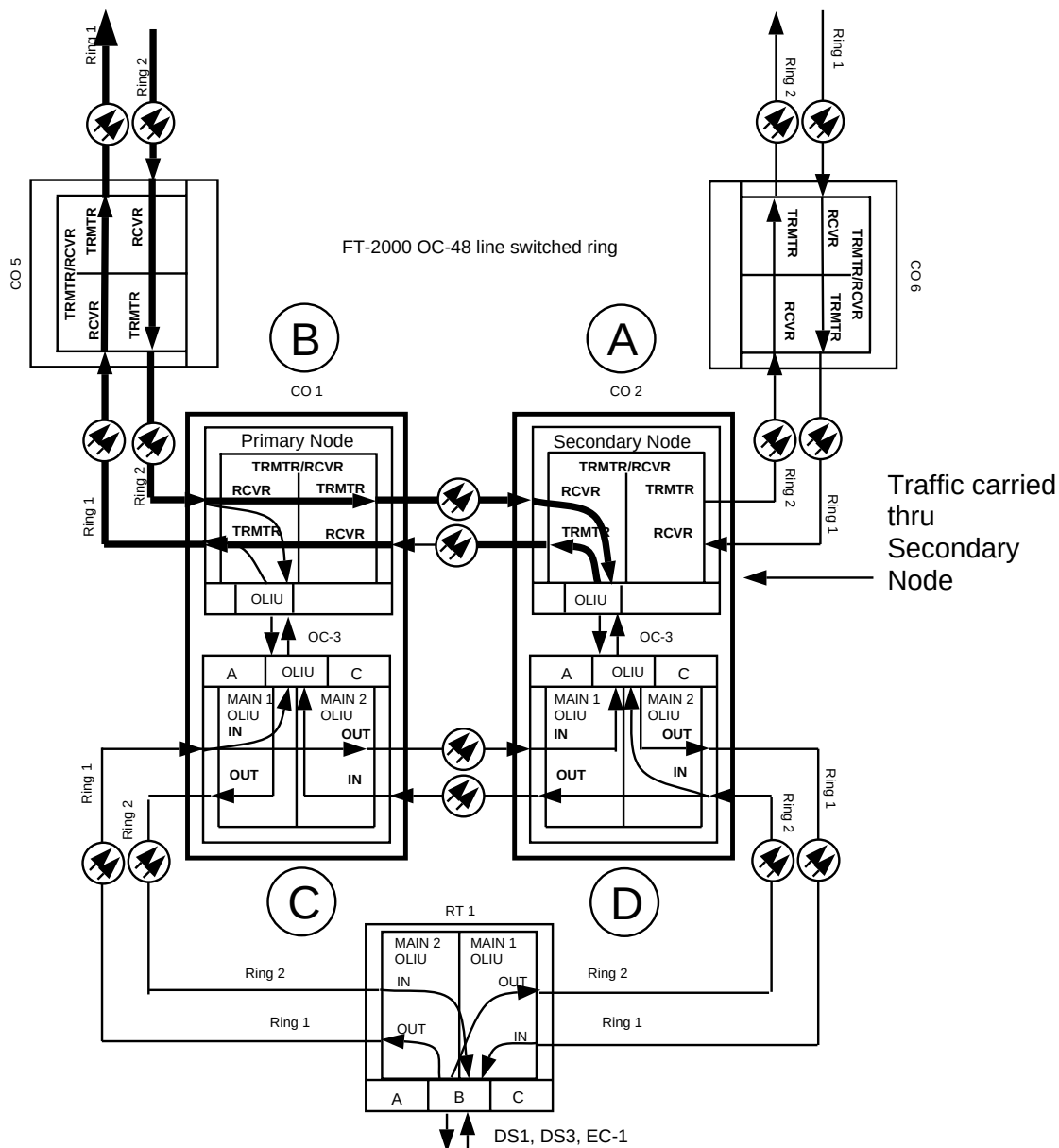


Figure 2. OC-3/OC-48 DRI Interworking

Establish Single-Homed FiberReach Access via DDM-2000 OC-3 Backbone Ring

DO ITEMS BELOW IN ORDER LISTED FOR DETAILS, GO TO

1.  **WARNING:**
Unterminated optical connectors may emit invisible laser radiation. Avoid direct exposure to the beam. Do not view beam with optical instruments. Use of controls or adjustments or performance of procedures other than those specified herein may result in hazardous radiation exposure.

 **CAUTION:**
*DDM-2000 circuit packs contain static sensitive components which can be damaged by electrostatic discharge. A static ground wrist strap must be worn when handling the circuit packs. See electrostatic discharge considerations in **Trouble Clearing: TAD-100**.*

 **NOTE 1:**
If the DDM-2000 fails to respond in the indicated manner, refer to **Trouble Clearing: IXL-001**.

 **NOTE 2:**
It is assumed that all DDM-2000 OC-3 shelves in the system have passed the looped transmission test(s) (**System Turnup: NTP-016**) and the DDM-2000 OC-3 ring has been established (**System Turnup: NTP-022**) It is also assumed the DDM-2000 FiberReach shelves have been equipped and tested (363-206-301, *DDM-2000 FiberReach Multiplexer, Wideband/Narrowband Shelf, User/Service Manual*, **System Turnup: NTP-016**).

DO ITEMS BELOW IN ORDER LISTED FOR DETAILS, GO TO

Determine the network configuration (for example, see Figure 1.)

2. Verify that the host DDM-2000 OC-3 shelf is equipped with Release 9 or later ring software. If not equipped with Release 9 or later software, upgrade the DDM-2000 OC-3 host shelf with proper software **NTP-046**
-

3. Determine the optical loss of each optical span from office records or by making the required measurements.
-

4.  **NOTE 1:**
The **rtrv-eqpt:** command retrieves the "Equipage and Version Report". This report lists the circuit pack type and version information for one or more slots. See the "Commands and Reports" section of this manual for a description of the **rtrv-eqpt:** command format.

-  **NOTE 2:**
If work order or office records do not specify **OLI** types, refer to 363-206-200, *DDM-2000 OC-3 and OC-12 Multiplexers, Applications, Planning, and Ordering Guide* and/or 363-206-280, *DDM-2000 OC-3 Multiplexer, Releases 8.0 through 11.1, User/Service Manual—Volume I*, for a description of **OLI** circuit packs and applications. Optical line power measurements and/or office records must be used to verify that the span length can be supported.

DO ITEMS BELOW IN ORDER LISTED FOR DETAILS, GO TO

At the host OC-3 node, verify/install **26G2-U** or **27G-U/27G2-U OLIU** circuit packs in **FUNCTION UNITS (A, B, or C)** slots being used for FiberReach access. **DLP-504**

5. **NOTE:**

If fecom is enabled, an "inconsistent DCC values" alarm will occur when the **OLIUs** are looped back. Normally, the alarm occurs when the user/network parameters on the **OHCTLs** at both ends of the DCC are set the same. To clear the alarm during a fiber loopback, use the **set-fecom:address:com=disable** command to disable the DCC.

Connect optical loops for **FUNCTION UNITS OLIUs** just installed. **DLP-505**

6. **NOTE:**

The Network Side/User Side parameters of the **set-fecom:** command must be set opposite at each end of the optical spans. For example, see Figure 2.

Use the **rtrv-fecom/set-fecom** command to verify/set "Network Side/User Side" parameters at each end of optical span being established.

DO ITEMS BELOW IN ORDER LISTED FOR DETAILS, GO TO

7. **NOTE:**

Two or more shelves in the same network with the same TBOS display number (set using the **set-ne** command) will cause a "duplicate TBOS display" alarm. Two or more shelves in the same network with the same site/ne address will cause a "duplicate site/ne address" alarm. Two or more shelves in the same network with the same system name or TID (set by the **set-ne** command) will cause a "duplicate TID" alarm.

Verify no duplicate TBOS, site/ne, or TID settings exist. The **rtrv-ne:** command may be used at each shelf in the network to display settings. If duplicates exist, determine new settings and use the **set-ne** command to make new settings.

DO ITEMS BELOW IN ORDER LISTED FOR DETAILS, GO TO

8. **NOTE 1:**

The **set -ne:** command designates a shelf as the directory service network element (DSNE). **One**, and only one, shelf in the network **must** be provisioned as a DSNE. If there is no DSNE in the network, all DCC communication can become disabled. If more than one shelf is provisioned as a DSNE, a "dupLiCate DSNE" alarm will occur. The DSNE must not be a FiberReach shelf. Multiple GNEs are allowed. A shelf is automatically provisioned as a GNE when connected to an active X.25 interface.

 NOTE 2:

Shelves may be designated as an alarm gateway network element (AGNE) and assigned an alarm group number. (Default alarm group number is 255.) At least one AGNE is required per alarm group. One primary AGNE and one backup per alarm group is recommended. For a network greater than 16 nodes, the AGNE and TL1 GNE should be on separate nodes. The AGNE parameter of the **set -ne:** command may have been set to **yes** on each new shelf during shelf turnup procedures to suppress an "AGNE communication failure" alarm.

Use the **set -ne:** command to designate ONE shelf in the network as the DSNE, if not already done.

Use the **set -ne:** command to designate the AGNE(s) and alarm group numbers, as required.

DO ITEMS BELOW IN ORDER LISTED FOR DETAILS, GO TO

9. **NOTE 1:**

This single-homed ring configuration requires that the **FUNCTION UNITS () 1 OLIU** on the OC-3 shelf connect to the **MAIN-1 OLIU** at the first FiberReach shelf from the OC-3 shelf. **MAIN-2 OLIU** at the FiberReach shelf (node) connects to the **MAIN-1 OLIU** at an adjacent FiberReach shelf (node). The **MAIN-2 OLIU** at the last FiberReach shelf on the OC-1 ring connects to **FUNCTION UNITS () 2(P) OLIU** on the host OC-3 shelf. See Figure 1. This procedure will establish the ring configuration starting from the OC-3 host node (near end) to the first FiberReach node, then continuing to the next node until the final connection is made from the last FiberReach node back to the host OC-3 node.

 NOTE 2:

All unused ports on the **27G-U/27G2-U OLIU** must be set to **nmon** with the **set-state-oc1** command.

At the near end, remove the optical loop from the **26G2-U** or **27G-U/27G2-U OLIU** OC-1 line (**1** or **2**) (for example in Figure 1, OC-3 shelf **FUNCTION UNITS A 1**, OC-1 line **1**) associated with the optical span being established. At the other end of the optical span, remove the optical loop from the associated **OLIU** (for example, in Figure 1, FiberReach **MAIN-1 OLIU**).

DO ITEMS BELOW IN ORDER LISTED FOR DETAILS, GO TO

10. **NOTE:**

The section data communication channel (DCC), used for far end communications, must be enabled at each network element (shelf) optical interface being tested in order for the end-to-end line tests to work. Default condition for the DCC channel is "enabled". If it has been disabled, use the **set - fecom:** command **at each shelf** to enable far end communications.

At each shelf, use the
set - fecom: address:com=enabled command to
ensure far end communications (fecom) is enabled.

-
11. Perform optical fiber connections and verification of the integrity of the optical span being established. **DLP-514**
-

12. **NOTE:**

The **rtrv-pm-line** command in the following procedure displays performance monitoring data associated with the OC-1 lines terminated on the system.

Perform end-to-end OC-1 line test. **DLP-556**

13. Repeat this procedure from Step 11 for all OC-1 optical spans back to the host OC-3 shelf.
-

14. The system is now ready for initial service to be established.
Initial DS1 Service **[System Turnup: NTP-004]**
-

DO ITEMS BELOW IN ORDER LISTED . . . FOR DETAILS, GO TO

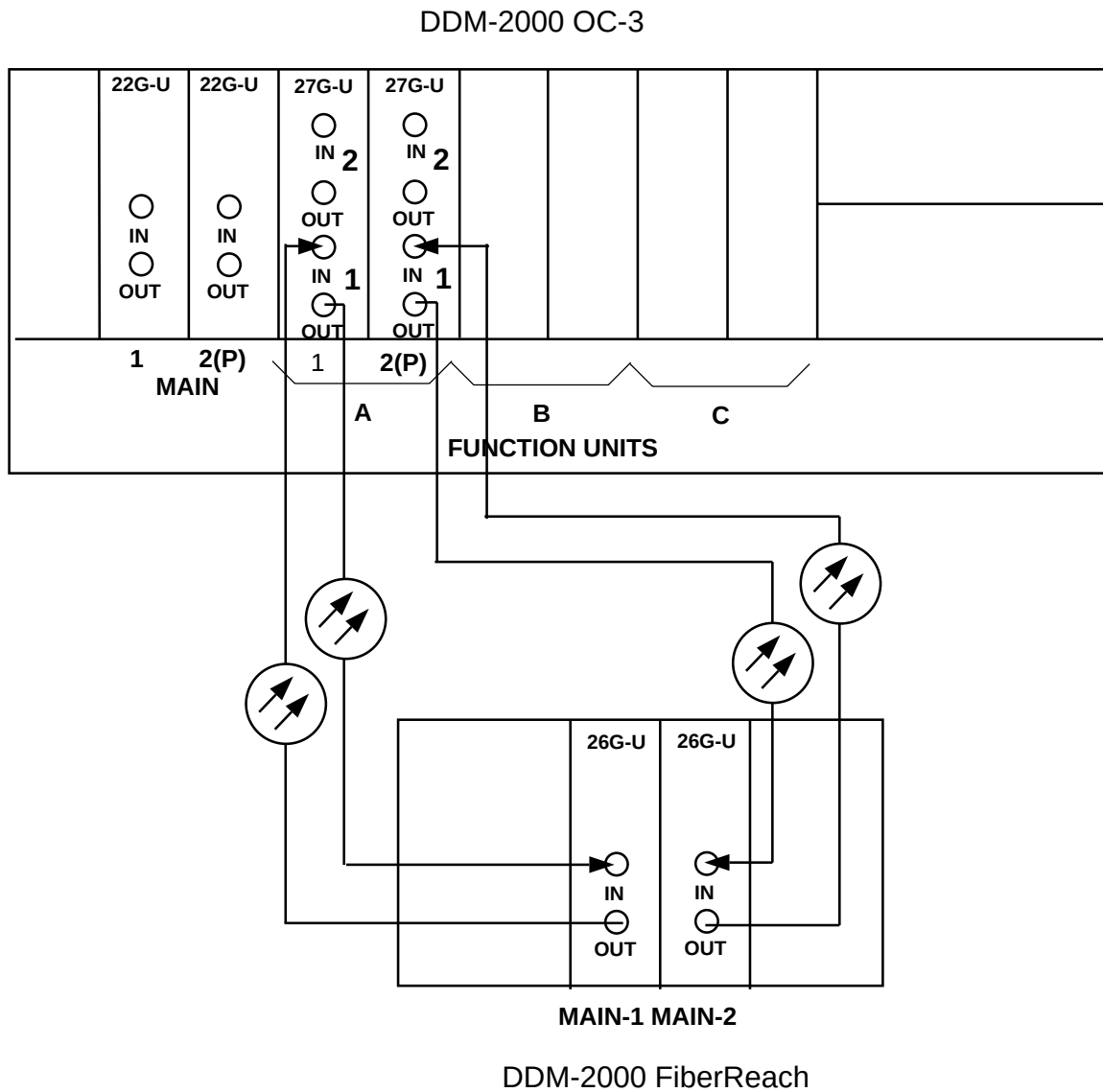
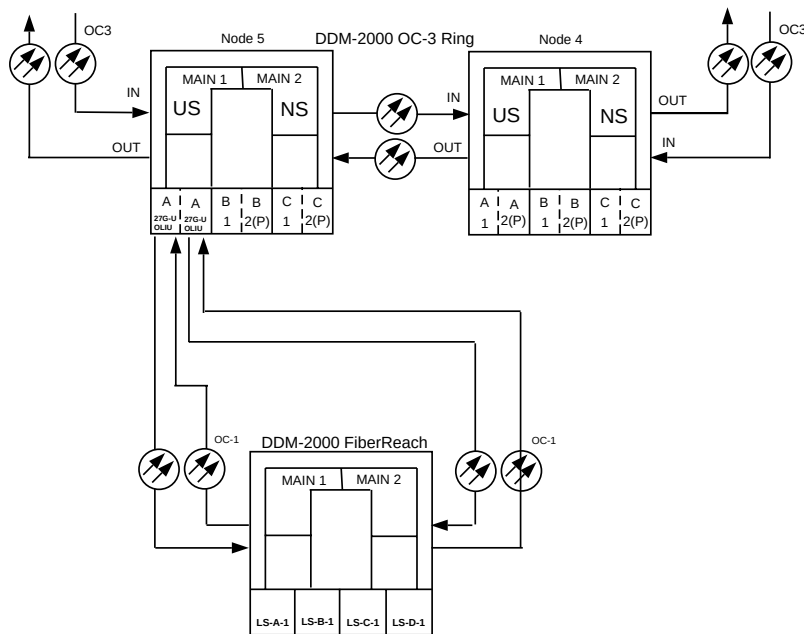


Figure 1. Example Single-Home Ring Configuration Connections

DO ITEMS BELOW IN ORDER LISTED FOR DETAILS, GO TO

DDM-2000 OC-3 DCC Network Side (NS)/User Side (US) Defaults (set-fecom:nsus=ns/us)								
22-Type OLIUs	MAIN-1 dcc-m1	MAIN-2 dcc-m2	FN-A dcc-a		FN-B dcc-b		FN-C dcc-c	
	US	NS	NS		NS		NS	
27-Type OLIUs	MAIN-1 dcc-m1-1	MAIN-2 dcc-m2-1	FN-A-1 dcc-a1-1	FN-A-2 dcc-a2-1	FN-B-1 dcc-b1-1	FN-B-2 dcc-b2-1	FN-C-1 dcc-c1-1	FN-C-2 dcc-c2-1
	dcc-m1-2	dcc-m2-2	dcc-a1-2	dcc-a2-2	dcc-b1-2	dcc-b2-2	dcc-c1-2	dcc-c2-2
	US	NS	NS	US	NS	US	NS	US



DDM-2000 FiberReach DCC Network Side (NS)/User Side (US) Defaults (set-fecom:nsus=ns/us)		
26-Type OLIUs	MAIN-1 dcc-m1	MAIN-2 dcc-m2
	US	NS

Figure 2. Example of User Side/Network Side Value Settings

Establish Dual-Homed FiberReach Access via DDM-2000 OC-3 Backbone Ring

DO ITEMS BELOW IN ORDER LISTED FOR DETAILS, GO TO

1.  **WARNING:**
Unterminated optical connectors may emit invisible laser radiation. Avoid direct exposure to the beam. Do not view beam with optical instruments. Use of controls or adjustments or performance of procedures other than those specified herein may result in hazardous radiation exposure.

 **CAUTION:**
*DDM-2000 circuit packs contain static sensitive components which can be damaged by electrostatic discharge. A static ground wrist strap must be worn when handling the circuit packs. See electrostatic discharge considerations in **Trouble Clearing: TAD-100**.*

 **NOTE 1:**
If the DDM-2000 fails to respond in the indicated manner, refer to **Trouble Clearing: IXL-001**.

 **NOTE 2:**
It is assumed that all DDM-2000 OC-3 shelves in the system have passed the looped transmission test(s). [**System Turnup: NTP-016**] and the host DDM-2000 OC-3 ring has been established [**System Turnup: NTP-022**] with software to support DDM-2000 FiberReach applications. It is also assumed the DDM-2000 FiberReach shelf(ves) has been equipped and tested using DDM-2000 FiberReach documentation (363-206-301, *DDM-2000 FiberReach Multiplexer, Wideband/Narrowband Shelf, User/Service Manual*, **System Turnup: NTP-007**).

DO ITEMS BELOW IN ORDER LISTED FOR DETAILS, GO TO

Determine the network configuration (for example, see Figures 1 and 2.)

2. Verify the host DDM-2000 OC-3 shelves (for example, Figures 1 and 2, nodes 4 and 5) are equipped with Release 9 or later ring software. If not equipped with Release 9 or later software, upgrade the DDM-2000 OC-3 host shelves with proper software.
-

3. Determine the optical loss of each optical span from office records or by making the required measurements.
-

4.  **NOTE 1:**

The **rtrv-eqpt:** command retrieves the "Equipage and Version Report". This report lists the circuit pack type and version information for one or more slots. See the "Commands and Reports" section of this manual for a description of the **rtrv-eqpt:** command format.

-  **NOTE 2:**

If work order or office records do not specify **OLI** types, refer to 363-206-200, *DDM-2000 OC-3 and OC-12 Multiplexers, Applications, Planning, and Ordering Guide* and/or 363-206-280, *DDM-2000 OC-3 Multiplexer, Releases 8.0 through 11.1, User/Service Manual—Volume I*, for a description of **OLI** circuit packs and applications. Optical line power measurements and/or office records must be used to verify that the span length can be supported.

DO ITEMS BELOW IN ORDER LISTED FOR DETAILS, GO TO

At the host OC-3 nodes, verify/install **26G2-U** or **27G-U/27G2-U OLIU** circuit packs in **FUNCTION UNITS (A, B, or C)** slots being used for FiberReach access. **DLP-504**

5. **NOTE:**

If fecom is enabled, an "inconsistent DCC values" alarm will occur when the **OLIUs** are looped back. Normally, the alarm occurs when the user/network parameters on the **OHCTLs** at both ends of the DCC are set the same. To clear the alarm during a fiber loopback, use the **set - fecom: address: com=disable** command to disable the DCC.

Connect optical loops for **FUNCTION UNITS OLIUs** just installed. **DLP-505**

6. **NOTE:**

The Network Side/User Side parameters of the **set - fecom:** command must be set opposite at each end of the optical spans. For example, see Figure 3.

Use the **rtrv - fecom/set - fecom** command to verify/set "Network Side/User Side" parameters at each end of OC-1 optical span being established.

DO ITEMS BELOW IN ORDER LISTED FOR DETAILS, GO TO

7. **NOTE:**

Two or more shelves in the same network with the same TBOS display number (determined by **SYSCTL** switch settings) will cause a "duplicate TBOS display" alarm. Two or more shelves in the same network with the same site/ne address will cause a "duplicate site/ne address" alarm. Two or more shelves in the same network with the same system name or TID (set by the **set-ne** command) will cause a "duplicate TID" alarm. Two or more shelves in the same network designated as a DSNE (set by the **set-ne** command) will cause a "duplicate DSNE" alarm.

Verify no duplicate TBOS, site/ne, TID or DSNE settings exist. The **rtrv-ne:** command may be used at each shelf in the network to display settings. If duplicates exist, determine new settings and use the **set-ne** command to make new settings.

DO ITEMS BELOW IN ORDER LISTED FOR DETAILS, GO TO

8. **NOTE 1:**

The **set-ne:** command designates a shelf as the directory service network element (DSNE). **One**, and only one, shelf in the network **must** be provisioned as a DSNE. If there is no DSNE in the network, all DCC communication can become disabled. If more than one shelf is provisioned as a DSNE, a "dupLiCate DSNE" alarm will occur. The DSNE must not be a FiberReach shelf. Multiple GNEs are allowed. A shelf is automatically provisioned as a GNE when connected to an active X.25 interface.

 NOTE 2:

Shelves may be designated as an alarm gateway network element (AGNE) and assigned an alarm group number. (Default alarm group number is 255.) At least one AGNE is required per alarm group. One primary AGNE and one backup per alarm group is recommended. For a network greater than 16 nodes, the AGNE and TL1 GNE should be on separate nodes. The AGNE parameter of the **set-ne:** command may have been set to **yes** on each new shelf during shelf turnup procedures to suppress an "AGNE communication failure" alarm.

Use the **set-ne:** command to designate ONE shelf as the DSNE.

Use the **set-ne:** to designate the AGNE(s) and alarm group number, as required.

DO ITEMS BELOW IN ORDER LISTED FOR DETAILS, GO TO

9. **NOTE 1:**

In dual homing configurations, **OLIU** circuit packs must be installed in the correct slots in the host OC-3 nodes to support the direction of traffic required. For example, see Figures 1 and 2. In Figure 1, if a **26G2-U** or **27G-U/27G2-U OLIU** is installed in Node 5, **FUNCTION UNITS A**, slot **1**, traffic will be routed toward Node 6 when cross-connections are made. The other end of the associated OC-1 ring must be connected to a **26G2-U** or **27G-U/27G2-U OLIU** installed in slot **2(P)** of the **FUNCTION UNITS** group () being used to terminate the OC-1 line (for example, Node 4 in Figure 1). Traffic from Node 4 will then be directed toward Node 3 when cross-connections are made. In Figure 2, note that all traffic from the FiberReach shelf will be directed to Node 7 because of the slot positions that terminate the OC-1 line.

 NOTE 2:

A dual-homed ring configuration requires that the first FiberReach **MAIN-1 OLIU** connect to **FUNCTION UNITS () 1 OLIU** on one host OC-3 shelf. The last FiberReach **MAIN-2 OLIU** connects to the **FUNCTION UNITS () 2(P) OLIU** on the other host OC-3 shelf. Intermediate FiberReach shelves on the same OC-1 ring connect from **MAIN-2 OLIU** at one FiberReach shelf to the **MAIN-1 OLIU** at an adjacent FiberReach shelf (node). For example, see Figure 4. This procedure will establish the ring configuration starting from one OC-3 host node (near end) and continuing to an adjacent FiberReach node, then to the next FiberReach node until the final connection is made from the last FiberReach node to the remaining OC-3 host node.

DO ITEMS BELOW IN ORDER LISTED FOR DETAILS, GO TO

⇒ NOTE 3:

All unused ports on the **27G-U/27G2-U OLIU** must be set to **nmon** with the **set-state-oc1** command.

At the near end OC-3 host node, remove the optical loop from the **26G2-U** or **27G-U/27G2-U OLIU** OC-1 line (**1** or **2**) being used for the OC-1 ring configuration (for example, in Figure 4, OC-3 shelf Node 5, slot **FUNCTION UNITS A 1**, OC-1 line **1**.) At the other end of the optical span being established, remove the optical loop from the associated **OLIU**. (for example, in Figure 4, FiberReach **MAIN-1 OLIU**.)

10. ⇒ NOTE:

The section data communication channel (DCC), used for far end communications, must be enabled at each network element (shelf) optical interface being tested in order for the end-to-end line tests to work. Default condition for the DCC channel is "enabled". If it has been disabled, use the **set-fecom: command at each shelf** to enable far end communications.

At each shelf, use the **set-fecom: address:com=enabled** command to ensure far end communications (fecom) is enabled.

-
11. Perform optical fiber connections and verification of the integrity of the optical span being established.
-

DLP-514

DO ITEMS BELOW IN ORDER LISTED FOR DETAILS, GO TO

12. **⇒ NOTE:**

The **rtrv-pm-line** command in the following procedure displays performance monitoring data associated with the OC-1 lines terminated on the system.

Perform end-to-end OC-1 line test.

DLP-556

-
13. Repeat this procedure from Item 11 for all OC-1 optical spans being established in the DDM-2000 OC-3/OC-1 network. Ensure that the last optical span connected to the OC-3 host shelf is connected to an **OLI** in the opposite slot as the one in the first host OC-3 (for example, slot **2(P)** at one node and slot **1** at the other node).

-
14. The dual-homed FiberReach access network is now ready for initial service to be established.
Initial DS1 Service [**System Turnup: NTP-004**]
-

DO ITEMS BELOW IN ORDER LISTED . . . FOR DETAILS, GO TO

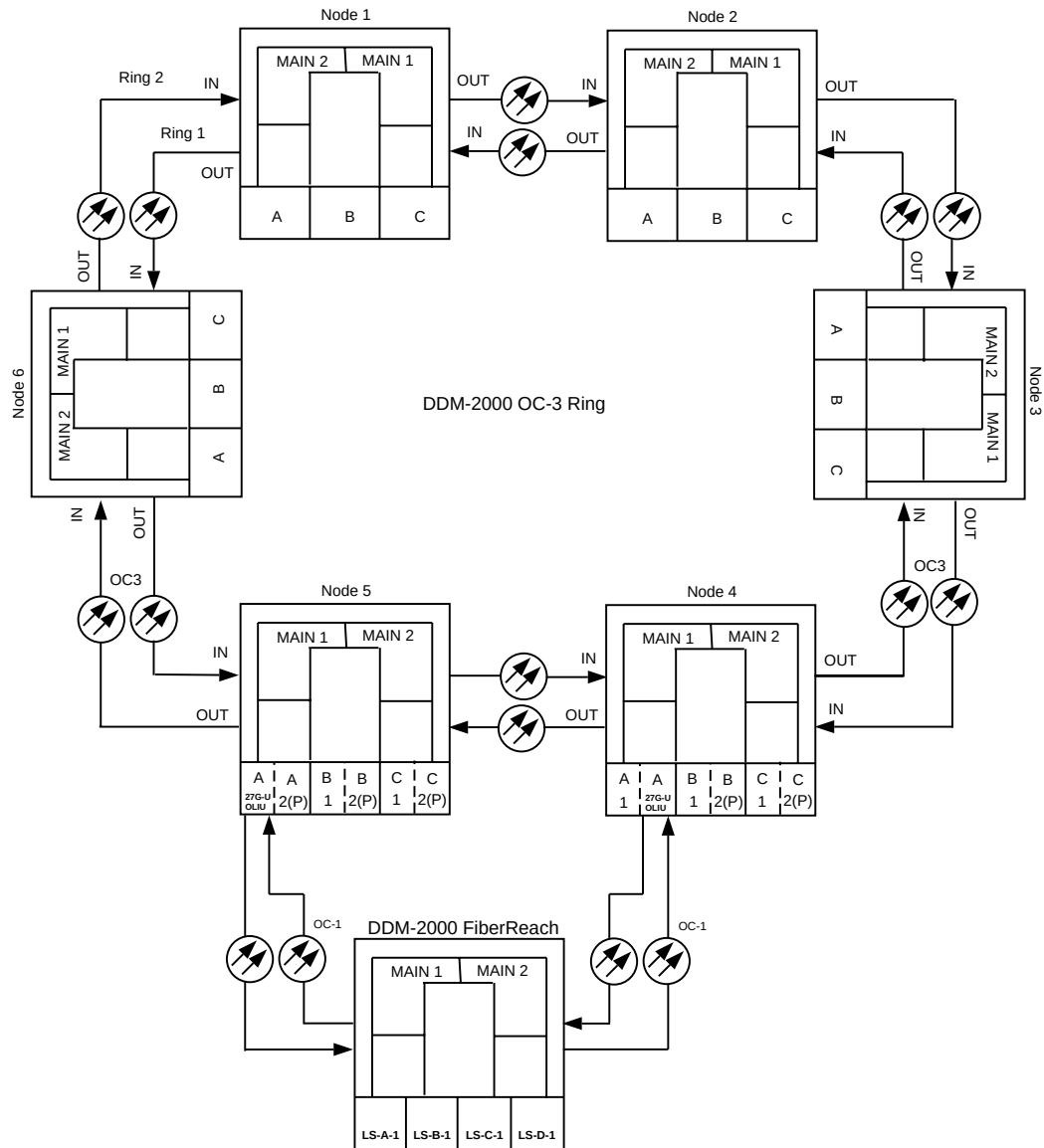


Figure 1. Example Dual-Homed OC-1/OC-3 Ring Configuration

DO ITEMS BELOW IN ORDER LISTED . . . FOR DETAILS, GO TO

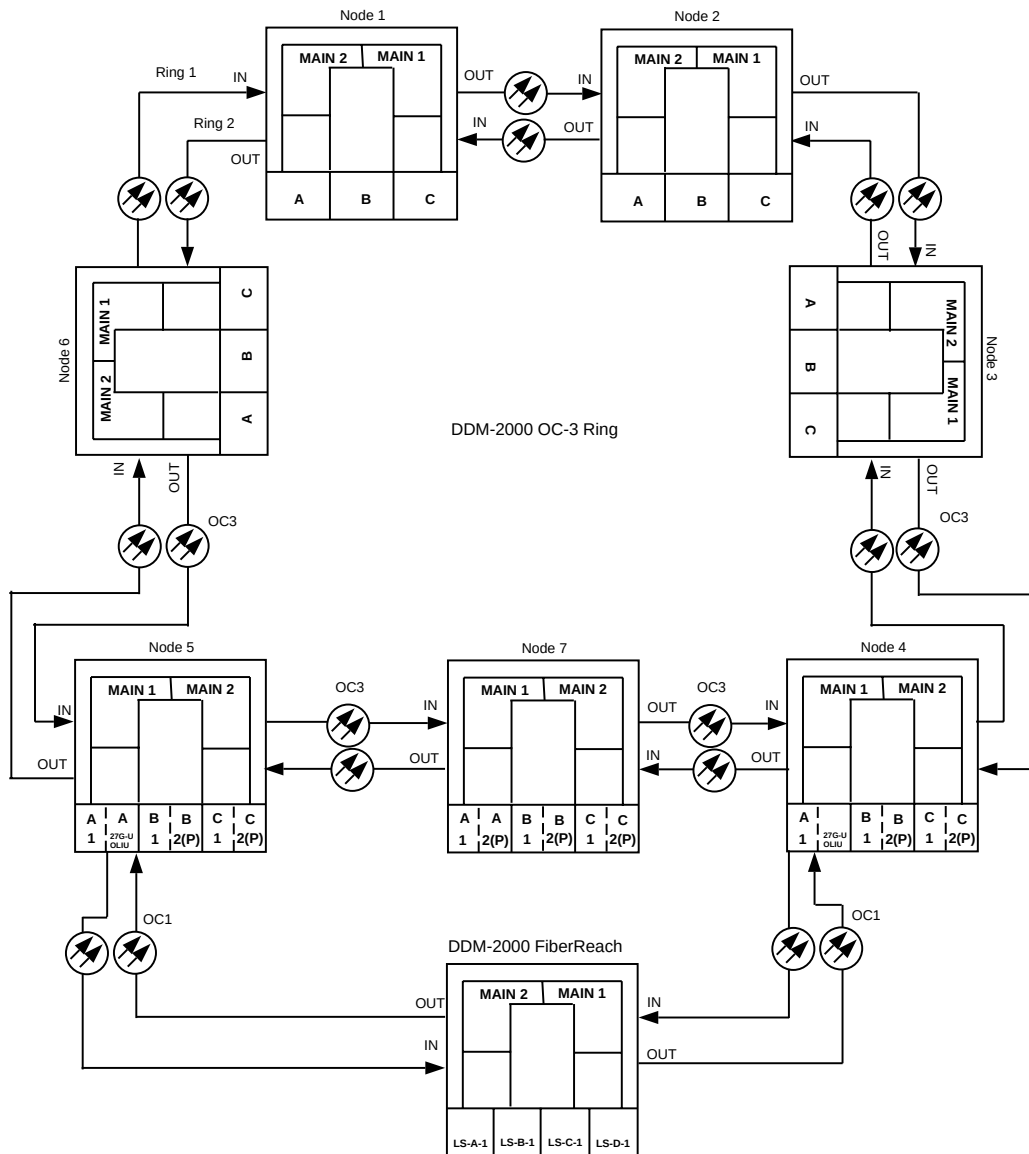
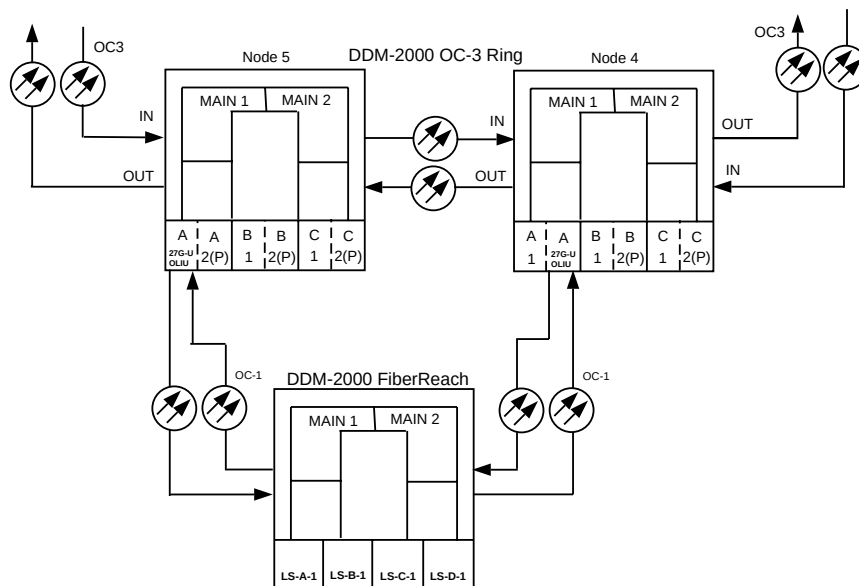


Figure 2. Example Dual-Homed OC-1/OC-3 Ring Configuration

DO ITEMS BELOW IN ORDER LISTED . . . FOR DETAILS, GO TO

DDM-2000 OC-3 DCC Network Side (NS)/User Side (US) Defaults (set-fecom:nsus=ns/us)								
22-Type OLIUs	MAIN-1 dcc-m1	MAIN-2 dcc-m2	FN-A dcc-a		FN-B dcc-b		FN-C dcc-c	
	US	NS	NS		NS		NS	
27-Type OLIUs	MAIN-1 dcc-m1-1 dcc-m1-2	MAIN-2 dcc-m2-1 dcc-m2-2	FN-A-1 dcc-a1-1 dcc-a1-2	FN-A-2 dcc-a2-1 dcc-a2-2	FN-B-1 dcc-b1-1 dcc-b1-2	FN-B-2 dcc-b2-1 dcc-b2-2	FN-C-1 dcc-c1-1 dcc-c1-2	FN-C-2 dcc-c2-1 dcc-c2-2
	US	NS	NS	US	NS	US	NS	US



DDM-2000 FiberReach DCC Network Side (NS)/User Side (US) Defaults (set-fecom:nsus=ns/us)		
26-Type OLIUs	MAIN-1 dcc-m1	MAIN-2 dcc-m2
	US	NS

Figure 3. Example of User Side/Network Side Value Settings

Figure 4. Example of Dual-Homed OC-1/OC-3 Ring Configuration Connections

Establish Stand-Alone FiberReach Access via DDM-2000 OC-3 Host Shelf

DO ITEMS BELOW IN ORDER LISTED FOR DETAILS, GO TO

1.  **WARNING:**
Unterminated optical connectors may emit invisible laser radiation. Avoid direct exposure to the beam. Do not view beam with optical instruments. Use of controls or adjustments or performance of procedures other than those specified herein may result in hazardous radiation exposure.

 **CAUTION:**
*DDM-2000 circuit packs contain static sensitive components which can be damaged by electrostatic discharge. A static ground wrist strap must be worn when handling the circuit packs. See electrostatic discharge considerations in **Trouble Clearing: TAD-100**.*

 **NOTE 1:**
If the DDM-2000 fails to respond in the indicated manner, refer to **Trouble Clearing: IXL-001**.

 **NOTE 2:**
It is assumed that the DDM-2000 OC-3 shelf in the system has passed the looped transmission test(s) (**System Turnup: NTP-016**). It is also assumed the DDM-2000 FiberReach shelves have been equipped and tested (363-206-301, *DDM-2000 FiberReach Multiplexer, Wideband/Narrowband Shelf, User/Service Manual*, **System Turnup: NTP-007**).

DO ITEMS BELOW IN ORDER LISTED FOR DETAILS, GO TO

Determine the network configuration (for example, see Figure 1.)

2. Verify that the host DDM-2000 OC-3 shelf is equipped with Release 9 or later ring software. If not equipped with Release 9 or later software, upgrade the DDM-2000 OC-3 host shelf with proper software
-

3. Determine the optical loss of each optical span from office records or by making the required measurements.
-

4.  **NOTE:**
The Network Side/User Side parameters of the **set-fecom:** command must be set opposite at each end of the optical spans. For example, see Figure 2.

Use the **rtrv-fecom/set-fecom** command to verify/set "Network Side/User Side" parameters at each end of optical span being established.

DO ITEMS BELOW IN ORDER LISTED FOR DETAILS, GO TO

5.  **CAUTION:**
*Stand-alone OC-3 shelves can be timed from an external source, set as free-running, or line timed from **FUNCTION UNITS C** OC-3 slot. Stand-alone OC-3 shelves cannot be line timed from the **MAIN** slots. Therefore, if the OC-3 shelf is to be line timed, the **set-sync:src=fn-c** must be used to derive timing from the **FUNCTION UNITS C** slot, if equipped.*

 **NOTE 1:**
At the OC-3 shelf, if line timing mode is specified or external timing mode is specified but the timing reference was not available at shelf turnup, the **TGS** option switches are probably set for *free running*. Before the end-to-end system is established, the specified timing mode must be set on the **TGS** circuit packs.

 **NOTE 2:**
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.

 **NOTE 3:**
If external timing is selected and the **NE ACTY** LED remains lighted after the **TGS** circuit pack is reinserted, use the CIT and the **rtrv-sync** command to check the operational mode of the system. If the mode is Holdover instead of External, check that the incoming timing references are connected. Also check Mode Switching (revertive or nonrevertive) and the external DS1 Line Code/Format switch settings.

Set timing mode on **TGS** circuit packs to the timing mode specified in work order or office records. Use the **set-sync:** command to set the OC-3 synchronization source, if required.

DLP-513

DO ITEMS BELOW IN ORDER LISTED FOR DETAILS, GO TO

6. **⇒ NOTE:**

Two or more shelves in the same network with the same TBOS display number (set using the **set-ne** command) will cause a "duplicate TBOS display" alarm. Two or more shelves in the same network with the same site/ne address will cause a "duplicate site/ne address" alarm. Two or more shelves in the same network with the same system name or TID (set by the **set-ne** command) will cause a "duplicate TID" alarm.

Verify no duplicate TBOS, site/ne, or TID settings exist. The **rtrv-ne:** command may be used at each shelf in the network to display settings. If duplicates exist, determine new settings and use the **set-ne** command to make new settings.

DO ITEMS BELOW IN ORDER LISTED FOR DETAILS, GO TO

7. **NOTE 1:**

The **set-ne:** command designates a shelf as the directory service network element (DSNE). **One**, and only one, shelf in the network **must** be provisioned as a DSNE. If there is no DSNE in the network, all DCC communication can become disabled. If more than one shelf is provisioned as a DSNE, a "dupLiCate DSNE" alarm will occur. The DSNE must not be a FiberReach shelf. Multiple GNEs are allowed. A shelf is automatically provisioned as a GNE when connected to an active X.25 interface.

 NOTE 2:

Shelves may be designated as an alarm gateway network element (AGNE) and assigned an alarm group number. (Default alarm group number is 255.) At least one AGNE is required per alarm group. One primary AGNE and one backup per alarm group is recommended. For a network greater than 16 nodes, the AGNE and TL1 GNE should be on separate nodes. The AGNE parameter of the **set-ne:** command may have been set to **yes** on each new shelf during shelf turnup procedures to suppress an "AGNE communication failure" alarm.

Use the **set-ne:** command to designate ONE shelf in the network as the DSNE, if not already done.

Use the **set-ne:** command to designate the AGNE(s) and alarm group numbers, as required.

DO ITEMS BELOW IN ORDER LISTED FOR DETAILS, GO TO

8. **NOTE 1:**

This standalone ring configuration requires that the **MAIN 1 OLIU** on the OC-3 shelf connect to the **MAIN-2 OLIU** at the first FiberReach shelf from the OC-3 shelf. **MAIN-1 OLIU** at the FiberReach shelf (node) connects to the **MAIN-2 OLIU** at an adjacent FiberReach shelf (node). The **MAIN-1 OLIU** at the last FiberReach shelf on the OC-1 ring connects to **MAIN 2(P) OLIU** on the host OC-3 shelf. See Figure 1. This procedure will establish the ring configuration starting from the OC-3 host node (near end) to the first FiberReach node, then continuing to the next node until the final connection is made from the last FiberReach node back to the host OC-3 node.

 NOTE 2:

All unused ports on the **27G-U/27G2-U OLIU** must be set to **nmon** with the **set-state-oc1** command.

At the near end, remove the optical loop from the **26G2-U** or **27G-U/27G2-U OLIU** OC-1 line (**1** or **2**) (for example in Figure 1, OC-3 shelf **MAIN 1**, OC-1 line **1**) associated with the optical span being established. At the other end of the optical span, remove the optical loop from the associated **OLIU** (for example, in Figure 1, FiberReach **MAIN-2 OLIU**).

DO ITEMS BELOW IN ORDER LISTED FOR DETAILS, GO TO

9. **NOTE:**

The section data communication channel (DCC), used for far end communications, must be enabled at each network element (shelf) optical interface being tested in order for the end-to-end line tests to work. Default condition for the DCC channel is "enabled". If it has been disabled, use the **set - fecom:** command **at each shelf** to enable far end communications.

At each shelf, use the
set - fecom: address:com=enabled command to
ensure far end communications (fecom) is enabled.

-
10. Perform optical fiber connections and verification of the integrity of the optical span being established. **DLP-514**
-

11. **NOTE:**

The **rtrv-pm-line** command in the following procedure displays performance monitoring data associated with the OC-1 lines terminated on the system.

Perform end-to-end OC-1 line test. **DLP-556**

12. Repeat this procedure for all OC-1 optical spans back to the host OC-3 shelf.
-

13. The system is now ready for initial service to be established.
Initial DS1 Service **[System Turnup: NTP-004]**
-

DO ITEMS BELOW IN ORDER LISTED FOR DETAILS, GO TO

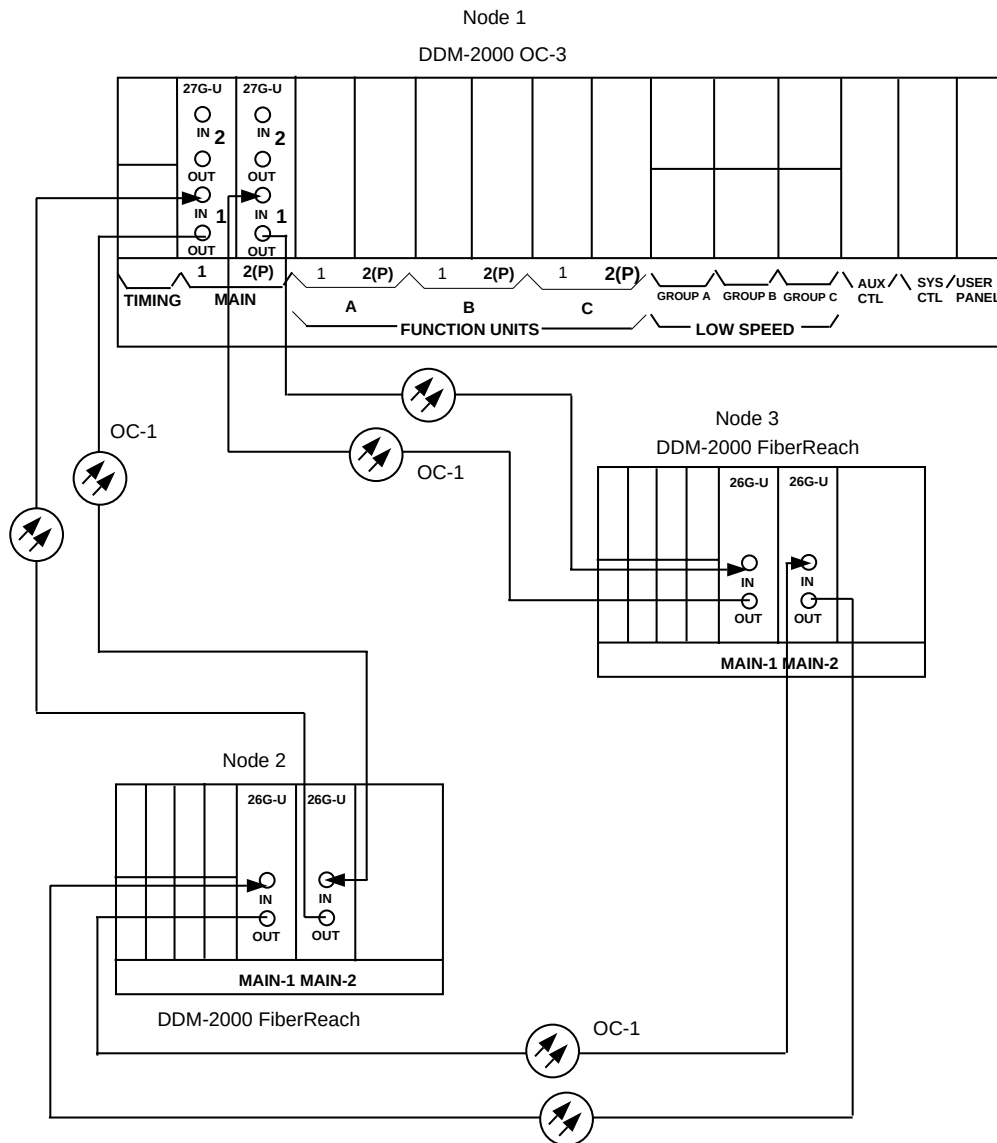
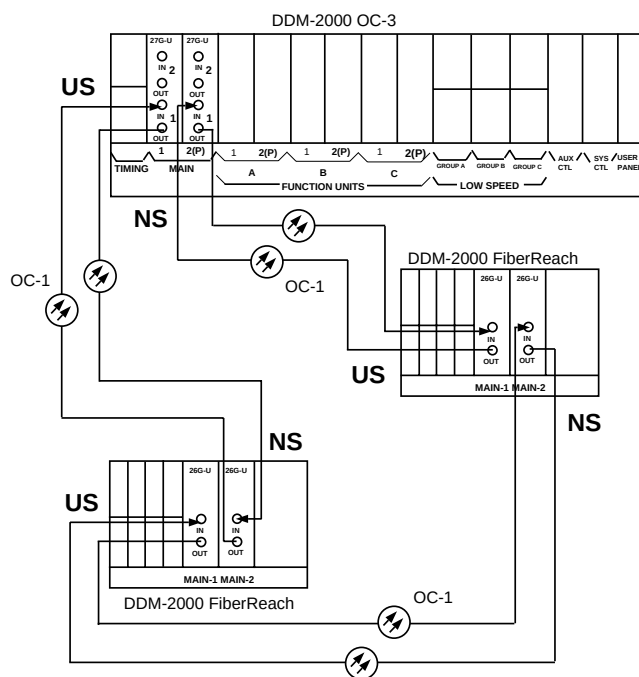


Figure 1. Example Stand-Alone OC3/OC1 Configuration Connections

DO ITEMS BELOW IN ORDER LISTED FOR DETAILS, GO TO

DDM-2000 OC-3 DCC Network Side (NS)/User Side (US) Defaults (set-fecom:nsus=ns/us)								
22-Type OLIUs	MAIN-1 dcc-m1	MAIN-2 dcc-m2	FN-A dcc-a		FN-B dcc-b		FN-C dcc-c	
	US	NS	NS		NS		NS	
27-Type OLIUs	MAIN-1 dcc-m1-1	MAIN-2 dcc-m2-1	FN-A-1 dcc-a1-1	FN-A-2 dcc-a2-1	FN-B-1 dcc-b1-1	FN-B-2 dcc-b2-1	FN-C-1 dcc-c1-1	FN-C-2 dcc-c2-1
	dcc-m1-2	dcc-m2-2	dcc-a1-2	dcc-a2-2	dcc-b1-2	dcc-b2-2	dcc-c1-2	dcc-c2-2
	US	NS	NS	US	NS	US	NS	US



DDM-2000 FiberReach DCC Network Side (NS)/User Side (US) Defaults (set-fecom:nsus=ns/us)		
26-Type OLIUs	MAIN-1 dcc-m1	MAIN-2 dcc-m2
	US	NS

Figure 2. Example of User Side/Network Side Value Settings

Upgrade DDM-2000 OC-3 Release 6 to Release 8 or Release 7.1 or 7.2 to Release 9 or 11 System In Service

DO ITEMS BELOW IN ORDER LISTED FOR DETAILS, GO TO

1.  **CAUTION:**
*DDM-2000 circuit packs contain static sensitive components which can be damaged by electrostatic discharge. A static ground wrist strap must be worn when handling the circuit packs. See electrostatic discharge considerations in **Trouble Clearing: TAD-100**.*

 **NOTE 1:**
This procedure assumes that the DDM-2000 is in service and is being upgraded from Release 6 software to Release 8 or Release 7.1 or 7.2 software to Release 9 or 11. Releases 8 and 9 or later software require that a new **BBG8/BBG8B SYSCTL** and a **BBG9 OHCTL** be installed in the shelf. This procedure must be performed locally at all shelves in the same control network.

 **NOTE 2:**
If the DDM-2000 fails to respond in the indicated manner, refer to **Trouble Clearing: IXL-001**.

Use the **rtrv-alm** command to verify that no alarms, locks, loops, or switches are present.

2. Notify maintenance center that alarms will be generated.
-

DO ITEMS BELOW IN ORDER LISTED FOR DETAILS, GO TO

3.  **CAUTION:**
*Both **TGS** circuit packs must be installed before performing this procedure. During this procedure, downloading Release 8.x, 9.x, or 11.x software to a shelf running OC-3 Releases 6.x or 7.x requires you to remove the **TGS** circuit pack in **TIMING** slot 1 in order to "force" the system to run the new software. If both **TGS** circuit packs are not installed, removal of the only **TGS** circuit pack will cause service interruption.*

 **NOTE 1:**
If upgrading from a Release 6 system to a Release 8 system or a Release 7.1 system to a Release 9 or 11 system, after the first shelf is upgraded, single ended operations will not be available and major alarms (section DCC channel failed) will exist until all shelves are upgraded.

 **NOTE 2:**
This procedure will not affect transmission when properly performed.

Before performing this procedure on an in-service system, ensure that both **TGS** circuit packs are installed in the shelf and use the
switch-sync:s=circuitpack,pri>manual
command to switch to the protection **TGS** circuit pack in **TIMING** slot 2, if not already **ACTIVE**. Use
rtrv-sync: command to verify that the **TGS** circuit pack in **TIMING** slot 2 is **ACTIVE**.

DO ITEMS BELOW IN ORDER LISTED FOR DETAILS, GO TO

4. From system records, work orders, or the retrieve [RTRV-()] commands, retrieve all parameters that might have been set using the SET commands [DLP-512]. See the "Commands and Reports" section of this manual for a description of the **rtrv-()** commands. Note all the parameters that are set using the **set-ne** and **set-fecom** commands. These parameters may have to be reset when the controllers are replaced and the new software is installed.

-
5. If upgrading from Release 6 to Release 8 or Release 7.1 to Release 9 or 11, use the **set-ne:gne=no** command to discontinue the GNE shelf in the R6 linear or R7.1 ring.
-

DO ITEMS BELOW IN ORDER LISTED . . . FOR DETAILS, GO TO

6.  **CAUTION:**
*Removing the **BBG5 SYSCTL** without performing a 10-second countdown sequence on the **FE ID** display (see **Note**) 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** pushbutton on the User Panel and the **FE SEL** pushbutton 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.

Remove **BBG5 SYSCTL** circuit pack.

-
7. Remove **BBG7 OHCTL** circuit pack.

-
8. Install **BBG9 OHCTL**. **DLP-500**

-
9.  **NOTE 1:**
If upgrading from Release 6 to Release 8 or Release 7.1 to Release 9 or 11 (all shelves), after the software download is successfully completed, the **FAULT** LED on the **OHCTL** will flash and the **MJ** LED will be lighted until the other end is upgraded.

DO ITEMS BELOW IN ORDER LISTED FOR DETAILS, GO TO

⇒ **NOTE 2:**

Users who receive software upgrades or new **SYSCTL** circuit packs from the factory may find that a new default login (LUC01, LUC02, or LUC03) is needed to allow access into the system. If none of the new default logins permits access to the system, the user should try one of the old default logins (ATT01, ATT02, ATT03). The default password is DDM-2000.

Install new **BBG8/BBG8B SYSCTL**.

DLP-501

10. **CAUTION:**

*Do not designate any shelf as the DSNE (Step 12) until all shelves in the network have been upgraded to the new software. Designating the DSNE first will prevent the other nodes from completing the **set -ne** command.*

⇒ **NOTE:**

Parameters that were previously set by switches on the **BBG7 OHCTL** and **BBG5 SYSCTL** are set by software commands on the new **BBG9 OHCTL** and **BBG8/BBG8B SYSCTL** controllers: **TID, Site, NE, Shelf, PMN, TBOS, CO/RT, Network Side/User Side (NS/US)** parameters.

Use the **set -ne** and **set -fecom** commands to set these parameters on the new controllers: **TID, Site, NE, Shelf, PMN, TBOS, CO/RT, Network Side/User Side (NS/US)**. If other parameters have to be reset from default during this upgrade, use the Commands and Reports section of this manual for a description of the **set -** commands.

DO ITEMS BELOW IN ORDER LISTED FOR DETAILS, GO TO

11. Repeat this procedure from Step 2 for all shelves being upgraded, if not already performed.
-
12. After all shelves have been upgraded to new software, use the **set-ne:agne=yes** command to designate one shelf as the AGNE.
-
13. After all shelves have been upgraded to new software, use the **set-ne:dsne=yes** command to designate one shelf as the DSNE.
-

Establish Single-Homed OC-3 Access via FT-2000 OC-48 Backbone Ring

DO ITEMS BELOW IN ORDER LISTED . . . FOR DETAILS, GO TO

1.  **WARNING:**
Unterminated optical connectors may emit invisible laser radiation. Avoid direct exposure to the beam. Do not view beam with optical instruments. Use of controls or adjustments or performance of procedures other than those specified herein may result in hazardous radiation exposure.

 **CAUTION:**
*DDM-2000 circuit packs contain static sensitive components which can be damaged by electrostatic discharge. A static ground wrist strap must be worn when handling the circuit packs. See electrostatic discharge considerations in **Trouble Clearing: TAD-100**.*

 **NOTE 1:**
If the DDM-2000 fails to respond in the indicated manner, refer to **Trouble Clearing: IXL-001**.

 **NOTE 2:**
It is assumed that the FT-2000 in the system have passed local tests and the FT-2000 ring has been established. It is also assumed the DDM-2000 OC-3 shelves have been equipped and tested (363-206-280, *DDM-2000 OC-3 Multiplexer, Releases 8.0 through 11.1, User/Service Manual (TOP)—Volume II, System Turnup: NTP-016*).

DO ITEMS BELOW IN ORDER LISTED FOR DETAILS, GO TO

⇒ NOTE 3:

This procedure is used to establish a single-homed DDM-2000 OC-3 ring connection to an FT-2000 ring (See Figure 1). Other configurations may have to be established to obtain your final configuration. See **NTP-048** for dual-homed configurations and **NTP-049** for single OC-3 optical extensions from the FT-2000 low speed interface (**LS INTFC**) ports.

Determine the network configuration (for example, see Figure 1.)

-
2. Verify that the host FT-2000 OC-48 shelf is equipped with Release 6 or later ring software. If not equipped with Release 6 or later software, upgrade the FT-2000 OC-48 host shelf with proper software. Verify that the DDM-2000 OC-3 shelves are equipped with Release 7.2, 9.0 or later ring software.

-
3. Determine the optical loss of each optical span from office records or by making the required measurements.
-

DO ITEMS BELOW IN ORDER LISTED FOR DETAILS, GO TO

4. **NOTE:**

FAULT LEDs will not go off until fibers are connected to the DDM.

Verify/Add OC-3/IS-3 Low Speed Slots at the host FT-2000 shelves. (365-575-102, *FT-2000 OC-48 Lightwave System, User/Service Manual*, **Add OC-3/IS-3 Low Speed Slot(s), NTP-010**).

-
5. At the FT-2000, verify/provision the FT-2000 low speed OC-3 slots Protection Mode (from OC-3) Parameter to *0X1* (See **CONFIGURATION-Set -OC3** command in 365-575-102, *FT-2000 OC-48 Lightwave System, User/Service Manual*, **Provision Low Speed Slot and Port Parameters, DLP-517**.)

-
6. At the FT-2000, verify/assign DCC channels to FT-2000 low speed OC-3 slots. (See **CONFIGURATION-Enter -Assignment -DCC** command in 365-575-102, *FT-2000 OC-48 Lightwave System, User/Service Manual*, **Provision Low Speed Slot and Port Parameters, DLP-517**.)
-

DO ITEMS BELOW IN ORDER LISTED FOR DETAILS, GO TO

7. **⇒ NOTE 1:**

This procedure will establish the OC-3 ring configuration starting from the FT-2000 host node (far end) to the first OC-3 node (near end), then continuing to the next OC-3 node until the final connection is made from the last OC-3 node back to the host FT-2000 node.

⇒ NOTE 2:

The Network Side (NS)/User Side (US) parameters of the OC-3 **set-fecom:** command and the FT-2000 DCC orientation must be set opposite at each end of the optical spans. For example, see Figure 2.

Use the **rtrv-fecom/set-fecom** command at the DDM-2000 or the **CONFIGURATION-Enter-Assignment-DCC** command at the FT-2000 to verify/set "Network Side/User Side" parameters at each end of all optical spans being established.

DO ITEMS BELOW IN ORDER LISTED FOR DETAILS, GO TO

8. **NOTE 1:**

If line timing mode is specified or external timing mode is specified but the timing reference was not available at the OC-3 shelf turnup, the **TGS** option switches are probably set for *free running*. Before this configuration is established, the specified timing mode must be set on the **TGS** circuit packs.

 NOTE 2:

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.

 NOTE 3:

If external timing is selected and the **NE ACTY** LED remains lighted after the **TGS** circuit pack is reinserted, use the CIT and the **rtrv-sync** command to check the operational mode of the system. If the mode is Holdover instead of External, check that the incoming timing references are connected. Also check Mode Switching (revertive or nonrevertive) and the external DS1 Line Code/Format switch settings.

Set timing mode on DDM-2000 **TGS** circuit packs to the timing mode specified in work order or office records.

DLP-513

DO ITEMS BELOW IN ORDER LISTED FOR DETAILS, GO TO

9.  **NOTE 1:**
If Kbyte (Release 9.0 and earlier) or Sbyte (Releases 8.1, 9.1, and later) (sync messaging) is enabled for the OC-3 **main-1** and **main-2** optical interfaces at any node in the OC-3 ring, it **must** be enabled at all nodes in the OC-3 ring.

-  **NOTE 2:**
The **rtrv-oc3:** command retrieves the "OC-3 Line Provisioning Report". This report displays the provisioned configuration of OC-3 lines. See the "Commands and Reports" section of this manual and the OC-3 manual for a description of the **rtrv-oc3:** command format.

Use the **rtrv-oc3:** command to obtain the "OC-3 Line Provisioning Report". Use the **set-oc3:** command to enable the Kbyte/Sbyte parameter, if required.

DO ITEMS BELOW IN ORDER LISTED FOR DETAILS, GO TO

10.  **NOTE 1:**
If Sync Autoreconfiguration is enabled, Kbyte/Sbyte must also be enabled.
-  **NOTE 2:**
If Sync Autoreconfiguration is enabled at any line-timed OC-3 node (not available for external timed or free-running nodes), it **must** be enabled at all line-timed OC-3 nodes.
-  **NOTE 3:**
The **rtrv-sync:** command retrieves the "Synchronization Report". This report displays the provisioning and operational information on the synchronization attributes of the DDM-2000. See the "Commands and Reports" section of this manual and the OC-3 manual for a description of the **rtrv-sync:** command format.

Use the **rtrv-sync:** command to obtain the "Synchronization Report" and verify if Sync Autoreconfiguration is enabled or disabled at any line-timed OC-3 node. Use the **set-sync:** command to enable or disable the Sync Autoreconfiguration parameter, as required.

DO ITEMS BELOW IN ORDER LISTED FOR DETAILS, GO TO

11. **NOTE:**

Two or more shelves in the same network with the same TBOS display number (set using the **set-ne** command) will cause a "duplicate TBOS display" alarm. Two or more shelves in the same network with the same site/ne address (set by the **set-ne** command) will cause a "duplicate site/ne address" alarm. Two or more shelves in the same network with the same system name or TID (set by the **set-ne** command) will cause a "duplicate TID" alarm.

Verify no duplicate TBOS, site/ne, or TID settings exist. The **rtrv-ne:** command may be used at each shelf in the network to display settings. If duplicates exist, determine new settings and use the **set-ne** command to make new settings.

DO ITEMS BELOW IN ORDER LISTED FOR DETAILS, GO TO

12. **⇒ NOTE 1:**

The DDM-2000 **set-ne:** command designates a DDM-2000 shelf as the directory service network element (DSNE). **One**, and only one, shelf in the DDM-2000/FT-2000 network **must** be provisioned as a DSNE. It is recommended that a DDM-2000 shelf be provisioned as the DSNE. If there is no DSNE in the network, all DCC communication can become disabled. If more than one shelf is provisioned as a DSNE, a "duplicate DSNE" alarm will occur. Multiple GNEs are allowed. A shelf is automatically provisioned as a GNE when connected to an active X.25 interface.

⇒ NOTE 2:

Shelves may be designated as an alarm gateway network element (AGNE) and assigned an alarm group number. (Default alarm group number is 255.) At least one AGNE is required per alarm group. One primary AGNE and one backup per alarm group is recommended. For a network greater than 16 nodes, the AGNE and TL1 GNE should be on separate nodes. The AGNE parameter of the **set-ne:** command may have been set to **yes** on each new shelf during shelf turnup procedures to suppress an "AGNE communication failure" alarm.

⇒ NOTE 3:

It is recommended that the DSNE be changed from an FT-2000 node to a DDM-2000 node, discontinue the FT-2000 DSNE and use the **reset** command to reset the DDM-2000 DSNE node.

Use the **set-ne:** command to designate ONE shelf in the DDM-2000 network as the DSNE, if the DSNE is going to be a DDM-2000 shelf.

Use the **set-ne:** command to designate the AGNE(s) and alarm group numbers, as required.

DO ITEMS BELOW IN ORDER LISTED FOR DETAILS, GO TO

13. **NOTE:**

If auto reconfiguration is enabled, the DDM-2000 shelf that will connect to the FT-2000 via the **MAIN 1** should be the first of the DDM-2000 ring to connect to the FT-2000. If the DDM-2000 shelf connecting to FT-2000 via **MAIN 2(P)** is connected first, the DDM-2000 shelf will remain in holdover as will all other subsequent DDM-2000 shelves in the ring until the shelf connecting to the FT-2000 via **MAIN 1** is connected.

At the near end, remove the optical loop from the **MAIN OLIU** (for example in Figure 2, OC-3 node 2 **MAIN 1**) associated with the optical span being established. At the other end of the optical span, remove the optical loop from the associated FT-2000 **OLIU** (for example, in Figure 2, FT-2000 **LS INTFC 1A** slot).

14. **NOTE:**

The section data communication channel (DCC), used for far end communications, must be enabled at each network element (shelf) optical interface being tested in order for the end-to-end line tests to work. Default condition for the DCC channel is "enabled". If it has been disabled, use the **set - fecom:** command **at each shelf** to enable far end communications.

At each DDM-2000 shelf, use the **set - fecom: address:com=enabled** command to ensure far end DCC communications (fecom) is enabled.

At each FT-2000 shelf, use the **SECURITY-Set -Far End Communications:** command to ensure far end DCC communications (fecom) is enabled.

DO ITEMS BELOW IN ORDER LISTED FOR DETAILS, GO TO

15. Perform optical fiber connections and verification of the integrity of the optical span being established. **DLP-514**
-

16.  **NOTE:**
The **rtrv-pm-line** command in the following procedure displays performance monitoring data associated with the OC-3 lines terminated on the system.

Perform end-to-end OC-3 line test. **DLP-515**

17. Repeat this procedure from Item 15 for all OC-3 optical spans until the OC-3 ring is complete back to the host FT-2000 shelf.
-

18.  **NOTE:**
Establishing service requires that the proper slots in each terminating node be properly equipped with the correct circuit pack(s) for the type of service being established. It also requires numerous cross connections in each of the nodes representing the path of the required service. Additionally, transmission tests should be performed to verify the continuity and quality of the established circuit.

The single-homed DDM-2000 OC-3 access network is now ready for initial service to be established. For service terminations on a FT-2000 shelf, use the procedures in the FT-2000 User/Service Manual to establish those services. For DS1, DS3, and/or EC-1 terminations on a DDM-2000 OC-3 shelf, use the procedures in this User/Service manual to establish those services.

DO ITEMS BELOW IN ORDER LISTED FOR DETAILS, GO TO

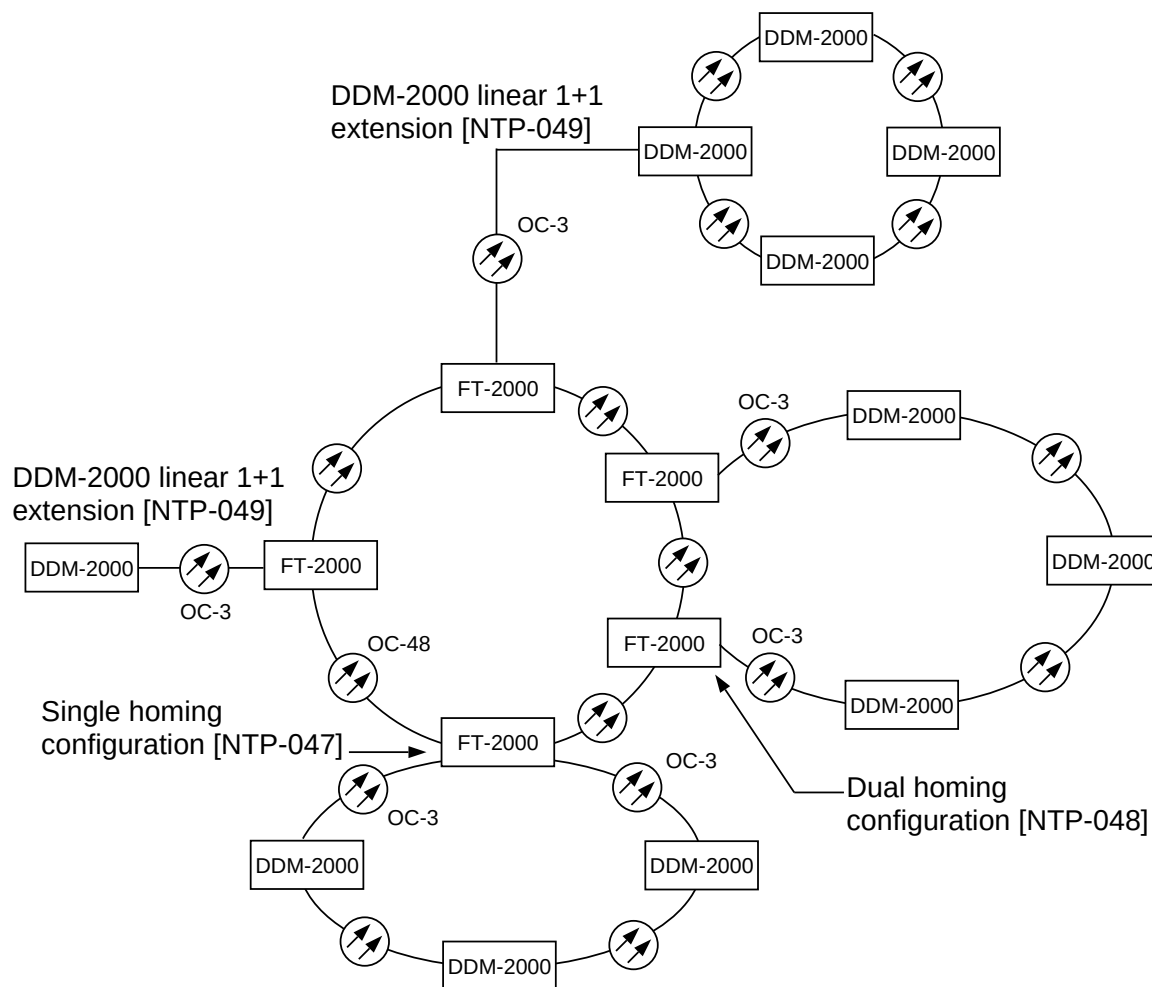
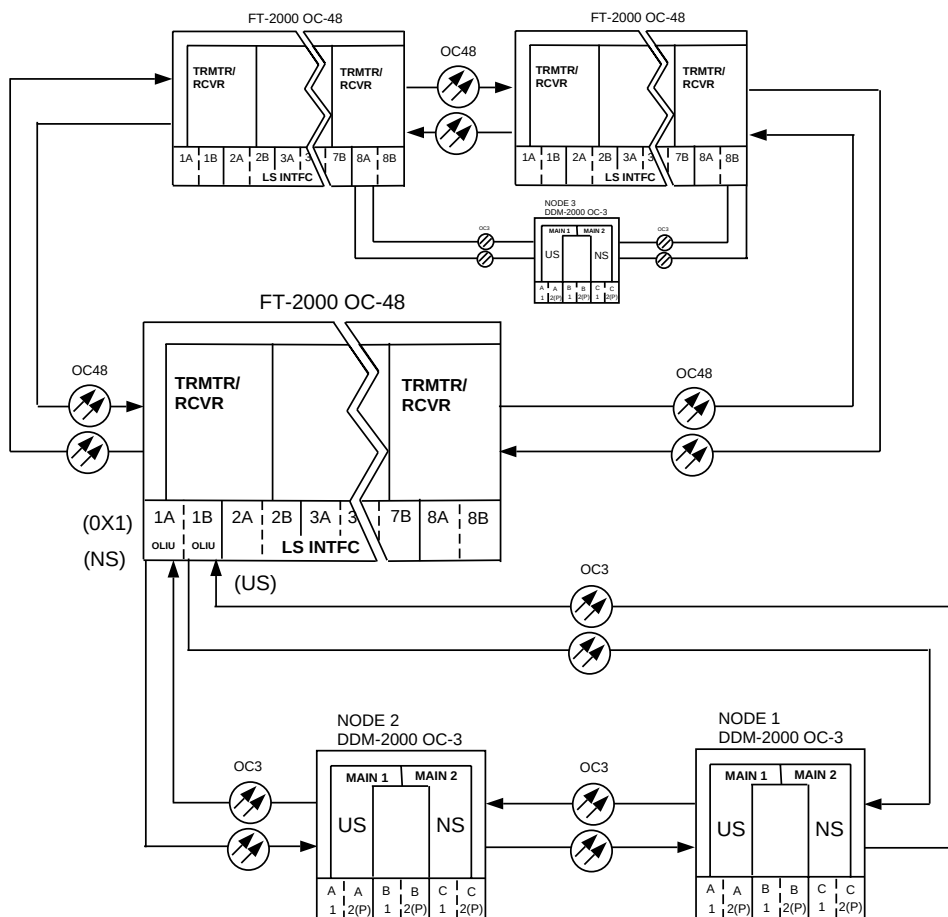


Figure 1. Example FT-2000 OC-48/DDM-2000 OC-3 Configurations

DO ITEMS BELOW IN ORDER LISTED . . . FOR DETAILS, GO TO



DDM-2000 OC-3 DCC Network Side (NS)/User Side (US) Defaults (set-fecom:nsus=ns/us)					
22-Type OLIUs (0X1 Rings application)	MAIN 1 dcc-m1	MAIN 2 dcc-m2	FN-A dcc-a	FN-B dcc-b	FN-C dcc-c
	US	NS	NS	NS	NS

Figure 2. Example of Single Homed User Side/Network Side Value Settings

Establish Dual-Homed OC-3 Access via FT-2000 OC-48 Backbone Ring

DO ITEMS BELOW IN ORDER LISTED FOR DETAILS, GO TO

1.  **WARNING:**
Unterminated optical connectors may emit invisible laser radiation. Avoid direct exposure to the beam. Do not view beam with optical instruments. Use of controls or adjustments or performance of procedures other than those specified herein may result in hazardous radiation exposure.

 **CAUTION:**
*DDM-2000 circuit packs contain static sensitive components which can be damaged by electrostatic discharge. A static ground wrist strap must be worn when handling the circuit packs. See electrostatic discharge considerations in **Trouble Clearing: TAD-100**.*

 **NOTE 1:**
If the DDM-2000 fails to respond in the indicated manner, refer to **Trouble Clearing: IXL-001**.

 **NOTE 2:**
It is assumed that the FT-2000 in the system have passed local tests and the FT-2000 ring has been established. It is also assumed the DDM-2000 OC-3 shelves have been equipped and tested (363-206-280, *DDM-2000 OC-3 Multiplexer, Releases 8.0 through 11.1, User/Service Manual (TOP)—Volume II, System Turnup: NTP-016*).

DO ITEMS BELOW IN ORDER LISTED FOR DETAILS, GO TO

⇒ NOTE 3:

This procedure is used to establish a dual-homed DDM-2000 OC-3 ring connection to an FT-2000 ring (See Figure 1). Other configurations may have to be established to obtain your final configuration. See **NTP-047** for single-homed configurations and **NTP-049** for single OC-3 optical extensions from the FT-2000 low speed interface (**LS INTFC**) ports.

Determine the network configuration (for example, see Figure 1.)

-
2. Verify that the host FT-2000 OC-48 shelves are equipped with Release 6 or later ring software. If not equipped with Release 6 or later software, upgrade the FT-2000 OC-48 host shelves with proper software. Verify that the DDM-2000 OC-3 shelves are equipped with Release 7.2, 9.0 or later ring software.
-
3. Determine the optical loss of each optical span from office records or by making the required measurements.
-

DO ITEMS BELOW IN ORDER LISTED FOR DETAILS, GO TO

4.  **NOTE:**
 FAULT LEDs will not go off until fibers are connected to the DDM.

Verify/Add OC-3/IS-3 Low Speed Slots at the host
FT-2000 shelves. (See 365-575-102, *FT-2000 OC-48
Lightwave System, User/Service Manual, Add OC-3/IS-3
Low Speed Slot(s), NTP-010*).

-
5. At the FT-2000, verify/provision the FT-2000 low-speed
OC-3 slots Protection Mode (from OC-3) Parameter to
"0X1". (See **CONFIGURATION-Set-OC3** command in
365-575-102, *FT-2000 OC-48 Lightwave System,
User/Service Manual, Provision Low Speed Slot and
Port Parameters, DLP-517*.)

-
6. At the FT-2000, verify/assign DCC channels to FT-2000
low-speed OC-3 slots. (See **CONFIGURATION-Enter -
Assignment-DCC** command in 365-575-102, *FT-2000
OC-48 Lightwave System, User/Service Manual,
Provision Low Speed Slot and Port Parameters,
DLP-517*.)
-

DO ITEMS BELOW IN ORDER LISTED FOR DETAILS, GO TO

7. **⇒ NOTE 1:**

This procedure will establish the OC-3 ring configuration starting from one FT-2000 host node (far end) to the first OC-3 node (near end), then continuing to the next OC-3 node until the final connection is made from the last OC-3 node to the other host FT-2000 node.

⇒ NOTE 2:

The Network Side (NS)/User Side (US) parameters of the DDM-2000 OC-3 **set-fecom:** command and the FT-2000 DCC orientation must be set opposite at each end of the optical spans. For example, see Figure 2.

Use the **rtrv-fecom** command at the DDM-2000 to retrieve DCC parameters. Use **set-fecom:nsus=NS/US** command at the DDM-2000 to set "Network Side (NS)/User Side (US)" parameters at each end of all optical spans being established. Use the **CONFIGURATION-Enter-Assignment-DCC** command at the FT-2000 to assign DCC channels.

DO ITEMS BELOW IN ORDER LISTED FOR DETAILS, GO TO

8. **NOTE 1:**

If line timing mode is specified or external timing mode is specified but the timing reference was not available at the OC-3 shelf turnup, the **TGS** option switches are probably set for *free running*. Before this configuration is established, the specified timing mode must be set on the **TGS** circuit packs.

 NOTE 2:

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.

 NOTE 3:

If external timing is selected and the **NE ACTY** LED remains lighted after the **TGS** circuit pack is reinserted, use the CIT and the **rtrv-sync** command to check the operational mode of the system. If the mode is Holdover instead of External, check that the incoming timing references are connected. Also check Mode Switching (revertive or nonrevertive) and the external DS1 Line Code/Format switch settings.

Set timing mode on DDM-2000 **TGS** circuit packs to the timing mode specified in work order or office records.

DLP-513

DO ITEMS BELOW IN ORDER LISTED FOR DETAILS, GO TO

9.  **NOTE 1:**
If Kbyte (Release 9.0 and earlier) or Sbyte (Releases 8.1, 9.1, and later) (sync messaging) is enabled for the OC-3 **main-1** and **main-2** optical interfaces at any node in the OC-3 ring, it **must** be enabled at all nodes in the OC-3 ring.

-  **NOTE 2:**
The **rtrv-oc3:** command retrieves the "OC-3 Line Provisioning Report". This report displays the provisioned configuration of OC-3 lines. See the "Commands and Reports" section of this manual and the OC-3 manual for a description of the **rtrv-oc3:** command format.

Use the **rtrv-oc3:** command to obtain the "OC-3 Line Provisioning Report". Use the **set-oc3:** command to enable the Kbyte/Sbyte parameter, if required.

DO ITEMS BELOW IN ORDER LISTED FOR DETAILS, GO TO

10.  **NOTE 1:**
If Sync Autoreconfiguration is enabled, Kbyte/Sbyte must also be enabled.

-  **NOTE 2:**
If Sync Autoreconfiguration is enabled at any line-timed OC-3 node (not available for external timed or free-running nodes), it **must** be enabled at all line-timed OC-3 nodes.

-  **NOTE 3:**
The **rtrv-sync:** command retrieves the "Synchronization Report". This report displays the provisioning and operational information on the synchronization attributes of the DDM-2000. See the "Commands and Reports" section of this manual and the OC-3 manual for a description of the **rtrv-sync:** command format.

Use the **rtrv-sync:** command to obtain the "Synchronization Report" and verify if Sync Autoreconfiguration is enabled or disabled at any line-timed OC-3 node. Use the **set-sync:** command to enable or disable the Sync Autoreconfiguration parameter, as required.

DO ITEMS BELOW IN ORDER LISTED FOR DETAILS, GO TO

11. **NOTE:**

Two or more shelves in the same network with the same TBOS display number (set using the **set-ne** command) will cause a "duplicate TBOS display" alarm. Two or more shelves in the same network with the same site/ne address (set by the **set-ne** command) will cause a "duplicate site/ne address" alarm. Two or more shelves in the same network with the same system name or TID (set by the **set-ne** command) will cause a "duplicate TID" alarm.

Verify no duplicate TBOS, site/ne, or TID settings exist. The **rtrv-ne:** command may be used at each shelf in the network to display settings. If duplicates exist, determine new settings and use the **set-ne** command to make new settings.

DO ITEMS BELOW IN ORDER LISTED FOR DETAILS, GO TO

12. **⇒ NOTE 1:**

The DDM-2000 **set-ne:** command designates a DDM-2000 shelf as the directory service network element (DSNE). **One**, and only one, shelf in the DDM-2000/FT-2000 network **must** be provisioned as a DSNE. It is recommended that a DDM-2000 shelf be provisioned as the DSNE. If there is no DSNE in the network, all DCC communication can become disabled. If more than one shelf is provisioned as a DSNE, a "duplicate DSNE" alarm will occur. Multiple GNEs are allowed. A shelf is automatically provisioned as a GNE when connected to an active X.25 interface.

⇒ NOTE 2:

Shelves may be designated as an alarm gateway network element (AGNE) and assigned an alarm group number. (Default alarm group number is 255.) At least one AGNE is required per alarm group. One primary AGNE and one backup per alarm group is recommended. For a network greater than 16 nodes, the AGNE and TL1 GNE should be on separate nodes. The AGNE parameter of the **set-ne:** command may have been set to **yes** on each new shelf during shelf turnup procedures to suppress an "AGNE communication failure" alarm.

⇒ NOTE 3:

It is recommended that the DSNE be changed from an FT-2000 node to a DDM-2000 node, discontinue the FT-2000 DSNE and use the reset command to reset the DDM-2000 DSNE node.

Use the **set-ne:** command to designate ONE shelf in the DDM-2000 network as the DSNE, if the DSNE is going to be a DDM-2000 shelf.

Use the **set-ne:** command to designate the AGNE(s) and alarm group numbers, as required.

DO ITEMS BELOW IN ORDER LISTED FOR DETAILS, GO TO

13. **NOTE 1:**

If auto reconfiguration is enabled, the DDM-2000 shelf that will connect to the FT-2000 via the **MAIN 1** should be the first of the DDM-2000 ring to connect to the FT-2000. If the DDM-2000 shelf connecting to FT-2000 via **MAIN 2(P)** is connected first, the DDM-2000 shelf will remain in holdover as will all othe subsequent DDM-2000 shelves in the ring until the shelf connecting to the FT-2000 via **MAIN 1** is connected.

At the near end, remove the optical loop from the **MAIN OLIU** (for example in Figure 1, OC-3 node 1 **MAIN 1**) associated with the optical span being established. At the other end of the optical span, remove the optical loop from the associated FT-2000 **OLIU** (for example, in Figure 2, FT-2000 **LS INTFC 1A** slot).

14. **NOTE:**

The section data communication channel (DCC), used for far end communications, must be enabled at each network element (shelf) optical interface being tested in order for the end-to-end line tests to work. Default condition for the DCC channel is "enabled". If it has been disabled, use the **set - fecom:** command **at each shelf** to enable far end communications.

At each DDM-2000 shelf, use the **set - fecom: address:com=enabled** command to ensure far end DCC communications (fecom) is enabled.

At each FT-2000 shelf, use the **SECURITY-Set -Far End Communications:** command to ensure far end DCC communications (fecom) is enabled.

DO ITEMS BELOW IN ORDER LISTED FOR DETAILS, GO TO

15. Perform optical fiber connections and verification of the integrity of the optical span being established. **DLP-514**
-

16.  **NOTE:**
The **rtrv-pm-line** command in the following procedure displays performance monitoring data associated with the OC-3 lines terminated on the system.

Perform end-to-end OC-3 line test. **DLP-515**

17. Repeat this procedure from Item 15 for all OC-3 optical spans until the OC-3 ring is complete to the other host FT-2000 shelf.
-

DO ITEMS BELOW IN ORDER LISTED FOR DETAILS, GO TO

18. **NOTE:**

Establishing service requires that the proper slots in each terminating node be properly equipped with the correct circuit pack(s) for the type of service being established. It also requires numerous cross connections in each of the nodes representing the path of the required service. Additionally, transmission tests should be performed to verify the continuity and quality of the established circuit.

The dual-homed DDM-2000 OC-3 access network is now ready for initial service to be established. For service terminations on a FT-2000 shelf, use the procedures in 365-575-102, *FT-2000 OC-48 Lightwave System, User/Service Manual* to establish those services. For DS1, DS3, and/or EC-1 terminations on a DDM-2000 OC-3 shelf, use the procedures in 363-206-280, *DDM-2000 OC-3 Multiplexer, Releases 8.0 through 11.1, User/Service Manual (TOP)—Volume II*, to establish those services.

DO ITEMS BELOW IN ORDER LISTED FOR DETAILS, GO TO

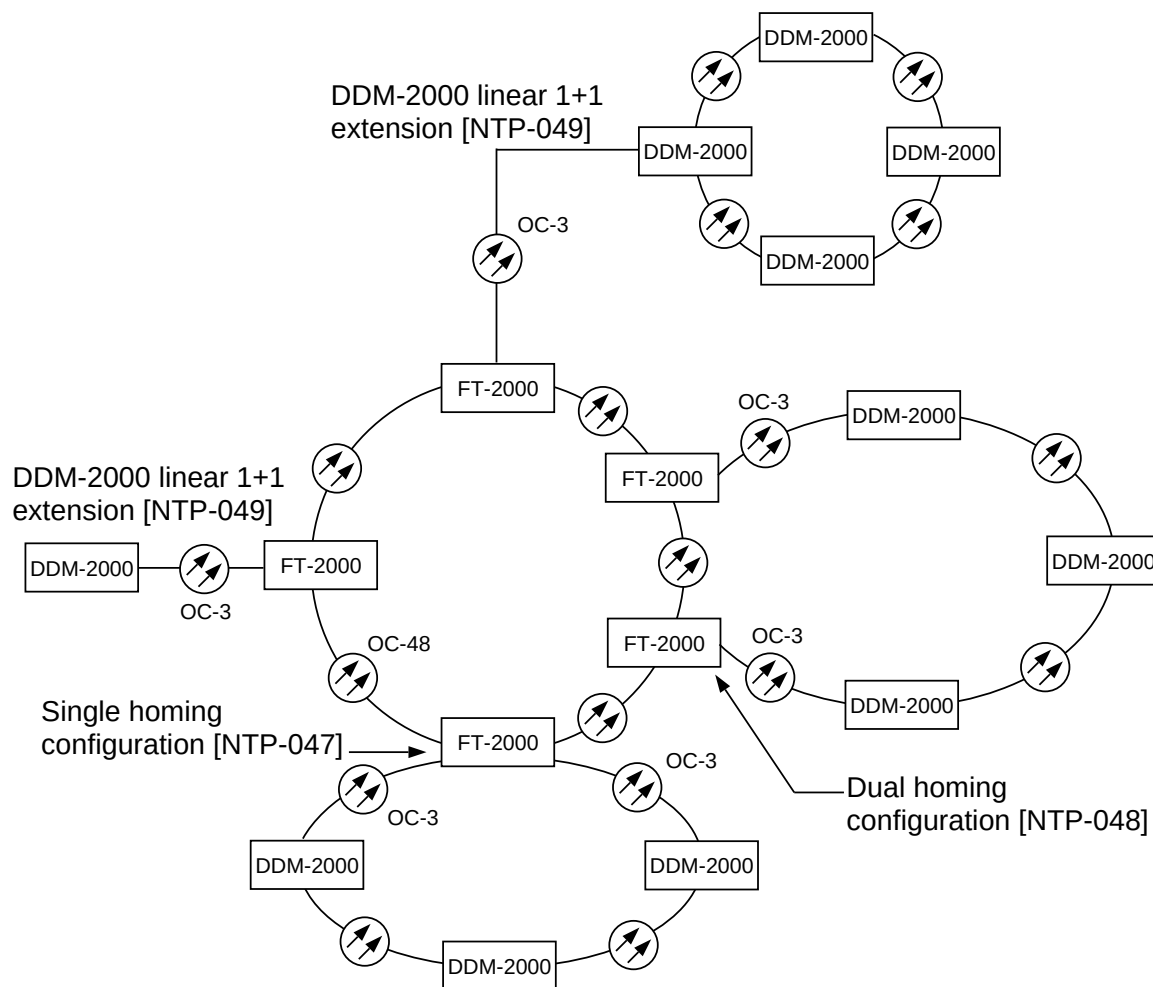


Figure 1. Example FT-2000 OC-48/DDM-2000 OC-3 Configurations

DO ITEMS BELOW IN ORDER LISTED . . . FOR DETAILS, GO TO

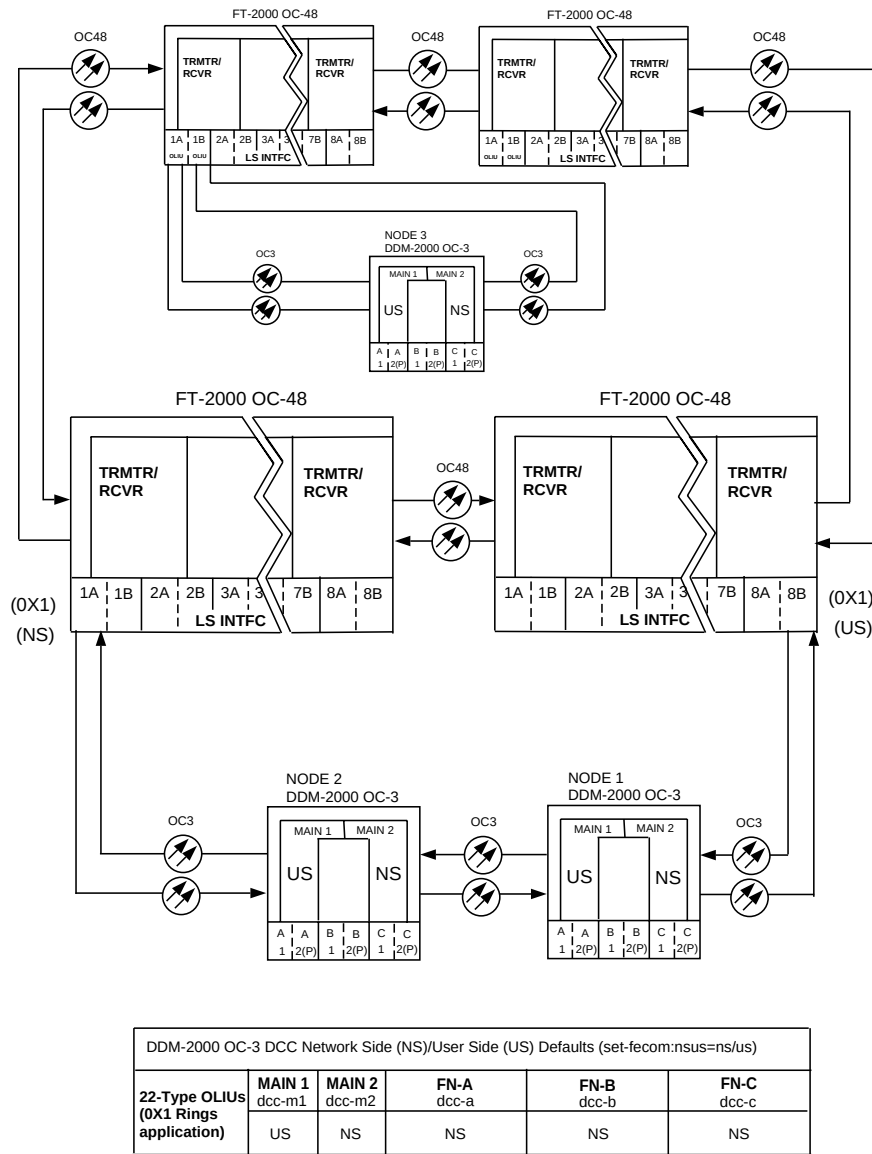


Figure 2. Example of Dual Homed User Side/Network Side Value Settings

Establish OC-3 Optical Span Linear Extension Extension Added Between FT-2000 and DDM-2000 OC-3

DO ITEMS BELOW IN ORDER LISTED FOR DETAILS, GO TO

1.  **CAUTION:**
*DDM-2000 circuit packs contain static sensitive components which can be damaged by electrostatic discharge. A static ground wrist strap must be worn when handling the circuit packs. See electrostatic discharge considerations in **Trouble Clearing: TAD-100**.*

 **NOTE 1:**
This procedure assumes that the FT-2000 OC-48 ring is in service and a new OC-3 optical span is being added between the OC-48 ring and DDM-2000. See Figure 1.

 **NOTE 2:**
If the DDM-2000 fails to respond in the indicated manner, refer to **Trouble Clearing: IXL-001**.

Use **rtrv-alm** command to verify that no alarms, locks, loops, or switches are present.

DO ITEMS BELOW IN ORDER LISTED FOR DETAILS, GO TO

2. Notify maintenance center that alarms will be generated.

3.  **WARNING:**
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.

 **NOTE 1:**
The **rtrv-eqpt:** command retrieves the "Equipage and Version Report". This report lists the circuit pack type and version information for one or more slots. See the "Commands and Reports" section of this manual for a description of the **rtrv-eqpt:** command format.

 **NOTE 2:**
DDM-2000 OC-3 shelves must be connected through the **FUNCTION UNITS C** slots if the shelf or network is deriving timing from the OC-3 optical links to the OC-48 network. See description of the **src** parameter in **set-sync:** command in 363-206-280, *DDM-2000 OC-3 Multiplexer, Releases 8.0 through 11.1, User/Service Manual—Volume I*.

At OC-3 node, verify/install **OLIU** circuit packs in **FUNCTION UNITS** slots being used for the new OC-3 extension.

DLP-504

DO ITEMS BELOW IN ORDER LISTED FOR DETAILS, GO TO

4. **NOTE 1:**

If **21G/21G-U OLIU** circuit packs are used, the **HIGH/LOW POWER** switch must be set to **LOW** before connecting the optical loops. The **22G-U OLIU(s)** requires a 10 dB LBO when it is looped on itself. **21G2-U** and **22G2-U/22G3-U OLIUs** require **no** attenuation when looped on themselves.

 NOTE 2:

If fecom is enabled, an "inconsistent DCC values" alarm will occur when the **OLIUs** are looped back. Normally, the alarm occurs when the user/network parameters on the **OHCTLs** at both ends of the DCC are set the same. To clear the alarm during a fiber loopback, use the **set - fecom: address: com=disable** command to disable the DCC.

Connect optical loops for **OLIUs** just installed.

DLP-505

-
5. Determine the optical loss of the optical facility from office records or by making the required measurements.
-

DO ITEMS BELOW IN ORDER LISTED FOR DETAILS, GO TO

6. **⇒ NOTE:**

The Network Side/User Side parameters of the OC-3 **set-fecom:** command and the FT-2000 DCC orientation must be set opposite at each end of the OC-3 optical spans. For example, see Figures 2 and 3.

Use the **rtrv-fecom/set-fecom** command at the DDM-2000 or the **CONFIGURATION-Enter-Assignment-DCC** command at the FT-2000 to verify/set "Network Side/User Side" parameters at each end of optical span being established.

-
7. If **21G/21G-U OLIUs** are used, set option switch on each **21G/21G-U OLIU** to agree with the loss of the optical facility.
-

DLP-513

8. **⇒ NOTE:**

If option switch setting is changed, an update must be performed by momentarily depressing the **UPD/INIT** button on the **SYSCTL** after the **OLIU** is reinstalled.

Reinstall **OLIUs** (if removed) and momentarily depress the **UPD/INIT** button on the **SYSCTL** or use the **UPD** command.

DO ITEMS BELOW IN ORDER LISTED FOR DETAILS, GO TO

9. Use procedures in the FT-2000 User/Service Manual to Verify/Add OC-3 Low Speed Slots at the host FT-2000 shelf. (365-575-102, *FT-2000 OC-48 Lightwave System, User/Service Manual*, **Add OC-3/IS-3 Low Speed Slot(s), NTP-010**).

(Verify/Provision the FT-2000 low speed OC-3 slots Protection Mode (from OC-3) Parameter to *1+1* if both slots are used for the extension or to *0X1* if only one slot is used.)

-
10. At DDM-2000 shelf, use the **set-fecom:address:com=enabled** command to ensure far end DCC communications (fecom) is enabled on the new OC-3 optical extension.

At FT-2000 shelf, use the **SECURITY-Set-Far End Communications:** command to ensure far end DCC communications (fecom) is enabled on the new OC-3 optical extension.

-
11. Perform OC-3 optical fiber connections and verification of the optical facility. **DLP-514**
-

12. Use **set-oc3:fn-{a,b,c, or d}:kbyte=enabled**
or
set-oc3:fn-{a,b,c, or d}:syncmsg=Kbyte/Sbyte
command to enable sync messaging for the **FUNCTION UNITS** group used for the new OC-3 optical extension.
-

DO ITEMS BELOW IN ORDER LISTED FOR DETAILS, GO TO

13. **⇒ NOTE 1:**

The **set-ne:** command designates a shelf as the directory service network element (DSNE). **One**, and only one, shelf in the subnetwork **must** be provisioned as a DSNE. If there is no DSNE in the network, all DCC communication can become disabled. If more than one shelf is provisioned as DSNE, a "duplicate DSNE" alarm will occur and one of the DSNEs must be disabled. Multiple GNEs are allowed and a shelf is automatically provisioned as a GNE when connected to an active X.25 interface.

⇒ NOTE 2:

It may take 6 minutes or more for the network to stabilize after one of the DSNEs is discontinued. The remaining or new DSNE must record and map all the new network elements in the network.

⇒ NOTE 3:

It is recommended that a DDM-2000 OC-3 shelf be assigned as the DSNE.

Discontinue the DSNE on the FT-2000 OC-48 ring. Use the **reset** command at DDM-2000 OC-3 DSNE to reset the node, if a DSNE was established on the DDM-2000 OC-3 ring. Use the **set-ne:TID=tid:dsne=yes** command to establish the DSNE on the DDM-2000 OC-3 ring, if no DSNE was established on the DDM-2000 OC-3 ring.

DO ITEMS BELOW IN ORDER LISTED . . . FOR DETAILS, GO TO

14. **NOTE:**

Shelves may be designated as an alarm gateway network element (AGNE) and assigned an alarm group number. (Default alarm group number is 255.) At least one AGNE is required per alarm group. One primary AGNE and one backup per alarm group is recommended. For a network greater than 16 nodes, the AGNE and TL1 GNE should be on separate nodes.

Use the **set -ne:** command to designate the AGNE(s) and alarm group numbers, as required.

15. **NOTE:**

Two or more shelves in the same network with the same TBOS display number (set using the **set -ne** command) will cause a "duplicate TBOS display" alarm. Two or more shelves in the same network with the same site/ne address will cause a "duplicate site/ne address" alarm. Two or more shelves in the same network with the same system name or TID (set by the **set -ne** command) will cause a "duplicate TID" alarm.

Verify no duplicate TBOS, site/ne, or TID settings exist. The **rtrv-ne:** command may be used at each shelf in the network to display settings. If duplicates exist, determine new settings and use the **set -ne** command to make new settings.

DO ITEMS BELOW IN ORDER LISTED FOR DETAILS, GO TO

16. Perform automatic end-to-end OC-3 line test on new OC-3 optical extension. **DLP-515**
-

17.  **NOTE:**
Establishing service requires that the proper slots in each terminating node be properly equipped with the correct circuit pack(s) for the type of service being established. It also requires numerous cross connections in each of the nodes representing the path of the required service. Additionally, transmission tests should be performed to verify the continuity and quality of the established circuit.

The network is ready for service to be established. For service terminations on a FT-2000 shelf, use the procedures in the FT-2000 User/Service Manual to establish those services. For DS1, DS3, and/or EC-1 terminations on a DDM-2000 OC-3 shelf, use the procedures in this User/Service manual to establish those services.

DO ITEMS BELOW IN ORDER LISTED FOR DETAILS, GO TO

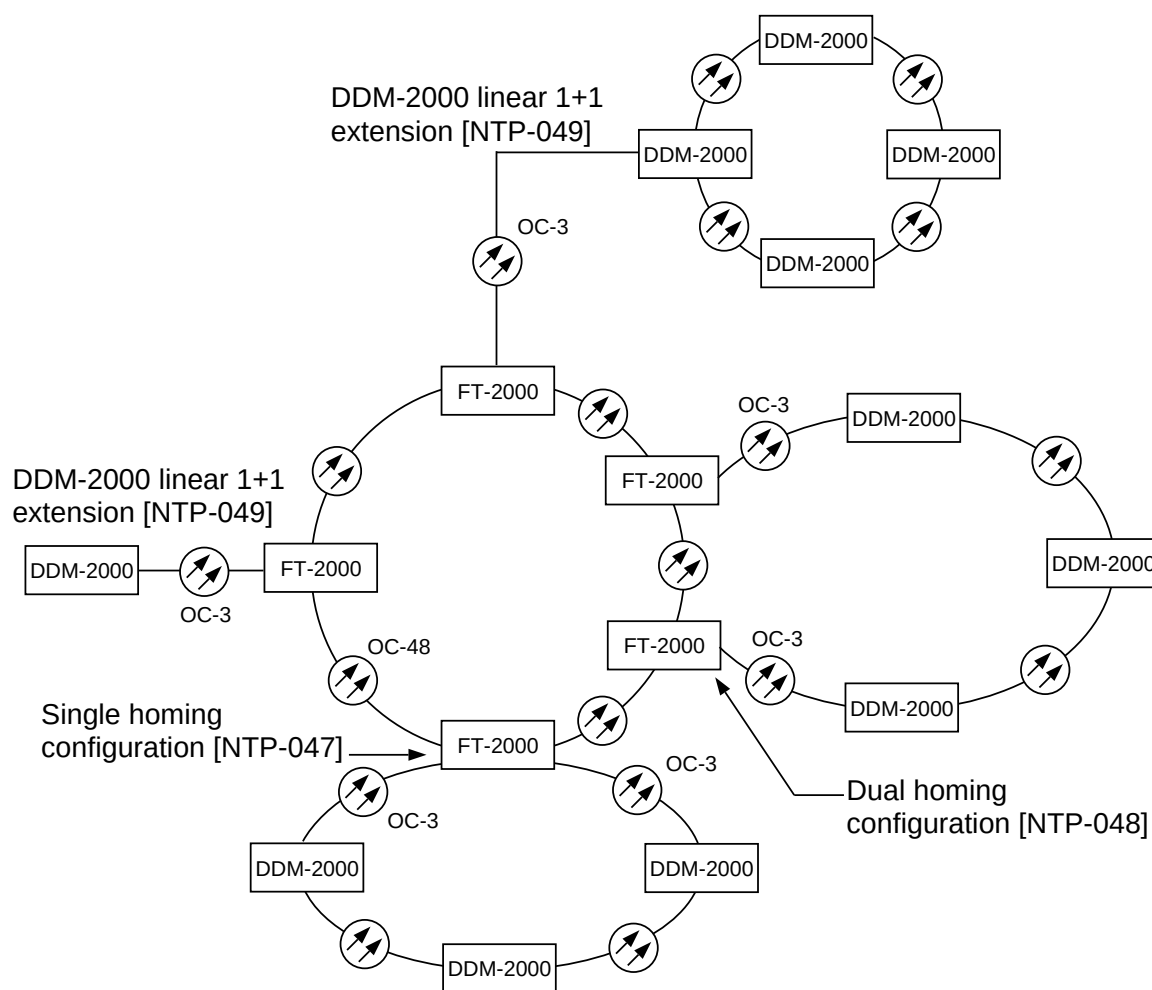
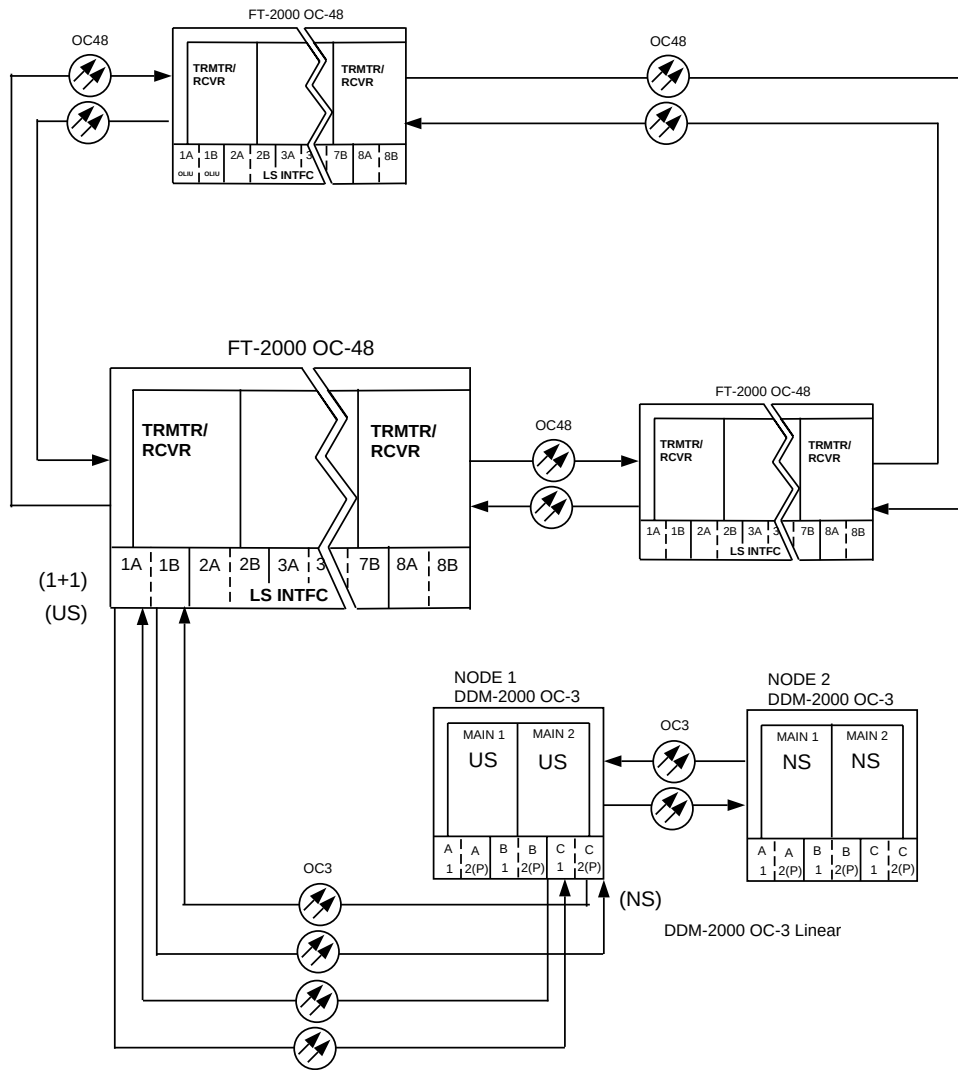


Figure 1. Example FT-2000 OC-48/DDM-2000 OC-3 Configurations

DO ITEMS BELOW IN ORDER LISTED . . . FOR DETAILS, GO TO



DDM-2000 OC-3 DCC Network Side (NS)/User Side (US) Defaults (set-fecom:nsus=ns/us)				
22-Type/ 21-Type OLIUs (1+1 Linear application)	MAIN dcc-m	FN-A dcc-a	FN-B dcc-b	FN-C dcc-c
	US	NS	NS	NS

Figure 2. Adding New OC-3 Optical Span Extension — FT-2000/OC-3 Linear

DO ITEMS BELOW IN ORDER LISTED . . . FOR DETAILS, GO TO

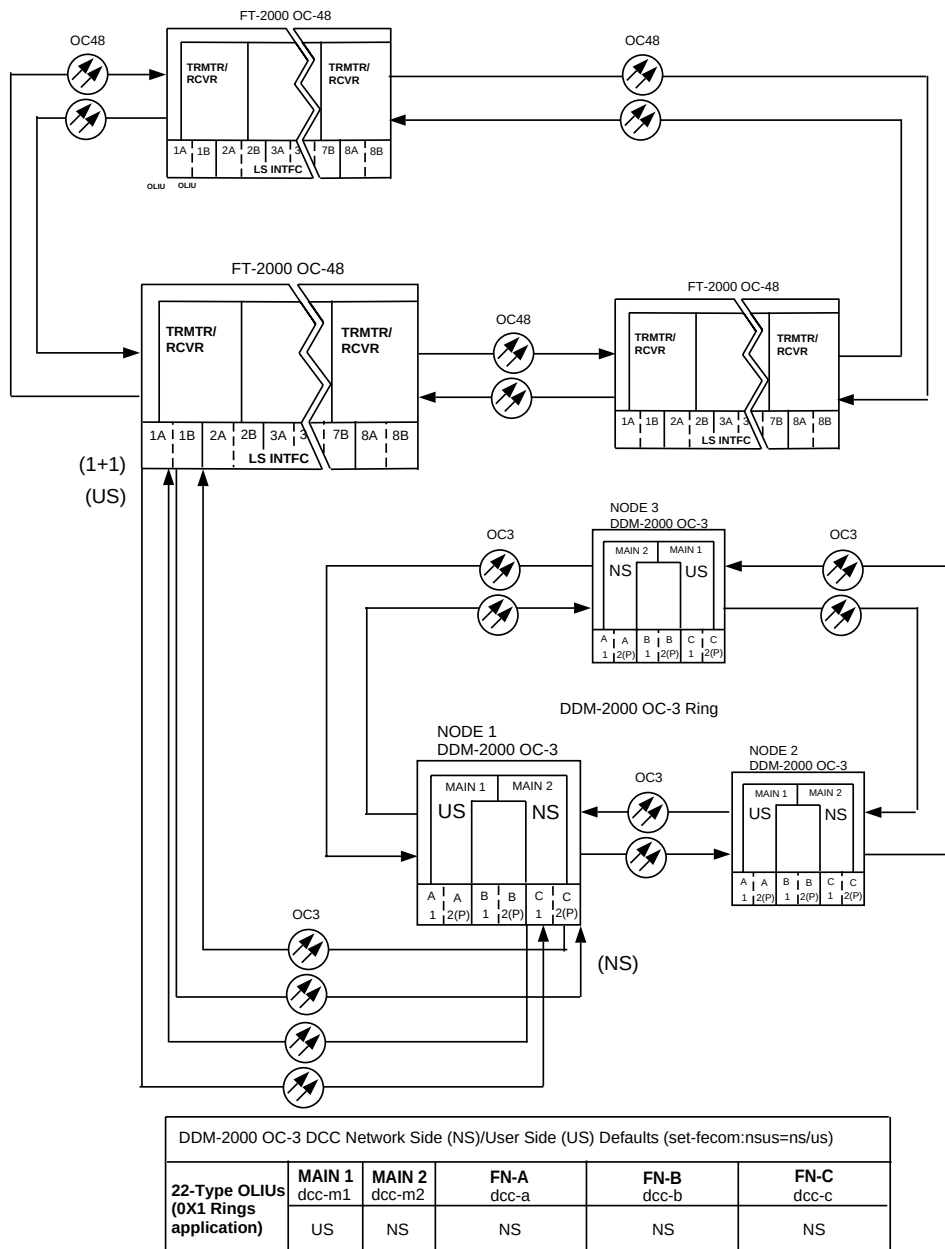


Figure 3. Adding New OC-3 Optical Span Extension — FT-2000/OC-3 Ring

Establish Dual-Homed OC-3 Access via DDM-2000 OC-12 Backbone Ring

DO ITEMS BELOW IN ORDER LISTED FOR DETAILS, GO TO

1.  **WARNING:**
Unterminated optical connectors may emit invisible laser radiation. Avoid direct exposure to the beam. Do not view beam with optical instruments. Use of controls or adjustments or performance of procedures other than those specified herein may result in hazardous radiation exposure.

 **CAUTION:**
*DDM-2000 circuit packs contain static sensitive components which can be damaged by electrostatic discharge. A static ground wrist strap must be worn when handling the circuit packs. See electrostatic discharge considerations in **Trouble Clearing: TAD-100**.*

 **NOTE 1:**
If the DDM-2000 fails to respond in the indicated manner, refer to **Trouble Clearing: IXL-001**.

 **NOTE 2:**
It is assumed that all DDM-2000 OC-12 shelves in the system have passed the looped transmission test(s) (363-206-290, *DDM-2000 OC-12 Multiplexer, Release 5 and Higher, User/Service Manual (TOP)—Volume II*, **System Turnup: NTP-002**) and the host DDM-2000 OC-12 ring has been established (363-206-290, *DDM-2000 OC-12 Multiplexer, Release 5 and Higher, User/Service Manual (TOP)—Volume II*, **System Turnup: NTP-020**) with software to support DDM-2000 OC-3 optical line access. It is also assumed the DDM-2000 OC-3 shelves have been equipped and tested, **System Turnup: NTP-016**.

DO ITEMS BELOW IN ORDER LISTED FOR DETAILS, GO TO

Determine the network configuration (for example, see Figures 1 and 2.)

2. Verify the host DDM-2000 OC-12 shelves (for example, Figures 1 and 2, Nodes 4 and 5) are equipped with Release 5 or later ring software. If not equipped with Release 5 or later software, upgrade the DDM-2000 OC-12 host shelves with proper software. Verify that the DDM-2000 OC-3 shelf is equipped with Release 9 or later software. **DLP-531**
-

3. Determine the optical loss of each optical span from office records or by making the required measurements.
-

4.  **NOTE 1:**
The "**rtrv-eqpt**:" command retrieves the "Equipage and Version Report". This report lists the circuit pack type and version information for one or more slots. See the "Commands and Reports" section of this manual for a description of the "**rtrv-eqpt**:" command format.

-  **NOTE 2:**
If work order or office records do not specify **OLI** types, refer to 363-206-200, *DDM-2000 OC-3 and OC-12 Multiplexers, Applications, Planning, and Ordering Guide* and/or 363-206-280, *DDM-2000 OC-3 Multiplexer, Releases 8.0 through 11.1, User/Service Manual—Volume I*, for a description of **OLI** circuit packs and applications. Optical line power measurements and/or office records must be used to verify that the span length can be supported.

DO ITEMS BELOW IN ORDER LISTED FOR DETAILS, GO TO

At the host OC-12 nodes, verify/install **OLIU** circuit packs in **FUNCTION UNITS (A, B, C, or D)** slots being used for OC-3 access.

5. **NOTE:**

If fecom is enabled, an "inconsistent DCC values" alarm will occur when the **OLIUs** are looped back. Normally, the alarm occurs when the user/network parameters on the **OHCTLs** at both ends of the DCC are set the same. To clear the alarm during a fiber loopback, use the "**set - fecom: address: com=disable**" command to disable the DCC.

At OC-12 shelves, connect optical loops for **FUNCTION UNITS OLIUs** just installed.

6. **NOTE:**

The Network Side (NS)/User Side (US) parameters of the "**set - fecom:**" command must be set opposite at each end of the optical spans. For example, see Figures 3 and 4.

Use the "**rtrv - fecom/set - fecom**" command to verify/set "Network Side/User Side" parameters at each end of OC-3 optical span being established.

7. Use the "**rtrv - oc3/set - oc3**" command at the OC-12 shelf to verify/set application (*app*) parameter for the OC-12 **FUNCTION UNITS** slots being used for this single homed configuration. For example, "**set - oc3: fn-a, app=0X1**".
-

DO ITEMS BELOW IN ORDER LISTED FOR DETAILS, GO TO

8. ➤ **NOTE 1:**

If line timing mode is specified or external timing mode is specified but the timing reference was not available at the OC-3 shelf turnup, the **TGS** option switches are probably set for *free running*. Before this configuration is established, the specified timing mode must be set on the **TGS** circuit packs.

➤ **NOTE 2:**

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.

➤ **NOTE 3:**

If external timing is selected and the **NE ACTY** LED remains lighted after the **TGS** circuit pack is reinserted, use the CIT and the "**rtrv-sync**" command to check the operational mode of the system. If the mode is Holdover instead of External, check that the incoming timing references are connected. Also check Mode Switching (revertive or nonrevertive) and the external DS1 Line Code/Format switch settings.

Set timing mode on **TGS** circuit packs to the timing mode specified in work order or office records. (OC-12 Reference: 363-206-290, *DDM-2000 OC-12 Multiplexer, Release 5 and Higher, User/Service Manual (TOP)*—Volume II, **DLP-510**)

DLP-513

DO ITEMS BELOW IN ORDER LISTED FOR DETAILS, GO TO

9. **NOTE 1:**

If Kbyte (Release 9.0 and earlier) or Sbyte (Releases 8.1, 9.1, and later) (sync messaging) is enabled for the OC-3 **MAIN 1** and **MAIN 2(P)** optical interfaces at any node in the OC-3 ring, it **must** be enabled at all nodes in the OC-3 ring and in the **FUNCTION UNITS** slots of the host OC-12 shelf.

 NOTE 2:

The "**rtrv-oc3:**" command retrieves the "OC-3 Line Provisioning Report". This report displays the provisioned configuration of OC-3 lines. See the "Commands and Reports" section of 363-206-290, *DDM-2000 OC-12 Multiplexer, Release 5 and Higher, User/Service Manual—Volume I* and 363-206-280, *DDM-2000 OC-3 Multiplexer, Releases 8.0 through 11.1, User/Service Manual—Volume I*, for a description of the "**rtrv-oc3:**" command format.

Use the "**rtrv-oc3:**" command to obtain the "OC-3 Line Provisioning Report" and verify if Kbyte/Sbyte is enabled or disabled. Use the "**set-oc3:**" command to enable or disable the Kbyte/Sbyte parameter, as required.

DO ITEMS BELOW IN ORDER LISTED FOR DETAILS, GO TO

10. ➤ **NOTE 1:**

If Sync Autoreconfiguration is enabled, Kbyte/Sbyte must also be enabled.

➤ **NOTE 2:**

If Sync Autoreconfiguration is enabled at any line-timed OC-3 node (not available for external timed or free-running nodes), it **must** be enabled at all line-timed OC-3 nodes.

➤ **NOTE 3:**

The "**rtrv-sync:**" command retrieves the "Synchronization Report". This report displays the provisioning and operational information on the synchronization attributes of the DDM-2000. See the "Commands and Reports" section of 363-206-290, *DDM-2000 OC-12 Multiplexer, Release 5 and Higher, User/Service Manual—Volume I* and 363-206-280, *DDM-2000 OC-3 Multiplexer, Releases 8.0 through 11.1, User/Service Manual—Volume I*, for a description of the "**rtrv-sync:**" command format.

Use the "**rtrv-sync:**" command to obtain the "Synchronization Report" and verify if Sync Autoreconfiguration is enabled or disabled at any line-timed OC-3 node. Use the "**set-sync:**" command to enable or disable the Sync Autoreconfiguration parameter, as required.

DO ITEMS BELOW IN ORDER LISTED FOR DETAILS, GO TO

11. **NOTE:**

Two or more shelves in the same network with the same TBOS display number (set by the "**set -ne**" command) will cause a "duplicate TBOS display" alarm. Two or more shelves in the same network with the same site/ne address (set by the "**set -ne**" command) will cause a "duplicate site/ne address" alarm. Two or more shelves in the same network with the same system name or TID (set by the "**set -ne**" command) will cause a "duplicate TID" alarm. Two or more shelves in the same network designated as a DSNE (set by the "**set -ne**" command) will cause a "duplicate DSNE" alarm.

Verify no duplicate TBOS, site/ne, TID or DSNE settings exist. The "**rtrv-ne:**" command may be used at each shelf in the network to display settings. If duplicates exist, determine new settings and use the "**set -ne**" command to make new settings.

DO ITEMS BELOW IN ORDER LISTED FOR DETAILS, GO TO

12. ➤ **NOTE 1:**

The "**set -ne:**" command designates a shelf as the directory service network element (DSNE). **One**, and only one, shelf in the network **must** be provisioned as a DSNE. If there is no DSNE in the network, all DCC communication can become disabled. If more than one shelf is provisioned as a DSNE, a "duplicate DSNE" alarm will occur. Multiple GNEs are allowed. A shelf is automatically provisioned as a GNE when connected to an active X.25 interface.

➤ **NOTE 2:**

Shelves may be designated as an alarm gateway network element (AGNE) and assigned an alarm group number. (Default alarm group number is 255.) At least one AGNE is required per alarm group. One primary AGNE and one backup per alarm group is recommended. For a network greater than 16 nodes, the AGNE and TL1 GNE should be on separate nodes. The AGNE parameter of the "**set -ne:**" command may have been set to **yes** on each new shelf during shelf turnup procedures to suppress an "AGNE communication failure" alarm.

Use the "**set -ne:**" command to designate ONE shelf as the DSNE.

Use the "**set -ne:**" command to designate the AGNE(s) and alarm group numbers, as required.

DO ITEMS BELOW IN ORDER LISTED FOR DETAILS, GO TO

13. **NOTE 1:**

In dual homing configurations, **OLIU** circuit packs must be installed in the correct **FUNCTION UNITS** slots in the host OC-12 nodes to support the direction of traffic required. For example, see Figures 1 and 2. In Figure 1, if an **OLIU** is installed in Node 5, **FUNCTION UNITS** group **A**, slot **1**, traffic will be routed toward Node 6 when cross connections are made. The other end of the associated OC-3 ring must be connected to an **OLIU** installed in slot **2(P)** of the **FUNCTION UNITS** group **()** being used to terminate the OC-3 line (for example, Node 4 in Figure 1). Traffic from Node 4 will then be directed toward Node 3 when cross-connections are made. In Figure 2, note that all traffic from the OC-3 shelf will be directed to Node 8 because of the slot positions that terminate the OC-3 line.

 NOTE 2:

A dual-homed ring configuration requires that the first OC-3 **MAIN 1 OLIU** connect to **FUNCTION UNITS () 1 OLIU** on one host OC-12 shelf. The last OC-3 **MAIN 2(P) OLIU** connects to the **FUNCTION UNITS () 2(P) OLIU** on the other host OC-12 shelf. Intermediate OC-3 shelves on the same OC-3 ring connect from **MAIN 2(P) OLIU** at one OC-3 shelf to the **MAIN 1 OLIU** at an adjacent OC-3 shelf (node). For example, see Figure 3. This procedure will establish the ring configuration starting from one OC-12 host node (near end) and continuing to an adjacent OC-3 node, then to the next OC-3 node until the final connection is made from the last OC-3 node to the remaining OC-12 host node.

DO ITEMS BELOW IN ORDER LISTED FOR DETAILS, GO TO

⇒ **NOTE 3:**

Unused optical connectors on **OLIUs** should remain looped until optical line connections are made.

At the near end OC-12 host node, remove the optical loop from the **FUNCTION UNITS OC-3 OLIU** being used for the OC-3 ring configuration (for example, in Figure 3, OC-12 shelf Node 5, slot **FUNCTION UNITS A 1**) At the other end of the optical span being established, remove the optical loop from the associated **OLIU** (for example, in Figure 3, OC-3 shelf Node 7 **MAIN 1 OLIU**).

14. ⇒ **NOTE:**

The section data communication channel (DCC), used for far end communications, must be enabled at each network element (shelf) optical interface being tested in order for the end-to-end line tests to work. Default condition for the DCC channel is "enabled". If it has been disabled, use the "**set - fecom:**" command **at each shelf** to enable far end communications.

At each shelf, use the "**set - fecom: address: com=enabled**" command to ensure far end communications (fecom) is enabled.

DO ITEMS BELOW IN ORDER LISTED FOR DETAILS, GO TO

15. Perform optical fiber connections and verification of the integrity of the optical span being established. **DLP-514**
-

16.  **NOTE:**
The "**rtrv-pm-line**" command in the following procedure displays performance monitoring data associated with the OC-3 lines terminated on the system.

Perform end-to-end OC-3 line test. **DLP-515**

17. Repeat this procedure from Item 13 for all OC-3 optical spans being established in the DDM-2000 OC-12/OC-3 network. Ensure that the last optical span connected to the OC-12 host shelf is connected to an **OLI**U in the opposite slot as the one in the first host OC-12 (for example in Figure 3, slot **1** at one host node and slot **2(P)** at the other host node).
-

DO ITEMS BELOW IN ORDER LISTED FOR DETAILS, GO TO

18. **NOTE:**

Establishing service requires that the proper slots in each terminating node be properly equipped with the correct circuit pack(s) for the type of service being established. It also requires numerous cross connections in each of the nodes representing the path of the required service. Additionally, transmission tests should be performed to verify the continuity and quality of the established circuit.

The dual-homed DDM-2000 OC-3 access network is now ready for initial service to be established. For DS3, EC-1, STS-3c, and video terminations on a DDM-2000 OC-12 shelf, use the procedures in 363-206-290, *DDM-2000 OC-12 Multiplexer, Release 5 and Higher, User/Service Manual (TOP)—Volume II*, to establish those services. For DS1, DS3, and/or EC-1 terminations on a DDM-2000 OC-3 shelf, use the procedures in 363-206-280, *DDM-2000 OC-3 Multiplexer, Releases 8.0 through 11.1, User/Service Manual (TOP)—Volume II* to establish those services.

DO ITEMS BELOW IN ORDER LISTED . . . FOR DETAILS, GO TO

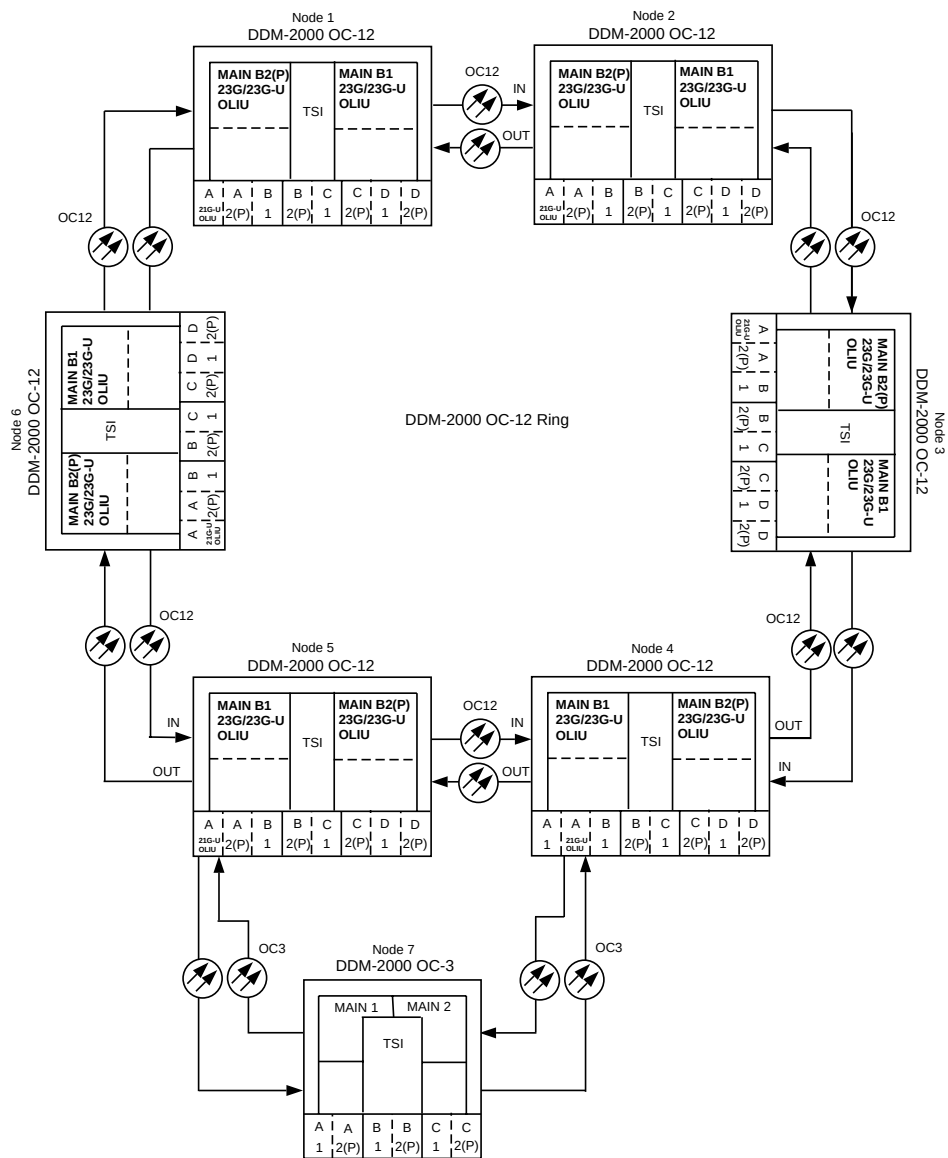


Figure 1. Example Dual-Homed OC-3/OC-12 Ring Configuration

DO ITEMS BELOW IN ORDER LISTED . . . FOR DETAILS, GO TO

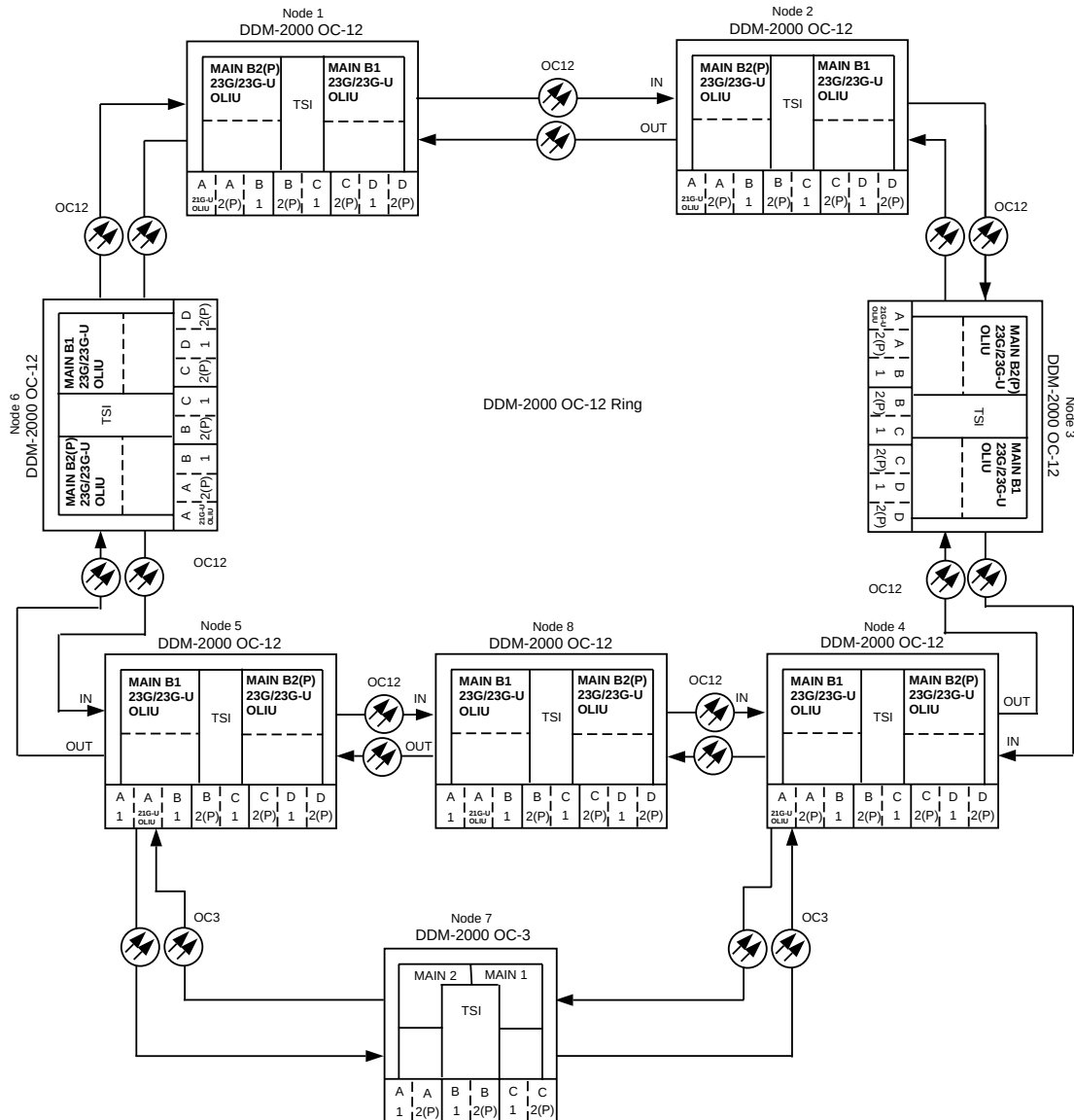
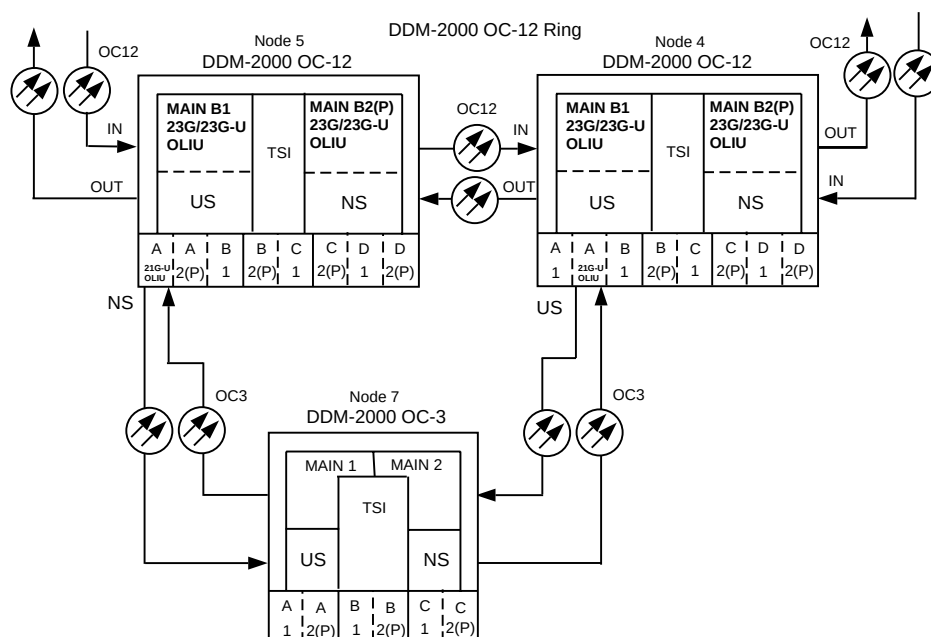


Figure 2. Example Dual-Homed OC-3/OC-12 Ring Configuration

DO ITEMS BELOW IN ORDER LISTED . . . FOR DETAILS, GO TO

DDM-2000 OC-12 DCC Network Side (NS)/User Side (US) Defaults (set-fecom:nsus=ns/us)								
21-Type OLIUs (0X1 or video)	FN-A-1 dcc-a1	FN-A-2 dcc-a2	FN-B-1 dcc-b1	FN-B-2 dcc-b2	FN-C-1 dcc-c1	FN-C-2 dcc-c2	FN-D-1 dcc-d1	FN-D-2 dcc-d2
	NS	US	NS	US	NS	US	NS	US
23-Type OLIUs	MAIN-B-1 dcc-mb1		MAIN-B-2 dcc-mb2					
	US		NS					



DDM-2000 OC-3 DCC Network Side (NS)/User Side (US) Defaults (set-fecom:nsus=ns/us)					
22-Type OLIUs	MAIN-1 dcc-m1	MAIN-2 dcc-m2	FN-A dcc-a	FN-B dcc-b	FN-C dcc-c
	US	NS	NS	NS	NS

Figure 3. Example of User Side/Network Side Value Settings

DO ITEMS BELOW IN ORDER LISTED . . . FOR DETAILS, GO TO

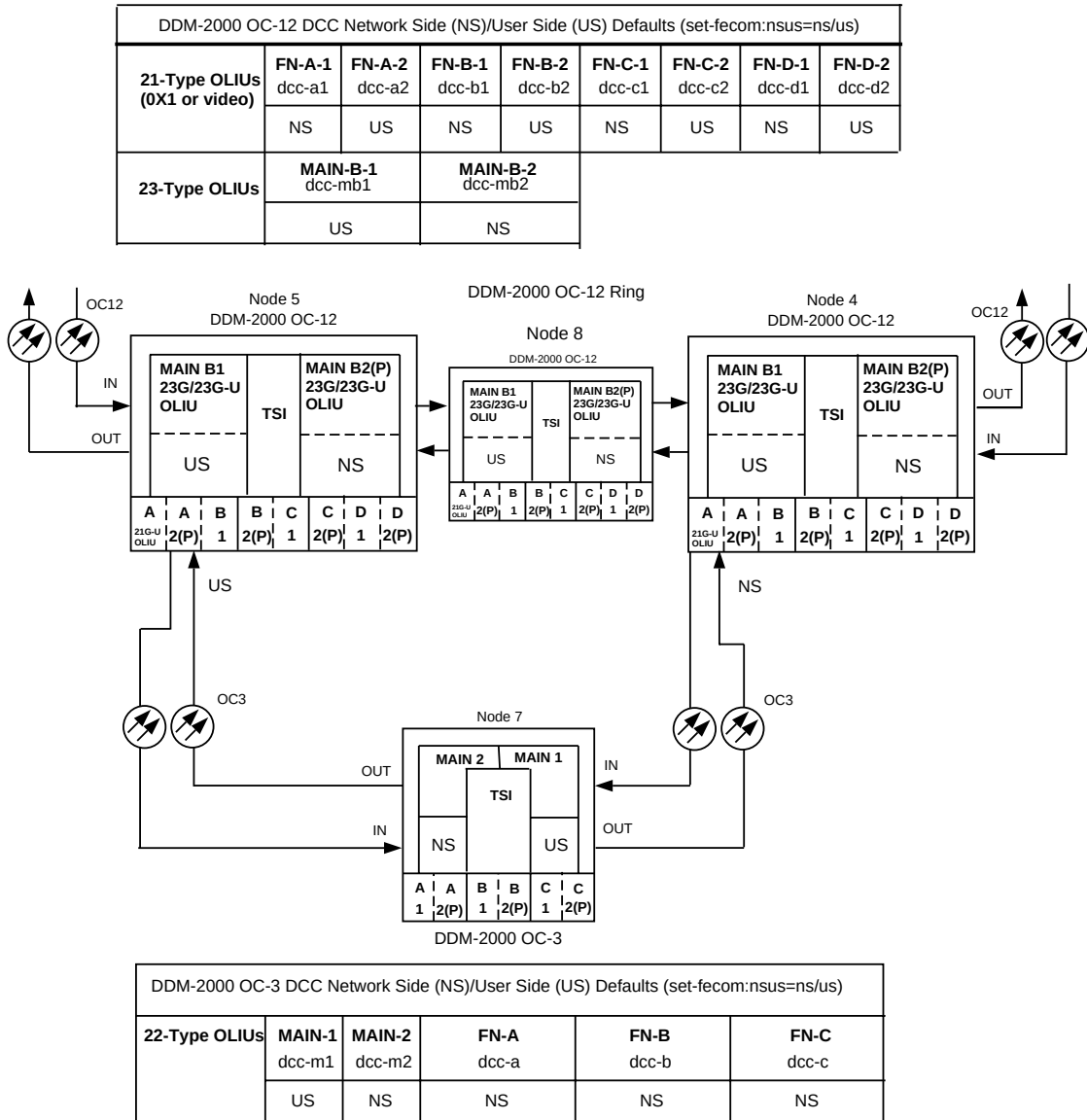


Figure 4. Example of User Side/Network Side Value Settings

Upgrade DDM-2000 OC-3/OC-12 Dual Ring Interworking Network from EC-1 to OC-3/IS-3 In Service

DO ITEMS BELOW IN ORDER LISTED FOR DETAILS, GO TO

1.  **CAUTION:**
*DDM-2000 circuit packs contain static sensitive components which can be damaged by electrostatic discharge. A static ground wrist strap must be worn when handling the circuit packs. See electrostatic discharge considerations in **Trouble Clearing: TAD-100**.*

 **NOTE 1:**
This procedure requires **21G/21G-U/21G2-U OLIUs** (OC-3) or **21D/21D-U OLIUs** (IS-3) circuit packs in all DDM-2000 OC-12 shelves and **22G-U/22G2-U/22G3-U OLIUs** (OC-3) or **22D-U OLIUs** (IS-3) circuit packs in all DDM-2000 OC-3 shelves. Existing **3STS1E** and **STS1E** circuit packs will be replaced in this procedure with **OLIU** circuit packs to support OC-3/IS-3 applications. Optical line power measurements and/or office records must be used to verify that the span length can be supported.

 **NOTE 2:**
This procedure assumes that the DDM-2000 systems are in service. Ring Release 5 or later software is required in each DDM-2000 OC-12 shelf. Ring Release 7.2 or later software is required in each DDM-2000 OC-3 shelf.

 **NOTE 3:**
All shelves in the same network must have the same or compatible software releases.

DO ITEMS BELOW IN ORDER LISTED FOR DETAILS, GO TO

⇒ NOTE 4:

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.

Use the "**rtrv-alm:**" command to verify that no alarms, locks, loops, or switches are present.

-
2. Notify maintenance center that alarms will be generated.

-
3. Upgrade software in each DDM-2000 OC-3/OC-12 shelf with a release that supports OC-3/IS-3 interfaces (Ring Release 5 (OC-12), Ring Release 7.2 or later (OC-3), if not already performed.

DLP-532

DO ITEMS BELOW IN ORDER LISTED FOR DETAILS, GO TO

4.  **CAUTION:**
Removal of the wrong cross-connections may cause service interruption.

 **NOTE 1:**
When signals or circuit packs are removed, alarms will be generated until update procedures are performed.

 **NOTE 2:**
STS1E slots cannot be unequipped without an alarm until all cross-connections are removed. The cross-connections must be removed first before removing circuit packs.

 **NOTE 3:**
If the OC-3 circuit pack is going to be using the same cross-connects as the EC-1 circuit pack that is to be removed, then the only cross-connects that need to be deleted are those at the node where the circuit pack is being replaced. The pass throughs can remain.

At the first set of dual ring interworking nodes having circuit packs replaced, discontinue the EC-1 interface cross-connections at the OC-3 node [NTP-036]/OC-12 node [NTP-025]. **Note that only cross-connections at the DRI node are being discontinued using NTP-036 or NTP-025.**

NTP-036

DO ITEMS BELOW IN ORDER LISTED . . . FOR DETAILS, GO TO

5. At the first set of dual ring interworking nodes having circuit packs replaced, remove both **3STS1E** circuit packs from the OC-12 node and both **STS1E** circuit packs from the OC-3 node. (For example, see Figure 1. Remove the **3STS1E** circuit packs from the OC-12 at node D and the **STS1E** circuit packs from the OC-3 at node G.)

-
6. At both OC-12 and OC-3 nodes, momentarily depress the **UPD/INIT** pushbutton on the **SYSCTL** or use the "upd" command to update the DDM-2000 internal equipment list.

-
7. Remove all EC-1/DS3 connections between the OC-3 and OC-12 nodes with **3STS1E/STS1E** circuit packs removed.

-
8. If **21G/21G-U OLIUs** are installed in OC-12 node, set the option switch on the **21G/21G-U OLIUs** to agree with the loss of the optical facility.

DLP-513

-
9. Install both **21G/21G-U/21G2-U OLIUs** (OC-3) or **21D/21D-U OLIUs** (IS-3) in the OC-12 node and both **22G-U/22G2-U/22G3-U OLIUs** (OC-3) or **22D-U OLIUs** (IS-3) in the OC-3 node.

DLP-504

DO ITEMS BELOW IN ORDER LISTED FOR DETAILS, GO TO

10. **NOTE 1:**

The section data communication channel (DCC), used for far end communications, must be enabled at each network element (shelf) for the end-to-end line tests to work when the optical span is being established. Default condition for the DCC channel is "enabled". If it has been disabled, use the "**set - fecom:**" command **at each DDM-2000 shelf** to enable far end communications.

 NOTE 2:

The network elements that terminate on each end of the optical span must have their "Network Side/User Side" parameters set to opposite values to avoid an "inconsistent DCC values" alarm. One end is provisioned as "Network Side" and the other end is provisioned as "User Side". Both ends of the OC-3 line cannot be the same and it makes no difference which end is "Network Side".

At each DDM-2000 shelf, use the
"**set - fecom: address: com=enabled, nsus=ns/us**"
command to enable far-end communications (fecom) and
set Network Side (ns)/User Side (us) parameters.

-
11. Perform optical fiber connections and verification of the
optical facility.
-

DLP-514

DO ITEMS BELOW IN ORDER LISTED FOR DETAILS, GO TO

12. **NOTE 1:**

The "**set-ne:**" command designates a shelf as the directory service network element (DSNE). **One**, and only one, shelf in the subnetwork **must** be provisioned as a DSNE. If there is no DSNE in the network, all DCC communication can become disabled. If more than one shelf is provisioned as DSNE, a "duplicate DSNE" alarm will occur and one of the DSNEs must be disabled. Multiple GNEs are allowed and a shelf is automatically provisioned as a GNE when connected to an active X.25 interface.

 NOTE 2:

It may take 5 minutes or more for the network to stabilize after one of the DSNEs is discontinued. The remaining DSNE must record and map all the new network elements in the network.

Use the "**set-ne:TID=tid:dsne=no**" command to discontinue one of DSNEs, if not already done. Use the "**reset**" command at the remaining DSNE to reset the DSNE node.

13.	Perform end-to-end OC-3/IS-3 line test at DRI nodes (For example, between nodes D and G in Figure 1).	DLP-515

14.	At the upgraded DRI nodes, use the " ent-crs-sts1 " or " ent-crs-vt1 " commands to make proper "drop and continue" cross-connections.	DLP-550

DO ITEMS BELOW IN ORDER LISTED FOR DETAILS, GO TO

15. At the next set of dual ring interworking nodes having circuit packs replaced, discontinue the EC-1 interface cross-connections at the OC-3 node [**NTP-036**]/OC-12 node [**NTP-025**]. **Note that only cross-connections at the DRI node are being discontinued using NTP-036 or NTP-025.** **NTP-036**

16. At the dual ring interworking nodes having circuit packs replaced, remove both **3STS1E** circuit packs from the OC-12 node and both **STS1E** circuit packs from the OC-3 node. (For example, see Figure 1. Remove the **3STS1E** circuit packs from the OC-12 at node C and the **STS1E** circuit packs from the OC-3 at node H.)

17. At both OC-12 and OC-3 nodes, momentarily depress the **UPD/INIT** pushbutton on the **SYSCTL** or use the "upd" command to update the DDM-2000 internal equipment list.

18. Remove all EC-1/DS3 connections between the OC-3 and OC-12 nodes with **3STS1E/STS1E** circuit packs removed.

19. If **21G/21G-U OLIUs** are installed in OC-12 node, set the option switch on the **21G/21G-U OLIUs** to agree with the loss of the optical facility. **DLP-513**

DO ITEMS BELOW IN ORDER LISTED FOR DETAILS, GO TO

20. Install both **21G/21G-U/21G2-U OLIUs** (OC-3) or **DLP-504**
21D/21D-U OLIUs (IS-3) in the OC-12 node and both
22G-U/22G2-U/22G3-U OLIUs (OC-3) or **22D-U OLIUs**
(IS-3) in the OC-3 node.

21. At each DDM-2000 shelf, use the
"set - fecom: address: com=enabled, nsus=ns/us"
command to enable far-end communications (fecom) and
set Network Side (ns)/User Side (us) parameters.

22. Perform optical fiber connections and verification of the **DLP-514**
optical facility.

23. Perform end-to-end OC-3/IS-3 line test at DRI nodes **DLP-515**
(For example, between nodes C and H in Figure 1).

24. At the upgraded DRI nodes, use the **"ent - crs - sts1"** or **DLP-550**
"ent - crs - vt1" commands to make proper "drop and
continue" cross-connections.

25. The upgrade is now complete.

DO ITEMS BELOW IN ORDER LISTED FOR DETAILS, GO TO

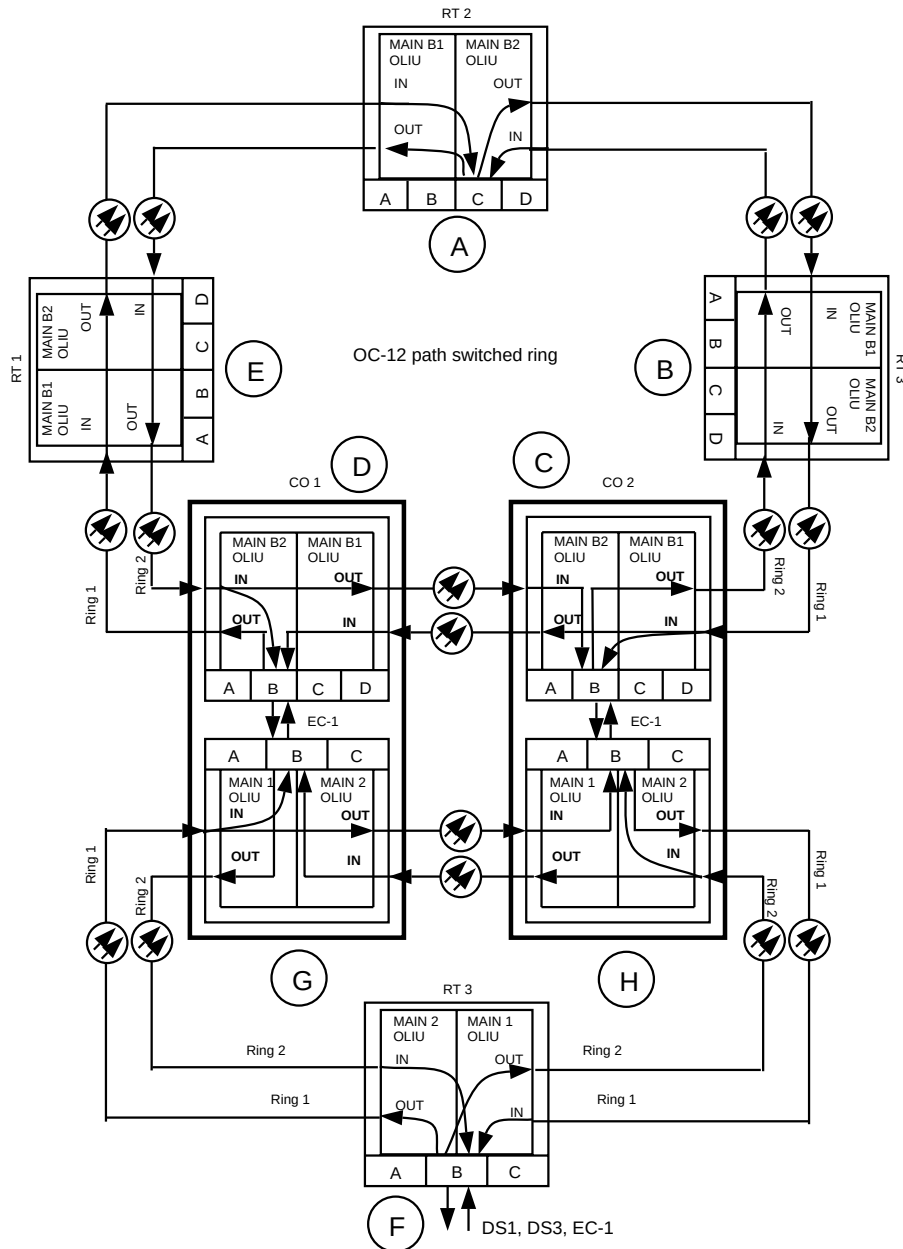


Figure 1. OC-3/OC-12 DRI Interworking

Establish FiberReach Access via DDM-2000 OC-3 Release 9 and Later Host Shelf OC-3 Release 8 Linear Configuration

DO ITEMS BELOW IN ORDER LISTED FOR DETAILS, GO TO

1.  **WARNING:**
Unterminated optical connectors may emit invisible laser radiation. Avoid direct exposure to the beam. Do not view beam with optical instruments. Use of controls or adjustments or performance of procedures other than those specified herein may result in hazardous radiation exposure.

-  **CAUTION:**
*DDM-2000 circuit packs contain static sensitive components which can be damaged by electrostatic discharge. A static ground wrist strap must be worn when handling the circuit packs. See electrostatic discharge considerations in **Trouble Clearing: TAD-100**.*

-  **NOTE 1:**
If the DDM-2000 fails to respond in the indicated manner, refer to **Trouble Clearing: IXL-001**.

-  **NOTE 2:**
It is assumed that the DDM-2000 OC-3 shelves in the system have passed the looped transmission test(s) (**System Turnup: NTP-016**) and the final configuration has been established with the DDM-2000 OC-3 Release 9 host shelf in the linear network. It is also assumed the DDM-2000 FiberReach shelves have been equipped and tested (363-206-301, *DDM-2000 FiberReach Multiplexer, Wideband/Narrowband Shelf, User/Service Manual*, **System Turnup: NTP-016**).

DO ITEMS BELOW IN ORDER LISTED FOR DETAILS, GO TO

Determine the network configuration (for example, see Figures 1 and 2.)

2. Verify that the host DDM-2000 OC-3 shelf is equipped with Release 9 or later ring software.
-

3. Determine the optical loss of each optical span from office records or by making the required measurements.
-

4.  **NOTE:**
The Network Side/User Side parameters of the **set-fecom:** command must be set opposite at each end of the optical spans. For example, see Figure 3.

Use the **rtrv-fecom/set-fecom** command to verify/set "Network Side/User Side" parameters at each end of optical span being established.

5.  **CAUTION:**
*The host OC-3 shelf can be timed from an external source or line timed from **FUNCTION UNITS C** slot. The host OC-3 shelf cannot be line timed from the **MAIN** slots. Therefore, if the OC-3 shelf is to be line timed, the **set-sync:src=fn-c** must be used to derive timing from the **FUNCTION UNITS C** slot.*

DO ITEMS BELOW IN ORDER LISTED FOR DETAILS, GO TO

⇒ **NOTE 1:**

At the OC-3 shelf, if line timing mode is specified or external timing mode is specified but the timing reference was not available at shelf turnup, the **TGS** option switches are probably set for *free running*. Before the end-to-end system is established, the specified timing mode must be set on the **TGS** circuit packs.

⇒ **NOTE 2:**

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.

⇒ **NOTE 3:**

If external timing is selected and the **NE ACTY** LED remains lighted after the **TGS** circuit pack is reinserted, use the CIT and the **rtrv-sync** command to check the operational mode of the system. If the mode is Holdover instead of External, check that the incoming timing references are connected. Also check Mode Switching (revertive or nonrevertive) and the external DS1 Line Code/Format switch settings.

Set timing mode on **TGS** circuit packs to the timing mode specified in work order or office records. Use the **set-sync:** command to set the OC-3 synchronization source, if required.

DLP-513

DO ITEMS BELOW IN ORDER LISTED FOR DETAILS, GO TO

6. **NOTE:**

Two or more shelves in the same network with the same TBOS display number (set using the **set-ne** command) will cause a "duplicate TBOS display" alarm. Two or more shelves in the same network with the same site/ne address will cause a "duplicate site/ne address" alarm. Two or more shelves in the same network with the same system name or TID (set by the **set-ne** command) will cause a "duplicate TID" alarm.

Verify no duplicate TBOS, site/ne, or TID settings exist. The **rtrv-ne:** command may be used at each shelf in the network to display settings. If duplicates exist, determine new settings and use the **set-ne** command to make new settings.

7. **NOTE 1:**

The **set-ne:** command designates a shelf as the directory service network element (DSNE). **One**, and only one, shelf in the network **must** be provisioned as a DSNE. If there is no DSNE in the network, all DCC communication can become disabled. If more than one shelf is provisioned as a DSNE, a "duplicate DSNE" alarm will occur. The DSNE must be an OC-3 shelf with Release 9 or later software, unless an FT-2000 is part of the network, then the DSNE will always be an FT-2000 node. The DSNE must not be a FiberReach shelf. Multiple GNEs are allowed. A shelf is automatically provisioned as a GNE when connected to an active X.25 interface.

DO ITEMS BELOW IN ORDER LISTED FOR DETAILS, GO TO

⇒ **NOTE 2:**

Shelves may be designated as an alarm gateway network element (AGNE) and assigned an alarm group number. (Default alarm group number is 255.) At least one AGNE is required per alarm group. One primary AGNE and one backup per alarm group is recommended. For a network greater than 16 nodes, the AGNE and TL1 GNE should be on separate nodes. The AGNE parameter of the **set-ne:** command may have been set to **yes** on each new shelf during shelf turnup procedures to suppress an "AGNE communication failure" alarm.

Use the **rtrv-ne/set-ne:** command to verify/designate ONE shelf in the network as the DSNE, if not already done.

Use the **set-ne:** command to designate the AGNE(s) and alarm group numbers, as required.

8. ⇒ **NOTE 1:**

This configuration requires that the **MAIN 1 OLIU** on the host OC-3 shelf (node) connect to the **MAIN-2 OLIU** at the first FiberReach shelf from the OC-3 shelf. See Figure 3. **MAIN-1 OLIU** at the FiberReach shelf connects to the **MAIN-2 OLIU** at an adjacent FiberReach shelf (node). The **MAIN-1 OLIU** at the last FiberReach shelf on the OC-1 ring connects to **MAIN 2(P) OLIU** on the host OC-3 shelf. This procedure will establish the FiberReach ring configuration starting from the OC-3 host node (near end) to the first FiberReach node, then continuing to the next node until the final connection is made from the last FiberReach node back to the host OC-3 node.

DO ITEMS BELOW IN ORDER LISTED FOR DETAILS, GO TO

⇒ NOTE 2:

All unused ports on the **27G-U/27G2-U OLIU** must be set to **nmon** with the **set-state-oc1** command.

At the near end, remove the optical loop from the **26G2-U** or **27G-U/27G2-U OLIU** OC-1 line (**1** or **2**) (for example in Figure 3, OC-3 shelf **MAIN 1**, OC-1 line **1**) associated with the optical span being established. At the other end of the optical span, remove the optical loop from the associated **OLIU** (for example, in Figure 3, FiberReach **MAIN-2 OLIU**).

9. ⇒ NOTE:

The section data communication channel (DCC), used for far end communications, must be enabled at each network element (shelf) optical interface being tested in order for the end-to-end line tests to work. Default condition for the DCC channel is "enabled". If it has been disabled, use the **set-fecom:** command **at each shelf** to enable far end communications.

At each shelf, use the
set-fecom:address:com=enabled command to
ensure far end communications (fecom) is enabled.

-
10. Perform optical fiber connections and verification of the integrity of the optical span being established.
-

DLP-514

DO ITEMS BELOW IN ORDER LISTED FOR DETAILS, GO TO

11. **NOTE:**

The **rtrv-pm-line** command in the following procedure displays performance monitoring data associated with the OC-1 lines terminated on the system.

Perform end-to-end OC-1 line test.

DLP-556

-
12. Repeat this procedure for all OC-1 optical spans back to the host OC-3 shelf.
-

13. The system is now ready for initial service to be established.
Initial DS1 Service [**System Turnup: NTP-004**]
-

DO ITEMS BELOW IN ORDER LISTED FOR DETAILS, GO TO

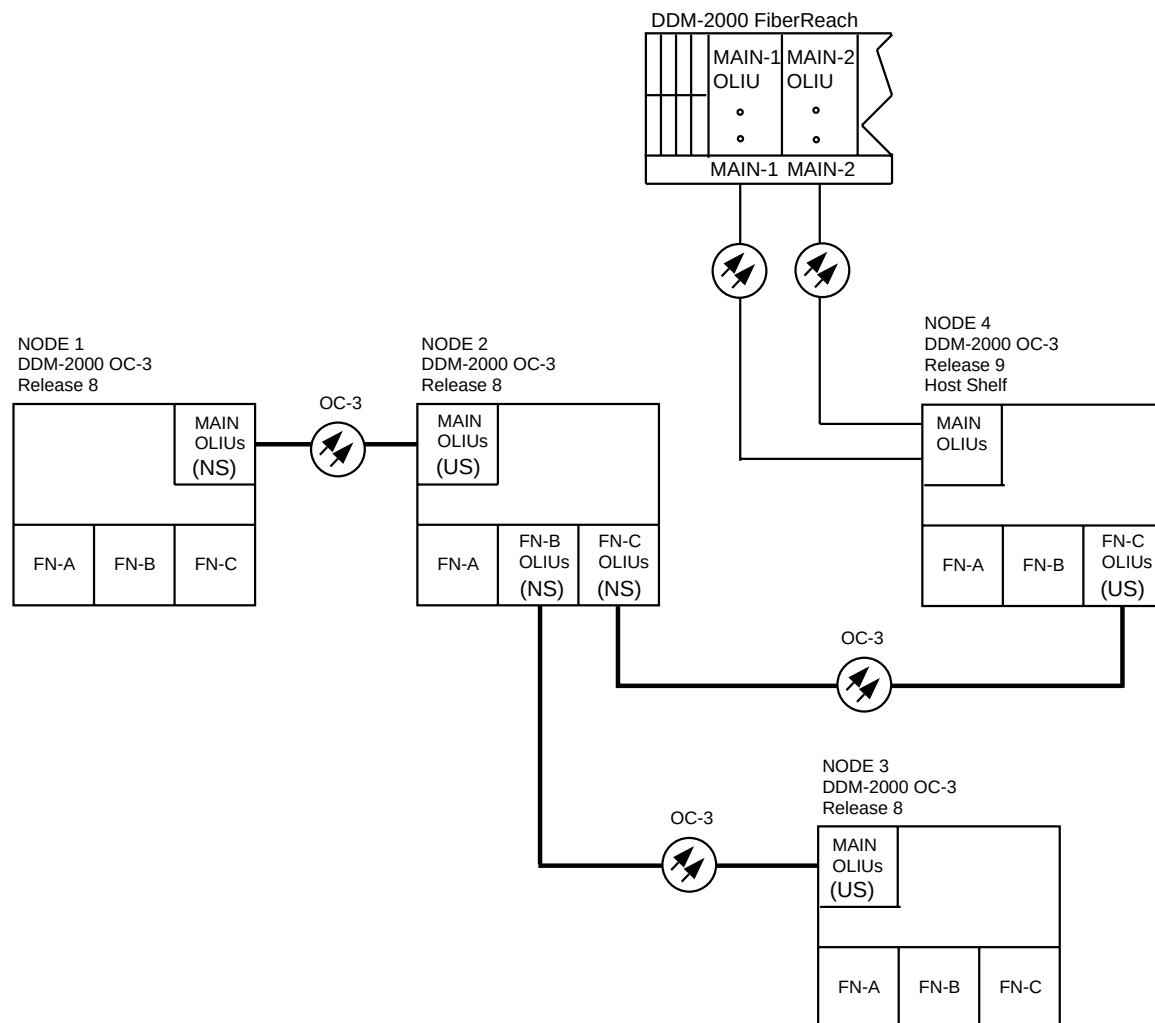


Figure 1. Example of Single-Homed FiberReach Ring to OC-3 Linear Terminating Node

DO ITEMS BELOW IN ORDER LISTED FOR DETAILS, GO TO

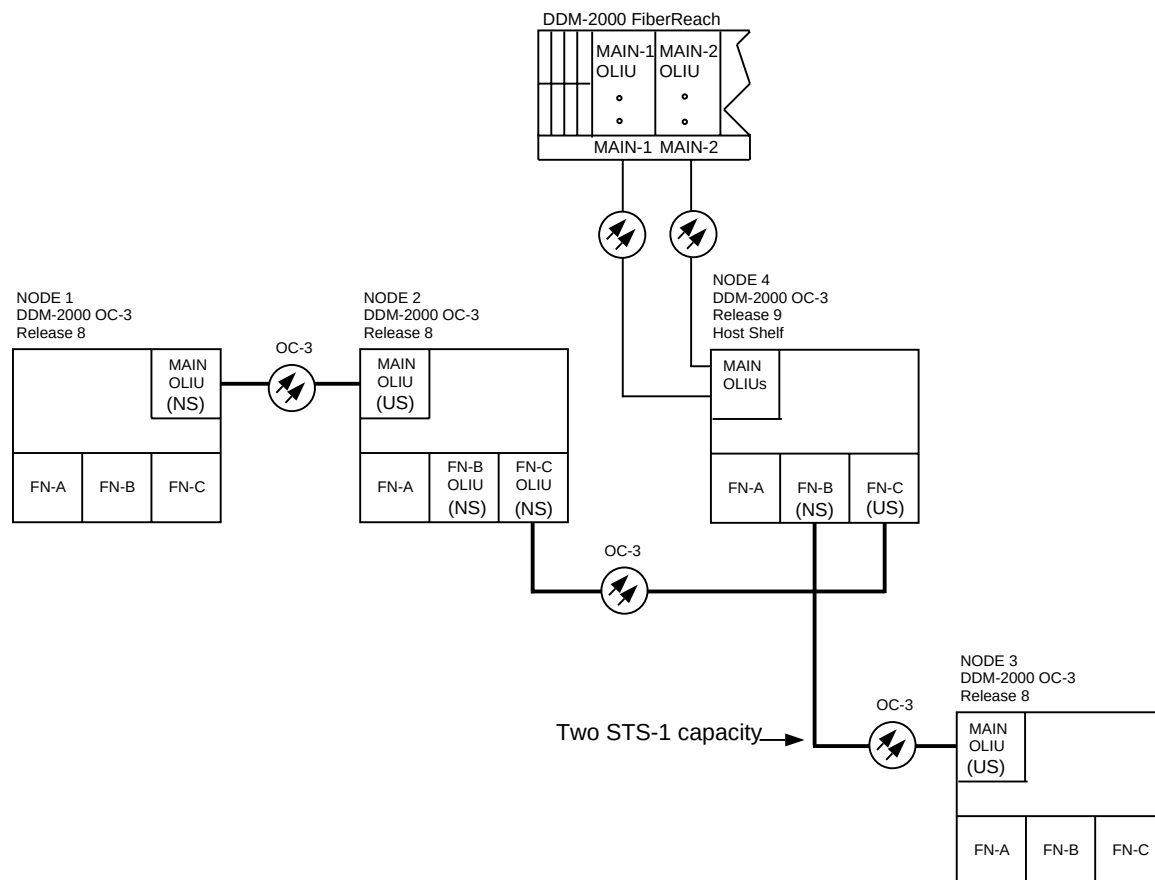
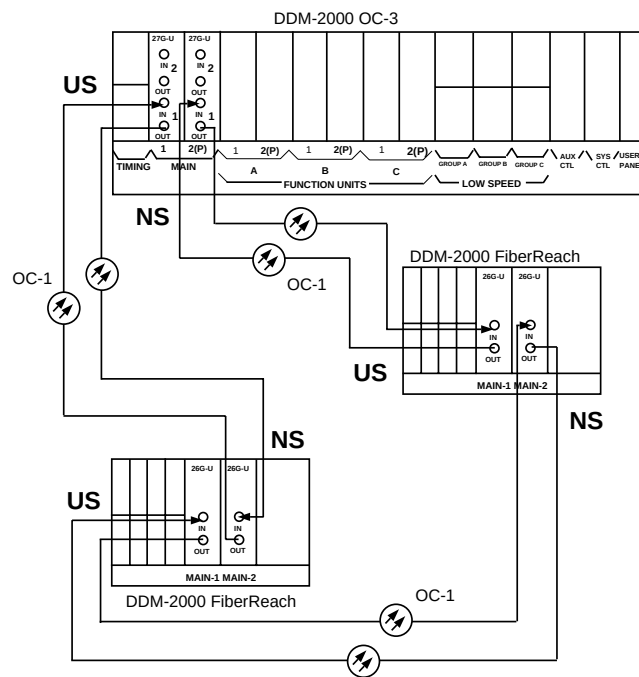


Figure 2. Example of Single-Homed FiberReach Ring to OC-3 Linear Intermediate Node

DO ITEMS BELOW IN ORDER LISTED . . . FOR DETAILS, GO TO

DDM-2000 OC-3 DCC Network Side (NS)/User Side (US) Defaults (set-fecom:nsus=ns/us)								
22-Type OLIUs	MAIN-1 dcc-m1	MAIN-2 dcc-m2	FN-A dcc-a		FN-B dcc-b		FN-C dcc-c	
	US	NS	NS		NS		NS	
27-Type OLIUs	MAIN-1 dcc-m1-1	MAIN-2 dcc-m2-1	FN-A-1 dcc-a1-1	FN-A-2 dcc-a2-1	FN-B-1 dcc-b1-1	FN-B-2 dcc-b2-1	FN-C-1 dcc-c1-1	FN-C-2 dcc-c2-1
	dcc-m1-2	dcc-m2-2	dcc-a1-2	dcc-a2-2	dcc-b1-2	dcc-b2-2	dcc-c1-2	dcc-c2-2
	US	NS	NS	US	NS	US	NS	US



DDM-2000 FiberReach DCC Network Side (NS)/User Side (US) Defaults (set-fecom:nsus=ns/us)		
26-Type OLIUs	MAIN-1 dcc-m1	MAIN-2 dcc-m2
	US	NS

Figure 3. Example of User Side/Network Side Value Settings

Establish Initial End-to-End DS3-to-DS1 Service TMUX Group Equipped But Not In Service

DO ITEMS BELOW IN ORDER LISTED FOR DETAILS, GO TO

1.  **CAUTION:**
*DDM-2000 circuit packs contain static sensitive components which can be damaged by electrostatic discharge. A static ground wrist strap must be worn when handling the circuit packs. See electrostatic discharge considerations in **Trouble Clearing: TAD-100**.*

 **NOTE 1:**
The OC-3 system must be established before continuing with this procedure. If all the nodes of the network have not been equipped and installed, refer to **System Turnup/Circuit Order: IXL-001** for procedures to equip the DDM-2000 shelves, and to establish a system.

 **NOTE 2:**
This procedure assumes that **TMUX** circuit packs have already been installed during the initial shelf turnup at the DS3 terminating end(s) of the circuit and either **DS1** or **STS1E** circuit packs have been installed during initial shelf turnup at the other terminating end of the circuit. If the appropriate circuit packs have not been installed and the system is in service on other groups, refer to **System Turnup/Circuit Order: IXL-001** for procedures to add a new DS3 group for DS3-to-DS1 service.

DO ITEMS BELOW IN ORDER LISTED FOR DETAILS, GO TO

⇒ NOTE 3:

If the DS1 terminating end(s) are in a DDM-2000 OC-3, this procedure assumes that **MXRVO** circuit packs have already been installed during initial shelf turnup and **TMUX** circuit packs have been installed during initial shelf turnup at the other DDM-2000 OC-3 terminating end(s) of the circuit. If the terminating end is in another system, it is assumed that the appropriate installation and connections have been made to that system. If the appropriate circuit packs have not been installed and the system is in service on other groups, refer to **System Turnup/Circuit Order: IXL-001** for procedures to add a new group for DS1 service.

⇒ NOTE 4:

If the DDM-2000 fails to respond in the indicated manner, refer to **Trouble Clearing: IXL-001**.

Verify that no LEDs or alarms are activated. If any LEDs or alarms are activated, refer to **Trouble Clearing: IXL-001** and follow the appropriate trouble-clearing procedure.

-
2. At the DS3 terminating node(s) of the circuit being established, determine which DS3 port is to be put into service and what options are to be selected.
-

DO ITEMS BELOW IN ORDER LISTED FOR DETAILS, GO TO

3. **NOTE:**

The "**rtrv-eqpt:**" command retrieves the "Equipage and Version Report". This report lists the circuit pack type and version information for one or more slots. See the "Commands and Reports" section of this manual for a description of the "**rtrv-eqpt:**" command format.

Use the "**rtrv-eqpt:**" command to obtain the "Equipage and Version Report" and verify that the service and protection (if required) **TMUX** circuit packs have been installed in proper **FUNCTION UNITS** group (**A**, **B**, or **C**) being put into service.

At the DS1 terminating end, use the "**rtrv-eqpt:**" command to obtain the "Equipage and Version Report" and verify that the proper service and protection (if required) **MXRVO (STS1E)** circuit packs have been installed in **FUNCTION UNITS** group(s) (**A**, **B**, or **C**) being put into service.

4. **NOTE:**

The "**rtrv-t3:**" command retrieves the "T3 Port Provisioning Report". This report lists information about each DS3 port. This information includes attributes set by the "**set-t3:**" command. See the "Commands and Reports" section of this manual for a description of the "**rtrv-t3:**" command format.

Use the "**rtrv-t3:**" command to obtain the "T3 Port Provisioning Report" and verify the software option settings.

DO ITEMS BELOW IN ORDER LISTED FOR DETAILS, GO TO

5.  **NOTE:**
 DS1 circuit packs *cannot* be installed in a **LOW SPEED GROUP**
 corresponding to a **FUNCTION UNITS** group that is equipped with
 TMUX circuit packs.

Verify the line build out (LBO) option jumpers are
installed as required and reinstall **TMUX** circuit pack(s).

DLP-513

-
6. Make the appropriate cable connection(s) to the DS3
cross-connect point(s) or equivalent connection point(s)
for the circuit being added.
-
7. At the DS1 terminating node(s) of the circuit being
established, determine which DS1 port(s) is to be put into
service and what options are to be selected.
-

8.  **NOTE:**
 The "**rtrv-t1:**" command retrieves the "T1 Port Provisioning
 Report". This report lists information about each DS1 port. This
 information includes attributes set by the "**set-t1:**" command. See
 the "Commands and Reports" section of this manual for a description
 of the "**rtrv-t1:**" command format.

At each DS1 terminating node, use the "**rtrv-t1:**"
command to obtain the "T1 Port Provisioning
Report" and verify the hardware and software option
settings.

DO ITEMS BELOW IN ORDER LISTED FOR DETAILS, GO TO

9. ➤ **NOTE 1:**

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 terminate 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.

➤ **NOTE 2:**

If DS1 protection is required and any service **DS1PM** circuit packs are installed, a **DS1PM** circuit pack must be installed in the protection **8(P)** slot.

➤ **NOTE 3:**

If the **LOW SPEED GROUP** is to be equipped with any **BBF3/BBF3B DS1PM** circuit packs, both service and protection **MXRVO** circuit packs must be installed in the corresponding **FUNCTION UNITS** group.

At each DS1 terminating node, set option switches and install **DS1/DS1PM** circuit pack(s), as required.

DLP-508

DO ITEMS BELOW IN ORDER LISTED FOR DETAILS, GO TO

10.  **CAUTION 1:**
*No service DS1 **LOW SPEED** slots should be left empty in **GROUPs** equipped with protection **DS1/DS1PM** circuit packs and corresponding to **FUNCTION UNITS** groups equipped with **MXRVO** circuit packs.*

 **CAUTION 2:**
*When a **DS1/DS1PM** circuit pack is switched to protection, removal of any other **DS1/DS1PM** circuit pack or **177A Retainer Card** in the same **LOW SPEED GROUP** will result in a loss of service to the protected **DS1/DS1PM** and the removed **DS1/DS1PM** circuit pack.*

 **NOTE:**
177A Retainer Cards are used to disconnect the cross-connect wiring associated with unused service DS1 slot locations from the DDM-2000's internal protection bus.

Install **177A Retainer Cards** into all unused service **DS1 LOW SPEED** slots in **GROUPs** equipped with protection **DS1/DS1PM** circuit packs and corresponding to **FUNCTION UNITS** groups equipped with **MXRVO** circuit packs.

-
11. At each DS1 terminating node, use the "**set-t1:**" command to set the characteristics of the DS1 port of the circuit being established.
-
12. At each DS1 terminating node, make the appropriate cable connection(s) to the DS1 cross-connect point(s) or equivalent connection point(s) for the circuit being added.
-

DO ITEMS BELOW IN ORDER LISTED FOR DETAILS, GO TO

13. Verify that no LEDs or alarms are activated. If any LEDs or alarms are activated, refer to **Trouble Clearing: IXL-001** and follow the appropriate trouble-clearing procedure.

-
14. If one of the terminating nodes is equipped with **STS1E** circuit packs for an EC-1 interface to support DS3 services being established, establish initial EC-1 low speed interface. **NTP-034**
-

15. **⇒ NOTE 1:**
Ring releases support only manual VT1.5 and STS-1 cross-connections. Manual STS-1 and/or DS1 cross-connections have to be made at each shelf to configure the transmission path for each DS3/DS1 circuit being established. Either terminating (drop) cross-connections or "drop and continue" cross-connections are made at terminating nodes and pass-through cross-connections are made at intermediate nodes.

- ⇒ NOTE 2:**
The following commands may be used to delete, enter, and retrieve cross-connections in a path protected ring network: "**cnvt-crs**", "**dlt-crs-sts1**", "**dlt-crs-vt1**", "**ent-crs-sts1**", "**ent-crs-vt1**", "**rtrv-crs-sts1**", and "**rtrv-crs-vt1**". See the "Commands and Reports" section of this manual for a description of commands.

Determine the necessary VT1.5/STS-1 cross-connections for each node from the work order or circuit order.

DO ITEMS BELOW IN ORDER LISTED FOR DETAILS, GO TO

16. Make necessary VT1.5/STS-1 cross-connections for each node in the network.

-
17.  **NOTE:**
For a DS3 circuit in a path protected ring network, the "**sw-path-sts1:address**" command must be used at the terminating nodes [and dual ring interworking (DRI) nodes in a DRI ring network] to switch the active STS-1 (DS3) path to repeat this test on the other path(s).

Perform DS3-to-DS1 transmission test for each circuit being put into service (optional).

-
18. Use the "**set-t3:**" command to set the characteristics of the DS3 port of the circuit being established.
-
19. Use the "**rtrv-state-eqpt**" command to determine the port state of the DS3 port of the circuit being established.
-

DO ITEMS BELOW IN ORDER LISTED FOR DETAILS, GO TO

20. **NOTE:**

If a port is in the *nmon* (*n*) state, the signal is not monitored or alarmed. The port will not automatically go to the *in service* (*i*) state when a signal is detected as it will in the *auto* (*a*) state. In the *nmon* state, the port must be returned to the *auto* state, using the "**set-state-t3:**" command, to turn on monitoring of signal failures and before any circuit packs associated with that port can be removed from the equipment list by the "**upd**" command.

Use the "**set-state-t3:**" command to set the port state of the DS3 port of the circuit being established.

21. Use the "**set-t1:**" command to set the characteristics of the DS1 port(s) of the circuit being established.
-

22. Use the "**rtrv-state-eqpt**" command to determine the port state of the DS1 port(s) of the circuit being established.
-

DO ITEMS BELOW IN ORDER LISTED FOR DETAILS, GO TO

23.  **NOTE:**
If a port is in the *nmon* (*n*) state, the signal is not monitored or alarmed. The port will not automatically go to the *in service* (*i*) state when a signal is detected as it will in the *auto* (*a*) state. In the *nmon* state, the port must be returned to the *auto* state, using the "**set-state-t1:**" command, to turn on monitoring of signal failures and before any circuit packs associated with that port can be removed from the equipment list by the "**upd**" command.

Use the "**set-state-t1:**" command to set the port state of the DS1 port(s) of the circuit being established.

24. If **BBF3/BBF3B DS1PM** circuit packs are installed and the optional **ds1pm** performance monitoring feature is to be used, use the "**set-feat:feat=ds1pm,act=enable**" command to enable the feature.
-

Add New TMUX Group for DS3 Service System In Service

DO ITEMS BELOW IN ORDER LISTED FOR DETAILS, GO TO

1.  **CAUTION:**
*DDM-2000 circuit packs contain static sensitive components which can be damaged by electrostatic discharge. A static ground wrist strap must be worn when handling the circuit packs. See electrostatic discharge considerations in **Trouble Clearing: TAD-100**.*

 **NOTE 1:**
This procedure assumes that the DDM-2000 is in service and that a new **FUNCTION UNITS** group is being equipped with **TMUX** circuit packs for DS3-to-DS1 service. It also assumes that **DS1** or **STS1E** circuit packs have been installed if the other end is an DS1 or EC-1 interface. If it has not been installed, refer to **System Turnup/Circuit Order: IXL-001** for procedures to add a new **DS1** or **STS1E** group.

 **NOTE 2:**
If the DDM-2000 fails to respond in the indicated manner, refer to **Trouble Clearing: IXL-001**.

Determine which **FUNCTION UNITS** group (**A**, **B**, or **C**) is being equipped.

DO ITEMS BELOW IN ORDER LISTED FOR DETAILS, GO TO

2. Use the "**rtrv-alm**" command to verify that no alarms, locks, loops, or switches are present.

-
3. Verify no **DS1/DS1PM** circuit packs are installed in **LOW SPEED** slots associated with new **TMUX FUNCTION UNITS** group being added.
-

4. Set line build out (LBO) option jumpers and install **TMUX** circuit packs into proper slots of **FUNCTION UNITS** group (**A**, **B**, or **C**) being equipped. **DLP-507**
-

5. Make the appropriate connection(s) to the DS3 cross-connect point(s) or equivalent connection point(s) for the circuit(s) being added.
-

6. Verify that no LEDs or alarms are activated. If any LEDs or alarms are activated, refer to **Trouble Clearing: IXL-001**.
-

DO ITEMS BELOW IN ORDER LISTED FOR DETAILS, GO TO

7. **NOTE 1:**

Ring releases support only manual VT1.5 and STS-1 cross-connections. Manual STS-1 and/or DS1 cross-connections have to be made at each shelf to configure the transmission path for each DS3/DS1 circuit being established. Either terminating (drop) cross-connections or "drop and continue" cross-connections are made at terminating nodes and pass-through cross-connections are made at intermediate nodes.

 NOTE 2:

The following commands may be used to convert, delete, enter, and retrieve STS-1 cross-connections: "**dlt-crs-sts1**", "**ent-crs-sts1**", and "**rtrv-crs-sts1**". See the "Commands and Reports" section of this manual for a description of commands. See "Cross-Connection Provisioning" in the "Administration and Provisioning" section of this manual for more information on cross-connection provisioning.

Determine the necessary STS-1 cross-connections for each node from the work order or circuit order.

-
8. Make necessary STS-1 cross-connections for each node in the network.
-

DO ITEMS BELOW IN ORDER LISTED FOR DETAILS, GO TO

9. **NOTE:**

For a DS3 circuit in a path protected ring network, the "sw-path-sts1:address" command must be used at the terminating nodes [and dual ring interworking (DRI) nodes in a DRI ring network] to switch the active STS-1 (DS3) path to repeat this test on the other path.

Perform DS3-to-DS1 transmission test for each circuit being put into service (optional).

-
10. Use the "**set-t3:**" command to set the characteristics of the DS3 port.
-

11. Use the "**rtrv-state-eqpt**" command to determine the port state of the DS3 port(s) of the circuit being established.
-

12. **NOTE:**

If a port is in the *nmon* (*n*) state, the signal is not monitored or alarmed. The port will not automatically go to the *in service* (*i*) state when a signal is detected as it will in the *auto* (*a*) state. In the *nmon* state, the port must be returned to the *auto* state, using the "**set-state-t3:**" command, to turn on monitoring of signal failures and before any circuit packs associated with that port can be removed from the equipment list by the "**upd**" command.

Use the "**set-state-t3:**" command to set the port state of the DS3 port(s) of the circuit being established.

Upgrade DDM-2000 OC-12 Ring by Removing OC-12 Shelf and Replacing with Existing Single-Homed OC-3 Shelf In Service

DO ITEMS BELOW IN ORDER LISTED FOR DETAILS, GO TO

1. **⇒ NOTE 1:**

This procedure is used to remove an OC-12 shelf from an OC-12 ring network that has an in-service OC-3 shelf single-homed on it. The existing OC-3 shelf is equipped with **24G-U OLIUs** and cut into the OC-12 ring. It is assumed that the fiber being used in the current OC-12 ring network will be used in the new configuration.

⇒ NOTE 2:

This procedure assumes an OC-12 Release 5, or later, ring configuration with one OC-3 Release 11, or later, shelf single-homed (OX1) on the OC-12 shelf being removed. This procedure uses a 3-node OC-12 ring as an example for the upgrade (See Figure 1). This procedure will eliminate the NODE 1 OC-12 shelf and replace it with the NODE 5 OC-3 shelf after equipping the OC-3 shelf with **24G-U OLIUs**.

⇒ NOTE 3:

A spare OC-3 shelf is required to preprovision the **SYSCTL** and **24G-U OLIUs** with the proper software, cross connections, synchronization requirements, and SITE, NE, and TID settings.

⇒ NOTE 4:

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.

DO ITEMS BELOW IN ORDER LISTED FOR DETAILS, GO TO

Contact maintenance center or use the "**rtrv-alm:**" command to verify that no alarms, locks, or switches are present.

2. Before beginning this procedure, determine which OC-12 shelf is being removed. If the shelf being removed is externally timed, the timing transfer can be done with a mult-out cable to the associated OC-3; or if holdover mode is acceptable, the timing cable can be switched later in this procedure.
-

3. Notify maintenance center that alarms will be generated.
-

4. Before beginning this procedure, verify ring integrity and path protection switching function. At the start nodes (NODE 1 OC-12 and NODE 5 OC-3), 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. Label each fiber and repeat this step on the other **MAIN OLIU**.
-

5. 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.
-

DO ITEMS BELOW IN ORDER LISTED FOR DETAILS, GO TO

6. Upgrade all OC-3 nodes to OC-3 Release 11 or later software, if required.

- A. In-Service Local Software Download
B. In-Service Remote Software Download

DLP-532
DLP-562

7.  **CAUTION:**
This step is very important. You should review the association among cross connections from the "Administration and Provisioning" section and the "Commands and Reports" section of Volume 1 of this manual. Improper cross connections will result in a loss of service.

Using office records or the "**rtrv-crs-():**" commands, determine the drop and pass-through cross connects at the nodes being converted.

8. Equip the spare OC-3 shelf with new **SYSCTL**, **OHCTL**, **TGS**, and new **24G-U OLIU**s circuit packs using procedures of **NTP-016**.
-

DO ITEMS BELOW IN ORDER LISTED FOR DETAILS, GO TO

9. Provision the **SYSCTL** and **24G-U OLIUs** using the **DLP-512**
"set-ne", "set-sync", and "set-fecom" commands to
parameters for the existing NODE 1 OC-12 shelf. Use
the "ent-crs-()" commands to preprovision the
proper cross connections for the new **24G-U OLIUs**.
(This procedure uses the cross connections shown in
Figures 1-3 as an example for this upgrade. Note the
preprovisioned cross connections for the **24G-U OLIUs** in
Figure 2 and how they relate to the original cross
connections in Figure 1.)
-

10.  **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 OC-3 NODE, (in this example, NODE 5
OC-3), remove optical fibers from **MAIN 1 OLIU**, then
remove **MAIN 1 OLIU**. See Figure 2.

11. At the starting OC-12 NODE, (in this example, NODE 1
OC-12), remove optical fibers from **MAIN B-1 OLIU** and
label fibers. See Figure 2.
-

DO ITEMS BELOW IN ORDER LISTED FOR DETAILS, GO TO

12.  **CAUTION:**
*Exercise care in the following step. Do not unseat (unplug) the **OLIU**.
The faceplate latch must be only slightly lifted until the **FAULT LED**
lights. Do not put any pressure on the latch.*

At the starting OC-3 NODE (NODE 5 OC-3), slightly lift
the faceplate latch on the **MAIN 2(P) OLIU** until the
FAULT LED lights.

-
13. At the starting OC-3 NODE (NODE 5 OC-3), remove
SYSCTL.

-
14. At the starting OC-3 NODE (NODE 5 OC-3), insert
preprovisioned **24G-U OLIU** into **MAIN 1 OLIU** slot.

-
15. At the starting OC-3 NODE (NODE 5 OC-3), connect
labeled fibers disconnected from NODE 1 OC-12 **MAIN
B-1** slot to **24G-U OLIUs** in **MAIN 1 OLIU** slots. Wait
until the **FAULT LED** at the adjacent OC-12 Node
(NODE 3, OC-12) goes off. The **FAULT LED** on the
OC-3 **24G-U OLIU** will remain lighted.

-
16. At the starting OC-3 NODE (NODE 5 OC-3), install
preprovisioned **SYSCTL**. Wait until system initializations
is complete, then verify new cross connections, TID, Site
and NE, and other preprovisioned settings.
-

DO ITEMS BELOW IN ORDER LISTED FOR DETAILS, GO TO

17. If timing changes are necessary, make new cable connections or **TGS** settings.
 18. At the starting OC-3 NODE (NODE 5 OC-3), disconnect optical fibers from **MAIN 2(P) OLIUs** and remove existing **OLIUs**.
 19. At the starting OC-3 NODE (NODE 5 OC-3), install new **24G-U OLIU** into **MAIN 2(P) OLIU** slot.
 20. At the starting OC-12 NODE (NODE 1 OC-12), disconnect optical fibers from **MAIN B-2(P) OLIUs** and label.
 21. At the starting OC-3 NODE (NODE 5 OC-3), connect optical fibers from adjacent OC-12 node **MAIN B-1 OLIUs** to **MAIN 2(P) 24G-U OLIU**. Wait until the **FAULT** LED at the adjacent OC-12 Node (NODE 2, OC-12) goes off. The **FAULT** LED on the OC-3 **24G-U OLIU** will remain lighted.
 22. At the starting OC-3 NODE (NODE 5 OC-3), connect the OC-12 faceplate connector between **MAIN 1** and **MAIN 2(P) 24G-U OLIUs**.
-

DO ITEMS BELOW IN ORDER LISTED FOR DETAILS, GO TO

23. At the starting OC-3 NODE (NODE 5 OC-3), momentarily depress the **UPD/INIT** button on the **SYSCTL** or execute the update ("**upd**") command.

24. At the DSNE, use the "**dlt-tadrmmap**" command to delete the discontinued OC-12 shelf (NODE 1, OC-12).

25. Use "**rtrv-network-map**" command to verify DCC connectivity throughout the ring. Verify system is free of alarms.

26. At the starting OC-3 NODE (NODE 5, OC-3), test protection switching and optical fiber integrity by disconnecting and reconnecting, one at a time, the **MAIN 1** and **MAIN 2(P) OLIU** fiber connections. Wait until alarms clear between disconnecting the fibers.

DO ITEMS BELOW IN ORDER LISTED . . . FOR DETAILS, GO TO

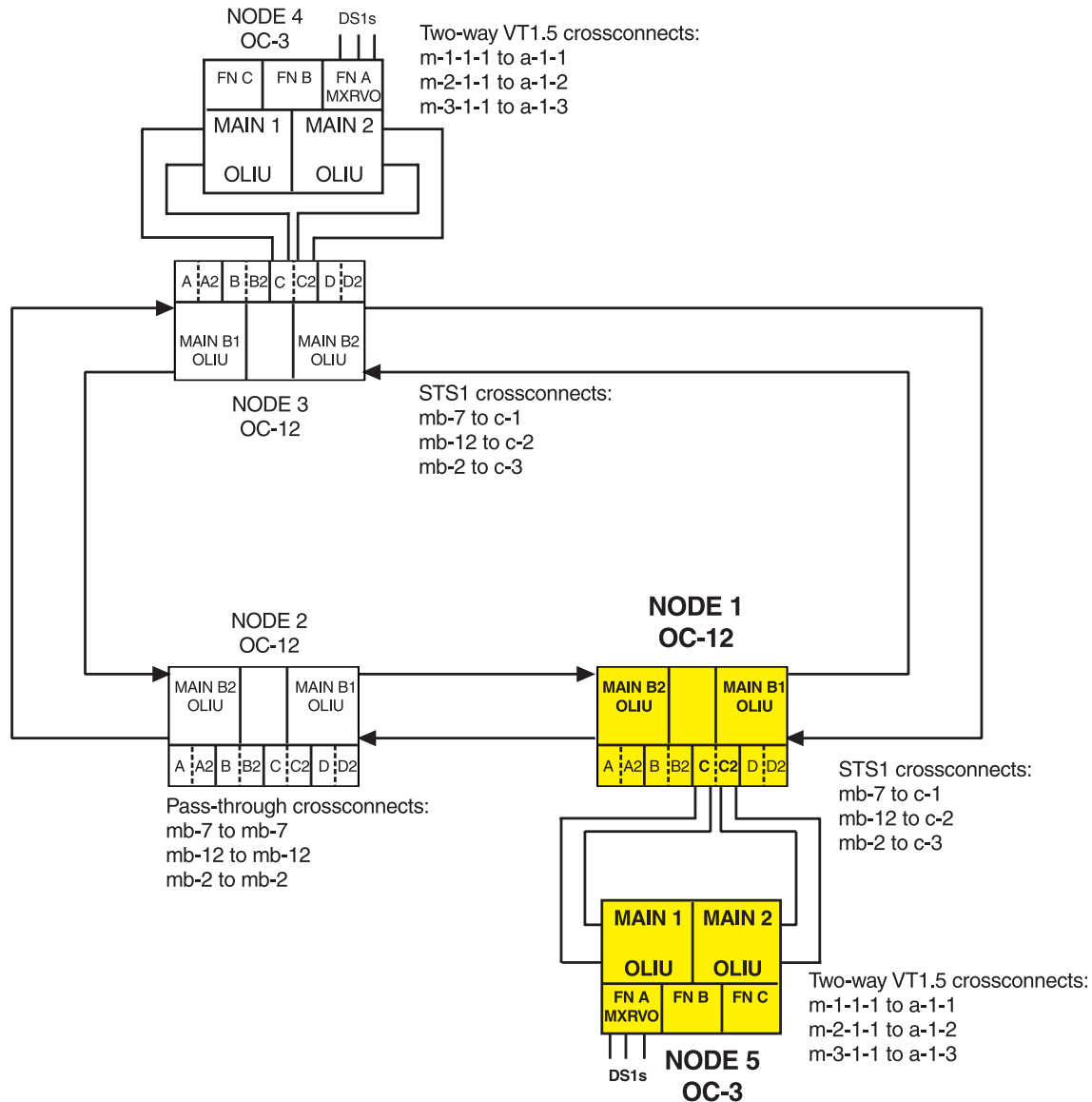


Figure 1. Basic 3-Node OC-12 Ring for Ring Upgrade

DO ITEMS BELOW IN ORDER LISTED . . . FOR DETAILS, GO TO

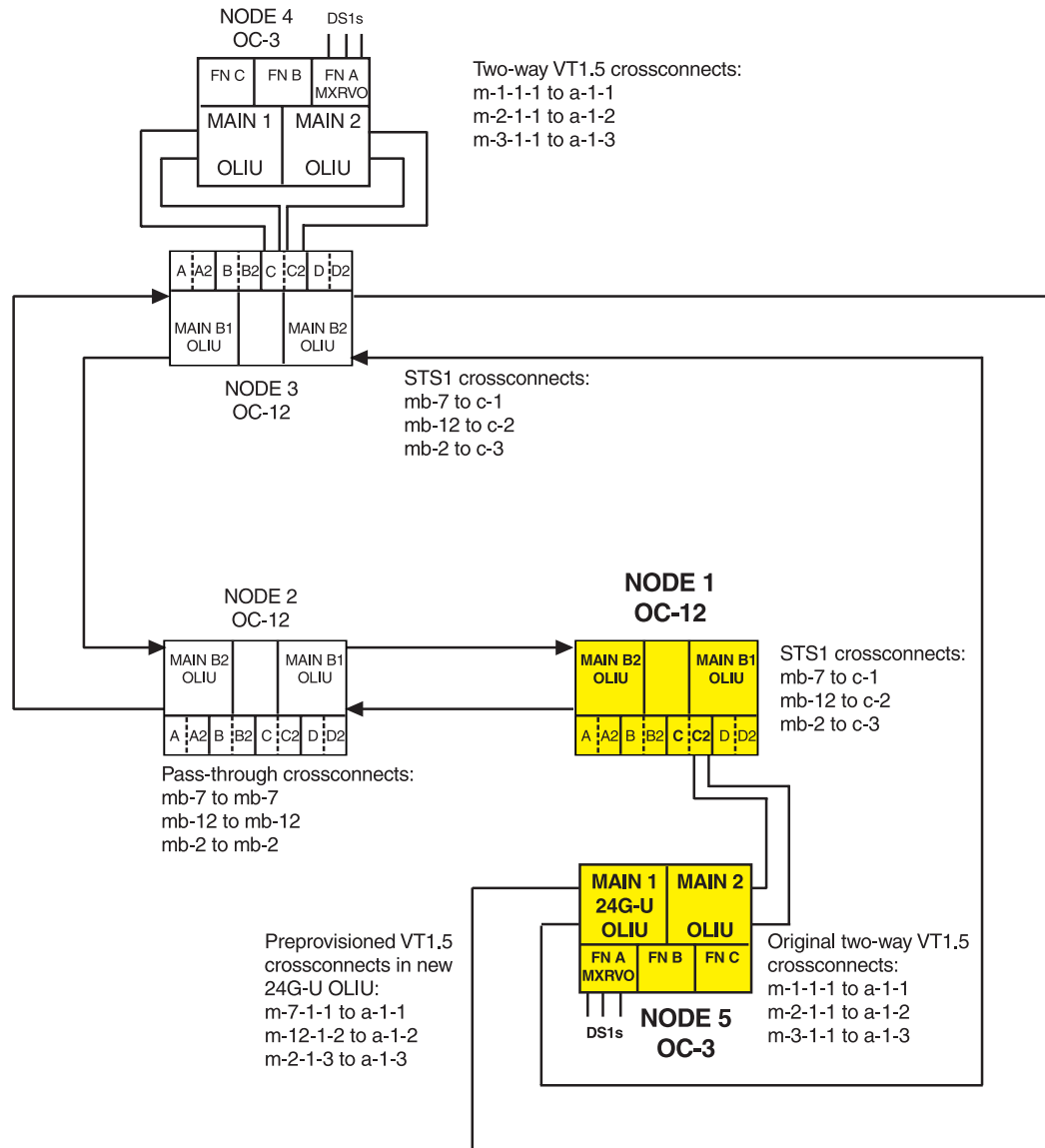


Figure 2. Basic 3-Node OC-12 Ring for Ring Upgrade

DO ITEMS BELOW IN ORDER LISTED . . . FOR DETAILS, GO TO

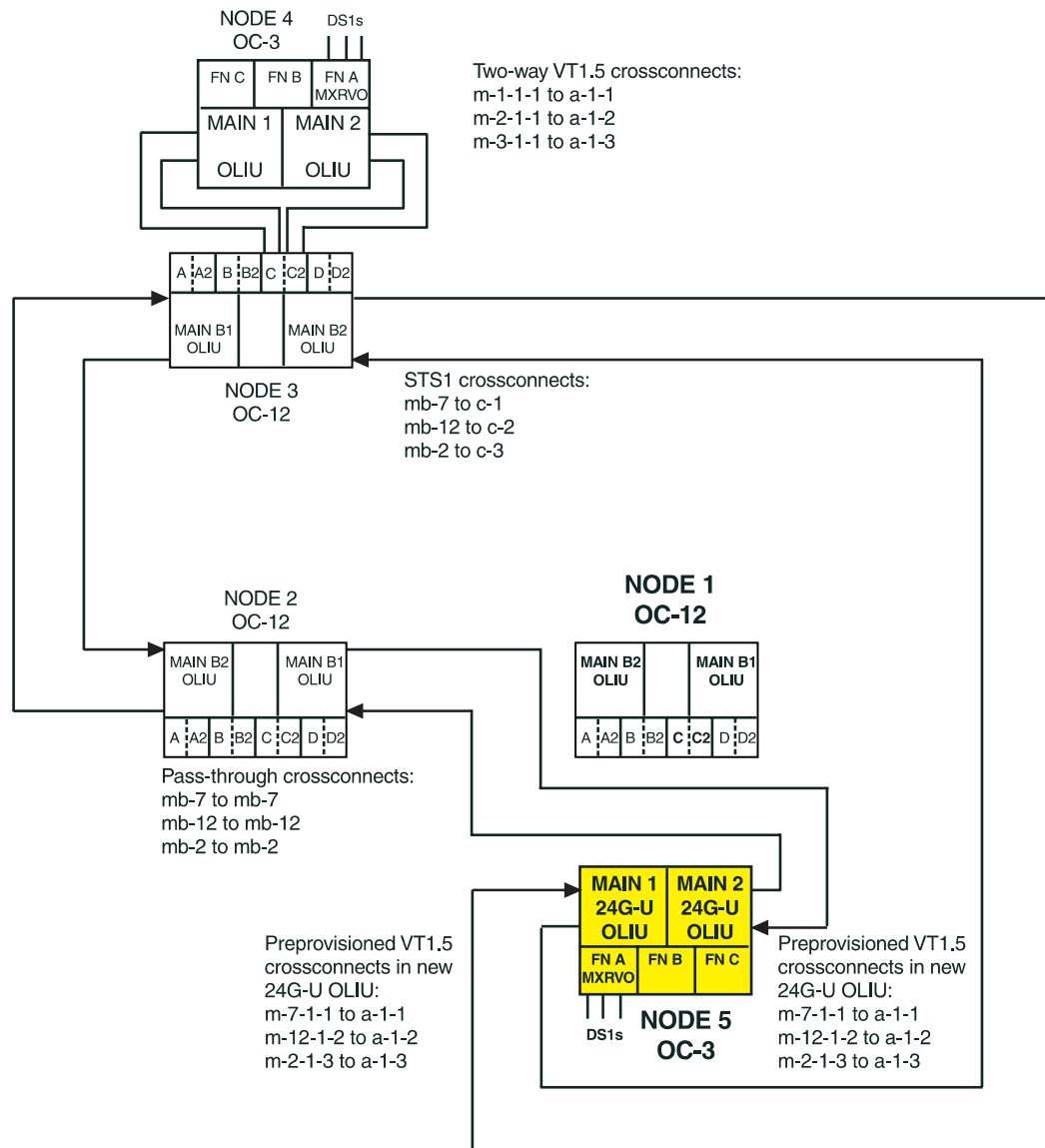


Figure 3. Basic 3-Node OC-12 Ring for Ring Upgrade

Task Index Operation

FIND YOUR JOB IN THE LIST BELOW THEN GO TO

Operation Procedures

CPro-2000 System Backup and Restore	Operation: NTP-002
CIT — Connect and Establish Session	Detailed Level Procedure: DLP-521
CIT — Activate Optional System Features	Detailed Level Procedure: DLP-512
CIT — Enable or Disable System Security and/or Edit, Delete, or Enter a User's Login	Detailed Level Procedure: DLP-541
Copy Diskettes (Floppy Disks) and Make Backups	Detailed Level Procedure: DLP-534
Display Terminal Alarm/Status Condition — Using Far End Select (FE SEL)	Detailed Level Procedure: DLP-530
Establish Remote Login	Detailed Level Procedure: DLP-522
Fan Filter — Replace	Detailed Level Procedure: DLP-540
Fan Shelf — Test	Detailed Level Procedure: DLP-539
FE SEL (Far End Select) — Display Terminal Alarm/Status Condition	Detailed Level Procedure: DLP-530
Fuse — Remove -48V DC User Panel	Detailed Level Procedure: DLP-555

FIND YOUR JOB IN THE LIST BELOW THEN GO TO

Generic Software Version Identification —

Retrieve Detailed Level Procedure: DLP-531

Install or Replace SYSCTL Detailed Level Procedure: DLP-501

Install New Generic Program

Local or Remote Detailed Level Procedure: DLP-532

Introduction to the PC Detailed Level Procedure: DLP-533

Modems — Condition and Connect Detailed Level Procedure: DLP-526

OLIU Receiver Sensitivity — Test Detailed Level Procedure: DLP-547

Sync Messaging —

Change Kbyte to Sbyte Detailed Level Procedure: DLP-565

Test LEDs Detailed Level Procedure: DLP-509

Upgrade DDM-2000 OC-3 Release 6 to Release 8
or Release 7.1 or 7.2 to Release 9 or 11 —

System In Service Non-Trouble Clearing Procedure: NTP-046

Upgrade Software Program Detailed Level Procedure: DLP-532

Upgrade TBOS/Parallel Telemetry to TL1/X.25 Detailed Level Procedure: DLP-538

Upgrade Timing Detailed Level Procedure: DLP-535

Reference Only Procedures

Option Settings — Check (Set) Detailed Level Procedure: DLP-513

Replace Circuit Pack (Reference Only) Detailed Level Procedure: DLP-523

CPro-2000 System Backup and Restore

DO ITEMS BELOW IN ORDER LISTED FOR DETAILS, GO TO

⇒ NOTE:

The CPro-2000 Graphical User Interface and Provisioning Tool includes backup and restore features to protect provisioning information in ring applications. These features save a copy of a node's provisionable parameters so they can be restored at a later date, if necessary.

These features provide backup and restore for:

- Cross-connections
- DS1 port options
- DS3 port options
- EC-1 port options
- OC-3 line options.

See the CPro-2000 Graphical User Interface and Provisioning Tool on-line user's guide for more information on these features.

Task Index Trouble Clearing

FIND YOUR JOB IN THE LIST BELOW THEN GO TO

Trouble Analysis Procedures

Maintenance Philosophy	TAD-100
ABN Indication - Clear	TAP-109
FAULT Indication (Flashing) - Clear	TAP-110
Alarm - Critical (CR) - Clear	TAP-101
Alarm - Major (MJ) - Clear	TAP-102
Alarm - Minor (MN) - Clear	TAP-112
Alarm - NE ACTY/FE ACTY Only - Clear	TAP-117
Alarm - Power Minor (PMN) - Clear	TAP-104
ED-8C733-30, G7 Fan Shelf Alarm - Clear	TAP-118
Trouble Report - Clear	TAP-105
Trouble During Program Upgrade - Clear	TAP-116

Maintenance Philosophy

Overview

The maintenance philosophy is built on gathering system information at two levels. The first is through an Operation System or Graphical User Interface [TL1 (X.25), ITM-SNC, CPro-2000, etc.]. Trouble indications obtained from these interfaces are analyzed at the operations center and trouble reports issued. For more information on TL1 interfaces, see 824-102-151 *Operations System Engineering Guide (OSEG)*. For ITM-SNC, see 107-564-288, *ITM-SNC System Administration Guide*, and 107-564-270, *ITM-SNC User Guide*. For CPro-2000, see 190-523-xxx (release dependent), *Cpro-2000 User Manual*.

Operations center personnel can use the OSEG and the **rtrv-alm** Report Descriptions in the "Commands and Reports" section of Volume 1 of this User/Service manual to assess the severity and meaning of alarm messages received at the operations interface. After analyzing the reports, center personnel may dispatch someone to the site indicating a local alarm condition. The trouble clearing procedures in this manual assume that troubles have been isolated to a particular node and are being used by technicians that have been dispatched to the site.

The second level of maintenance is a local visual inspection of the user panel and circuit pack LEDs, then using a CIT interface to retrieve detailed alarm reports.

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. After determining the alarm level (Critical, Major, Minor, etc.) or trouble indication, the technician accesses the proper trouble analysis procedure (TAP) from **Trouble Clearing: IXL-001**. If the trouble cannot be corrected or identified using these procedures, the procedures direct the technician to obtain assistance because no more step-action procedural data is known for the specific trouble.

Regional Technical Assistance Center (RTAC)

The technician must make the decision regarding trouble analysis, corrective action, and obtaining assistance. The technician or local technical support staff may choose to continue trouble analysis based on their knowledge or experience on the DDM-2000 system, or may elect to obtain assistance by calling the Regional Technical Assistance Center **1-800-225-RTAC**.

COACH Assistance

Various customer computer-support tools are on-line and available via COACH. A login identification and password must be obtained to gain access to the COACH tools. Contact your regional 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 which 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 and reported by system alarms and/or by manual or automatic diagnostic reports. When this occurs, a determination must be made as to why a circuit pack has failed. 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 DS3 circuit pack is reported faulty, that circuit 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 DS3 circuit pack. If there is a contact problem such as dirt, oil, or lack of total contact connection, then this may be corrected by reseating and thus avoiding the return of a good unit for repair. Use caution when unseating circuit packs. For example, ensure protection switching is available for circuit pack being removed.

When circuit packs are replaced in some sequence to clear a trouble, they should be replaced one at a time by installing the original circuit packs if they were found to be operational.

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 a circuit pack's 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.

* Registered trademark of the Dow Chemical Corporation.

10. 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.

Clear Critical (CR) Alarm

1.  **NOTE:**
Critical alarms are failures that cause loss of service to more than four DS1s (96 DS0 customer channels). Table A lists conditions which may cause critical alarms.

Is a CIT available?

If **NO**, then continue with **Step 2**.

If **YES**, then proceed to **Step 10**.

2. On the User Panel, momentarily depress **ACO** button to silence active audible office alarms.

3.  **NOTE:**
The **FE SEL** button on the **SYSCtl** is used to display local and remote (farend) alarm and status conditions [**DLP-530**].

Use **FE SEL** button to display alarm conditions for local shelf (**L.** displayed in **FE ID** display).

4. Was **NE ACTY** LED lighted on User Panel when local shelf alarm conditions were displayed (**L.** displayed in **FE ID** display)?
If **NO**, then continue with **Step 5**.
If **YES**, then proceed to **Step 16**.
5. Use **FE SEL** button to display alarm conditions for other sites/shelves in the network (observe site address in **FE ID** display).
6. Was **NE ACTY** LED lighted on User Panel when alarms were displayed for any selected site?
If **YES**, then continue with **Step 7**.
If **NO**, then do **TAP-108**.
7. Use **FE SEL** button to display alarm conditions for other sites/shelves in the network (observe site address in **FE ID** display [**DLP-530**]).

8. Issue a trouble report of critical alarm condition at the far-end DDM-2000 site indicated in **FE ID** display.
9. **STOP. YOU HAVE COMPLETED THIS PROCEDURE.**
10. **⇒ NOTE:**
For all network configurations except point-to-point, there will be multiple far-end far end terminals. Using a Craft Interface Terminal (CIT) aids in troubleshooting multi-shelf DDM-2000 networks.

Connect the CIT to the **CIT** connector on the near-end User Panel and log in to the near-end system, if not already performed.

Reference: **DLP-521**

11. **⇒ NOTE 1:**
The "**rtrv-alm**" command can be used to display a report of active DDM-2000 OC-3 alarm and status conditions. The "Commands and Reports" section of this manual gives a description of the command.
- ⇒ NOTE 2:**
The "Active Alarms and Status Report" is output automatically following CIT log in. The report shown in Figure 1 is an example that shows several entries. There may be only one entry in the actual report.

Note the information in the Source Address and Description columns for the top entry/entries above the first single-dashed line (for example, "CRITICAL ... inc. OC3 LOS" in the report below) in the "Active Alarms and Status Report".

```

/* Active Alarms and Status Report
=====
Alarm      Source      Date   Time      Srv  Description
Level      Address      Detected
=====
CRITICAL   main-2      MM-DD HH:MM:SS  SA    inc. OC3 LOS
-----
MAJOR      m2-2-1-1    MM-DD HH:MM:SS          inc. VT AIS
          .
          .
          .
MAJOR      dcc-m2      MM-DD HH:MM:SS          section DCC chan fail
MAJOR      dcc-m1      MM-DD HH:MM:SS          section DCC chan fail
-----
MINOR      main-1      MM-DD HH:MM:SS          inc. OC3 LOS
-----
ne-acty    -              holdover mode active
*/

```

Figure 1. Example of Active Alarms and Status Report

12.  **NOTE:**
Far-end alarm or status conditions are listed in this report with a Source Address of farend. Local alarm or status conditions have a Source Address of the local slot, line, port, channel, path, cross-connection, or operations interface (DCC, TL1 (X.25), TBOS, etc.) where the event occurred. (See *Addresses* in the "Commands and Reports" section of this manual.) Use the "**rtrv-alm**" command to get another report, if necessary.

Does the Source Address of any top entry in the alarm report indicate a **local** slot, channel, port or operations interface for the CRITICAL alarm?

If **NO**, then do **TAP-107**.

If **YES**, then continue with **Step 13**.

13. Use "**opr-aco**" command to silence active audible office alarms, if required.
14. Note the **local** trouble indication in the Description column of the "Active Alarms and Status Report", starting with the highest alarm level (Critical) listed in the Alarm Level column.
15. Find the trouble description in Table A for the highest alarm level and go to the indicated step or procedure.

Table A. Critical (CR) Alarm Conditions

Alarm Level or LED Indication	Trouble Description (Note)	Likely causes	Step or Procedure
CRITICAL. CR LED lighted. FAULT LED flashing on OLI circuit pack(s).	inc. OC3 LOS inc. OC3 LOF inc. OC3 sig failed (BER) inc. OC3 sig degrade (BER)	Failure of OLI circuit pack at near or far end, or failure of receive fiber.	TAP-111 (linear, 1+1) or TAP-119 (ring, 0X1)
	inc. STS1 LOP OC3 <i>slotaid</i>	If failure on both OC-3 lines: unprotected removal or failure of MXRVO or DS3 circuit pack at far end.	Step 31
		If failure on only one OC-3 line: Failure of OLI circuit pack at near or far end.	TAP-111 (linear, 1+1) or TAP-119 (ring, 0X1)
	inc. OC12 LOS inc. OC12 LOF inc. OC12 sig failed (BER) inc. OC12 sig degrade (BER)	Failure of OLI circuit pack at near or far end, or failure of receive fiber.	TAP-119 (ring, 0X1)
	inc. STS1 LOP OC12 <i>slotaid</i> inc. STS3c LOP OC12 <i>slotaid</i>	If failure on both OC-12 lines: unprotected removal or failure of MXRVO or DS3 circuit pack at far end.	Step 31
		If failure on only one OC-12 line: Failure of OLI circuit pack at near or far end.	TAP-119 (ring, 0X1)
	inc. OC1 LOS inc. OC1 LOF inc. OC1 sig failed (BER) inc. OC1 sig degrade (BER)	Failure of OLI circuit pack at near or far end, or failure of receive fiber.	TAP-119 (ring, 0X1)
	inc. STS1 LOP OC1 <i>slotaid</i>	If failure on both OC-1 lines: unprotected removal or failure of MXRVO or OLI circuit pack at far end.	Step 31
		If failure on only one OC-1 line: Failure of OLI circuit pack at near or far end.	TAP-119 (ring, 0X1)
CRITICAL. CR LED lighted.	inc. OC3 line AIS* inc. OC12 line AIS* inc. OC1 line AIS	Failure of OLI circuit pack at the far end.	Step 37

See notes/footnotes at end of table.

Table A. Critical (CR) Alarm Conditions (Continued)

Alarm Level or LED Indication	Trouble Description (Note)	Likely causes	Step or Procedure
CRITICAL. CR LED lighted. FAULT LED flashing on DS3/TMUX circuit pack.	inc. (from DSX) DS3 AIS* inc. (from DSX) DS3 LOS* inc. (from DSX) DS3 OOF* inc. (from DSX) DS3 sig fail*	Equipment failed or removed at DSX-3; DS3 input disconnected at the DSX-3 or at the DDM-2000 backplane; an out-of-frame DS3 signal incoming to the DSX-3 at the far end; unprotected failure of DS3 circuit pack at the far end or near end; DS3 signal looped at both ends for DS3 circuit packs.	Step 17
CRITICAL. CR LED lighted. FAULT LED flashing on STS1E circuit pack.	inc. EC1 LOS* inc. EC1 LOF* inc. EC1 sig failed (BER)* inc. EC1 sig degrade (BER)*	Failure of incoming EC-1 signal from STSX, failure of STS1E circuit pack at the near end, failure of incoming cable or cable disconnect at EC-1 STSX cross-connect point or shelf connector, cross talk in office wiring,	Step 17
	inc. EC1 line AIS*	Failure of the STS1E circuit pack or equivalent at other end of EC-1 line.	Step 35
	inc. STS1 LOP EC1*	Failure of the near-end or far-end STS1E circuit pack.	Step 35
CRITICAL. CR LED lighted.	inc. STS1 AIS*	Incomplete or incorrect cross-connect provisioning in an end-to-end network; unprotected removal or obscure failure of a DS3, STS1E, MXRVO, or OLIU circuit pack at the far end; unprotected optical line failure.	TAP-120
	inc. VT AIS*	Incomplete or incorrect cross-connect provisioning in an end-to-end network; unprotected removal or failure of a DS1 circuit pack at the far end.	TAP-120
	inc. STS1 sig failed (BER) inc. STS1 sig degrade (BER)	Failure of OLIU circuit pack at near end or far end or failure of receive fiber.	TAP-111 (linear, 1+1) or TAP-119 (ring, 0X1)

See notes/footnotes at end of table.

Table A. Critical (CR) Alarm Conditions (Continued)

Alarm Level or LED Indication	Trouble Description (Note)	Likely causes	Step or Procedure
CRITICAL. CR LED lighted.	inc. STS1 unequipped	STS-1 cross-connects have been deleted or an equipment slot(s) has been deleted in upstream equipment interfacing with the DDM-2000 OC-3 ring.	TAP-120
	invalid CP switches	When associated with TIMING slot, timing mode switch settings on TGS circuit pack are invalid.	Step 24
CRITICAL. CR LED lighted. FAULT LED may be lighted on failed circuit packs.	Both TGS CP fail Both MXRVO CP fail Both OLIU CP fail Both DS3 CP fail Both STS1E CP fail Both TMUX CP fail	Internal circuit pack failure. Replace circuit pack.	DLP-523
CRITICAL. CR LED lighted.	Both TGS CP removed Both MXRVO CP removed Both OLIU CP removed Both DS3 CP removed Both STS1E CP removed Both TMUX CP removed	Circuit packs removed without doing upd command to remove circuit packs from equipment list.	Step 28
	CP not allowed - (crs)	Circuit pack does not support the manual cross-connection(s) currently provisioned for this slot.	Change circuit pack or change cross-connections.
	CP not allowed - (timing)	When associated with TIMING slot, current circuit pack switch settings do not support the sync. timing provisioned.	Change TGS switches [DLP-513] or change sync. parameters (" set - sync ").
		When associated with FUNCTION UNITS group C , circuit pack type does not support the current provisioned sync. parameters (" set - sync ").	Change circuit pack type or change timing options
	environment ⁿ *	Default message, can be changed. An environmental alarm point (miscellaneous discrete input) is active.	Use " rtrv-attr-env " command at RT to determine cause.
	ExternalMinor [*]	External minor alarm (environmental alarm input 15) is active at RT. DC power or cooling fan in RT has failed.	Use " rtrv-attr-env " command at RT to determine cause. Clear trouble using local procedures.

See notes/footnotes at end of table.

Table A. Critical (CR) Alarm Conditions (Continued)

Alarm Level or LED Indication	Trouble Description (Note)	Likely causes	Step or Procedure
CRITICAL. CR LED lighted. FAULT LED lighted on circuit pack.	unexpected CP switches unexpected CP type	Switch settings invalid, different from other circuit pack, or different than they were before circuit pack was removed or replaced. Circuit pack inserted into slot provisioned for different circuit pack.	Step 21
CRITICAL. CR LED lighted.	illegal CP type	An illegal or unknown circuit pack type has been inserted into the shelf.	Remove circuit pack and install correct circuit pack.
	2nd CP required for BBF3	The BBF3/BBF3B DS1PM circuit pack requires both companion FUNCTION UNITS slots in the group to be equipped with MXRVO or STS1E circuit packs.	Insert a second MXRVO or STS1E circuit pack in the companion FUNCTION UNITS slot.

Note: Similar descriptions of trouble may also appear in the CIT "Active Alarms and Status Report".

*May be provisioned for Critical, Major, Minor or no alarm.

16.  **NOTE:**
The alarm level for incoming DS3/EC-1 signal failure may be set for Critical. The "**set - t3**" (DS3) or "**set - ec1**" (EC-1) command is used to set the alarm level.

Is the **FAULT** LED on any **DS3/STS1E** circuit pack flashing?

If **YES**, then continue with **Step 17**.

If **NO**, then proceed to **Step 19**.

17. Issue a trouble report of a bad incoming DS3 (EC-1) signal from DSX-3 (STX) cross-connect point. Clear trouble using local procedures. If no trouble found, replace **STS1E** circuit pack at near end.

Reference: **DLP-523**

18. **STOP. YOU HAVE COMPLETED THIS PROCEDURE.**

19. Is **FAULT** LED on an **OLIU** circuit pack lighted or flashing?

If **YES**, then do **TAP-111** if Release 8 (linear configuration).

Do **TAP-119** if Release 9 or 11 (ring configuration).

If **NO**, then continue with **Step 20**.

20.  **NOTE:**

Failure of both the service and protection **TGS**, **MXRVO**, **STS1E**, **DS3**, or **TMUX** circuit packs will activate a Critical alarm.

Are the **FAULT** LEDs lighted (not flashing) on a service and protection circuit pack of the same type?

If **YES**, then continue with **Step 21**.

If **NO**, then proceed to **Step 28**.

21.  **NOTE:**

Alarm may be caused by circuit packs inserted into the wrong slots or by invalid or wrong switch settings on the **TGS** circuit packs.

Are circuit packs installed in the correct slots?

If **YES**, then proceed to **Step 24**.

If **NO**, then continue with **Step 22**.

22. Remove circuit packs from wrong slots, check option switches (**DLP-513**) and reinstall circuit packs into the correct slots.

23. **STOP. YOU HAVE COMPLETED THIS PROCEDURE.**

24.  **CAUTION:**
*When removing circuit packs ensure that protection switching is available. Also, remove the circuit pack without the lighted **ACTIVE** LED first.*

Check switch settings ("**rtrv-sync**" command) on the **TGS** circuit packs for correct settings. If the circuit pack has been replaced, check if settings are the same as they were before the circuit pack was replaced. Also check if the switches are set the same as the companion circuit pack.

Reference: **DLP-513**

25. Are switch settings correct?
If **YES**, then do **TAP-103**.
If **NO**, then continue with **Step 26**.
26. Change switch settings to the correct settings. (Use "**switch-sync**" command to switch to other circuit pack before removing pack.) If switch settings are to be changed from what they were previously, update the equipment list by momentarily depressing the **UPD/INIT** button on the **SYSCTL** after the circuit pack is reinstalled.
27. **STOP. YOU HAVE COMPLETED THIS PROCEDURE.**
28. Have two of the same type (service and protection **TGS**, **MXRVO**, **OLI**, **STS1E**, **DS3**, or **TMUX**) circuit packs been removed from the system?
If **YES**, then continue with **Step 29**.
If **NO**, then do **TAP-108**.
29. Determine the reason the circuit packs were removed. If the same circuit pack is to be reinserted and no switch settings are changed, reinstall the circuit pack. If the circuit pack was removed and switch settings changed, reinstall the circuit pack and momentarily depress the **UPD/INIT** button on the **SYSCTL**. If the circuit pack is not to be reinserted, momentarily depress the **UPD/INIT** button on the **SYSCTL** to remove the circuit pack from the inventory.
30. **STOP. YOU HAVE COMPLETED THIS PROCEDURE.**

31. Indications are that there is an unprotected failure or removal of a **MXRVO(s)** or **DS3(s)** circuit pack at the far-end associated with the identified **OLIU** slot at the near-end. Determine location of the circuit pack(s) from office records or use the "**rtrv-crs-()**" commands to trace back through the STS1/VT1.5 cross-connections associated with the identified **OLIU** slot.
32. If circuit packs are removed, determine the reason the circuit packs were removed. If the same circuit pack is to be reinserted and no switch settings are changed, reinstall the circuit pack. If the circuit pack was removed and switch settings changed, reinstall the circuit pack and momentarily depress the **UPD/INIT** button on the **SYSCTL** or use the "**upd**" command. If the circuit pack is not to be reinserted, momentarily depress the **UPD/INIT** button on the **SYSCTL** or use the "**upd**" command to remove the circuit pack from the inventory.
33. If the **MXRVO** or **DS3** circuit packs have not been removed, replace the **MXRVO** or **DS3** circuit pack associated with the identified **OLIU** slot in the alarm message.

Reference: **DLP-523**

34. **STOP. YOU HAVE COMPLETED THIS PROCEDURE.**

35. If the source address is a **FUNCTION UNITS** slot, the likely cause of trouble is a failure of the equipment at the far end of the EC-1 line (towards the STSX) or the near-end **STS1E** circuit pack. Replace **STS1E** circuit pack [DLP-523]. If trouble does not clear, issue a trouble report of equipment failure at the far end.

If the source address is an **OLIU** slot, the likely cause of trouble is a failure of the far-end **STS1E** circuit pack associated with the identified STS-1 signal. Determine location of the **STS1E** circuit pack from office records or use the "rtrv-crs-()" commands to trace back through the STS1/VT1.5 cross-connections associated with the identified STS-1 signal. Replace far-end **STS1E** circuit pack.

Reference: **DLP-523**

36. **STOP. YOU HAVE COMPLETED THIS PROCEDURE.**
37. Replace **OLIUs** at far end that are associated with the Source Address of the "inc. 0C3 line AIS", "inc. 0C12 line AIS", or "inc. 0C1 line AIS" alarm message.

Reference: **DLP-523**

38. **STOP. YOU HAVE COMPLETED THIS PROCEDURE.**

Clear Major (MJ) Alarm

1.  **NOTE:**
Major alarms are failures that cause loss of service to 96 or less DS0 customer channels. Table A lists conditions which may cause a major alarm.

Is a CIT available?

If **NO**, then continue with **Step 2**.

If **YES**, then proceed to **Step 10**.

2. On the User Panel, momentarily depress **ACO** button to silence active audible office alarms.

3.  **NOTE:**
The **FE SEL** button on the **SYSC TL** is used to display local and remote (farend) alarm and status conditions [**DLP-530**].

Use **FE SEL** button to display alarm conditions for local shelf (**L.** displayed in **FE ID** display).

4. Was **NE ACTY** LED lighted on User Panel when local shelf alarm conditions were displayed (**L.** displayed in **FE ID** display)?
If **NO**, then continue with **Step 5**.
If **YES**, then proceed to **Step 15**.
5. Use **FE SEL** button to display alarm conditions for other sites/shelves in the network (observe site address in **FE ID** display).
6. Was **NE ACTY** LED lighted on User Panel when alarms were displayed for any selected site?
If **YES**, then continue with **Step 7**.
If **NO**, then do **TAP-108**.

7. Use **FE SEL** button to display alarm conditions for other sites/shelves in the network (observe site address in **FE ID** display) (**DLP-530**).
8. Issue a trouble report of critical alarm condition at the far-end DDM-2000 site indicated in **FE ID** display.
9. **STOP. YOU HAVE COMPLETED THIS PROCEDURE.**
10. **⇒ NOTE:**
For all network configurations except point-to-point, there will be multiple far-end far end terminals. Troubleshooting multi-shelf DDM-2000 networks is facilitated by use of a Craft Interface Terminal (CIT).

Connect the CIT to the **CIT** connector on the near-end User Panel and log in or remote log in to the near-end system, if not already performed.

Reference: **DLP-521**

11. **⇒ NOTE 1:**
The "**rtrv-alm**" command can be used to display a report of active DDM-2000 OC-3 alarm and status conditions. The "Commands and Reports" section of this manual gives a description of the command.
- ⇒ NOTE 2:**
The "Active Alarms and Status Report" is output automatically following CIT log in. The report shown in Figure 1 is an example that shows several entries. There may be only one entry in the actual report.

Note the information in the Source Address and Description columns for the top entry/entries above the first single-dashed line in the "Active Alarms and Status Report" (Figure 1) (for example, "MAJOR m1-1-1-1 MM-DD HH:MM:SS SA inc. VT AIS").

```
/* Active Alarms and Status Report
=====
Alarm      Source      Date   Time      Srv   Description
Level      Address      Detected
=====
MAJOR      m1-1-1-1    MM-DD HH:MM:SS  SA    inc. VT AIS
-----
ne-acty    m2-1-1-1    MM-DD HH:MM:SS  nsa    inc. VT AIS
*/
```

Figure 1. Example of Active Alarms and Status Report

12.  **NOTE:**
Far-end alarm or status conditions are listed in this report with a Source Address of farend. Local alarm or status conditions have a Source Address of the local slot, line, port, channel, path, cross-connection, or operations interface (DCC, TL1 (X.25), TBOS, etc.) where the event occurred. (See *Addresses* in the "Commands and Reports" section of this manual.) Use the "**rtrv-alm**" command to get another report, if necessary.
- Does the Source Address of any top entry in the alarm report indicate a **local** slot, channel, port or operations interface for the MAJOR alarm?
If **NO**, then do **TAP-107**.
If **YES**, then continue with **Step 13**.
13. Use "**opr-aco**" command to silence active audible office alarms, if required.
14. Note the **local** trouble indication in the Description column of the "Active Alarms and Status Report", starting with the highest alarm level (Major) listed in the Alarm Level column.
15. See Table A for trouble description for the highest alarm level and go to the indicated step or procedure.

Table A. Major (MJ) Alarm Conditions

Alarm Level or LED Indication	Trouble Description (Note)	Likely causes	Step or Procedure
MAJOR. MJ LED lighted.	AGNE communication failure	The AGNE has not been assigned in an alarm group. The AGNE and NE(s) are assigned different alarm group numbers. The AGNE has failed (Unless there are 2 or 3 AGNEs).	Use " rtrv-ne " command to check AGNE assignment and alarm group number assignment. Use " set-ne " command to change AGNE assignment and alarm group assignment.
	BBF5 required in LS-8	A BBF5 JMPR circuit pack is missing from a shelf (Group 3 or earlier) with two 27G-U OLIU circuit packs or a 27G-U and 27G2-U OLIU circuit packs in the corresponding FUNCTION UNITS slot pair.	Install BBF5 JMPR circuit pack in slot 8(P) of the LOW SPEED GROUP associated with the corresponding FUNCTION UNITS slots where the 27G-U/27G2-U OLIUs are installed.
	BBF5 required in LS-4	A BBF5 JMPR circuit pack is missing from a shelf (Group 3 or earlier) with two 27G2-U OLIU circuit packs in the corresponding FUNCTION UNITS slot pair.	Install BBF5 JMPR circuit pack in slot 4 of the LOW SPEED GROUP associated with the corresponding FUNCTION UNITS slots where the 27G2-U OLIUs are installed.
	CP not allowed - (eqpt)	A DS1/DS1PM circuit pack is installed in a LOW SPEED GROUP slot associated with the corresponding FUNCTION UNITS slot provisioned for DS3 , STS1E_L low speed, or OLIU circuit pack service.	Remove DS1 circuit pack or change FUNCTION UNITS to MXRVO or STS1E_H circuit pack high speed.

See notes and footnotes at end of table.

Table A. Major (MJ) Alarm Conditions (Continued)

Alarm Level or LED Indication	Trouble Description (Note)	Likely causes	Step or Procedure
MAJOR. MJ LED lighted. FAULT LED lit on SYSCTL and OHCTL circuit pack.	duplicate site/ne address	Two or more shelves in the network have the same site address and the same network element address (determined by " set - ne " command).	Use " rtrv-ne " command to check site and network element assignments at each shelf. Use " set - ne " command to change site and network element assignments.
MAJOR. MJ LED lighted.	DSNE not reachable	No network element has been provisioned as a directory service network element (DSNE); non-DSNE network element starts up and does not get registered by a DSNE within a specified time; DCC failure between local NE and the DSNE; optical line failure in the subnetwork; a controller failure or pull; reset or initialization of the DSNE.	See the " set - ne " and " rtrv-ne " commands for DSNE provisioning information. Use the " set - ne " command to provision one (and only one) shelf as the DSNE.
	duplicate DSNE	A shelf has been provisioned as a directory services network element (DSNE) in a network that already has a DSNE. Only one network element in the network may be provisioned as the DSNE.	Use " rtrv-map-network " command to check DSNE assignments. Delete duplicate DSNE using " set - ne " command.
	duplicate TBOS display	Two or more shelves in the alarm group have the same TBOS display address (determined by " set - ne " command).	Use " rtrv-ne " command to check TBOS display address at each shelf. Use " set - ne " command to change TBOS display address.
	duplicate TID	Two or more shelves in the network have the same system name or TID set by the " set - ne " command.	Use " set - ne " to change TID of improperly named shelves.
	ExternalMinor [*]	External minor alarm (environmental alarm input 15) is active. DC power or cooling fan in RT failed.	Clear trouble using local procedures.

See notes and footnotes at end of table.

Table A. Major (MJ) Alarm Conditions (Continued)

Alarm Level or LED Indication	Trouble Description (Note)	Likely causes	Step or Procedure
MAJOR. MJ LED lighted.	environment ⁿ *	An environmental alarm point (miscellaneous discrete input) is active.	Clear trouble using local procedures.
	frequency error	The DS1 external timing reference or the timing from a remote shelf has a frequency offset greater than 20 hertz.	Check the DS1 external timing source or the timing obtained from a remote shelf.
MAJOR. MJ LED lighted. FAULT LED flashing on TGS circuit pack.	inc. DS1 sync. ref. LOS inc. DS1 sync. ref. LOF inc. DS1 sync. ref. BER inc. DS1 sync. ref. AIS inc. DS1 sync. ref. 00L inc. DS1 sync. ref. E00F	Failure of TGS circuit pack at near or far end, or failure of upstream timing supply, timing eqpt., system set for SF and received DS1 is ESF.	Step 23
MAJOR. MJ LED lighted. FAULT LED flashing on DS3/TMUX circuit pack.	inc. (from DSX) DS3 AIS [*] inc. (from DSX) DS3 LOS [*] inc. (from DSX) DS3 00F [*]	Equipment failed or signal removed at DSX-3, unprotected failure of DS3/TMUX circuit pack.	Step 21
MAJOR. MJ LED lighted. FAULT LED flashing on STS1E circuit pack.	inc. EC1 LOS [*] inc. EC1 LOF [*] inc. EC1 sig failed (BER) [*] inc. EC1 sig degrade (BER) [*]	Failure of the STS1E or equivalent circuit pack at near end or far end of EC-1, failure of the incoming cable, failure of the STS1E circuit pack at the near end, cross talk in office wiring, or a cable disconnect at the EC-1 STSX cross-connect point or shelf connector.	Step 21
	inc. EC1 line AIS [*]	Failure of STS1E circuit pack or equivalent at far end of EC-1 line.	Step 21
	inc. STS1 LOP EC1 [*]	Failure of the far end STS1E circuit pack or failure of the STS1E circuit pack at the near end.	Step 21
MAJOR. MJ LED lighted.	inc. OC3 line AIS [*] inc. OC12 line AIS [*]	Failure of OLI circuit pack at far end.	Step 78

See notes and footnotes at end of table.

Table A. Major (MJ) Alarm Conditions (Continued)

Alarm Level or LED Indication	Trouble Description (Note)	Likely causes	Step or Procedure
MAJOR. MJ LED lighted. FAULT LED flashing on DS1/DS1PM circuit pack.	inc. (from DSX) DS1 LOS† inc. (from DSX) DS1 sig fail†	Equipment failed, DSX-1 signal removed, cross talk in office wiring, or DS1/DS1PM circuit pack failed.	Step 19
MAJOR. MJ LED lighted. FAULT LED lighted on circuit pack.	DS1 CP failed DS1PM CP failed	Two service DS1/DS1PM circuit packs failed. Unprotected service DS1/DS1PM circuit pack failure.	Step 65
	SYSCTL CP failed	Internal circuit pack failure	Step 42
	OHCTL CP failed	Internal circuit pack failure	Step 51
MAJOR. MJ LED lighted.	CP removed	Circuit packs removed without doing " upd " command to remove circuit packs from equipment list.	Perform " upd " command to remove circuit packs from equipment list.
	excessive holdover	System has been in holdover mode for more than 4 hours because of timing ref. fail or manual switch.	Check timing ref., check state of eqpt. (" rtrv-state-eqpt ")
	inc. STS1 AIS*	Incomplete or incorrect cross-connect provisioning in end-to-end network. In ring applications, unprotected removal or failure of DS3 , MXRVO , or STS1E circuit pack at far end; fiber or OLI circuit pack failure.	TAP-120
	inc. VT AIS*	Incomplete or incorrect cross-connect provisioning in end-to-end network. In ring applications, unprotected removal or failure of DS1/DS1PM circuit pack at far end; fiber or OLI circuit pack failure.	TAP-120
	inc. VT LOP	Unprotected failure of DS1/DS1PM or MXRVO circuit pack at near end or far end.	Replace failed circuit pack [DLP-523]
	inc. VT sig degrade (BER)	An OLI circuit pack failure, or a fiber failure at some point on the failed ring.	TAP-119
	inc. VT unequipped	VT1.5 cross-connects have been deleted in upstream equipment interfacing with the DDM-2000 OC-3 ring.	Find the deleted cross-connects in the upstream equipment.

See notes and footnotes at end of table.

Table A. Major (MJ) Alarm Conditions (Continued)

Alarm Level or LED Indication	Trouble Description (Note)	Likely causes	Step or Procedure
MAJOR. MJ LED lighted.	inc. VT unequipped	VT1.5 cross-connects have been deleted in upstream equipment interfacing with the DDM-2000 OC-3 ring.	Find the deleted cross-connects in the upstream equipment.
	illegal CP type	An illegal or unknown circuit pack type has been inserted into the shelf.	Remove circuit pack and install correct circuit pack.
	inconsistent DCC values	The Network Side/User Side parameters are set the same at both ends of a DCC (optical span).	Use " rtrv-fecom " command to check Network Side/User Side parameters at each shelf in the network. Use " set-fecom " command to change Network Side/User Side parameters at one end of optical span.
	unexpected CP type unexpected CP switches	Switch settings invalid, different from other circuit pack, or different than they were before circuit pack was removed or replaced. Circuit pack inserted into slot provisioned for different pack.	Step 68
	Intersubsys com link failed	In the MegaStar [®] 2000 system, the SONET subsystem session is active, but is unable to communicate with the RADIO subsystem.	
	TID address map full	Network elements have been removed from the network but not from the DSNE database.	Use " dlt-tadmap " command to delete removed NEs from database.
	unsupported DCC connection	DCC is enabled on an OC-1 connection between the MAIN slots in two OC-3 shelves. The DDM-2000 OC-3 system does not support a DCC link over an OC-1 line terminating on the MAIN slots between two OC-3 shelves.	Use " set-fecom " command to disable the DCC on the OC-1 interface.
	X.25 communication failure	X.25 communication eqpt. failed; failure at the OS.	Issue trouble report to OS.

See notes and footnotes at end of table.

Table A. Major (MJ) Alarm Conditions (Continued)

Alarm Level or LED Indication	Trouble Description (Note)	Likely causes	Step or Procedure
MAJOR. MJ LED lighted. Flashing FAULT LED on OHCTL circuit pack.	section DCC channel failed	SYSCTL circuit pack failure, reset, or initialization at far end. SYSCTL circuit pack removed from a site. Program installation in progress or failed at far end. SYSCTL or OHCTL circuit pack failed at near end. OLI circuit pack or fiber failure between this node and node connected to the source address (no communication with other end).	Step 25

Note: Similar descriptions of trouble may also appear in the CIT "Active Alarms and Status Report".

* May be provisioned for Critical, Major, Minor or no alarm.

† May be provisioned for Major, Minor or no alarm.

‡ Trademark of Harris Corporation.

16. **⇒ NOTE:**

If a program installation is being performed to a **SYSCTL** at the far end, it is normal for the **FAULT** LED on the near-end **OHCTL** to flash and the **MJ** and **NE ACTY** LEDs to light on the User Panel. If there is a **MJ** alarm at the end receiving the program, trouble is indicated. You should check if a program installation is being done.

Was new software generic being downloaded (program upgrade) to the **SYSCTL** at this end when alarm occurred?

If **YES**, then do **TAP-116**.

If **NO**, then continue with **Step 17**.

17. Is the **FAULT** LED on the faceplate of one or more circuit packs flashing?

If **YES**, then continue with **Step 18**.

If **NO**, then proceed to **Step 41**.

18. Find the circuit pack(s) with a flashing LED in Table B below and go to the indicated step or procedure.

Table B. Circuit Pack(s) With Flashing LED

Circuit Pack	Go To
DS1/DS1PM	Step 19
DS3/STS1E (SRV or PROTN)	Step 21
TGS	Step 23
OHCTL	Step 33
OLIU (Linear)	TAP-111
OLIU (Rings)	TAP-119

19. Switch service to protection. If LED is flashing on protection **DS1/DS1PM**, issue trouble report of bad incoming signal at input to **DS1/DS1PM** circuit pack with flashing LED(s). If LED is not flashing on protection **DS1/DS1PM**, replace service **DS1/DS1PM** circuit pack [**DLP-523**].
20. **STOP. YOU HAVE COMPLETED THIS PROCEDURE.**
21. Switch service to protection. If LED is flashing on protection **DS3/TMUX/STS1E**, issue trouble report of bad incoming DS3/EC-1 signal from DSX-3/STX cross-connect point. If LED is not flashing on protection **DS3/TMUX/STS1E**, replace service **DS3/TMUX/STS1E** circuit pack [**DLP-523**].
22. **STOP. YOU HAVE COMPLETED THIS PROCEDURE.**
23. Check **TGS** option switches for proper line coding and frame format settings ("**rtrv-sync**"). If no trouble found, check incoming timing reference signals. If timing reference signals are bad, issue trouble report of bad incoming timing reference signal(s). If no trouble found with timing references, replace **TGS** circuit packs.

Reference: **DLP-523**

24. **STOP. YOU HAVE COMPLETED THIS PROCEDURE.**

25. **⇒ NOTE:**
If a program installation is being performed to a **SYSCTL** at the far end, it is normal for the **FAULT** LED on the near-end **OHCTL** to flash and the **MJ** and **NE ACTY** LEDs to light on the User Panel. If there is a **MJ** alarm at the end receiving the program, trouble is indicated. You should check if a program installation is being done.

Is new software generic being downloaded (program upgrade) to the **SYSCTL** at the far end terminal?

If **YES**, then **STOP. YOU HAVE COMPLETED THIS PROCEDURE.**
If **NO**, then continue with **Step 26.**

26. In alarm report, is there any indication of **OLIU** or fiber trouble at near end or far end such as "inc. 0C3 FERF" or "inc. 0C12 FERF" alarm message?
If **YES**, then continue with **Step 27.**
If **NO**, then proceed to **Step 29.**

27. **⇒ NOTE:**
If there is a DCC failure, a remote login to the shelf connected through the Source Address cannot be done. The "**rtrv-alm**", "**rtrv-nmap**", "**rtrv-map-network**", and "**rtrv-map-neighbor**" commands can be used to check for DCC failure for **MAIN** (and **FUNCTION UNITS A, B, or C**). Also, use "**rtrv-fecom**" command to see if fecom has been disabled.

Note Source Address of DCC channel failure. Check optical fibers connected through the Source Address per local procedures. If no trouble found, replace near-end **OLIU** first then far-end **OLIU**.

Reference: **DLP-523**

28. **STOP. YOU HAVE COMPLETED THIS PROCEDURE.**
29. Use CIT and "**reset**" command to reset **SYSCTL** at the near end or unplug and reseat the **SYSCTL**.
30. Is the **FAULT** LED on the **OHCTL** circuit pack still flashing ("section DCC channel failed")?
If **YES**, then continue with **Step 31.**
If **NO**, then **STOP. YOU HAVE COMPLETED THIS PROCEDURE.**

31. If possible, use CIT and "**r lgn**" command to log in to the far-end terminal (**DLP-522**) and use the "**reset**" command to reset **SYSCTL** at the far end.
32. Is the **FAULT** LED on the **OHCTL** circuit pack still flashing ("section DCC channel failed")?
If **YES**, then proceed to **Step 37**.
If **NO**, then **STOP. YOU HAVE COMPLETED THIS PROCEDURE.**
33.  **NOTE:**
Unseating and reseating the **SYSCTL** performs a *reset* procedure which restarts the software program.

Unseat and reseat **SYSCTL** circuit pack. Do not depress **UPD/INIT** button.
34. Is the **FAULT** LED on the affected circuit pack still flashing?
If **YES**, then continue with **Step 35**.
If **NO**, then **STOP. YOU HAVE COMPLETED THIS PROCEDURE.**
35. Obtain a CIT and repeat this procedure.
36. **STOP. YOU HAVE COMPLETED THIS PROCEDURE.**
37. Refer to **DLP-501** and replace **SYSCTL** at near-end terminal.
38. Is the **FAULT** LED on the **OHCTL** circuit pack still flashing?
If **YES**, then continue with **Step 39**.
If **NO**, then **STOP. YOU HAVE COMPLETED THIS PROCEDURE.**
39. At far-end terminal, reset **SYSCTL** by unseating and reseating **SYSCTL** or by using a CIT and the "**reset**" command, if not already performed. If **FAULT** LED is still flashing after a reset, refer to **DLP-501** and replace **SYSCTL** at far-end terminal. If the **FAULT** LED is still flashing after the **SYSCTL** is replaced, replace the **OHCTL** [**DLP-523**] first at one end and then the other, if trouble still exists.
40. **STOP. YOU HAVE COMPLETED THIS PROCEDURE.**
41. Is the **FAULT** LED lighted on the **SYSCTL**?
If **YES**, then continue with **Step 42**.
If **NO**, then proceed to **Step 49**.

42. Remove **SYSCCTL** and check switch settings.

Reference: **DLP-513**

43. Are switch settings correct?

If **YES**, then proceed to **Step 45**.

If **NO**, then continue with **Step 44**.

44. Set switches to correct settings.

Reference: **DLP-513**

45. Reinstall the **SYSCCTL**. Is the **FAULT** LED still lighted?

If **YES**, then continue with **Step 46**.

If **NO**, then proceed to **Step 50**.

46. Use CIT and "**rtrv-ne**" command to check provisioning of site ID and network element number. Two or more shelves cannot have the same site ID and/or network element number. If provisioning is incorrect, use CIT and "**set-ne**" command to set site ID and/or network element number.

47. Is the **FAULT** LED still lighted on the **SYSCCTL**?

If **YES**, then proceed to **Step 48**.

If **NO**, then continue with **Step 50**.

48. Refer to **DLP-501** and replace the **SYSCCTL**.

49. Is the **FAULT** LED still lighted on the **SYSCCTL**?

If **YES**, then proceed to **Step 57**.

If **NO**, then continue with **Step 50**.

50. Is the **MJ** alarm LED still lighted?

If **YES**, then continue with **Step 51**.

If **NO**, then **STOP. YOU HAVE COMPLETED THIS PROCEDURE.**

51. Is the **FAULT** LED on **OHCTL** lighted?

If **YES**, then continue with **Step 52**.

If **NO**, then proceed to **Step 59**.

52. Use CIT and "**rtrv-ne**" command to check provisioning of site ID and network element number. Two or more shelves cannot have the same site ID and/or network element number. If provisioning is incorrect, use CIT and "**set-ne**" command to set site ID and/or network element number.

53. Is the **FAULT** LED on **OHCTL** still lighted?
If **YES**, then proceed to **Step 54**.
If **NO**, then continue with **Step 56**.
54. Refer to **DLP-523** and replace the **OHCTL**.
55. Is the **FAULT** LED still lighted on the **OHCTL**?
If **YES**, then proceed to **Step 57**.
If **NO**, then continue with **Step 56**.
56. Is the **MJ** alarm LED still lighted?
If **YES**, then proceed to **Step 59**.
If **NO**, then **STOP. YOU HAVE COMPLETED THIS PROCEDURE**.
57. The problem appears to be in the backplane of the DDM-2000 or another circuit pack in the shelf is causing the **FAULT** LED on the **SYSCTL** to light. Remove service from one **FUNCTION UNITS** group (**A**, **B**, or **C**) and unseat all circuit packs associated with that group. If the trouble clears, it means that one or more of the circuit packs removed is defective. If the trouble does not clear, reinsert the removed circuit packs and repeat the above for another **FUNCTION UNITS** group. If the trouble cannot be isolated by removing circuit packs, seek technical assistance and/or replace the shelf. Notify your supervisor, your local technical support organization, or call Lucent Technologies RTAC, per local operating instructions.
58. **STOP. YOU HAVE COMPLETED THIS PROCEDURE.**
59.  **NOTE:**
A major alarm may also be caused by a wrong circuit pack inserted into the **AUXCTL** slot, DS1 line code switch settings that are different from what they were before a **DS1/DS1PM** circuit pack was replaced, excessive holdover due to loss of synchronization reference, or a manual switch to holdover in effect too long.

Is any circuit pack except an **OHCTL** installed in the **AUXCTL** slot?

- If **YES**, then continue with **Step 60**.
If **NO**, then proceed to **Step 62**.

60. Remove wrong circuit pack from **AUXCTL** slot and install correct **OHCTL** circuit pack [DLP-523].
61. **STOP. YOU HAVE COMPLETED THIS PROCEDURE.**
62.  **CAUTION:**
*If a DS1 is switched to protection, removal of any other **DS1/DS1PM** circuit pack or **177A** Retainer Card in the same **LOW SPEED GROUP** will result in a loss of service to the protected DS1 and the removed **DS1/DS1PM** circuit pack.*

Has an unprotected **DS1/DS1PM** circuit pack or more than one **DS1/DS1PM** circuit pack been removed from the system?

If **YES**, then continue with **Step 63**.

If **NO**, then proceed to **Step 65**.

63. Determine the reason the circuit packs were removed. If the same circuit pack(s) is to be reinserted and no switch settings are changed, reinstall the circuit pack. If the circuit pack was removed and switch settings changed, reinstall the circuit pack and momentarily depress the **UPD/INIT** button on the **SYSCTL**. If the circuit pack is not to be reinserted, momentarily depress the **UPD/INIT** button on the **SYSCTL** to remove the circuit pack from the inventory.
64. **STOP. YOU HAVE COMPLETED THIS PROCEDURE.**
65. Is **FAULT** LED lighted on any **DS1/DS1PM** circuit pack?
If **YES**, then continue with **Step 66**.
If **NO**, then proceed to **Step 70**.
66. Check switch settings on **DS1/DS1PM** circuit pack (with lighted **FAULT** LED) for correct line code settings. If circuit pack has been replaced, check if settings are the same as they were before the circuit pack was replaced.

Reference: **DLP-513**

67. Are switch settings correct?
 If **YES**, then do **TAP-103**.
 If **NO**, then continue with **Step 68**.
68. Change switch settings to the correct settings. If switch settings are to be changed from what they were previously, update the equipment list by momentarily depressing the **UPD/INIT** button on the **SYSCTL** after the circuit pack is reinstalled.
69. **STOP. YOU HAVE COMPLETED THIS PROCEDURE.**
70. Is there an "inc. VT AIS" alarm indication?
 If **YES**, then do **TAP-120**.
 If **NO**, then do **TAP-103**.
71.  **NOTE:**
 Alarm may be caused by circuit packs inserted into the wrong slots or by invalid or wrong switch settings on the **TGS** circuit packs.
- Are circuit packs installed in the correct slots?
 If **YES**, then proceed to **Step 74**.
 If **NO**, then continue with **Step 72**.
72. Remove circuit packs from wrong slots, check option switches (**DLP-513**) and reinstall circuit packs into the correct slots.
73. **STOP. YOU HAVE COMPLETED THIS PROCEDURE.**

74.  **CAUTION:**
*When removing circuit packs ensure that protection switching is available. Also, remove the circuit pack without the lighted **ACTIVE** LED first.*

Check switch settings on the circuit packs for correct settings. If the circuit pack has been replaced, check if settings are the same as they were before the circuit pack was replaced. Also check if the switches are set the same as the companion circuit pack.

Reference: **DLP-513**

75. Are switch settings correct?
If **YES**, then do **TAP-103**.
If **NO**, then continue with **Step 76**.
76. Change switch settings to the correct settings. (Use "**switch-()**" command to switch to other circuit pack before removing pack.) If switch settings are to be changed from what they were previously, update the equipment list by momentarily depressing the **UPD/INIT** button on the **SYSCTL** after the circuit pack is reinstalled.
77. **STOP. YOU HAVE COMPLETED THIS PROCEDURE.**
78. Replace **OLIUs** at far end that are associated with the Source Address of the "inc. 0C3 line AIS" or "inc. 0C12 line AIS" alarm message.

Reference: **DLP-523**

79. **STOP. YOU HAVE COMPLETED THIS PROCEDURE.**

Clear Multiple Failure

1.  **CAUTION:**
*Although the **FAULT** LEDs may be lighted or flashing on an **OLI**U, service may be interrupted if the **OLI**U is removed. The **OLI**Us may be in unidirectional switching mode and transmitting on one **OLI**U while receiving on the other. The state of the switch mode must be analyzed before removing an **OLI**U.*

 **NOTE:**
A multiple failure condition exists when a service circuit pack and its associated protection circuit pack have failed, when two service DS1 circuit packs in the same group have failed, or when the switch mode is inhibited or locked and a failure occurs on a service circuit pack.

Is the **FAULT** LED on an **OLI**U lighted ("CP failed") or flashing ("inc. OC3 LOS", etc.) or ("inc. OC12 LOS", etc.)?

If **YES**, then do **TAP-111** if linear.

Do **TAP-119** if ring configuration.

If **NO**, then continue with **Step 2**.

2. Are the **FAULT** LEDs on both a service and protection circuit pack of the same type lighted (not flashing) ("CP failed")?
If **YES**, then continue with **Step 3**.
If **NO**, then proceed to **Step 7**.

3.  **CAUTION:**
Replacement circuit pack may have option switches which must be properly set before the circuit pack is installed.

Replace the service circuit pack with the lighted **FAULT** LED.

Reference: **DLP-523**

4. Is the **FAULT** LED on the circuit pack just replaced off?

If **YES**, then continue with **Step 5**.

If **NO**, then do **TAP-106**.

5. Replace the protection circuit pack with the lighted **FAULT** LED.

Reference: **DLP-523**

6. Is the **FAULT** LED on the circuit pack just replaced off?

If **YES**, then **STOP. YOU HAVE COMPLETED THIS PROCEDURE.**

If **NO**, then do **TAP-106**.

7. Are the **FAULT** LEDs on two or more service **DS1** circuit packs lighted (not flashing)?

If **YES**, then continue with **Step 8**.

If **NO**, then proceed to **Step 12**.

8. Replace either of the service **DS1** circuit packs with the lighted **FAULT** LED.

Reference: **DLP-523**

9. Is the **FAULT** LED on the circuit pack just replaced off?

If **YES**, then continue with **Step 10**.

If **NO**, then do **TAP-106**.

10. Replace the other service **DS1** circuit pack with the lighted **FAULT** LED.

Reference: **DLP-523**

11. Is the **FAULT** LED on the circuit pack just replaced off?

If **YES**, then **STOP. YOU HAVE COMPLETED THIS PROCEDURE.**

If **NO**, then do **TAP-106**.

12. Use CIT and the **rtrv-()** commands (**rtrv-state**, **rtrv-sync**, etc.) to check switching mode for inhibits, locks, etc.

13. Was any trouble found?

If **YES**, then continue with **Step 14**.

If **NO**, then do **TAP-108**.

14. Determine reason for locks, inhibits, etc. to be in place. See the "Commands and Reports" section of this manual for a description of the **switch-()** commands and the **rtrv-alm** command report descriptions. Use the **switch-()** commands to reset switching mode or priority.

If you need assistance, notify your supervisor, your local technical support organization, or call Lucent Technologies RTAC, per local operating instructions.

15. **STOP. YOU HAVE COMPLETED THIS PROCEDURE.**

Clear Power Minor (PMN) Alarm

1.  **CAUTION:**
There is an AC power failure at the remote DDM-2000 terminal. This will result in a service interruption if it is not restored.

Are you at the remote terminal site?

If **YES**, then proceed to **Step 5**.

If **NO**, then continue with **Step 2**.

2. Momentarily depress the **ACO** pushbutton on the DDM-2000 User Panel.

Response: The audible alarm is silenced.

3. Issue a trouble report of an AC power failure at the remote terminal.

4. **STOP. YOU HAVE COMPLETED THIS PROCEDURE.**

5. What type of RT configuration do you have?

If **Bulk Power**, then continue with **Step 6**.

If **Distributed Power**, then proceed to **Step 8**.

6. Use documentation for your bulk power plant to clear trouble. Check AC circuit breakers and verify AC power is present at the RT enclosure.

7. **STOP. YOU HAVE COMPLETED THIS PROCEDURE.**

8. Using digital multimeter (DMM), measure incoming AC voltage (use **AC** and **GND** jacks on **LDU** faceplate in J1C182BA power shelf).

9. Is measured AC voltage between 105 and 129 volts?

If **YES**, then continue with **Step 10**.

If **NO**, then proceed to **Step 19**.

10. Is power shelf a J1C182BA Power Shelf?

If **YES**, then continue with **Step 11**.

If **NO**, then proceed to **Step 27**.

11. Is **FAIL** LED lighted on any **336A RECTIFIERs** at RT?
If **YES**, then continue with **Step 12**.
If **NO**, then proceed to **Step 14**.
12. Replace **336A RECTIFIERs** that have **FAIL** LED lighted.
13. Did alarm clear within 20 seconds?
If **YES**, then **STOP. YOU HAVE COMPLETED THIS PROCEDURE**.
If **NO**, then proceed to **Step 27**.
14. Is **BAT DISCHG** LED lighted on any **337A BATTERY CHARGER(s)**?
If **YES**, then continue with **Step 15**.
If **NO**, then proceed to **Step 27**.
15. Replace one **336A RECTIFIER**.
16. Did alarm clear within 20 seconds?
If **YES**, then **STOP. YOU HAVE COMPLETED THIS PROCEDURE**.
If **NO**, then continue with **Step 17**.
17. Replace another **336A RECTIFIER**.
18. Did alarm clear within 20 seconds?
If **YES**, then **STOP. YOU HAVE COMPLETED THIS PROCEDURE**.
If **NO**, then proceed to **Step 27**.
19. Is fuse blown or circuit breaker tripped at RT main AC circuit breaker box?
If **YES**, then continue with **Step 20**.
If **NO**, then proceed to **Step 23**.
20. Replace blown fuse or reset circuit breaker.
21. Does fuse blow or circuit breaker trip again?
If **YES**, then proceed to **Step 27**.
If **NO**, then continue with **Step 22**.
22. Did alarm clear within 20 seconds?
If **YES**, then **STOP. YOU HAVE COMPLETED THIS PROCEDURE**.
If **NO**, then proceed to **Step 27**.

23. Contact local power company if loss of AC power has occurred or if there is overvoltage or undervoltage condition.
24. Does local power company verify abnormal power condition?
If **YES**, then continue with **Step 25**.
If **NO**, then proceed to **Step 27**.
25. Estimate restoration time for AC power. If necessary, equip RT with fully charged batteries or other power source to maintain power until AC power is restored.
26. **STOP. YOU HAVE COMPLETED THIS PROCEDURE**
27.  **NOTE:**
If alarms remain, multiple troubles exist and trouble analysis must be repeated.

If you have a J1C182BA Power Shelf, use SD-7C117 and SD-7C118 to locate trouble. If another power shelf or powering arrangement is used, use the appropriate documentation and wiring diagrams to locate power trouble. If you need technical assistance, notify your supervisor, your local technical support organization, or call Lucent Technologies RTAC, per local operating instructions.

28. **STOP. YOU HAVE COMPLETED THIS PROCEDURE**

Clear Trouble Report

1. Is the **CR** alarm LED lighted on the User Panel?
If **YES**, then do **TAP-101**.
If **NO**, then continue with **Step 2**.
2. Is the **MJ** alarm LED lighted on the User Panel?
If **YES**, then do **TAP-102**.
If **NO**, then continue with **Step 3**.
3. Is the **MN** alarm LED lighted on the User Panel?
If **YES**, then do **TAP-112**.
If **NO**, then continue with **Step 4**.
4. Is the **FAULT** LED on the faceplate of a **DS1/DS1PM**, **DS3**, or **STS1E** circuit pack flashing ["inc. () LOS"]?
If **YES**, then continue to **Step 5**.
If **NO**, then proceed to **Step 7**.
5. There appears to be an incoming DS1, DS3, or EC-1 signal failure. Refer to **TAP-110** and clear the condition.
6. **STOP. YOU HAVE COMPLETED THIS PROCEDURE.**
7. Is the **FAULT** LED on the faceplate of any circuit pack in the DDM-2000 lighted (not flashing) ["() CP failed"]?
If **YES**, then continue with **Step 8**.
If **NO**, then proceed to **Step 10**.
8.  **NOTE:**
There is an inconsistent combination of alarms and diagnostic indications.

Refer to **TAP-108** and determine the true status of the system.

9. **STOP. YOU HAVE COMPLETED THIS PROCEDURE.**

10. Perform an LED test by depressing the **ACO/TST** button or using the **"test - led"** command.

Reference: **DLP-509**

11. Did all the circuit packs pass the LED test?

If **YES**, then continue with **Step 12**.

If **NO**, then proceed to **Step 14**.

12.  **NOTE:**
The DDM-2000 appears to be operating correctly with no failures present.

Return a report of NO TROUBLE FOUND.

13. **STOP. YOU HAVE COMPLETED THIS PROCEDURE.**

14. Replace the circuit pack that failed the LED test.

Reference: **DLP-523**

15. Repeat the LED test.

16. Did all the circuit packs pass the LED test?

If **YES**, then **STOP. YOU HAVE COMPLETED THIS PROCEDURE.**

If **NO**, then continue with **Step 17**.

17.  **NOTE:**
The failure is not in the circuit pack just replaced.

Refer to **TAP-106** to isolate and clear the failure.

18. **STOP. YOU HAVE COMPLETED THIS PROCEDURE.**

Isolate and Clear Failure

1.  **NOTE:**
It is assumed that the **FAULT** LED on a circuit pack is lighted and replacing the circuit pack does not clear the problem.

Is the circuit pack with the lighted LED a **DS1/DS1PM** or **OLIU**?

If **YES**, then continue with **Step 2**.

If **NO**, then proceed to **Step 12**.

2. Unseat and reseal the standby (without lighted **ACTIVE** LED) **MXRVO (STS1E)** in the same group as the affected circuit pack with the lighted LED.
3. Is a CIT available?
If **YES**, then continue with **Step 4**.
If **NO**, then proceed to **Step 6**.
4. Use the CIT and **reset** command to reset **SYSCCTL**.
5. Is the **FAULT** LED on the affected circuit pack still lighted?
If **YES**, then proceed to **Step 8**.
If **NO**, then **STOP. YOU HAVE COMPLETED THIS PROCEDURE**.
6.  **NOTE:**
Unseating and reseating the **SYSCCTL** performs a *reset* procedure which restarts the software program.

Unseat and reseal **SYSCCTL** circuit pack. Do not depress **UPD/INIT** button.

7. Is the **FAULT** LED on the affected circuit pack still lighted?
If **YES**, then continue with **Step 8**.
If **NO**, then **STOP. YOU HAVE COMPLETED THIS PROCEDURE**.

8. Have both **MXRVO (STS1E)** circuit packs been unseated and reseated?
If **YES**, then proceed to **Step 10**.
If **NO**, then continue with **Step 9**.
9. Unseat and reseal the active **MXRVO (STS1E)** in the same group as the affected circuit pack with the lighted LED. Repeat this procedure from **Step 3**.
10. Replace the standby **MXRVO (STS1E)** (without lighted **ACTIVE** LED) in the same group as the affected circuit pack with the lighted LED. If the **FAULT** LED on the affected circuit pack is still lighted, replace the active **MXRVO (STS1E)** in the same group as the affected circuit pack with the lighted LED.

Reference: **DLP-523**

11. Is the **FAULT** LED on the affected circuit pack still lighted?
If **YES**, then proceed to **Step 17**.
If **NO**, then **STOP. YOU HAVE COMPLETED THIS PROCEDURE**.
12. Is a CIT available?
If **YES**, then continue with **Step 13**.
If **NO**, then proceed to **Step 15**.
13. Use the CIT and **reset** command to reset **SYCTL**.
14. Is the **FAULT** LED on the affected circuit pack still lighted?
If **YES**, then proceed to **Step 17**.
If **NO**, then **STOP. YOU HAVE COMPLETED THIS PROCEDURE**.
15.  **NOTE:**
Unseating and reseating the **SYCTL** performs a *reset* procedure which restarts the software program.

Unseat and reseal **SYCTL** circuit pack. Do not depress **UPD/INIT** button.

16. Is the **FAULT** LED on the affected circuit pack still lighted?
If **YES**, then continue with **Step 17**.
If **NO**, then **STOP. YOU HAVE COMPLETED THIS PROCEDURE**.

17.  **CAUTION:**
*Replacing the **SYSCTL** involves updating the internal memory on the circuit pack.*

Refer to **DLP-501** and replace the **SYSCTL**.

18. Is the **FAULT** LED on the affected circuit pack still lighted?

If **YES**, then continue with **Step 19**.

If **NO**, then **STOP. YOU HAVE COMPLETED THIS PROCEDURE.**

19.  **NOTE:**
The problem appears to be in the backplane wiring of the DDM-2000. One way to verify this is to swap the **SYSCTL** and any circuit pack with an inconsistent diagnostic indication with the corresponding circuit packs in another DDM-2000. If the problem moves with the circuit packs, it means that one or more of the circuit packs is defective. If the problem stays with the original DDM-2000 the entire assembly, but not the circuit packs, should be replaced. The DDM-2000 has a printed backplane and cannot be repaired in the field.

Check for bent or broken pins, shorted pins, etc. If you need technical assistance, notify your supervisor, your local technical support organization, or call Lucent Technologies RTAC, per local operating instructions.

20. **STOP. YOU HAVE COMPLETED THIS PROCEDURE.**

Clear Far End Alarm Using Craft Interface Terminal (CIT)

1.  **NOTE:**
It is assumed that a CIT is available and that there is a failure at a far end node (as indicated by an **FE ACTY** LED on the local system or by the Source Address of farend in the local "Active Alarms and Status Report").

Connect the CIT to the connector on the User Panel or remote login to the near-end system, if not already performed.

Reference: **DLP-521**

2.  **NOTE:**
The "Active Alarms and Status Report" is output automatically following CIT log in. The report shown in Figure 1 is an example that shows several entries. There may be only one entry in the actual report.

Note the information in the Source Address and Description columns for the top entry/entries above the first single-dashed line in the "Active Alarms and Status Report" (Figure 1) (for example, "MINOR farend MM-DD HH:MM:SS - SiteXNE1")

```
/* Active Alarms and Status Report
=====
Alarm   Source   Date   Time   Srv   Description
Level   Address   Detected
=====
MINOR   farend   MM-DD HH:MM:SS   -   SiteXNE1
MINOR   farend   MM-DD HH:MM:SS   -   SiteYNE1
-----
ne-acty m1-1-1-1 MM-DD HH:MM:SS   inc. VT AIS
*/
```

Figure 1. Example of Active Alarms and Status Report

3.  **NOTE:**
Far-end alarm or status conditions are listed in this report with a Source Address of farend. Local alarm or status conditions have a Source Address of the local slot, line, port, channel, path, cross-connection, or operations interface (DCC, TL1 (X.25), TBOS, etc.) where the event occurred. (See *Addresses* in the "Commands and Reports" section of this manual.) Use the "**rtrv-alm**" command to get another report, if necessary.

Does the Source Address of any top entry above the first single-dashed line in the alarm report indicate a **local** alarm?

If **YES**, then continue with **Step 4**.

If **NO**, then proceed to **Step 6**.

4. Find the Alarm Level for the local alarm in Table A and go to the indicated procedure.

Table A. Trouble Conditions

Alarm Level	TAP
CRITICAL	TAP-101
MAJOR	TAP-102
MINOR	TAP-112
ne-acty	TAP-117
PWR MINOR (PMN)	TAP-104
abnormal (ABN)	TAP-109

5. **STOP. YOU HAVE COMPLETED THIS PROCEDURE.**
6. Use the "**rtrv-nmap/rtrv-map-network**" command to get a network map report.
7.  **NOTE 1:**
The TID of the far-end system is the TID listed in the Description column of the near-end "Active Alarm and Status Report" obtained using the "**rtrv-alm**" command.

⇒ **NOTE 2:**

In a path protection switched ring network, FAILED Communication Status most likely indicates a total node failure (power failure, failure of both **OLIUs** or both fiber pairs). In a linear or hub configuration, it most likely indicates a failure of both service and protection paths between the last shelf without communication failure and the first shelf with a communication failure.

⇒ **NOTE 3:**

If any systems have a Communications Status of FAILED, you may have to log in to the system nearest to the system with a FAILED communications status or issue a trouble report on the system you cannot log into.

⇒ **NOTE 4:**

The far-end alarms refer to alarms in the same alarm group as the local network element. For systems you cannot log into (FT-2000), issue a trouble report on the system indicated in the "Active Alarms and Status Report".

If possible, enter the "**r lgn:TID**" command to log in to any far-end system indicated in the top entry in the "Active Alarms and Status Report" (for example,

MINOR farend MM-DD HH:MM:SS - SiteXNE1)

Reference: **DLP-522**

8. Use the "**rtrv-alm**" command at the far-end DDM-2000 system to get a report of status and alarms. See Table B for a detailed description of the messages in the "Active Alarms and Status Report". For systems other than DDM-2000 OC-3, FT-2000 OC-48, DDM-2000 FiberReach, DDM-2000 OC-12, and *SLC*[®]-2000, etc., use the User/Service Manual for that system for trouble clearing procedures.
9. Repeat this procedure from Step 3 for the DDM-2000 OC-3 shelf you are now logged into. Remember that when the procedures refer to local it is now the shelf from which you are getting the "Active Alarms and Status Report".

Table B. RTRV-ALM Message Descriptions

Description	Alarm Level	Meaning
2nd CP required for BBF3	CR or MN	The BBF3/BBF3B DS1PM circuit pack requires both corresponding FUNCTION UNITS slots in the group to be equipped with MXRVO or STS1E circuit packs. A second MXRVO or STS1E circuit pack should be inserted in the companion FUNCTION UNITS slot.
-48V power/fuse FA FB failed	MN	A -48 volt power feeder or a fuse on the user panel has failed. (FA or FB LED identifies failure.)
AC power failed	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.)
AGNE communication failure	MJ	A remote network element (NE) cannot establish and NE status association with an alarm gateway network element (AGNE). The alarm is also declared by an AGNE that can not establish an NE status association with one or more NEs in its alarm group. Likely cause: The AGNE has not been assigned in an alarm group. The AGNE and NEs are assigned different alarm group numbers.
APS - automatic lock	MN	The service associated with a DS1/DS1PM circuit pack has been automatically switched and locked onto the protection DS1/DS1PM circuit pack. The automatic protection switching (APS) lock will remain active until midnight. Likely cause: Four automatic switches of a single DS1/DS1PM circuit pack in 10 minutes, probably because of an intermittent failure of the DS1/DS1PM circuit pack.
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 circuit pack on the protection line (MAIN-2(P)) at the far end or failure of the OLIU circuit pack on the protection line (MAIN-2(P)) at the near end.
auto turnup test IP	ABN	An automatic turnup test is in progress.
BBF5 required in LS-8	MJ	A BBF5 JMPR circuit pack is missing from a shelf (Group 3 or earlier) with two 27G-U OLIU circuit packs or a 27G-U and 27G2-U OLIU circuit packs in the corresponding FUNCTION UNITS slot pair. Install BBF5 JMPR circuit pack in slot 8(P) of the LOW SPEED GROUP associated with the corresponding FUNCTION UNITS slots where the 27G-U/27G2-U OLIUs are installed.

Table B. RTRV-ALM Message Descriptions (Continued)

Description	Alarm Level	Meaning
BBF5 required in LS-4	MJ	A BBF5 JMPR circuit pack is missing from a shelf (Group 3 or earlier) with two 27G2-U OLIU circuit packs in the corresponding FUNCTION UNITS slot pair. Install BBF5 JMPR circuit pack in slot 4 of the LOW SPEED GROUP associated with the corresponding FUNCTION UNITS slots where the 27G2-U OLIUs are installed.
communication failure	Status	The system is not communicating with another shelf in the subnetwork. This system is normally communicating with that shelf through the SONET section DCC specified in the address column. The " rtrv-map-network " and " rtrv-map-neighbor " command will report the name of the system(s) with which this system is not communicating. Likely causes: An unprotected OC-3 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 circuit pack.
controln	Status	The specified environmental control point (miscellaneous discrete output) is active. Note: The actual message that appears in the "Active Alarms 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: 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.
CP not allowed - (crs)	CR or MN	The circuit pack does not support the manual cross-connection(s) currently provisioned for this slot. The user should change the circuit pack type or change the cross-connection(s) to the slot.
CP not allowed - (eqpt)	MJ or MN	A DS1 or DS1PM circuit pack is installed in a LOW SPEED slot associated with a FUNCTION UNITS slot currently provisioned for DS3 , STS1E_L (low speed), or OLIU circuit pack service. The DS1 or DS1PM circuit pack should be removed from the shelf, or the FUNCTION UNITS circuit pack should be replaced with an MXRVO or STS1E_H (high speed) circuit pack.
CP not allowed - (timing)	CR or MN	When associated with a TIMING slot, the current circuit pack switch settings do not support the synchronization timing provisioned. The user should change the circuit pack switches or change the settable synchronization parameters. When associated with FUNCTION UNITS slot C , the circuit pack type does not support the current provisioned synchronization parameters. The circuit pack type or the timing options should be changed.

Table B. RTRV-ALM Message Descriptions (Continued)

Description	Alarm Level	Meaning
CP removed	CR, MJ or MN	A circuit pack previously installed in this system is removed. The circuit pack should be replaced, or an update (" upd ") command should be done to remove it from the system equipment list.
dormant/executing code mismatch	Status	This alarm condition is raised when the network element (NE) detects that dormant software exists on the NE with a release number that does not match the release number of the executing software.
DS1 CP failed	MJ or MN	Internal equipment failure of the specified DS1 circuit pack.
DS1PM CP failed	MJ or MN	Internal equipment failure of the specified DS1PM circuit pack.
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 loopback (to fiber)	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 loopback (to DSX)	ABN	A loopback (toward the DSX) 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 circuit pack.
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 loopback (to fiber)	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 loopback (to DSX)	ABN	A loopback (toward the DSX) 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.)

Table B. RTRV-ALM Message Descriptions (Continued)

Description	Alarm Level	Meaning
DSNE not reachable	MJ	No network element has been designated a directory service network element (DSNE); non-DSNE network element starts up and does not get registered by a DSNE within a specified time; DCC failure between local NE and the DSNE; optical line failure in the subnetwork; a controller failure or pull; reset or initialization of the DSNE. (Use the " set -ne " command to provision one (and only one) shelf as the DSNE. Use " rtrv -ne " command to check DSNE provisioning.)
duplicate DSNE	MJ	A shelf has been provisioned as a directory services network element (DSNE) in a network that already has a DSNE. Only one network element in the network may be provisioned as the DSNE. (See the " set -ne " and " rtrv -ne " commands for DSNE provisioning information.)
duplicate site/ne address	MJ	Two or more shelves in the network have the same site address. (Set by the " set -ne " command.)
duplicate TBOS display	MJ	Two or more shelves in the network have the same TBOS display number. (Set by the " set -ne " command.)
duplicate TID	MJ	Two or more shelves in the network have the same system name or TID. (Set by the " set -ne " command.)
EC1 loopback	ABN	A loopback (toward the optical fiber) is active on the specified EC1 port. (See " opr -lpbk-ec1 " and " rls -lpbk-ec1 " commands.)
EC1 loopback (to fiber)	ABN	A loopback (toward the optical fiber) is active on the specified EC1 port. (See " opr -lpbk-ec1 " and " rls -lpbk-ec1 " commands.)
EC1 loopback (to DSX)	ABN	A loopback (toward the STSX-1) is active on the specified EC1 port. (See " opr -lpbk-ec1 " and " rls -lpbk-ec1 " commands.)
environmentn	CR, MJ, MN or None	The specified environmental alarm point (miscellaneous discrete input) is active. Note: The actual message that appears in the "Active Alarms and Status Report" for this condition can be provisioned; this is the default message. (See the " rtrv-attr-env " and " set-attr-env " commands.)
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.

Table B. RTRV-ALM Message Descriptions (Continued)

Description	Alarm Level	Meaning
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 "Active Alarms and Status Report" for this condition can be provisioned; this is the default message. (See the " rtrv-attr-env " and " set-attr-env " commands.)
fan control relay failed	MN	The thermostat on the SYCTL circuit pack indicates that the cooling fan should be turned on, and the fan control relay on the SYCTL circuit pack failed to operate. The system will continue to operate, but it might overheat, leading to degraded or interrupted transmission and/or circuit pack failures. Likely causes: Telemetry input common (TLMIC, pin 9) on J62 not grounded (adapter plug missing from J62 on RT shelf when J62 does not have a cable attached.) SYCTL circuit pack failure.
fan shelf failed	MN	The system has detected a failure of the DDM-2000 fan shelf. The ED-8C733-30, G7 CO cooling fan has failed. The system will continue to operate but it may overheat. The fan must be repaired within 4 hours of the failure, otherwise service may be interrupted and/or circuit packs may fail. Likely causes: Filter needs replacing, a fan pack failed, a fan pack has lost one or both power feeders, or the fan shelf control board has failed.
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 UNITS 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.)

Table B. RTRV-ALM Message Descriptions (Continued)

Description	Alarm Level	Meaning
frequency error	MJ	This alarm condition indicates that an incoming timing signal has an unacceptable frequency offset. Likely causes: A DS1 external timing reference to the local shelf or a remote shelf has a frequency offset greater than about 20 hertz.
holdover mode active	NE ACTY	System is in holdover synchronization mode. Likely causes: System was manually switched to holdover mode (with " switch-sync " command or in a central office system, with TBOS control point 54) and switch has not been reset; or the system automatically switched to holdover mode due to failure of timing references, and either (1) the reference failures have not cleared, or (2) the system is provisioned for nonrevertive synchronization mode switching, or (3) the system is provisioned for External timing and no external timing references are available, or (4) the system is provisioned for loop-timed operation and the optical line or OLIU circuit pack has failed, or a message indicating an upstream clock problem has been received on the sync message bits of the optical line (" rtrv-sync " command) or (5) the system is provisioned for sync message signaling, but the upstream system from which it loop-times has not been provisioned for sync message signaling. The condition can be cleared by provisioning both systems the same (" set-sync " and " rtrv-sync " commands). Condition can be cleared by repairing at least one of timing references (if both are failed) and resetting synchronization mode protection switch with command " switch-sync:s=mode,pri=reset ". In a central office system, the synchronization mode can also be reset with a TBOS control point.
illegal CP type	CR, MJ or MN	An illegal or unknown circuit pack type has been inserted into the shelf.
inc. (from DSX) 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: Hard failure of upstream equipment or 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.

Table B. RTRV-ALM Message Descriptions (Continued)

Description	Alarm Level	Meaning
inc. (from DSX) DS1 sig fail	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} , 10^{-6} , 10^{-7} , or 10^{-8} . Likely causes: Mismatch of line code (AMI/B8ZS). Failure of upstream equipment or facility (towards the DSX-1). Cross-talk in office wiring. Failure of the DS1/DS1PM circuit pack.
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. E00F	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.
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 cause: Failure of the office timing supply that provides the DS1 timing reference.
inc. (from DSX) DS3 AIS	CR, MJ, MN, or NE ACTY	The system has detected DS3 alarm indication signal (AIS) in the MUX direction (that is, coming from the DSX) for the specified DS3 signal. Likely causes: The incoming DS3 signal at the near end is failed, or DS3 AIS is received from the DSX-3 at the near end.

Table B. RTRV-ALM Message Descriptions (Continued)

Description	Alarm Level	Meaning
inc. (from fiber) DS3 AIS	NE ACTY	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. (from DSX) 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 DDM-2000 backplane.
inc. (from DSX) DS3 OOF	CR, MJ, MN, or None	The system has detected a DS3 out-of-frame (OOF) condition in the MUX direction (that is, coming from the DSX) 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 near end, failure of the DS3 circuit pack at the near end, or the DS3 signal is looped at both ends.
inc. (from fiber) 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 circuit pack at the far end or near end, or the DS3 signal is looped at both ends.
inc. (from DSX) DS3 sig fail	CR	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, or unprotected failure of DS3 circuit pack.
inc. EC1 FERF	NE ACTY	The system has detected the EC-1 far end receive failure (FERF) signal in the incoming EC-1 signal. Likely causes: The far end has detected an incoming signal failure on the specified EC-1 line. This may be caused by failure of the STS1E circuit pack at the near end, the STS1E circuit pack at the far end, or the transmit cable on the specified line.
inc. EC1 LOF	CR, MJ MN, or None	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 three milliseconds. Likely cause: Failure of the STS1E or equivalent circuit pack at the far end, failure of the STS1E or equivalent circuit pack at the near end, failure of the incoming cable, or a cable disconnect at the STSX-1 or shelf connector.

Table B. RTRV-ALM Message Descriptions (Continued)

Description	Alarm Level	Meaning
inc. EC1 LOS	CR, MJ MN or None	The system has detected loss of signal (LOS) condition on the EC-1 line. Likely cause: Failure of the STS1E or equivalent circuit pack at far end, failure of the incoming cable, failure of the STS1E circuit pack at the near end, or a cable disconnect at the STSX-1 or shelf connector.
inc. EC1 line AIS	CR, MJ MN or None	The system has detected the EC-1 line alarm indication signal (AIS) on an incoming EC-1 line. Likely cause: Failure of an STS1E circuit pack at the far end.
inc. EC1 sig degrade (BER)	CR, MJ, MN, or None	The bit error ratio (BER) in the received EC-1 signal exceeds the provisioned threshold, 10^{-5} or 10^{-9} . Likely causes: Failure of the STS1E circuit pack at the near end, failure of the incoming cable, cross-talk in office wiring, or failure of the STS1E circuit pack at the far end.
inc. EC1 sig failed (BER)	CR, MJ, MN, or None	The bit error ratio (BER) in the received EC-1 signal exceeds the provisioned threshold of 10^{-5} or 10^{-9} . Likely causes: Failure of the STS1E circuit pack at the near end, failure of the incoming cable, cross-talk in office wiring, or failure of the STS1E circuit pack at the far end.
inc. OC1 FERF	NE ACTY	The system has detected the OC-1 far end receive failure (FERF) signal in the incoming OC-1 signal. Likely causes: The far end has detected an incoming signal failure on the specified OC-1 line. This may be caused by failure of the OLIUI circuit pack at the near end, the OLIUI circuit pack at the far end, or the transmit cable on the specified line.
inc. OC1 line AIS	CR or NE ACTY	The system has detected the OC-1 line alarm indication signal (AIS) on an incoming OC-1 line. Likely cause: Failure of an OLIUI circuit pack at the far end.
inc. OC1 LOF	CR or MN	The system has detected a loss-of-frame (LOF) condition in an incoming OC-1 signal. LOF is defined as an out of frame (OOF) condition (five consecutive errored STS-1 framing patterns) that lasts for at least three milliseconds. Likely cause: Failure of the OLIUI or equivalent circuit pack at the far end, failure of the OLIUI or equivalent circuit pack at the near end, or failure of the receive fiber.
inc. OC1 LOS	CR or MN	The system has detected loss of signal (LOS) condition on the OC-1 line. Likely cause: Failure of the OLIUI or equivalent circuit pack at far end, failure of the receive fiber, or failure of the OLIUI circuit pack at the near end.

Table B. RTRV-ALM Message Descriptions (Continued)

Description	Alarm Level	Meaning
inc. OC1 sig degrade (BER)	CR or MN	The bit error ratio (BER) in the specified OC-1 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 OLI U circuit pack at the near end, failure of the OLI U circuit pack at the far end, or failure of the receive fiber.
inc. OC1 sig failed (BER)	CR or MN	The bit error ratio (BER) in the received OC-1 signal exceeds 10^{-3} . Likely causes: Failure of the OLI U circuit pack at the near end, failure of the receive fiber, or failure of the OLI U circuit pack 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 OLI U circuit pack at the near end, the OLI U circuit pack at the far end, or the transmit fiber on the specified line.
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 (five consecutive errored STS-1 framing patterns) that lasts for at least 3 milliseconds. Likely causes: Failure of the OLI U circuit pack at the near end, failure of the OLI U circuit pack at the far end, or failure of the receive fiber.
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 OLI U circuit pack at near end, failure of the OLI U circuit pack at far end, or failure of the receive fiber.
inc. OC3 line AIS	CR, MJ, MN, or None	The system has detected OC-3 line alarm indication signal (AIS) on an incoming OC-3 line. Likely cause: Failure of an OLI U circuit pack at the far end.
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 OLI U circuit pack at the near end, failure of the OLI U circuit pack at the far end, failure of the receive fiber, or incorrect setting of the optical power switch on the OLI U circuit pack.

Table B. RTRV-ALM Message Descriptions (Continued)

Description	Alarm Level	Meaning
inc. OC3 sig failed (BER)	CR or MN	The bit error ratio (BER) in the specified OC-3 signal exceeds 10^{-3} . Likely causes: Failure of the OLI circuit pack at the near end, failure of the OLI circuit pack at the far end, or failure of the receive fiber.
inc. OC12 FERF	NE ACTY	The system has detected the OC-12 far end receive failure (FERF) signal in the incoming OC-12 signal. Likely causes: The far end has detected an incoming signal failure on the specified OC-12 line. This may be caused by failure of the OLI circuit pack at the near end, the OLI circuit pack at the far end, or the transmit fiber on the specified line.
inc. OC12 LOF	CR or MN	The system has detected a loss-of-frame (LOF) condition in an incoming OC-12 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: Failure of the OLI circuit pack at the near end, failure of the OLI circuit pack at the far end, or failure of the receive fiber.
inc. OC12 LOS	CR or MN	The system has detected loss-of-signal (LOS) condition on the OC-12 line. Likely causes: Failure of the OLI circuit pack at near end, failure of the OLI circuit pack at far end, or failure of the receive fiber.
inc. OC12 line AIS	CR, MJ, MN, or None	The system has detected OC-12 line alarm indication signal (AIS) on an incoming OC-12 line. Likely cause: Failure of an OLI circuit pack at the far end.
inc. OC12 sig degrade (BER)	CR or MN	The bit error ratio (BER) in the specified OC-12 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 OLI circuit pack at the near end, failure of the OLI circuit pack at the far end, failure of the receive fiber, or incorrect setting of the optical power switch on the OLI circuit pack.
inc. OC12 sig failed (BER)	CR or MN	The bit error ratio (BER) in the specified OC-12 signal exceeds 10^{-3} . Likely causes: Failure of the OLI circuit pack at the near end, failure of the OLI circuit pack at the far end, or failure of the receive fiber.

Table B. RTRV-ALM Message Descriptions (Continued)

Description	Alarm Level	Meaning
inc. STS1 AIS	CR, MJ, MN, or None	The system has detected an incoming STS-1 alarm indication signal (AIS) in the active OC-3, OC-12, or OC-1 line. The system responds by transmitting DS1 or DS3 AIS toward the DSX and transmitting STS-1 yellow toward the fiber from which the AIS is being received. Likely causes: Incomplete or incorrect cross-connect provisioning in an end-to-end network. Unprotected removal or failure of a DS3 , MXRVO , or OLIUI circuit pack at the far end, or unprotected optical line failure.
inc. STS1 LOP EC1	CR, MJ, MN, or None	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 cause: Failure of the far end STS1E circuit pack or failure of the STS1E circuit pack at the near end.
inc. STS1 LOP OC1 <i>slotaid</i>	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-1 lines, the likely cause is an unprotected failure of an MXRVO or an OLIUI circuit pack at the far end. If this condition occurs on only one OC-1 line, the likely cause is failure of the OLIUI circuit pack at the near end or far end.
inc. STS1 LOP OC3 <i>slotaid</i>	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 circuit pack at the far end. If this condition occurs on only one OC-3 line, the likely cause is failure of the OLIUI circuit pack at the near end or far end.
inc. STS1 LOP OC12 <i>slotaid</i>	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-12 lines, the likely cause is an unprotected failure of an MXRVO or a DS3 circuit pack at the far end. If this condition occurs on only one OC-12 line, the likely cause is failure of the OLIUI circuit pack at the near end or far end.

Table B. RTRV-ALM Message Descriptions (Continued)

Description	Alarm Level	Meaning
inc. STS1 sig degrade (BER)	CR or MN	For STS-1 path ring applications, the bit error ratio (BER) of the specified STS-1 signal exceeds the user-provisioned signal degrade threshold. Likely cause: Failure at a fiber or failure of an OLI circuit pack at some point in the STS-1 path.
inc. STS1 sig failed (BER)	CR or MN	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: Failure of the near end OLI circuit pack reporting the STS-1 failure, failure of the far end OLI circuit pack, or failure of the receive fiber if the OC-3/OC-12 is also reporting a failure.
inc. STS1 unequipped	MN	The system has detected the unequipped code (SONET path overhead signal code label byte=0) on an in-service STS-1 channel. Likely causes: An upstream STS-1 cross-connect has been deleted.
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: Incomplete or incorrect cross-connect provisioning in end-to-end network, unprotected unidirectional failure of the OLI circuit pack, or fiber at some point in the end-to-end path.
inc. VT AIS	CR, MJ, MN, or None	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 from which the AIS is being received. Likely causes: Incomplete or incorrect cross-connect provisioning in end-to-end network (In ring applications, this alarm may be caused by fiber or OLI circuit pack failures). Unprotected removal or failure of a DS1 circuit pack at the far end.
inc. VT LOP	MJ or MN	The system has detected a VT loss-of-pointer (LOP) condition. Likely causes: Unprotected failure of a DS1 circuit pack at the near end, unprotected failure of a DS1 circuit pack at the far end, unprotected failure of a MXRVO circuit pack at the near end, or unprotected failure of a MXRVO circuit pack at the far end.

Table B. RTRV-ALM Message Descriptions (Continued)

Description	Alarm Level	Meaning
inc. VT sig degrade (BER)	MJ or MN	In a VT path switched ring, the system has detected a VT error rate that exceeds the provisioned threshold of 10^{-5} to 10^{-8} . The system selects a good VT signal from the other ring path. Likely causes: An OLI circuit pack failure or a fiber failure at some point on the failed ring.
inc. VT unequipped	MJ or MN	The system has detected the unequipped code (SONET path overhead VT signal code label byte=0) on an in-service VT1.5 channel. Likely causes: An upstream VT1.5 cross connect has been deleted or a DS1 LOW SPEED slot has been unequipped.
inc. VT yellow	NE ACTY	The far end is detecting VT AIS or VT LOP and inserting VT yellow in its transmit signal. Likely causes: Unprotected failure of a DS1 circuit pack at the near end, a DS1 circuit pack at the far end, an MXRVO circuit pack at the near end, an MXRVO circuit pack at the far end, or fiber at some point in the end-to-end path.
inconsistent DCC values	MJ	The Network Side/User Side parameters are set the same at both ends of a DCC (optical span). (See the " set - fecom " command.)
inhibit auto. OS messages	ABN	This message occurs when TL1 autonomous alarm reporting is inhibited by the TL1 " INH-MSG " command. This message is cleared by enabling autonomous message reporting with the TL1 " ALW-MSG " command.
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 UNITS 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.)

Table B. RTRV-ALM Message Descriptions (Continued)

Description	Alarm Level	Meaning
Intersubsys com link failed	MJ	In a MegaStar* 2000 system, the SONET subsystem session is active, but is unable to communicate with the RADIO subsystem.
invalid CP switches	CR or MN	When associated with a TIMING slot, this message means that the timing mode switch settings on the TGS circuit pack are invalid.
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.)
manual switch	ABN	The specified DS1 circuit pack 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 circuit pack.

* Trademark of Harris Corporation.

Table B. RTRV-ALM Message Descriptions (Continued)

Description	Alarm Level	Meaning
OC12 connector failed	MN	Failure or removal of the OC-12 24G-U OLIU faceplate connector which carries STS-1/STS-3c ring pass through traffic on the OC-12 ring interface on the OC-3 shelf.
OHCTL CP failed	MJ	Internal equipment failure of the OHCTL circuit pack.
OHCTL standby boot fail	MN	OHCTL circuit pack failed during local or remote software download.
OLIU CP failed	CR or MN	Internal equipment failure of the specified OLIU circuit pack.
program installation IP	Status	This system is being used to install software into another system. If this procedure is interrupted prior to completion, the remote systems' control circuit packs will likely become inoperable until another install program attempt is successful.
section DCC channel failed	MJ or MN	The system cannot communicate with the far-end system through the SONET section data communications channel (DCC). Likely causes: SYSCTL or OHCTL circuit pack 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 circuit pack failure at the near end.
STS1E_H CP failed STS1E_L CP failed	CR or MN	Internal equipment failure of the specified high speed or low speed STS1E circuit pack.
SYSCTL CP failed	MJ	Internal equipment failure of the SYSCTL circuit pack. The system has determined that some part of the SYSCTL circuit pack has failed. Note: Some types of failures cannot be reported since the SYSCTL circuit pack cannot function under these conditions.
SYSCTL standby boot fail	MN	SYSCTL circuit pack failed during local or remote software download.
TID address map full	MJ	The size of the directory services network element (DSNE) database has been exceeded. Likely causes: Network elements have been removed from the network but not from the DSNE database. (See the " dlt-tadrmap " command.)
TGS CP failed	CR or MN	Internal equipment failure of the specified TGS circuit pack or the systems at both ends of the span are loop timed.
TMUX CP failed	CR or MN	Internal equipment failure of the specified TMUX circuit pack.

Table B. RTRV-ALM Message Descriptions (Continued)

Description	Alarm Level	Meaning
unexpected CP switches	CR, MJ, or MN	When associated with the SYS (SYSCTL) slot, this message means that an invalid switch setting has been selected or some of the unused switches are not in the prescribed position. For MAIN or FUNCTION UNITS slots equipped with OLIU circuit packs, it indicates that the optical power switch on the OLIU circuit pack was different from what it was before the OLIU circuit pack was replaced. For LOW SPEED slots equipped with DS1 circuit packs or FUNCTION UNITS slots equipped with DS3 circuit packs, this message means that a change in a circuit pack switch setting was made. When associated with a TIMING slot equipped with TGS circuit packs, this message means: 1. The timing mode switch settings on the TGS circuit pack are a. invalid, b. different from those on the companion TGS circuit pack, or c. different from what they were before the TGS circuit pack was replaced, 2. The DS1 format or line coding switches on the TGS circuit pack are not the same as they were before the TGS circuit pack was replaced.
unexpected CP type	CR, MJ, MN, or Status	When associated with a FUNCTION UNITS slot, this message means that a different but supported circuit pack is inserted in a slot already provisioned. When associated with a LOW SPEED slot equipped with a DS1 circuit pack, this message means that a different but supported DS1 circuit pack type (for example, BBF3 circuit pack) is inserted in a slot already provisioned. When associated with a FUNCTION UNITS slot equipped with a STS1E circuit pack, this message means that the circuit pack type switch (located on the circuit pack) is different from that already provisioned for the slot. When associated with a MAIN slot, if a 24G-U OLIU is inserted into a MAIN slot of a Release 11 OC-3 shelf expecting a 22-type OLIU, the alarm level for the resulting "unexpected CP type" alarm is "status". If the 24G-U OLIU fails, a "OLIU CP failed" alarm is reported; but the status condition is maintained until the circuit pack is removed.

Table B. RTRV-ALM Message Descriptions (Continued)

Description	Alarm Level	Meaning
unsupported DCC connection	MJ	DCC is enabled on an OC-1 connection between the MAIN slots in two OC-3 shelves. The alarm is cleared by disabling the DCC on the OC-1 interface using the " set - fecom " command. The DDM-2000 OC-3 system does not support a DCC link over an OC-1 line terminating on the MAIN slots between two OC-3 shelves.
X.25 communication failure	MJ	Failure in the X.25 communication channel. Likely causes: Failure of the X.25 communication equipment or failure at the OS.

Clear Obscure Failure Condition

1.  **NOTE:**
It is assumed that a set of alarms or conditions exist which are inconsistent or may not have associated LEDs indications.

Perform LED test by depressing the **ACO** button or using the CIT command **test - led**.

Reference: **DLP-509**

2. Did any LED fail the LED test?
If **YES**, then do **TAP-115**.
If **NO**, then continue with **Step 3**.
3. Is a CIT available?
If **YES**, then proceed to **Step 7**.
If **NO**, then continue with **Step 4**.
4. Are there associated LED indications (for example, **NE ACTY** or **FE ACTY** LED lighted; **CR**, **MJ**, **MN**, **PMN**, etc. LED lighted when alarm is present, etc.)?
If **YES**, then continue with **Step 5**.
If **NO**, then proceed to **Step 11**.
5.  **NOTE:**
Unseating and reseating the **SYSCCTL** performs a *reset* procedure which restarts the software program.

Unseat and reseat **SYSCCTL** circuit pack. Do not depress **UPD/INIT** button.

6. Is trouble still present?

If **YES**, then proceed to **Step 9**.

If **NO**, then **STOP. YOU HAVE COMPLETED THIS PROCEDURE.**

7. Use the CIT and **reset** command to reset **SYSCTL**.

8. Is the trouble still present?

If **YES**, then continue with **Step 9**.

If **NO**, then **STOP. YOU HAVE COMPLETED THIS PROCEDURE.**

9.  **CAUTION:**

*Replacing the **SYSCTL** involves updating the internal memory on the circuit pack.*

Replace the **SYSCTL**.

Reference: **DLP-501**

10. Is the trouble still present?

If **YES**, then continue with **Step 11**.

If **NO**, then **STOP. YOU HAVE COMPLETED THIS PROCEDURE.**

11.  **NOTE 1:**

The problem may be in the backplane wiring of the DDM-2000. One way to verify this is to swap the **SYSCTL** and any circuit pack with an inconsistent diagnostic indication with the corresponding circuit packs in another DDM-2000. If the problem moves with the circuit packs, it means that one or more of the circuit packs is defective. If the problem stays with the original DDM-2000, the entire assembly, but not the circuit packs, should be replaced. The DDM-2000 has a printed backplane and cannot be repaired in the field.

⇒ **NOTE 2:**

A CIT and the system **rtrv-()** commands may be helpful in determining the condition of the system.

Use CIT and **rtrv-alm** command to get an "Active Alarms and Status Report". See the "Commands and Reports" section of this manual under **RTRV-ALM** for a description of each message retrieved with the **rtrv-alm** command.

If you need technical assistance, notify your supervisor, your local technical support organization, or call Lucent Technologies RTAC, per local operating instructions.

12. **STOP. YOU HAVE COMPLETED THIS PROCEDURE.**

Clear Abnormal (ABN) Indication

1.  **NOTE:**
The **ABN** LED indicates a manually caused abnormal condition. Table A lists the conditions which may cause an **ABN** alarm. These conditions may have been initiated locally, from another DDM-2000 at the other end of the facility, or through telemetry.

Is the **CR**, **MJ**, **MN**, or **PMN** LED on the User Panel lighted?

If **YES**, then continue with **Step 2**.

If **NO**, then proceed to **Step 4**.

2.  **NOTE 1:**
It is better to clear the higher priority alarms (**CR**, **MJ**, etc.) first, although in most cases this will not clear an **ABN** alarm. If the higher priority alarm is cleared first, you can then use this procedure to clear the **ABN** alarm.

 **NOTE 2:**
In some cases, clearing an **ABN** alarm will result in a higher priority alarm being cleared. For example, clearing the abnormal condition "manual sync. mode switch" may cause an "excessive holdover" **MJ** alarm to clear.

Refer to Task Index **IXL-001** for procedure to clear the indicated alarm.

3. **STOP. YOU HAVE COMPLETED THIS PROCEDURE.**

4. Is a CIT available?

If **NO**, then continue with **Step 5**.

If **YES**, then proceed to **Step 12**.

5.  **NOTE:**

The **FE SEL** button on the **SYSCTL** is used to display local and remote alarm and status conditions [**DLP-530**].

Use **FE SEL** button to display alarm conditions for local shelf (**L.** displayed in **FE ID** display).

6. Was **NE ACTY** LED lighted on the User Panel when local shelf alarm conditions are displayed (**L.** displayed in **FE ID** display)?

If **YES**, then proceed to **Step 27**.

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

7. Use **FE SEL** button to display alarm conditions for other sites/shelves in the network (observe site address in **FE ID** display).

8. Was **NE ACTY** LED lighted on User Panel when alarms were displayed for any selected site?

If **YES**, then continue with **Step 9**.

If **NO**, then do **TAP-108**.

9. Refer to **DLP-530** and use **FE SEL** pushbutton on **SYSCTL** to display far-end alarm conditions for other sites/shelves in the network.

10. Issue a trouble report of abnormal (**ABN**) alarm condition at the far-end DDM-2000 terminal.

11. **STOP. YOU HAVE COMPLETED THIS PROCEDURE.**

12.  **NOTE:**

For all network configurations except point-to-point, there will be multiple far-end far end terminals. Troubleshooting multi-shelf DDM-2000 networks is facilitated by use of a Craft Interface Terminal (CIT).

Connect the CIT to the **CIT** connector on the near-end User Panel and log in to the near-end system, if not already performed.

Reference: **DLP-521**

13.

⇒ **NOTE 1:**

The **rtrv-alm** command can be used to display a report of active alarm and status conditions. The "Commands and Reports" section of this manual gives a description of the command.

⇒ **NOTE 2:**

The "Active Alarms and Status Report" is output automatically following CIT log in. The report shown in Figure 1 is an example that shows several entries. There may be only one entry in the actual report.

Note the information in the Source Address and Description columns for the top entry/entries above the first single-dashed line in the "Active Alarms and Status Report" (Figure 1) (for example, "abnormal a-1-1 MM-DD HH:MM:SS nsa DS1 loopback").

```
/* Active Alarms and Status Report
=====
Alarm      Source   Date   Time      Srv   Description
Level      Address  Detected
=====
abnormal   a-1-1    MM-DD HH:MM:SS  nsa   DS1 loopback
-----
*/
```

Figure 1. Example of Active Alarms and Status Report

14.  **NOTE:**
 Far-end alarm or status conditions are listed in this report with a Source Address of `farend`. Local alarm or status conditions have a Source Address of the local slot, line, port, channel, path, cross-connection, or operations interface (DCC, TL1 (X.25), TBOS, etc.) where the event occurred. (See *Addresses* in the "Commands and Reports" section of this manual.) Use the **`rtrv-alm`** command to get another report, if necessary.

Does the Source Address of any top entry in the alarm report indicate local slot, channel, port or operations interface for the `abnormal` alarm?

If **NO**, then do **TAP-107**.

If **YES**, then continue with **Step 15**.

15. Use **`opr-aco`** command to silence active audible office alarms, if required.
16. Note the **local** trouble indication in the Description column of the "Active Alarms and Status Report", starting with the highest alarm level (abnormal) listed in the Alarm Level column.
17. Find the trouble description in Table A for the highest alarm level and note the related commands.

Table A. Abnormal (ABN) Alarm and Status Conditions

Description	Related Commands
forced switch inhibit switch	<code>switch-line</code> <code>switch-fn</code> <code>switch-sync</code>
lockout of protection	<code>switch-line</code> <code>switch-ls</code>
lockout of service manual switch	<code>switch-ls</code>
manual sync. mode switch	<code>switch-sync</code>
DS1 loopback DS1 loopback (to Fiber) DS1 loopback (to DSX)	<code>opr-lpbk-t1</code> <code>rls-lpbk-t1</code>
DS3 loopback DS3 loopback (to Fiber) DS3 loopback (to DSX)	<code>opr-lpbk-t3</code> <code>rls-lpbk-t3</code>

Table A. Abnormal (ABN) Alarm and Status Conditions (Continued)

Description	Related Commands
EC1 loopback EC1 loopback (to Fiber) EC1 loopback (to DSX)	opr-lpbk-ec1 rls-lpbk-ec1
DS1 trmsn test IP DS3 trmsn test IP auto turnup test IP	test-trmsn-t1 test-trmsn-t3 test-auto
inhibit auto. OS messages	INH-MSG ALW-MSG

18.  **CAUTION:**
*You must determine the reason for the **ABN** indication before attempting to clear it.*

Use the command **rtrv-state-()** to see if you can determine the condition associated with the **ABN** indication.

19. Contact the appropriate personnel at your location, at the far-end location, and at any central maintenance location to determine the reason for the **ABN** indication before clearing it.
20. Have you determined that it is appropriate for you to clear the condition causing the **ABN** indication?
 If **YES**, then proceed to **Step 23**.
 If **NO**, then continue with **Step 21**.
21. There is nothing more to be done until the reason for the **ABN** condition is known.
22. **STOP. YOU HAVE COMPLETED THIS PROCEDURE.**
23. Use the appropriate command to clear the abnormal condition. The command will be **rls-lpbk-()** or **switch-()**.
24. Is the **ABN** indicator still lighted?
 If **YES**, then continue with **Step 25**.
 If **NO**, then **STOP. YOU HAVE COMPLETED THIS PROCEDURE.**

25. Use the **rtrv-alm** command to determine if there are other conditions causing the **ABN** alarm. See Table A.
26. See Table A. Does the **rtrv-alm** command report any other abnormal conditions.
 - If **NO**, then do **TAP-108**.
 - If **YES**, then repeat this procedure from **Step 16**.
27. Unseat and reseal the **SYSCTL** to perform a reset.
28. Is the **ABN** LED still lighted?
 - If **YES**, then continue with **Step 29**.
 - If **NO**, then **STOP. YOU HAVE COMPLETED THIS PROCEDURE.**
29. Obtain CIT and repeat this procedure from **Step 12**.

Clear Flashing FAULT LED Indication

1. Is the **MN** LED lighted on the User Panel?
If **YES**, then do **TAP-112**.
If **NO**, then continue with **Step 2**.
2. Is the **MJ** LED lighted on the User Panel?
If **YES**, then do **TAP-102**.
If **NO**, then continue with **Step 3**.
3. Is the **CR** LED lighted on the User Panel?
If **YES**, then do **TAP-101**.
If **NO**, then continue with **Step 4**.
4. Is the **FAULT** LED flashing on the faceplate of one or more **DS1/DS1PM** circuit packs?
If **YES**, then continue with **Step 5**.
If **NO**, then proceed to **Step 10**.
5.  **NOTE:**
There is an incoming DS1 signal failure. This failure can be further isolated using a CIT.

Is a CIT available?
If **YES**, then continue with **Step 6**.
If **NO**, then proceed to **Step 8**.
6. Connect the CIT to the connector on the User Panel and establish session.

Reference: **DLP-521**

7. Refer to the "Commands and Reports" section of this manual under **RTRV-()** and use the **rtrv-()** commands to further isolate the particular incoming DS1 signal failure.
8. Switch service to protection. If LED is flashing on protection **DS1/DS1PM**, issue trouble report of bad incoming signal at input to **DS1/DS1PM** circuit pack with flashing LED(s). If LED is not flashing on protection **DS1/DS1PM**, replace service **DS1/DS1PM** circuit pack [**DLP-523**].
9. **STOP. YOU HAVE COMPLETED THIS PROCEDURE.**
10. Is the **FAULT** LED flashing on the faceplate of one or more **DS3/STS1E** circuit packs?
 If **YES**, then continue with **Step 11**.
 If **NO**, then do **TAP-108**.
11. Switch service to protection. If LED is flashing on protection **DS3/TMUX/STS1E**, issue trouble report of bad incoming DS3/EC-1 signal from DSX-3 (STXS) cross-connect point. If LED is not flashing on protection **DS3/TMUX/STS1E**, replace service **DS3/TMUX/STS1E** circuit pack [**DLP-523**]. With a CIT, use the command **rtrv-alm** to verify the alarm.
12. **STOP. YOU HAVE COMPLETED THIS PROCEDURE.**

Clear OLIU or Fiber Trouble Linear Extensions/Configurations

1.  **WARNING:**
Open optical connectors may emit invisible laser radiation. Do not view beam with optical instruments. Avoid direct exposure to the beam. Use of controls or adjustments or performance of procedures other than those specified herein may result in hazardous radiation exposure.

-  **CAUTION 1:**
When removing circuit packs, 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 2:**
*When removing circuit packs, always remove the one without a lighted **ACTIVE LED** first.*

-  **NOTE 1:**
A lighted **FAULT** LED on the **OLIU** indicates that either the receiver, the transmitter, or both has failed. A flashing **FAULT** LED on the **OLIU** indicates that either the near-end receiver, far-end transmitter, or incoming (receive) fiber has failed. A lighted **ACTIVE** LED indicates that the **OLIU** is carrying service (transmitting, receiving, or both).

⇒ **NOTE 2:**

Because the OC-3 line protection switching request is unidirectional in all releases, it is possible to have lighted **FAULT** LEDs 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-eqpt**" commands to check the far-end status.

⇒ **NOTE 3:**

This procedure can be used to clear some troubles, but a knowledge of the **OLIU** protection switching arrangement and use of CIT commands are necessary to clear other troubles where a service interruption might occur.

Was **OLIU(s)** removed or being replaced, installed, or having switch setting changed when alarm occurred?

If **YES**, then continue with **Step 2**.

If **NO**, then proceed to **Step 11**.

2. ⇒ **NOTE:**

An alarm will occur if a circuit pack is removed without performing an update by momentarily depressing the **UPD/INIT** button or using the "**upd**" command.

Is any previously installed **OLIU(s)** removed from the shelf?

If **YES**, then continue with **Step 3**.

If **NO**, then proceed to **Step 5**.

3. Determine the reason the circuit pack(s) was removed. If the same circuit pack is to be reinserted and switch setting is not changed, reinstall the circuit pack. If the circuit pack was removed and switch setting changed, reinstall the circuit pack (**DLP-514**) and momentarily depress the **UPD/INIT** button on the **SYSCTL**. If the circuit pack is not to be reinserted, momentarily depress the **UPD/INIT** button on the **SYSCTL** to remove the circuit pack from equipment inventory.

4. **STOP. YOU HAVE COMPLETED THIS PROCEDURE.**

5. Is **OLIU**(s) installed in correct slot(s) ("rtrv-eqpt")?
If **NO**, then continue with **Step 6**.
If **YES**, then proceed to **Step 8**.
6. Remove optical fibers from circuit packs, if connected, then remove circuit pack(s) from wrong slot(s). Check option switch setting (**DLP-513**), and install circuit pack(s) into correct slot(s). Reconnect optical fibers (**DLP-514**).
7. **STOP. YOU HAVE COMPLETED THIS PROCEDURE.**
8. Was circuit pack installed with switch setting(s) changed from what it was previously ("rtrv-oc3")?
If **YES**, then continue with **Step 9**.
If **NO**, then proceed to **Step 11**.
9. Ensure switch setting on the **OLIU** circuit pack(s) is correct (**DLP-513**). If an **OLIU** circuit pack(s) was replaced or installed with switch setting changed from what it was previously, momentarily depress the **UPD/INIT** button on the **SYSCTL**.
10. **STOP. YOU HAVE COMPLETED THIS PROCEDURE.**
11. Are **FAULT** LEDs flashing ("inc. OC3 LOS, LOF, sig. failed", etc.) on both the service and protection **OLIUs**?
If **YES**, then continue with **Step 12**.
If **NO**, then proceed to **Step 14**.
12. **⇒ NOTE:**
Indications are that both incoming (receive) optical fiber lines have failed, or both near-end or far-end service and protection **OLIUs** have failed, or both **TGS**, **MXRVO**, or **DS3** circuit packs have failed or been removed.

Check for failed or removed **TGS**, **MXRVO**, or **DS3** circuit packs. Replace failed circuit packs [**DLP-523**]. Use local procedures to check optical fiber connections and transmission. If no trouble is found on the optical fibers, replace **OLIUs** at near end first (**DLP-523**). If trouble still exists, replace **OLIUs** at far end. If alarm still exists, trouble is in the optical fibers.

13. **STOP. YOU HAVE COMPLETED THIS PROCEDURE.**

14. Is **FAULT** LED lighted ("OLIU CP fail", "unexpected CP type/switches", etc.) or flashing ("inc. OC3 LOS, LOF, sig. failed", etc.) on only ONE **OLIU** at either near end or far end?
If **YES**, then continue with **Step 15**.
If **NO**, then proceed to **Step 24**.
15. Is **ACTIVE** LED lighted on both service and protection **OLIUs** ("rtrv-state-eqpt")?
If **YES**, then proceed to **Step 17**.
If **NO**, then continue with **Step 16**.
16. Is alarm Critical or Minor?
If **MINOR**, then proceed to **Step 19**.
If **CRITICAL**, then continue with **Step 17**.
17.  **NOTE:**
Indications are that the near-end or far-end **OLIU** or incoming fiber line has failed and protection switching has been inhibited or locked at one or both ends. Also, if the protection fiber fails, the **ACTIVE** LEDs on both **OLIUs** will be lighted because of the uncertain state of the far end. If the "rtrv-state-eqpt" report indicates active-? for the protection line [slot **2(P)**], indications are that the protection line is failed. If the service line (slot **1**), indicates active-rx at both ends of the system, the service line is carrying all service.

Use CIT and "rtrv-state-eqpt" command to check switch status at BOTH ends of the system.

18. Use CIT and "switch-line" command to reset switch and switch both near-end and far-end lines to **OLIU** pair without lighted **FAULT** LED.
19.  **NOTE:**
Local procedures may require you to check optical fibers first before replacing **OLIUs**.

Replace **OLIU** with lighted or flashing **FAULT** LED.

Reference: **DLP-523**

20. Did trouble clear?
If **YES**, then **STOP. YOU HAVE COMPLETED THIS PROCEDURE.**
If **NO**, then continue with **Step 21.**
 21. Is **FAULT** LED lighted or flashing?
If **FLASHING**, then continue with **Step 22.**
If **LIGHTED**, then do **TAP-106.**
 22. Replace **OLIU** at far-end (**DLP-523**). If trouble does not clear, trouble is in incoming optical fiber.
 23. **STOP. YOU HAVE COMPLETED THIS PROCEDURE.**
 24.  **NOTE:**
Remember that the OC-3 line protection switching request is unidirectional. It is possible to have a lighted **FAULT** LED on an **OLIU** and still have that **OLIU** active (for example, if the transmitter failed, the receiver could still be receiving). It is necessary to analyze the lighted or flashing **OLIU** LEDs before replacing an **OLIU**. If the **ACTIVE** LED is lighted on an **OLIU**, it is in service (**ACTIVE**) either transmitting or receiving or both. It may be necessary to perform a "**switch-line**" at the near end and at the far end to switch both transmit and receive to the same line.
- Is **FAULT** LED lighted or flashing on both service and protection **OLIUs**?
- If **NO**, then continue with **Step 25.**
If **YES**, then proceed to **Step 32.**
25. Is **ACTIVE** LED lighted on **OLIUs** with lighted **FAULT** LEDs?
If **YES**, then continue with **Step 26.**
If **NO**, then proceed to **Step 27.**
 26. Use CIT and "**rtrv-state-eqpt**" command to check switch status at both ends of the system. Use CIT and "**switch-line**" command to reset switch and switch both near-end and far-end lines to **OLIUs** without lighted **FAULT** LED.

27.  **NOTE:**
Local procedures may require you to check optical fibers first before replacing **OLIUs**.

Replace **OLIUs** with lighted **FAULT** LEDs.

Reference: **DLP-523**

28. Did trouble clear?
If **YES**, then **STOP. YOU HAVE COMPLETED THIS PROCEDURE.**
If **NO**, then continue with **Step 29.**
29. Is **FAULT** LED(s) lighted or flashing?
If **FLASHING**, then continue with **Step 30.**
If **LIGHTED**, then do **TAP-106.**
30. Trouble is in optical fiber. Clear trouble using local procedures.
31. **STOP. YOU HAVE COMPLETED THIS PROCEDURE.**
32. Multiple troubles exist which are beyond the scope of this document. Without knowing the exact LED indications, the alarm and status indications (obtained with the "**rtrv-alm**" command), or the state of the protection switch (using the "**rtrv-state-eqpt**" command), this procedure can not go any further.

Use the LED indications, the "**rtrv-alm**" and "**rtrv-state-eqpt**" commands to analyze the trouble. Look for protection switch locks or inhibits. If the system is found to be completely out of service, replace circuit packs with lighted **FAULT** LEDs. If system is still in-service and a protection switch can place all service on either the protection or service **OLIUs**, perform the switch then replace circuit packs with lighted **FAULT** LEDs.

If you need technical assistance, notify your supervisor, your local technical support organization, or call Lucent Technologies RTAC, per local operating instructions.

33. **STOP. YOU HAVE COMPLETED THIS PROCEDURE.**

Clear Minor (MN) Alarm

1.  **NOTE:**
Table A lists some possible causes and indications of minor alarms.

Is a CIT available?

If **NO**, then continue with **Step 2**.

If **YES**, then proceed to **Step 10**.

2. On the User Panel, momentarily depress **ACO** button to silence active audible office alarms.

3.  **NOTE:**
The **FE SEL** button on the **SYSCTL** is used to display local and remote (farend) alarm and status conditions [**DLP-530**].

Use **FE SEL** button to display alarm conditions for local shelf (**L.** displayed in **FE ID** display).

4. Was **NE ACTY** LED lighted on User Panel when local shelf alarm conditions were displayed (**L.** displayed in **FE ID** display)?
If **NO**, then continue with **Step 5**.
If **YES**, then proceed to **Step 15**.
5. Use **FE SEL** button to display alarm conditions for other sites/shelves in the network (observe site address in **FE ID** display).
6. Was **NE ACTY** LED lighted on User Panel when alarms were displayed for any selected site?
If **YES**, then continue with **Step 7**.
If **NO**, then do **TAP-108**.
7. Use **FE SEL** button to display alarm conditions for other sites/shelves in the network (observe site address in **FE ID** display). (**DLP-530**).

8. Issue a trouble report of critical alarm condition at the far-end DDM-2000 site indicated in **FE ID** display.
9. **STOP. YOU HAVE COMPLETED THIS PROCEDURE.**
10. **⇒ NOTE:**
For all network configurations except point-to-point, there will be multiple far-end far end terminals. Troubleshooting multi-shelf DDM-2000 networks is facilitated by use of a Craft Interface Terminal (CIT).

Connect the CIT to the **CIT** connector on the near-end User Panel and log in or remote log in to the near-end system, if not already performed.

Reference: **DLP-521**

11. **⇒ NOTE 1:**
The "**rtrv-alm**" command can be used to display a report of active alarm and status conditions. The "Commands and Reports" section of this manual gives a description of the command.
- ⇒ NOTE 2:**
The "Active Alarms and Status Report" is output automatically following CIT log in. The report shown in Figure 1 is an example that shows several entries. There may be only one entry in the actual report.

Note the information in the Source Address and Description columns for the top entry/entries above the first single-dashed line in the "Active Alarms and Status Report" (Figure 1) (for example, "MINOR dcc-m2 MM-DD HH:MM:SS nsa section dcc channel failed").

```

/* Active Alarms and Status Report
=====
Alarm      Source      Date   Time      Srv  Description
Level      Address      Detected
=====
MINOR      farend      MM-DD HH:MM:SS  nsa  SiteXNE1
MINOR      dcc-m2      MM-DD HH:MM:SS  nsa  section dcc channel failed
-----
ne-acty    farend      MM-DD HH:MM:SS  -    SiteYNE1
ne-acty    m2-1       MM-DD HH:MM:SS  -    inc. STS1 yellow
ne-acty    m2-2       MM-DD HH:MM:SS  -    inc. STS1 yellow
ne-acty    main-2     MM-DD HH:MM:SS  -    inc. OC3 FERF
*/

```

Figure 1. Example of Active Alarms and Status Report

12.  **NOTE:**
Far-end alarm or status conditions are listed in this report with a Source Address of farend. Local alarm or status conditions have a Source Address of the local slot, line, port, channel, path, cross-connection, or operations interface (DCC, TL1 (X.25), TBOS, etc.) where the event occurred. (See *Addresses* in the "Commands and Reports" section of this manual.) Use the "**rtrv-alm**" command to get another report, if necessary.

Does the Source Address of any top entry in the alarm report indicate **local** slot, channel, port or operations interface for the MINOR alarm?

If **NO**, then do **TAP-107**.

If **YES**, then continue with **Step 13**.

13. Use "**opr-aco**" command to silence active audible office alarms, if required.
14. Note the trouble indication in the Description column of the "Active Alarms and Status Report", starting with the highest alarm level (Minor) listed in the Alarm Level column.
15. Find the trouble description in Table A for the highest alarm level and go to the indicated step or procedure.

Table A. Minor Alarm Conditions

Alarm Level or LED Indication	Trouble Description (Note)	Likely causes	Step or Procedure
MN LED lighted.	2nd CP required for BBF3	The BBF3/BBF3B DS1PM circuit pack requires both FUNCTION UNITS slots in the group to be equipped with MXRVO or STS1E circuit packs.	Insert a second MXRVO or STS1E circuit pack in the companion FUNCTION UNITS slot.
	–48V power/fuse FA FB failed	–48V power feeder or fuse on User Panel failed.	Check –48V power feeders or replace fuse. [DLP-555]
	automatic protection switch (APS) channel failed	Failure of near-end or far-end protection OLI circuit pack in MAIN-2(P) slot or failure of receive fiber on the protection line at near end.	TAP-111
	automatic protection switch (APS) automatic lock	Four automatic switches of one DS1 circuit pack in 10 minutes; DS1 intermittent failure.	Replace DS1 circuit pack. [DLP-523]
	CP not allowed - (crs)	Circuit pack does not support the manual cross-connection(s) currently provisioned for this slot.	Change circuit pack or change cross-connections.
	CP not allowed - (eqpt)	A DS1 or DS1PM circuit pack is installed in a LOW SPEED slot associated with FUNCTION UNITS slot provisioned for DS3 , STS1E_L low speed, or OLI circuit pack service.	Remove DS1 circuit pack or change FUNCTION UNITS slot to MXRVO or STS1E-H high speed circuit pack.
	CP not allowed - (timing)	When associated with TIMING slot, current circuit pack switch settings do not support the sync. timing provisioned.	Change TGS circuit pack switches [DLP-513] or change sync. parameters ("set - sync").
		When associated with FUNCTION UNITS slot C , circuit pack type does not support the current provisioned sync. parameters.	Change circuit pack type or change timing options.

See notes/footnotes at the end of this table.

Table A. Minor Alarm Conditions (Continued)

Alarm Level or LED Indication	Trouble Description (Note)	Likely causes	Step or Procedure
MN LED lighted. FAULT LED lighted on circuit pack	DS1 CP failed DS1PM CP fail DS3 CP fail TMUX CP fail STS1E_L CP fail STS1E_H CP fail TGS CP fail MXRVO CP fail OLIU CP fail	Internal failure of circuit pack with lighted LED.	Step 17
	DS1 CP removed DS1PM CP removed DS3 CP removed TMUX CP removed STS1E_L CP removed STS1E_H CP removed TGS CP removed MXRVO CP removed OLIU CP removed	Circuit packs removed without doing "upd" command to remove circuit packs from equipment list.	Step 29
	environmentn*	The specified environmental alarm point (misc. discrete input) is active at RT. Note: The actual message that appears in the "Active Alarms and Status Report" for this condition can be provisioned; this is the default message. See the "rtrv-attr-env" and "set-attr-env" commands.	Use "rtrv-attr-env" command at RT to determine trouble.
	ExternalMinor*	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 "Active Alarms and Status Report" for this condition can be provisioned; this is the default message. See "rtrv-attr-env" and "set-attr-env" commands.	Use "rtrv-attr-env" command at RT to determine trouble.

See notes/footnotes at the end of this table.

Table A. Minor Alarm Conditions (Continued)

Alarm Level or LED Indication	Trouble Description (Note)	Likely causes	Step or Procedure
MN LED lighted. FAULT LED lighted on SYSCTL circuit pack	fan control relay failed	Telemetry output common is not grounded. SYSCTL circuit pack failed.	Step 18
MN LED lighted. LEDs lighted on fan shelf	fan shelf failed	Fan filter needs replacing. Fan pack failed. Fan shelf control board failed. Fan power feeder failed. The fan must be repaired within 4 hours, otherwise service interruption may occur.	TAP-118
MN LED lighted. FAULT LED lighted on circuit pack.	illegal CP type	An illegal or unknown circuit pack type has been inserted into the shelf.	Remove circuit pack and install correct circuit pack.
MN LED lighted. FAULT LED flashing on DS1 circuit pack	inc. (from DSX) DS1 LOS† inc. (from DSX) DS1 sig fail†	Equipment failed or removed at DSX-1	Step 23
MN LED lighted. FAULT LED flashing on TGS circuit pack	inc. DS1 sync. ref. LOS inc. DS1 sync. ref. LOF inc. DS1 sync. ref. BER inc. DS1 sync. ref. AIS inc. DS1 sync. ref. 00L inc. DS1 sync. ref. E00F	Failure of incoming sync. ref. signal. TGS circuit pack provisioned for wrong frame format (SF or ESF).	Step 27
MN LED lighted. FAULT LED flashing on DS3/TMUX circuit pack	inc. (from DSX) DS3 AIS* inc. (from DSX) DS3 LOS* inc. (from DSX) DS3 00F*	Equipment failed or removed at DSX-3	Step 25
MN LED lighted. FAULT LED flashing on OLI circuit pack	inc. OC1 loss of signal (LOS) inc. OC1 LOF inc. OC1 sig degrade (BER) inc. OC1 sig failed (BER)	Failure of OLI circuit pack at near or far end, or failure of receive fiber.	TAP-119 (ring, 0X1)

See notes/footnotes at the end of this table.

Table A. Minor Alarm Conditions (Continued)

Alarm Level or LED Indication	Trouble Description (Note)	Likely causes	Step or Procedure
MN LED lighted. FAULT LED flashing on OLI U circuit pack	inc. STS1 LOP OC1 <i>slotaid</i>	If failure on both OC-1 lines: unprotected removal or failure of MXRVO or DS3 circuit pack at far end.	Step 48
		If failure on only one OC-1 line: Failure of OLI U circuit pack at near or far end.	TAP-119 (ring, 0X1)
	inc. OC3 LOS inc. OC3 LOF inc. OC3 sig degrade (BER) inc. OC3 sig failed (BER)	Failure of OLI U circuit pack at near or far end, or failure of receive fiber.	TAP-111 (linear, 1+1) TAP-119 (ring, 0X1)
	inc. STS1 LOP OC3 <i>slotaid</i>	If failure on both OC-3 lines: unprotected removal or failure of MXRVO or DS3 circuit pack at far end.	Step 48
		If failure on only one OC-3 line: Failure of OLI U circuit pack at near or far end.	TAP-111 (linear, 1+1) TAP-119 (ring, 0X1)
	inc. OC12 LOS inc. OC12 LOF inc. OC12 sig degrade (BER) inc. OC12 sig failed (BER)	Failure of OLI U circuit pack at near or far end, or failure of receive fiber.	TAP-119 (ring, 0X1)
MN LED lighted.	inc. STS1 LOP OC12 <i>slotaid</i>	If failure on both OC-12 lines: unprotected removal or failure of MXRVO or DS3 circuit pack at far end.	Step 48
		If failure on only one OC-12 line: Failure of OLI U circuit pack at near or far end.	TAP-119 (ring, 0X1)
inc. OC3 line AIS [*] inc. OC12 line AIS [*]		Failure of OLI U circuit pack at far end.	Step 63
MN LED lighted. FAULT LED flashing on STS1E circuit pack	inc. EC1 sig failed (BER) [*] inc. EC1 LOF [*] inc. STS1 LOP EC1 inc. EC1 LOS [*] inc. EC1 sig degrade (BER) [*] inc. EC1 line AIS [*]	Failure of STS1E circuit pack at near or far end, or failure of receive fiber.	Step 25

See notes/footnotes at the end of this table.

Table A. Minor Alarm Conditions (Continued)

Alarm Level or LED Indication	Trouble Description (Note)	Likely causes	Step or Procedure
MN LED lighted.	inc. STS1 AIS [*]	Incomplete or incorrect cross-connect provisioning in an end-to-end network; unprotected removal or failure of DS3 , MXRVO , STS1E , or OLI circuit pack at far end; or unprotected optical line failure.	TAP-120
	inc. STS1 sig degrade (BER) inc. STS1 sig failed (BER)	Failure of OLI circuit pack at near end or far end or failure of receive fiber.	TAP-111 (linear, 1+1) TAP-119 (ring, 0X1)
	inc. STS1 unequipped	An STS-1 cross-connect has been deleted in upstream equipment interfacing with the DDM-2000 OC-3 ring.	Find the deleted cross-connect in the upstream equipment.
	inc. VT AIS [*]	Incomplete or incorrect cross-connect provisioning in end-to-end network; unprotected removal or failure of DS1 circuit pack at far end. In ring applications: upstream OLI circuit pack or fiber failure affecting only one ring direction. A VT yellow alarm message is not returned for a non-service affecting VT AIS.	TAP-120
	inc. VT LOP	Unprotected failure of DS1 or MXRVO circuit pack at near end or far end.	Replace circuit pack associated with alarm.
	inc. VT sig degrade (BER)	An OLI circuit pack failure or a fiber failure at some point on the failed ring.	TAP-119
	inc. VT unequipped	An VT1.5 cross-connect has been deleted in upstream equipment interfacing with the DDM-2000 OC-3 ring.	Find the deleted cross-connect in the upstream equipment.
	invalid CP switches	When associated with TIMING slot, timing mode switch settings on TGS circuit packs are invalid.	Step 44
	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.

See notes/footnotes at the end of this table.

Table A. Minor Alarm Conditions (Continued)

Alarm Level or LED Indication	Trouble Description (Note)	Likely causes	Step or Procedure
MJ LED lighted. Flashing FAULT LED on OHCTL circuit pack	section DCC channel failed	SYSCTL circuit pack failure, reset, or initialization at far end. SYSCTL circuit pack removed from a site. Program installation in progress or failed at far end. SYSCTL or OHCTL circuit pack failed at near end or removed at far end. OLI circuit pack or fiber failure between this node and node connected to the source address (no communication with other end).	Step 52
MN LED lighted. FAULT LED lighted on affected circuit pack.	OHCTL standby boot fail SYSCTL standby boot fail	SYSCTL or OHCTL circuit pack failed during local or remote software download.	Replace SYSCTL or OHCTL circuit pack and try software download again or download a compatible version of software.
	unexpected CP switches unexpected CP type	Switch settings invalid, different from other circuit pack, or different than they were before circuit pack was removed or replaced. Circuit pack inserted into slot provisioned for different circuit pack.	Step 41

Note: Similar descriptions of trouble may also appear in the CIT "Active Alarms and Status Report".

* May be provisioned for Critical, Major, Minor or no alarm.

† May be provisioned for Major, Minor or no alarm.

16. Is a **FAULT** LED lighted or flashing on an **OLI** circuit pack?

If **YES**, then do **TAP-111** if linear configuration.

Do **TAP-119** if ring configuration.

If **NO**, then continue with **Step 17**.

17. Is the **FAULT** LED lighted (not flashing) on the faceplate of one and only one circuit pack of the **DDM-2000**?

If **YES**, then continue with **Step 18**.

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

18.  **CAUTION:**
Replacement circuit packs may have option switches which must be properly set before the circuit pack is installed.

Check circuit pack option switch settings for improper or invalid settings. If no trouble is found, refer to **DLP-523** and replace the circuit pack with the lighted **FAULT** LED.

19. Is the **MN** LED off on the User Panel?
If **YES**, then **STOP. YOU HAVE COMPLETED THIS PROCEDURE.**
If **NO**, then continue with **Step 20.**
20. Is the **FAULT** LED lighted on the faceplate of the replacement circuit pack just installed?
If **YES**, then do **TAP-106.**
If **NO**, then return to **Step 1.**
21. Is the **FAULT** LED on the faceplate of one or more circuit packs flashing?
If **YES**, then continue with **Step 22.**
If **NO**, then proceed to **Step 29.**
22. Find the circuit pack(s) with the flashing LED(s) in Table B below and go to the indicated step.

Table B. Flashing LEDs

Circuit Pack With Flashing LED	Go To
DS1/DS1PM	Step 23
DS3/STS1E	Step 25
TGS	Step 27

23. There is an incoming DS1 signal failure. Switch service to protection. If LED is flashing on protection **DS1/DS1PM**, issue trouble report of bad incoming signal at input to **DS1/DS1PM** circuit pack with flashing LED(s). If LED is not flashing on protection **DS1/DS1PM**, replace service **DS1/DS1PM** circuit pack [**DLP-523**].
24. **STOP. YOU HAVE COMPLETED THIS PROCEDURE.**

25. Switch service to protection. If LED is flashing on protection **DS3/TMUX/STS1E**, issue trouble report of bad incoming DS3/EC-1 signal from DSX-3/STSX cross-connect point. If LED is not flashing on protection **DS3/TMUX/STS1E**, replace service **DS3/TMUX/STS1E** circuit pack [DLP-523].
26. **STOP. YOU HAVE COMPLETED THIS PROCEDURE.**
27. Check **TGS** option switches for proper line coding and frame format settings ("**rtrv-sync**"). If no trouble found, check incoming timing reference signals. If timing reference signals are bad, issue trouble report of bad incoming timing reference signal(s). If no trouble found with timing references, replace **TGS** circuit packs.

Reference: **DLP-523**

28. **STOP. YOU HAVE COMPLETED THIS PROCEDURE.**
29. Have two of the same type (service and protection **TGS**, **MXRVO**, **STS1E**, or **DS3**) circuit packs been removed from the system?
If **YES**, then continue with **Step 30**.
If **NO**, then proceed to **Step 32**.
30. Determine the reason the circuit packs were removed. If the same circuit pack is to be reinserted and no switch settings are changed, reinstall the circuit pack. If the circuit pack was removed and switch settings changed, reinstall the circuit pack and momentarily depress the **UPD/INIT** button on the **SYSCTL**. If the circuit pack is not to be reinserted, momentarily depress the **UPD/INIT** button on the **SYSCTL** to remove the circuit pack from the inventory.
31. **STOP. YOU HAVE COMPLETED THIS PROCEDURE.**
32. Is ED-8C733-30, G7 Fan Shelf installed?
If **YES**, then continue with **Step 33**.
If **NO**, then proceed to **Step 35**.
33. Is **POWER ON** LED lighted on fan shelf?
If **YES**, then continue with **Step 34**.
If **NO**, then go to **TAP-118**.
34. Is **FILTER REPLACE** or any **FAULT** LED lighted on fan shelf?
If **NO**, then continue with **Step 35**.
If **YES**, then go to **TAP-118**.

35.  **CAUTION:**
*If fuse on User Panel is not blown, trouble may be a failure of **one** of the –48V DC power feeders. Removing the wrong fuse or disconnecting the wrong feeder for power measurement will cause service interruption. Blown fuses are detected by noting that the fuse indicator pin is extended through the fuse holder.*

 **NOTE:**
If fuse is not blown on the User Panel, check office battery distribution fuse board for blown fuses or tripped breakers. Replace fuse or reset breaker if necessary.

Is –48V fuse blown on User Panel?

If **YES**, then continue with **Step 36**.
If **NO**, then do **TAP-113**.

36.  **NOTE:**
The fuses on the G1 shelf User Panel are 5 amp indicator type fuses, COMCODE 405697442. With older indicator type fuses, insure the indicator end of the fuse is placed into the fuse cap so the indicator can protrude through the hole in the fuse cap, if the fuse blows. The fuses on the G3 and G4 shelf User Panel are 5 amp fuses, COMCODE 406203976. The extraction tool COMCODE for these fuses is 406420273.

Replace blown –48V fuse on User Panel?

37. Did fuse blow again?
If **YES**, then proceed to **Step 39**.
If **NO**, then continue with **Step 38**.
38. Is MINOR alarm cleared?
If **YES**, then **STOP. YOU HAVE COMPLETED THIS PROCEDURE**.
If **NO**, then proceed to **Step 41**.

39.  **CAUTION:**
Removal of an unprotected circuit pack may cause service interruption.

 **NOTE:**
The –48V power feeders/fuses on the User Panel supply power to DC-to-DC converters on the **TGS**, **OLIU**, **MXRVO**, **DS3**, and **SYCTL** circuit packs. It is unlikely that a circuit pack 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 circuit pack shelf connector. After a thorough inspection of the backplane, if no trouble is found, the circuit packs can be removed one at a time to try and isolate the trouble.

Remove **one** of each pair of circuit packs listed in the above note and replace blown –48V fuse. If fuse does not blow again, reinstall all removed circuit packs one at a time, beginning with the **SYCTL**. Replace any circuit pack that causes the fuse to blow (**DLP-523**). If fuse blows again with one of each pair of circuit packs removed, reinstall removed circuit packs and repeat the procedure for the remaining circuit packs (except DS1s). If fuse blows after all circuit packs have been removed, trouble is in the backplane.

40. **STOP. YOU HAVE COMPLETED THIS PROCEDURE.**

41.  **NOTE:**
Alarm may be caused by circuit packs inserted into the wrong slots or by invalid or wrong switch settings on the **TGS** circuit packs.

Are circuit packs installed in the correct slots ("**rtrv-eqpt**")?

If **YES**, then proceed to **Step 44**.

If **NO**, then continue with **Step 42**.

42. Remove circuit packs from wrong slots, check option switches (**DLP-513**) and reinstall circuit packs into the correct slots.
43. **STOP. YOU HAVE COMPLETED THIS PROCEDURE.**
44.  **CAUTION:**
*When removing circuit packs ensure that protection switching is available. Also, remove the circuit pack without the lighted **ACTIVE LED** first.*

Check switch settings ("**rtrv-sync**" command) on the **TGS** circuit packs for correct settings. If the circuit pack has been replaced, check if settings are the same as they were before the circuit pack was replaced. Also check if the switches are set the same as the companion circuit pack.

Reference: **DLP-513**

45. Are switch settings correct?
If **YES**, then do **TAP-103**.
If **NO**, then continue with **Step 46**.
46. Change switch settings to the correct settings. (Use "**switch-sync**" command to switch to other circuit pack before removing pack.) If switch settings are to be changed from what they were previously, update the equipment list by momentarily depressing the **UPD/INIT** button on the **SYSCTL** after the circuit pack is reinstalled.
47. **STOP. YOU HAVE COMPLETED THIS PROCEDURE.**
48. Indications are that there is an unprotected failure or removal of a **MXRVO** or **DS3** circuit pack at the far-end associated with the identified **OLI** slot at the near-end. Determine location of the circuit pack(s) from office records or use the "**rtrv-crs-()**" commands to trace back through the STS1/VT1.5 cross-connections associated with the identified **OLI** slot.

49. If circuit packs are removed, determine the reason the circuit packs were removed. If the same circuit pack is to be reinserted and no switch settings are changed, reinstall the circuit pack. If the circuit pack was removed and switch settings changed, reinstall the circuit pack and momentarily depress the **UPD/INIT** button on the **SYSCTL** or use the "**upd**" command. If the circuit pack is not to be reinserted, momentarily depress the **UPD/INIT** button on the **SYSCTL** or use the "**upd**" command to remove the circuit pack from the inventory.
50. If the **MXRVO** or **DS3** circuit packs have not been removed, replace the **MXRVO** or **DS3** circuit pack associated with the identified **OLI**U slot in the alarm message.

Reference: **DLP-523**

51. **STOP. YOU HAVE COMPLETED THIS PROCEDURE.**
52. In alarm report, is there any indication of **OLI**U or fiber trouble at near end or far end such as "inc. 0C3 FERF" or "inc. 0C12 FERF" alarm message?
If **YES**, then continue with **Step 53**.
If **NO**, then proceed to **Step 55**.
53. **⇒ NOTE:**
If there is a DCC failure, a remote login to the shelf connected through the Source Address cannot be done. The "**rtrv-alm**" and "**rtrv-map-neighbor**" commands can be used to check for DCC failure for main (and **FUNCTION UNITS A, B, or C**). Also, use "**rtrv-fecom**" command to see if "fecom" has been disabled.

Note Source Address of DCC channel failure. Check optical fibers connected through the Source Address per local procedures. If no trouble found, replace near-end **OLI**U first then far-end **OLI**U.

Reference: **DLP-523**

54. **STOP. YOU HAVE COMPLETED THIS PROCEDURE.**

55. Use CIT and "**reset**" command to reset **SYSCTL** at the near end or unplug and reseal the **SYSCTL**.
56. Is the **FAULT** LED on the **OHCTL** circuit pack still flashing ("section DCC channel failed")?
If **YES**, then continue with **Step 57**.
If **NO**, then **STOP. YOU HAVE COMPLETED THIS PROCEDURE.**
57. If possible, use CIT and "**rlgn**" command to log in to the far-end terminal (**DLP-522**) and use the **reset** command to reset **SYSCTL** at the far end.
58. Is the **FAULT** LED on the **OHCTL** circuit pack still flashing ("section DCC channel failed")?
If **YES**, then continue with **Step 59**.
If **NO**, then **STOP. YOU HAVE COMPLETED THIS PROCEDURE.**
59.  **NOTE:**
You may prefer to go to the far end first and check if the **OHCTL** is failed or removed before replacing the **SYSCTL** at the near end.

Refer to **DLP-501** and replace **SYSCTL** at near-end terminal.

60. Is the **FAULT** LED on the **OHCTL** circuit pack still flashing?
If **YES**, then continue with **Step 61**.
If **NO**, then **STOP. YOU HAVE COMPLETED THIS PROCEDURE.**
61. At far-end terminal, reset **SYSCTL** by unseating and reseating **SYSCTL** or by using a CIT and the "**reset**" command, if not already performed. If **FAULT** LED is still flashing after a reset, refer to **DLP-501** and replace **SYSCTL** at far-end terminal. If the **FAULT** LED is still flashing after the **SYSCTL** is replaced, replace the **OHCTL** [**DLP-523**] first at one end and then the other, if trouble still exists.
62. **STOP. YOU HAVE COMPLETED THIS PROCEDURE.**
63. Replace **OLIUs** at far end that are associated with the Source Address of the "inc. 0C3 line AIS", "inc. 0C12 line AIS", or "inc. 0C1 line AIS" alarm message.

Reference: **DLP-523**

64. **STOP. YOU HAVE COMPLETED THIS PROCEDURE.**

Clear Obscure Minor (MN) Alarm

1. Perform an LED test by depressing the **ACO** button or using the **test - led** command from a CIT.

Reference: **DLP-509**

2. Did any circuit pack fail the LED test?
If **YES**, then do **TAP-115**.
If **NO**, then continue with **Step 3**.
3. Is this site a remote terminal location with separate J1C182BA Power Shelf and/or fan unit?
If **YES**, then continue with **Step 4**.
If **NO**, then proceed to **Step 5**.
4. Look for blown fuses and/or lighted LEDs on the battery shelf, battery charger, or fan assembly. Is there any indication of trouble?
If **YES**, then do **TAP-114**.
If **NO**, then continue with **Step 5**.
5. Is a CIT available?
If **YES**, then proceed to **Step 11**.
If **NO**, then continue with **Step 6**.
6.  **NOTE:**
Unseating and reseating the **SYSC TL** performs a *reset* procedure which restarts the software program.

Unseat and reseat **SYSC TL** circuit pack. Do not depress **UPD/INIT** button.

7. Is the **MN** alarm LED still lighted, after about 1 minute?

If **YES**, then continue with **Step 8**.

If **NO**, then **STOP. YOU HAVE COMPLETED THIS PROCEDURE.**

8.



CAUTION:

*Replacing the **SYSCTL** involves updating the internal memory on the circuit pack.*

Replace the **SYSCTL (DLP-501)**.

9. Is **MN** alarm LED still lighted?

If **YES**, then continue with **Step 10**.

If **NO**, then **STOP. YOU HAVE COMPLETED THIS PROCEDURE.**

10.



NOTE:

Without a CIT it is difficult to determine the cause of the minor alarm. Table A lists some remaining possible causes of a minor alarm.

Obtain a CIT and establish session with the DDM-2000 system.

Reference: **DLP-521**

11. Use CIT and **rtrv-alm** command to get an "Active Alarms and Status Report". See the REPORT DESCRIPTIONS section of this manual under **RTRV-ALM** for a description of each message retrieved with the **rtrv-alm** command.
12. Refer to Table A. Are any of the conditions listed in the Description column reported in the "Active Alarms and Status Report"?
- If **YES**, then continue with **Step 13**.
- If **NO**, then proceed to **Step 26**.

13. Refer to Table A. Note the suspected trouble and go to the indicated step or procedure.

Table A. Obscure Minor Alarm Conditions

Description	Meaning	Step
APS - automatic lock	Service associated with a DS1 circuit pack has been automatically switched and locked onto the protection DS1 circuit pack. The APS lock will remain active until midnight.	Step 14
APS channel failed	The APS channel on the protection OC-3 line has failed.	Step 17
ExternalMinor	DC power or fan failure at a remote terminal far end.	TAP-114
environmentn	A miscellaneous discrete input is active. This message may be changed using the set-attr-env command. The description may be an alphanumeric string up to 26 characters long (for example, Fire, Open door, etc.).	Step 19
protected CP removed	A circuit pack previously installed in the system is removed. The pack should be replaced or an update (upd) should be done to remove it from the equipment list.	Step 21
unexpected CP type unexpected CP switches	A circuit pack is installed in a slot provisioned for a different circuit pack, or switch settings have been changed from what they were before the circuit pack was removed.	Step 23

14.  **NOTE:**
There is an automatic lock. An automatic lock occurs when an *automatic* protection switch is made and then broken four times within a 10-minute interval.

From the "Active Alarms and Status Report", determine the source address of the **DS1** circuit pack locked onto the protection **DS1**.

15.  **CAUTION:**
*When a **DS1** is switched to protection, removal of any other **DS1** circuit pack or **177A** Retainer Card in the same **LOW SPEED GROUP** will result in a loss of service to the protected **DS1** and the removed **DS1** circuit pack.*

Replace **DS1** service circuit pack locked onto protection.

Reference: **DLP-523**

16. **STOP. YOU HAVE COMPLETED THIS PROCEDURE.**

17.  **NOTE:**
Indications are that the **OLIU** circuit pack on the protection line (slot **2(P)**) has failed at the near end or far end, or the receive fiber on the protection line at the near end has failed.

Go to **TAP-111** and isolate trouble on the **OLIUs**.

18. **STOP. YOU HAVE COMPLETED THIS PROCEDURE.**
19. Use local procedures to clear condition(s) that caused environmental alarm.
20. **STOP. YOU HAVE COMPLETED THIS PROCEDURE.**
21. Locate source address of removed circuit pack from the "Active Alarms and Status Report", then determine the reason the **DS1** circuit pack was removed. If the same circuit pack is to be reinserted and no switch settings are changed, reinstall the circuit pack. If the circuit pack was removed and switch settings changed, reinstall the circuit pack and momentarily depress the **UPD/INIT** button on the **SYSCTL**. If the circuit pack is not to be reinserted, momentarily depress the **UPD/INIT** button on the **SYSCTL** to remove the circuit pack from the inventory.
22. **STOP. YOU HAVE COMPLETED THIS PROCEDURE.**

23.  **NOTE:**
Indications are that a circuit pack has been installed in a wrong slot;
switch settings are invalid or different from a companion circuit pack;
or switches are set differently from what they were before a circuit
pack was replaced.

Determine the source address from the "Active Alarms and Status Report". Refer to the "Commands and Reports" section of this manual under **RTRV-ALM** for a more detailed description of the meaning of the report.

24. If a circuit pack(s) is installed in the wrong slot, remove the circuit pack. Determine correct position of the circuit pack and install circuit pack into the correct slot.

Check circuit pack switch settings for valid settings or wrong settings (**DLP-513**). If switch settings are to be changed from what they were previously, update the equipment list by momentarily depressing the **UPD/INIT** button on the **SYSCTL** after the circuit pack is reinstalled.

25. **STOP. YOU HAVE COMPLETED THIS PROCEDURE.**
26. Has the **SYSCTL** been replaced?
If **YES**, then proceed to **Step 31**.
If **NO**, then continue with **Step 27**.
27. Use the CIT and **reset** command to reset **SYSCTL**.
28. Is the **MN** alarm LED still lighted after about 1 minute?
If **YES**, then continue with **Step 29**.
If **NO**, then **STOP. YOU HAVE COMPLETED THIS PROCEDURE.**

29. **⇒ NOTE:**
Replacing the **SYSCTL** involves updating the internal memory on the circuit pack.

Replace the **SYSCTL (DLP-501)**.

30. Is **MN** alarm LED still lighted?
If **YES**, then continue with **Step 31**.
If **NO**, then **STOP. YOU HAVE COMPLETED THIS PROCEDURE.**

31. **⇒ NOTE:**
The problem appears to be in the backplane wiring of the DDM-2000. One way to verify this is to swap the **SYSCTL** and any circuit pack with an inconsistent diagnostic indication with the corresponding circuit packs in another DDM-2000. If the problem moves with the circuit packs, it means that one or more of the circuit packs is defective. If the problem stays with the original DDM-2000 the entire assembly, but not the circuit packs, should be replaced. The DDM-2000 has a printed backplane and cannot be repaired in the field.

Check for broken or bent pins, shorted pins, etc. If you need technical assistance, notify your supervisor, your local technical support organization, or call Lucent Technologies RTAC, per local operating instructions.

32. **STOP. YOU HAVE COMPLETED THIS PROCEDURE.**

Clear External Minor Alarm at RT

1. Are there any blown fuses on battery shelf or **BFU** (for bulk powering)?
If **YES**, then continue with **Step 2**.
If **NO**, then proceed to **Step 4**.
2. Replace blown fuse(s).
3. Does alarm clear?
If **YES**, then **STOP. YOU HAVE COMPLETED THIS PROCEDURE.**
If **NO**, then continue with **Step 4**.
4. Is bulk power (J1C182BB bulk power shelf) being used?
If **YES**, then proceed to **Step 25**.
If **NO**, then continue with **Step 5**.
5. Is **OPEN BATT** LED on **337A BATTERY CHARGER** lighted at RT battery shelf?
If **YES**, then continue with **Step 6**.
If **NO**, then proceed to **Step 25**.
6. Condition DMM (digital multimeter) to measure voltage.
7. Measure voltage at **–48B** and **GND** and **–48L** and **GND** jacks on the **LDU** faceplate.
8. Does voltage measure between **–42** and **–58** volts?
If **YES**, then continue with **Step 9**.
If **NO**, then proceed to **Step 18**.
9. Use SD-7C119 to check wiring between **337A BATTERY CHARGER** and batteries.
10. Was a problem found in wiring?
If **YES**, then continue with **Step 11**.
If **NO**, then proceed to **Step 12**.
11. Correct wiring problem and proceed to **Step 17**.

12. Is fuse blown on **337A BATTERY CHARGER**?
If **YES**, then proceed to **Step 16**.
If **NO**, then continue with **Step 13**.
13. Is **BAT DISCHG** LED on **337A BATTERY CHARGER** lighted?
If **YES**, then continue with **Step 14**.
If **NO**, then proceed to **Step 16**.
14. Depress and hold **HIGH RATE CHG ACTIVATE** pushbutton on **337A BATTERY CHARGER**. Is **BAT DISCHG** LED lighted?
If **YES**, then continue with **Step 15**.
If **NO**, then proceed to **Step 16**.
15.  **NOTE:**
HIGH RATE CHG ON LED will remain lighted until batteries reach approximately -58 volts. If batteries are completely discharged, it may take approximately one day for **HIGH RATE CHG ON** LED to go out.

Release **HIGH RATE CHG ACTIVATE** pushbutton. Does **BAT DISCHG** LED go off and is **HIGH RATE CHG ON** LED lighted?
If **YES**, then proceed to **Step 17**.
If **NO**, then continue with **Step 16**.
16. Replace **337A BATTERY CHARGER** and proceed to **Step 17**.
17. Did alarm clear?
If **YES**, then **STOP. YOU HAVE COMPLETED THIS PROCEDURE**.
If **NO**, then proceed to **Step 23**.
18. Use DMM to measure voltage at battery shelf jacks **J5 (+BAT)** and **J6 (-BAT)**.
19. Does voltage measure between -42 and -58 volts?
If **YES**, then proceed to **Step 37**.
If **NO**, then continue with **Step 20**.
20. Is **197A BATTERY LOAD TEST SET** available for use in testing batteries?
If **YES**, then continue with **Step 21**.
If **NO**, then proceed to **Step 23**.

21. Test batteries using **197A** test set.

Reference: **DLP-536**

22. Replace any failed battery pack(s) and reconnect battery leads to battery shelf and proceed to **Step 24**.
23. Replace battery packs one at a time until –48 volts is present at output jacks on battery shelf.
24. Does alarm clear?
If **YES**, then **STOP. YOU HAVE COMPLETED THIS PROCEDURE.**
If **NO**, then continue with **Step 25**.
25. Is **FAN ALARM** LED lighted on a fan assembly?
If **YES**, then continue with **Step 26**.
If **NO**, then proceed to **Step 37**.
26. Remove **FAN H** and **FAN L** fuses on corresponding **BFU** on power shelf.
Are fuses blown?
If **YES**, then continue with **Step 27**.
If **NO**, then proceed to **Step 30**.
27. Replace **FAN H** and **FAN L** fuses on corresponding **BFU**.
28. Does alarm clear?
If **YES**, then **STOP. YOU HAVE COMPLETED THIS PROCEDURE.**
If **NO**, then continue with **Step 29**.
29. Is **FAN ALARM** LED lighted on fan assembly?
If **YES**, then continue with **Step 30**.
If **NO**, then proceed to **Step 37**.
30.  **WARNING:**
To avoid possible damage, do not overextend fan assembly power cable.

Remove fan assembly from bay.

31. Examine fan assembly for anything that will prevent fan from operating properly.
32. Remove any blockages and reinstall fan assembly and fuses.
33. Is fan assembly **FAN ALARM** LED off?
If **YES**, then **STOP. YOU HAVE COMPLETED THIS PROCEDURE.**
If **NO**, then continue with **Step 34.**
34. Remove **FAN H** and **FAN L** fuses on corresponding **BFU**.
35. Replace fan assembly with new fan assembly and install fuses.
36. Is fan assembly **FAN ALARM** LED off?
If **YES**, then **STOP. YOU HAVE COMPLETED THIS PROCEDURE.**
If **NO**, then continue with **Step 37.**
37. Replace one of the **336 RECTIFIERS**.
38. Does alarm clear?
If **YES**, then **STOP. YOU HAVE COMPLETED THIS PROCEDURE.**
If **NO**, then continue with **Step 39.**
39. Reinstall original **336A RECTIFIER**.
40. Replace second **336A RECTIFIER**.
41. Does alarm clear?
If **YES**, then **STOP. YOU HAVE COMPLETED THIS PROCEDURE.**
If **NO**, then continue with **Step 42.**
42. Reinstall original **336A RECTIFIER**.
43. If you need technical assistance, notify your supervisor, your local technical support organization, or call Lucent Technologies RTAC, per local operating instructions.
44. **STOP. YOU HAVE COMPLETED THIS PROCEDURE.**

Clear LED Test Trouble

1. Did all of the LEDs in the **DDM-2000** fail to light?
If **YES**, then proceed to **Step 4**.
If **NO**, then continue with **Step 2**.
2.  **CAUTION:**
Replacement circuit packs may have option switches which must be properly set before the circuit pack is installed.

Refer to **DLP-523** and replace the circuit pack that failed the LED test.
Repeat the LED test.

3. Did the same LED fail the test again?
If **YES**, then continue with **Step 4**.
If **NO**, then **STOP. YOU HAVE COMPLETED THIS PROCEDURE.**
4.  **NOTE:**
Using the CIT and **reset** command or unseating and reseating the **SYCTL** restarts the software program.

Enter **reset** command or unseat and reseal **SYCTL** circuit pack. Do not depress **UPD/INIT** button.

5. Repeat the LED test.
6. Did the same LED(s) fail the test again?
If **YES**, then continue with **Step 7**.
If **NO**, then **STOP. YOU HAVE COMPLETED THIS PROCEDURE.**

7.  **CAUTION:**
*Replacing the **SYSCTL** involves updating the internal memory on the circuit pack.*

Replace the **SYSCTL (DLP-501)** and repeat the LED test.

8. Did the LED test fail again?
If **YES**, then continue with **Step 9**.
If **NO**, then **STOP. YOU HAVE COMPLETED THIS PROCEDURE.**
9.  **NOTE:**
The problem appears to be in the backplane wiring of the DDM-2000. One way to verify this is to swap the **SYSCTL** and any circuit pack with an inconsistent diagnostic indication with the corresponding circuit packs in another DDM-2000. If the problem moves with the circuit packs, it means that one or more of the circuit packs is defective. If the problem stays with the original DDM-2000 the entire assembly, but not the circuit packs, should be replaced. The DDM-2000 has a printed backplane and cannot be repaired in the field.

If you need technical assistance, notify your supervisor, your local technical support organization, or call Lucent Technologies RTAC, per local operating instructions.

10. **STOP. YOU HAVE COMPLETED THIS PROCEDURE.**

Clear Trouble During Program Upgrade

1.  **NOTE:**
Program installation may fail due to failure of communication link between PC and DDM-2000, failure of the floppy disk or hard disk on the PC, failure or loss of power in the PC, or failure of the **SYSCTL** or **OHCTL**. See **ins-prog** and **cpy-prog** command pages in the "Commands and Reports" section of 363-206-280, *DDM-2000 OC-3 Multiplexer, Releases 8.0 through 11.1, User/Service Manual—Volume I*, for other failure indications.

Was the following message received?

SCSN

/* Status, invalid Command Sequence. */

/* Incompatible software. */

If **YES**, then continue with **Step 2**.

If **NO**, then proceed to **Step 4**.

2. Indications are that you are trying to download software that is incompatible with the shelf type (for example, DDM-2000 OC-12 software into a DDM-2000 OC-3 shelf) or Controller type (for example, software prior to Release 8 and later into **BBG8/BBG8B/BBG9** controllers. Find compatible software.

If you need assistance, notify your supervisor, your local technical support organization, or call Lucent Technologies RTAC, per local operating instructions.

3. **STOP. YOU HAVE COMPLETED THIS PROCEDURE.**

4. Was the following message received?
/* Status, execution stopped. */
/* Communication link could not be established.
Please connect PC with program to be installed and
start again. */

If **YES**, then continue with **Step 5**.

If **NO**, then proceed to **Step 6**.

5. Indications are that the **ins-prog** command was not executed from a PC. A program upgrade to the near end DDM-2000 cannot be performed with a CIT. Use PC to repeat software download.
6. Was the following message received?
/* Status, execution stopped. */
/* Communication link cannot be established.
Please connect PC with DDM-2000 upgrade program and
start again. */

If **YES**, then continue with **Step 7**.

If **NO**, then proceed to **Step 8**.

7. Indications are that the PC is not functioning properly, the disk drive is inoperable, the diskette has been removed, or the program has previously been erased from the **SYSCTL**. Check that the PC is operating properly and the diskette has not been removed. Check PC to CIT port connections.

Has program installation procedure been tried more than once?

If **YES**, then continue with **Step 8**.

If **NO**, then proceed to **Step 15**.

8. Was the following or similar message received?
ins-prog:tid DENY

SSTP

/* Status, execution stopped. */

/* Far end not responding.

If **YES**, then continue with **Step 9**.

If **NO**, then proceed to **Step 12**.

9. Are **SYSCTL** and **OHCTL** circuit packs installed at far end?

If **YES**, then proceed to **Step 12**.

If **NO**, then continue with **Step 10**.

10. Determine reason **SYSCTL** or **OHCTL** is not installed. The **SYSCTL** and **OHCTL** must be installed to upgrade program. Reinstall the **SYSCTL** and **OHCTL** and repeat the program installation procedure.
11. **STOP. YOU HAVE COMPLETED THIS PROCEDURE.**

12. Did **SYSCTL** or **OHCTL** 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**, then proceed to **Step 17**.

If **NO**, then continue with **Step 13**.

13. Did **FAULT** LED on **SYSCTL** light and did the **SYSCTL FE ID** display go off?

If **YES**, then proceed to **Step 19**.

If **NO**, then continue with **Step 14**.

14.  **NOTE:**

It is assumed that the program installation failed in one of two ways: before the old program was erased or 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.

Check PC COM() port to CIT connection. Check PC disk drive and floppy diskette.

15. **NOTE:**

The new program installation may have failed because of faulty diskettes.

Disconnect PC and repeat program installation procedure. Use your *backup diskettes* containing new generic program, if available. If new program installation cannot be completed and the old program has been erased, one the following procedures may be used to restore the old program or install a different version program.

- A. If a "P." was displayed in the **FE ID** display during a software download, indications are that a portion of the program has been erased and you will have to reinstall the program. You may be able to use the **ins-prog:tid** or **cpy-prog:tid** command from a far-end shelf to reload software. Go to the far-end shelf and establish session with a CIT. Enter the **ins-prog:tid** or **cpy-prog:tid** command where the *tid* is the *tid* (shelf name) for the failed shelf where you want to install the old program.
- B. If a "P." was displayed in the **FE ID** display during a software download and you cannot load the program from the far-end, you can force the download. To load another version of software, unseat 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 repeat the download procedure.
- C. Replace the **SYSCTL** and **OHCTL** with ones that have compatible software. [DLP-523]
- D. If a "C" was displayed in the **FE ID** display after a software download, indications are that the software 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 a version of software that does not support the system configuration that you have. To load another version of software, unseat 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 repeat the download procedure.

If you need technical assistance, notify your supervisor, your local technical support organization, or call Lucent Technologies RTAC, per local operating instructions.

16. **STOP. YOU HAVE COMPLETED THIS PROCEDURE.**

17. Unseat and reseal **SYSCTL** to perform reset.

18. Is alarm still present?

If **YES**, then continue with **Step 19**.

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

19. Has **SYSCTL** or **OHCTL** been replaced?

If **NO**, then continue with **Step 20**.

If **YES**, then proceed to **Step 23**.

20.



CAUTION:

*Replacing the **SYSCTL** involves updating the internal memory on the circuit pack.*

Replace the **SYSCTL** or **OHCTL**.

Reference: **DLP-523**

21. Repeat program installation procedure.

Reference: **DLP-532**

22. **STOP. YOU HAVE COMPLETED THIS PROCEDURE.**

23. If you need technical assistance, notify your supervisor, your local technical support organization, or call Lucent Technologies RTAC, per local operating instructions.

24. **STOP. YOU HAVE COMPLETED THIS PROCEDURE.**

Clear NE ACTY/FE ACTY Alarm Only

1. Is a CIT available?

If **YES**, then continue with **Step 2**.

If **NO**, then proceed to **Step 8**.

2.  **NOTE:**

For all network configurations except point-to-point, there will be multiple far-end far-end terminals. Troubleshooting multi-shelf DDM-2000 networks is facilitated by use of a Craft Interface Terminal (CIT).

Connect the CIT to the **CIT** connector on the near-end User Panel and log in to the near-end system.

Reference: **DLP-521**

3.  **NOTE 1:**

The **rtrv-alm** command can be used to display a report of active alarm and status conditions. The "Commands and Reports" section of this manual gives a description of the command.

-  **NOTE 2:**

The "Active Alarms and Status Report" is output automatically following CIT log in. The report shown in Figure 1 is an example that shows one entry. There may be many entries in the actual report.

Note the information in the Source Address and Description columns for the top entry/entries above the first single-dashed line in the "Active Alarms and Status Report" (Figure 1) (for example, "ne-acty m2-1-1-1 MM-DD HH:MM:SS nsa inc. VT AIS").

```
/* Active Alarms and Status Report
=====
Alarm      Source   Date   Time      Srv   Description
Level      Address  Detected
=====
ne-acty    m2-1-1-1  MM-DD HH:MM:SS  nsa   inc. VT AIS
-----
*/
```

Figure 1. Example of Active Alarms and Status Report

4.  **NOTE:**
Far-end alarm or status conditions are listed in this report with a Source Address of farend. Local alarm or status conditions have a Source Address of the local slot, line, port, channel, path, cross-connection, or operations interface (DCC, TL1 (X.25), TBOS, etc.) where the event occurred. (See *Addresses* in the "Commands and Reports" section of this manual.) Use the **rtrv-alm** command to get another report, if necessary.

Does the Source Address of any top entry in the alarm report indicate a **local** slot, channel, port or operations interface for the "NE ACTY/FE ACTY" alarm?

If **NO**, then do **TAP-107**.

If **YES**, then continue with **Step 5**.

5. Note the trouble indication in the Description column of the "Active Alarms and Status Report".
6. Find the trouble description in Table A and perform the indicated repair procedure(s).
7. **STOP. YOU HAVE COMPLETED THIS PROCEDURE.**

8.  **NOTE:**
The **FE SEL** button on the **SYSCTL** is used to display local and remote (farend) alarm and status conditions [**DLP-530**].

Use **FE SEL** button to display alarm conditions for local shelf (**L.** displayed in **FE ID** display).

9. Was **NE ACTY** LED lighted on User Panel when local shelf alarm conditions were displayed (**L.** displayed in **FE ID** display)?
If **NO**, then continue with **Step 10**.
If **YES**, then proceed to **Step 12**.

10.  **NOTE:**
The **FE SEL** button on the **SYSCTL** is used to display local and remote alarm and status conditions [**DLP-530**].

Use **FE SEL** button to display alarm conditions for other sites/shelves in the network (observe site address in **FE ID** display).

11. Was **NE ACTY** LED lighted on the User Panel when alarms were displayed for any selected site?
If **NO**, then do **TAP-108**.
If **YES**, then continue with **Step 12**.
12. See the description of activity indications in Table A. Without a CIT it is difficult to diagnose the trouble further. If trouble cannot be isolated using the conditions listed in Table A, obtain a CIT for further analysis.
13. **STOP. YOU HAVE COMPLETED THIS PROCEDURE.**

Table A. Alarm and Status - NE ACTY

Activity	Meaning
holdover mode active	System is in holdover synchronization mode. Likely causes: System was manually switched to holdover mode (with switch-sync command or in a central office system, with TBOS control point 54) and switch has not been reset; or the system automatically switched to holdover mode due to failure of timing references, and either (1) the reference failures have not cleared, or (2) the system is provisioned for nonrevertive synchronization mode switching, or (3) the system is provisioned for External timing and no external timing references are available, or (4) the system is provisioned for loop-timed operation and the optical line or OLIU circuit pack has failed, or a message indicating an upstream clock problem has been received on the sync message bits of the optical line (rtrv-sync command) or (5) the system is provisioned for sync message signaling, but the upstream system from which it loop-times has not been provisioned for sync message signaling. The condition can be cleared by provisioning both systems the same (set-sync and rtrv-sync commands). Condition can be cleared by repairing at least one of timing references (if both are failed) and resetting synchronization mode protection switch with command switch-sync:s=mode,pri=reset. In a central office system, the synchronization mode can also be reset with a TBOS control point.
inc. OC1 line AIS	System detects inc. OC-1 line AIS on active OC-1 line. Likely cause: Failure of OLIU circuit pack at far end [TAP-119].
inc. (from fiber) DS3 AIS	The system has detected DS3 AIS in the demux direction (coming from the fiber) for the specified DS3 signal. Likely causes: The incoming DS3 signal at the far end has failed, DS3 AIS is received from the DSX-3 at the far end, or incomplete or missing STS1 (DS3) cross-connections at a far end terminal. Check incoming DS3 signal at far end and/or look for missing cross-connections [TAP-120].
inc. (from fiber) DS3 OOF	System detects a DS3 out-of-frame condition in demux direction (coming from fiber). Likely causes: An OOF DS3 signal inc. to the DSX-3 at the far end; or failure of DS3 circuit pack at near or far end. If no trouble with DSX-3 signal, replace DS3 circuit pack [DLP-523].
inc. (from DSX) DS3 AIS	The system has detected DS3 AIS in the mux direction (coming from the DSX) for the specified DS3 signal. Likely causes: The incoming DS3 signal at the near end has failed, DS3 AIS is received from the DSX-3 at the near end. Check incoming DS3 signal at near end.

Table A. Alarm and Status - NE ACTY (Continued)

Activity	Meaning
inc. EC1 FERF	The system has detected the EC-1 far end receive failure (FERF) signal in the incoming EC-1 signal. Likely causes: The other end has detected an incoming signal failure on the specified EC-1 line. This may be caused by failure of the STS1E circuit pack at the near end, the STS1E circuit pack at the far end, or the transmit cable on the specified line. Replace STS1E circuit pack at near end and/or far end [DLP-523] or repair EC-1 cable.
inc. OC1 FERF	System detects the OC-1 Far End Receive Failure (FERF) signal in the incoming OC-1 signal. Likely causes: The far end has detected an incoming signal failure on the specified OC-1 line. This may be caused by failure of the OLIUI circuit pack at the near end, the OLIUI circuit pack at the far end, or the transmit fiber on the specified line [TAP-119].
inc. OC3 FERF	System detects 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 OLIUI circuit pack at the near end, the OLIUI circuit pack at the far end, or the transmit fiber on the specified line [TAP-111] or [TAP-119].
inc. OC12 FERF	System detects the OC-12 Far End Receive Failure (FERF) signal in the incoming OC-12 signal. Likely causes: The far end has detected an incoming signal failure on the specified OC-12 line. This may be caused by failure of the OLIUI circuit pack at the near end, the OLIUI circuit pack at the far end, or the transmit fiber on the specified line [TAP-119].
inc. STS1 yellow	System detects an incoming STS-1 yellow signal inserted by the far end path terminating equipment. Likely causes: Incomplete or incorrect cross-connect provisioning in the end-to-end network [TAP-120], or unprotected unidirectional failure of the OLIUI circuit pack or fiber at some point in the end-to-end path.
inc. VT yellow	The far end is detecting VT AIS or VT LOP and inserting VT yellow in its transmit signal. Likely causes: Unprotected unidirectional failure of a circuit pack or fiber at some point in the end-to-end path.

Clear Fan Shelf Alarm

1.  **NOTE:**
POWER ON LED not lighted indicates power failure. **POWER FAULT** LED lighted indicates a single power feeder failure. **CONTROL FAULT** LED lighted indicates fan shelf assembly failure. **FILTER REPLACE** LED lighted indicates fan filter needs replacing. **FAN FAULT 1, 2, 3, or 4** LED lighted indicates single fan failure. Execute **ALARM RESET** after failure is cleared.

Is **POWER ON** LED lighted on fan shelf?

If **NO**, then continue with **Step 2**.

If **YES**, then proceed to **Step 9**.

2. Are **POWER RESET A** and **B** circuit breakers tripped (pins extended)?

If **YES**, then continue with **Step 3**.

If **NO**, then proceed to **Step 7**.

3. Reset circuit breakers (depress pins).

4. Did circuit breakers trip again?

If **YES**, then continue with **Step 5**.

If **NO**, then proceed to **Step 35**.

5.  **CAUTION:**
Exercise care in removing the fiber tray or fiber support bracket to prevent damage to the optical fibers.

 NOTE:

To remove the front cover of a fan shelf located between two OC-3 shelves it may be necessary to remove either the fiber tray from the top OC-3 shelf, if it is a G1 shelf, or the fiber support bracket, if the shelf is a G3 or G4 shelf.

Trouble in fan shelf. Remove front cover, disconnect cables to all 4 fan packs, and reset circuit breakers. If circuit breakers trip again, replace the fan shelf. If circuit breakers do not trip, reconnect fan units one at a time and replace the fan unit that causes the breaker to trip. The fan shelf must be repaired within 4 hours of minor alarm indication. Service interruption and/or circuit pack failure may occur if fan shelf is not replaced.

6. **STOP. YOU HAVE COMPLETED THIS PROCEDURE.**
7. Trouble in power feeder(s). Check office battery distribution fuse panel for blown fuses. Check power feeders to fan shelf. Power must be restored within 4 hours of minor alarm indication. Service interruption and/or circuit pack failure may occur if power is not restored and fan made operational.
8. **STOP. YOU HAVE COMPLETED THIS PROCEDURE.**
9. Is **POWER FAULT** LED lighted on fan shelf?
 If **YES**, then continue with **Step 10**.
 If **NO**, then proceed to **Step 17**.
10. Is circuit breaker tripped?
 If **NO**, then continue with **Step 11**.
 If **YES**, then proceed to **Step 13**.
11. Trouble in one of the power feeders. Check office battery distribution fuse panel for blown fuses. Check power feeders to fan shelf.
12. **STOP. YOU HAVE COMPLETED THIS PROCEDURE.**
13. Reset circuit breaker (depress pin).
14. Did circuit breaker trip again?
 If **YES**, then continue with **Step 15**.
 If **NO**, then proceed to **Step 35**.

15.  **CAUTION:**
Exercise care in removing the fiber tray or fiber support bracket to prevent damage to the optical fibers.

 **NOTE:**
To remove the fan shelf located between two OC-3 shelves it may be necessary to remove either the fiber tray from the top OC-3 shelf, if it is a G1 shelf, or the fiber support bracket, if the shelf is a G3 or G4 shelf.

Trouble in fan shelf. Replace fan shelf.

16. **STOP. YOU HAVE COMPLETED THIS PROCEDURE.**

17. Is **CONTROL FAULT** LED lighted on fan shelf?

If **YES**, then continue with **Step 18**.

If **NO**, then proceed to **Step 20**.

18.  **CAUTION:**
Exercise care in removing the fiber tray or fiber support bracket to prevent damage to the optical fibers.

 **NOTE:**
To remove a fan shelf located between two OC-3 shelves it may be necessary to remove either the fiber tray from the top OC-3 shelf, if it is a G1 shelf, or the fiber support bracket, if the shelf is a G3 or G4 shelf.

Trouble in fan shelf. Replace fan shelf within 4 hours of minor alarm indication. Service interruption and/or circuit pack failure may occur if fan shelf is not replaced.

19. **STOP. YOU HAVE COMPLETED THIS PROCEDURE.**

20. Is **FILTER REPLACE** LED lighted on fan shelf?

If **YES**, then continue with **Step 21**.

If **NO**, then proceed to **Step 33**.

21.  **NOTE:**

The fan filter is located on the bottom of the DDM-2000 OC-3 shelf that is installed immediately below the fan shelf. It is held in place by magnetic strips. To remove the filter, simply pull it out. To install a filter, insert the filter, with magnetic strips facing up, into the bottom cavity of the shelf.

Replace fan filter. Momentarily depress **ALARM RESET** button.

Reference: **DLP-540**

22. Is **FILTER REPLACE** LED lighted on fan shelf?

If **YES**, then continue with **Step 23**.

If **NO**, then **STOP. YOU HAVE COMPLETED THIS PROCEDURE.**

23.  **CAUTION:**

If the air flow sensor element is disturbed during cleaning, it may cause the fan shelf to go out of calibration and cause the DDM-2000 equipment to overheat. If experienced personnel are not available to clean the air flow sensor element, it is recommended you replace the fan shelf.

 **NOTE:**

Trouble in fan shelf or air flow sensor. Replace fan shelf or clean air flow sensor within 4 hours of minor alarm indication. Service interruption and/or circuit pack failure may occur if fan shelf is not replaced.

Are you going to clean the air flow sensor or replace the fan shelf?

If **REPLACE FAN SHELF**, then continue with **Step 24**.

If **CLEAN SENSOR**, then proceed to **Step 26**.

24.  **CAUTION:**
If the fan shelf is removed, exercise care in removing the fiber tray or fiber support bracket to prevent damage to the optical fibers.

 **NOTE:**
To remove a fan shelf located between two OC-3 shelves it may be necessary to remove either the fiber tray from the top OC-3 shelf, if it is a G1 shelf, or the fiber support bracket, if the shelf is a G3 or G4 shelf.

Replace fan shelf.

25. **STOP. YOU HAVE COMPLETED THIS PROCEDURE.**

26.  **NOTE:**
The air flow sensor could get contaminated with dust in environments where excessive dust is present and/or in situations where the fan filter was not installed. The air flow sensor is located in the area where fan pack #2 is located. When fan pack #2 is removed, it is still difficult to see if the air flow sensor has accumulated dust. If dust is suspected and a replacement fan shelf is not available, then personnel experienced in the air flow sensor cleaning procedures may clean the sensor element.

27. Remove fan shelf front cover.

28.  **NOTE:**
Fan packs are numbered from left to right as viewed from the front of the fan shelf. To remove fan pack, disconnect fan cable from fan pack. Remove 2 screws holding fan in place. Slide out fan pack.

Remove fan pack #2. See Figure 2.

29. Locate air flow sensor (Figure 2) and direct a gentle blast of clean dry air toward the center of the vertical sensor orifice.

30. Reinsert fan pack #2. Reinstall screws and connect fan cable.
31. Reinstall front cover and momentarily depress the **ALARM RESET** button.
32. Is **FILTER REPLACE** LED lighted on fan shelf?
If **YES**, then proceed to **Step 15**.
If **NO**, then **STOP. YOU HAVE COMPLETED THIS PROCEDURE.**
33. Is **FAN FAULT 1, 2, 3, or 4** LED lighted on fan shelf?
If **YES**, then continue with **Step 34**.
If **NO**, then proceed to **Step 35**.
34.  **NOTE:**
Fan packs are numbered from left to right as viewed from the front of the fan shelf. To replace fan pack, remove front cover and disconnect fan cable from failed fan pack. Remove 2 screws holding fan in place. Slide out old fan and install new one. Reinstall screws and connect fan cable.

Trouble is in fan pack associated with lighted LED. Replace ED-8C733-30, G6 fan pack.

Reference: **DLP-548**

35. Momentarily depress the **ALARM RESET** button to reset alarms.
36. Verify that all fan shelf alarm LEDs are extinguished and no circuit breakers are tripped.
37. **STOP. YOU HAVE COMPLETED THIS PROCEDURE.**

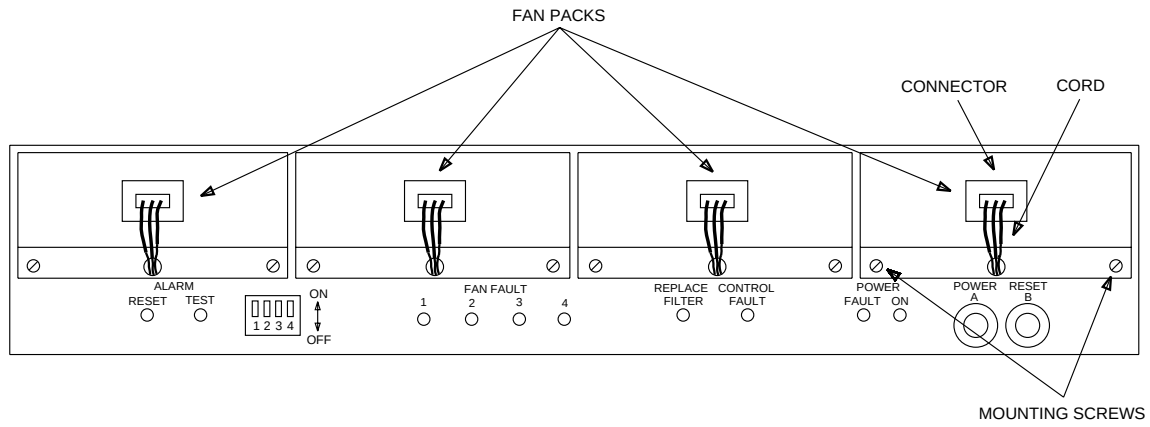


Figure 1. DDM-2000 Fan Shelf — Front Cover Removed

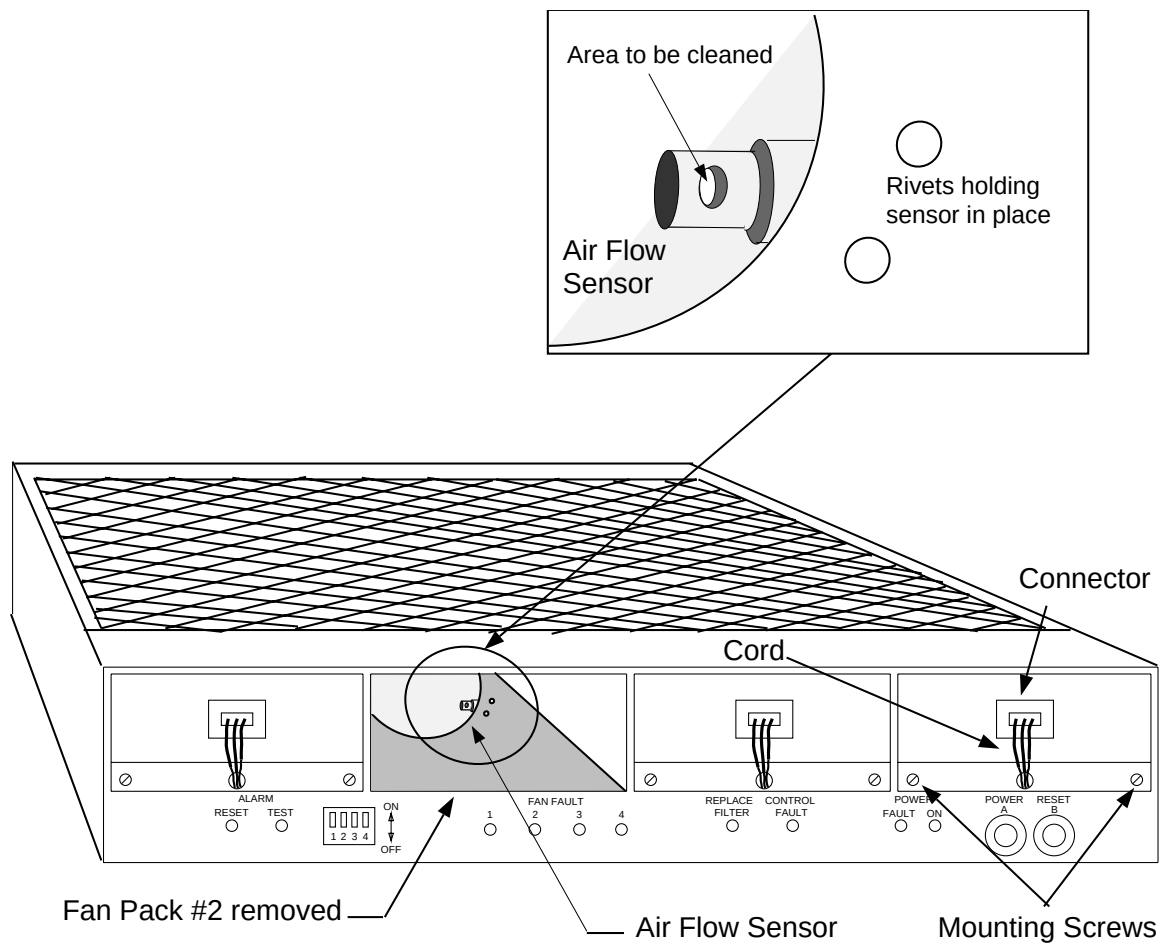


Figure 2. DDM-2000 Fan Shelf — Air Flow Sensor Location

Clear OLIU or Fiber Trouble Path Protected Ring

1.  **WARNING:**
Open optical connectors may emit invisible laser radiation. Do not view beam with optical instruments. Avoid direct exposure to the beam. Use of controls or adjustments or performance of procedures other than those specified herein may result in hazardous radiation exposure.

-  **CAUTION 1:**
*When removing **OLIU** circuit packs or replacing fiber, ensure that all VT/STS paths are active on the **OLIU** and fiber that is **NOT** being removed or replaced. When available, use a CIT and the "**switch-path-():all:pri>manual**" command to switch all VT/STS paths to the **OLIU** and fiber that are not being removed or replaced. It is also recommended to login to the far end of the **OLIU** and use the "**switch-path-():all:pri>manual**" command to switch all VT/STS paths to the **OLIU** and fiber that are not being removed or replaced.*

-  **CAUTION 2:**
*If timing source has been previously set to optical line (main-1 or main-2) that has failed, use the "**set-sync:src=main-1**" or "**main-2**" command to select timing source from good optical line.*

⇒ **NOTE:**

A lighted **FAULT** LED on the **OLIU** indicates that either the receiver, the transmitter, or both has failed. A flashing **FAULT** LED on the **OLIU** indicates that either the near-end receiver, far-end transmitter, or incoming (receive) fiber has failed. In a Path Protected Ring network, both **OLIUs** are normally **ACTIVE**. One **OLIU** carries service on one path of the ring and the other **OLIU** carries service on the other path. If possible, log into shelf associated with source address (for example, main-2) of "inc. 0C3 LOS", "inc. 0C12 LOS", or "inc. 0C1 LOS", etc. to see if circuit pack is removed or failed.

Was **OLIU(s)** removed or being replaced or installed when alarm occurred?

If **YES**, then continue with **Step 2**.

If **NO**, then proceed to **Step 8**.

2. ⇒ **NOTE:**

An alarm will occur if a circuit pack is removed without performing an update by momentarily depressing the **UPD/INIT** button or using the update "**upd**" command.

Is any previously installed **OLIU(s)** removed from the shelf?

If **YES**, then continue with **Step 3**.

If **NO**, then proceed to **Step 5**.

3. Determine the reason the circuit pack was removed. If the same circuit pack is to be reinserted, reinstall the circuit pack. If the circuit pack was removed and is not to be reinserted, momentarily depress the **UPD/INIT** button on the **SYSCTL** to remove the circuit pack from equipment inventory.

4. **STOP. YOU HAVE COMPLETED THIS PROCEDURE.**

5. Is **OLIU(s)** installed in correct slot(s) ("**rtrv-eqpt**")?

If **NO**, then continue with **Step 6**.

If **YES**, then proceed to **Step 8**.

6. Remove optical fibers from circuit packs, if connected, then remove circuit pack(s) from wrong slot(s). Install circuit pack(s) into correct slot(s). Reconnect optical fibers (**DLP-514**).
7. **STOP. YOU HAVE COMPLETED THIS PROCEDURE.**
8. Is **FAULT** LED lighted ("OLIU CP failed") on **OLIU** at any location associated with source address?
 If **YES**, then continue with **Step 9**.
 If **NO**, then proceed to **Step 11**.
9. Replace **OLIU** with lighted **FAULT** LED.

Reference: **DLP-523**

10. Is **FAULT** LED still lighted ("OLIU CP failed") on **OLIU**?
 If **YES**, then do **TAP-106**.
 If **NO**, then **STOP. YOU HAVE COMPLETED THIS PROCEDURE.**
11. Is **FAULT** LED flashing ("inc. OC3 LOS", "inc. OC12 LOS", or "inc. OC1 LOS") on **OLIU(s)**?
 If **YES**, then continue with **Step 12**.
 If **NO**, then proceed to **Step 14**.
12.  **NOTE:**
 Indications are that the incoming (receive) optical fiber line has failed or near-end or far-end **OLIUs** have failed.

Check optical fiber lines per local procedures, repair if necessary. If no trouble is found in the optical fibers, replace **OLIU(s)** at near end first (**DLP-523**). If trouble still exists, replace **OLIU(s)** at far end. Check for removed or failed **TGS**, **MXRVO**, or **DS3** circuit packs at the far end. If trouble still exists, trouble is in receive optical fiber associated with **OLIU** with flashing LED. Clear trouble in optical fiber per local procedures.

13. **STOP. YOU HAVE COMPLETED THIS PROCEDURE.**
14. For technical assistance, notify your supervisor, your local technical support organization, or call Lucent Technologies RTAC, per local operating instructions.
15. **STOP. YOU HAVE COMPLETED THIS PROCEDURE.**

Clear STS/VT AIS Alarm Conditions

1.  **NOTE 1:**
Incoming VT and/or STS1 AIS often indicates missing or incorrect cross-connects. In linear or add/drop configurations these are reported in the "Active Alarms and Status Report" and the "Maintenance History Report" with an alarm level of "ne-acty." In ring configurations they may have an alarm level of "ne-acty", MJ or CR. Incoming STS1 AIS may also indicate an unprotected failure or removal of a **DS3**, **MXRVO**, **STS1E** or **OLIU** at the far end associated with the Source Address of the alarm message. Incoming VT AIS may indicate an unprotected failure or removal of a **DS1** or **OLIU** failures in ring applications.

 **NOTE 2:**
VT and STS1 AIS conditions are only reported at service termination (drop) points. Incoming VT and/or STS AIS reported as "ne-acty" at a shelf where the service is cross-connected to a DS1, DS3 or EC1 drop can be caused by missing or incorrect cross-connections at the other terminal shelf or at any shelves where the service should be pass-through cross-connected.

 **NOTE 3:**
An STS1 may contain only one VT, when dropped causes an "inc. STS1 AIS" since it is the only one connected in the STS1.

Does the "Active Alarms and Status Report" indicate incoming VT AIS or STS1 AIS ("inc. VT AIS" or "inc. STS1 AIS")?

- If **STS1 AIS**, then continue with **Step 2**.
- If **VT AIS**, then proceed to **Step 12**.

2. Note the Source Address of the STS1 AIS condition reported in the "Active Alarms and Status Report" (for example, m-1). Based on the circuit layout or other office records, determine the other shelf where that time slot is supposed to be terminated (cross-connected to a DS1, DS3 or EC-1 termination).
3. Use the "**r1gn**" command to login to the other terminating shelf, then use the "**rtrv-crs-sts1**" command to determine if the time slot identified in Step 2 is cross-connected as specified in circuit layout or other office records.
4. Were there incomplete or incorrect cross-connects?
 If **YES**, then continue with **Step 5**.
 If **NO**, then proceed to **Step 7**.
5. Use the commands "**ent-crs-sts1**" and "**dlt-crs-sts1**", as necessary, to correct the provisioning.
6. Have all indications of STS1 AIS cleared?
 If **YES**, then **STOP. YOU HAVE COMPLETED THIS PROCEDURE.**
 If **NO**, then continue with **Step 7**.
7.  **NOTE:**
 If the service is STS1 cross-connected at either terminating shelf, both terminating shelves must be properly equipped to terminate the entire STS1. For example, if DS1 service is being provided, the **FUNCTION UNITS** groups at both ends must be equipped with **MXRVO** circuit packs and the same number of **DS1/DS1PM** circuit packs in the **LOW SPEED GROUPS** that are STS1 cross-connected.

Use the "**rtrv-eqpt**" command at both shelves to verify that the shelves are properly equipped for the service being provided. If the shelves are not properly equipped, install circuit packs as required.

8. Have all indications of STS1 AIS cleared?
 If **YES**, then **STOP. YOU HAVE COMPLETED THIS PROCEDURE.**
 If **NO**, then continue with **Step 9**.

9. Using the "**rlgn**" command, login to every shelf where the service should be pass-through cross-connected (for example, **m-1** to **c-1**) and use the "**rtrv-crs-sts1**" command to determine if the time slot identified in Step 2 is cross-connected as specified in circuit layout or other office records. If service is cross-connected through other maintenance subnetworks, such as dual ring interworking (DRI), look for missing cross-connections in the other subnetworks.
10. At any shelves with missing cross-connects use the "**ent-crs-sts1**" command to provision the pass-through cross-connect (for example, **m-1** to **c-1**).
11. **STOP. YOU HAVE COMPLETED THIS PROCEDURE.**
12. Note the Source Address of the VT AIS condition reported in the "Active Alarms and Status Report" (for example, **m-1-1-1**). Based on the circuit layout or other office records, determine the other shelf where that time slot is supposed to be terminated (cross-connected to a DS1 or EC-1 termination).
13. Use the "**rlgn**" command to login to the other terminal shelf, then "**rtrv-crs-sts1**" and "**rtrv-crs-vt1**" to determine if the time slot identified in Step 12 is cross-connected as specified in circuit layout or other office records.
14. Were there incomplete or incorrect cross-connects?
 If **YES**, then continue with **Step 15**.
 If **NO**, then proceed to **Step 17**.
15. Use the commands "**ent-crs-()**" and "**dlt-crs-()**", as necessary, to correct the provisioning.
16. Have all indications of VT AIS cleared?
 If **YES**, then **STOP. YOU HAVE COMPLETED THIS PROCEDURE**.
 If **NO**, then continue with **Step 17**.

17.  **NOTE:**
If the service is STS1 cross-connected at either terminating shelf, both terminating shelves must be equipped to terminate the entire STS1. For example, if DS1 service is being provided, both ends must be equipped with **MXRVO** circuit packs and the same number of **DS1/DS1PM** circuit packs in the groups that are STS1 cross-connected.
- Use the "**rtrv-eqpt**" command at both shelves to verify that the shelves are properly equipped for the service being provided. If the shelves are not properly equipped, install circuit packs as required.
18. Have all indications of VT AIS cleared?
If **YES**, then **STOP. YOU HAVE COMPLETED THIS PROCEDURE.**
If **NO**, then continue with **Step 19.**
19. Use the "**rlgn**" command to login to a shelf where the service should be pass-through cross-connected (for example, **m-1-1-1** to **c-1-1-1**). Use the "**rtrv-crs- ()**" command to determine if the time slot identified in Step 12 is cross-connected as specified in circuit layout or other office records. If service is cross-connected through other maintenance subnetworks, such as dual ring interworking (DRI), look for missing cross-connections in the other subnetworks.
20. Are there any missing cross-connects?
If **YES**, then continue with **Step 21.**
If **NO**, then proceed to **Step 24.**
21. At any shelves with missing cross-connects use "**ent-crs- ()**" to provision the pass-through cross-connect.
22. Use the "**rtrv-alm**" command to see if alarms have cleared.
23. Did alarms clear?
If **YES**, then **STOP. YOU HAVE COMPLETED THIS PROCEDURE.**
If **NO**, then continue with **Step 24.**
24. Repeat this procedure from Step 19 to look for other missing cross-connections.

Clear Brownout Condition Flashing L in FE ID Display

1. Is fuse **FA** or **FB** blown?
If **YES**, then do **DLP-555**.
If **NO**, then proceed to **Step 2**.
2. Condition DMM (digital multimeter) to measure voltage.
3.  **CAUTION:**
*If fuse on User Panel is not blown, trouble may be a failure of **one** of the -48V DC power feeders. Removing the wrong fuse or disconnecting the wrong feeder for power measurement will cause service interruption.*

Measure voltage at fuse holder **FA** or **FB**.

4. Does voltage measure less than -40 volts DC?
If **YES**, then continue with **Step 5**.
If **NO**, then proceed to **Step 7**.
5.  **CAUTION:**
*During brownout conditions the **SYCTL** 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.

6. **STOP. YOU HAVE COMPLETED THIS PROCEDURE.**

7. Are frame ground and battery return feeders at the same potential?
If **NO**, then continue with **Step 8**.
If **YES**, then proceed to **Step 10**.
8. 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.
9. **STOP. YOU HAVE COMPLETED THIS PROCEDURE.**
10.  **NOTE:**
Unseating and reseating **SYSCTL** circuit pack performs a **reset** procedure which restarts the software program.

Unseat and reseal **SYSCTL** circuit pack or use "**reset**" command. Do not press **UPD/INIT** pushbutton.
11. Is trouble cleared?
If **YES**, then **STOP. YOU HAVE COMPLETED THIS PROCEDURE.**
If **NO**, then continue with **Step 11**.
12.  **CAUTION:**
*Replacing the **SYSCTL** involves updating the internal memory on the circuit pack.*

Replace the **SYSCTL (DLP-501)**.
13. **STOP. YOU HAVE COMPLETED THIS PROCEDURE.**

Install OHCTL Circuit Pack New Shelf

1.  **NOTE 1:**
For Release 8 or later standard applications, the **OHCTL** must be a **BBG9 OHCTL**. For special applications with MegaStar* 2000 SONET Radio Systems (Releases 8.1 (linear) or 9.1 (ring) or later), the **OHCTL** must be a **BBG10 OHCTL**. This procedure is used to install the **OHCTL** for the first time in a new shelf. To replace an **OHCTL** in an in-service system, refer to **DLP-523**.

-  **NOTE 2:**
The shelf must be equipped with both **OHCTL** and **SYSCTL** [**DLP-549**] circuit packs before new software can be installed [**DLP-561**]. An **OHCTL** must have software installed and it must be the same as the software in the **BBG8/BBG8B SYSCTL**. If no software is installed or if the software is not compatible with software in the **SYSCTL**, you must find circuit packs with compatible software or install new software in both the **OHCTL** and **SYSCTL** when the **SYSCTL** is installed.

Are you installing a **BBG10** or **BBG9 OHCTL**?

If **BBG10**, then continue with **Step 2**.

If **BBG9**, then proceed to **Step 3**.

2. Set orderwire option jumper on **BBG10** plug **P3** for type of orderwire interface required (Multiplexed or E1-only). See Figure 1.

* Trademark of Harris Corporation.

3.  **NOTE 3:**
When the **OHCTL** is installed, the **FAULT** LED will light and remain lighted until the **SYSCTL** is installed.

Install **OHCTL** into **AUXCTL** slot.

Response: **FAULT** LED lights.

4. **STOP. YOU HAVE COMPLETED THIS PROCEDURE.**
-

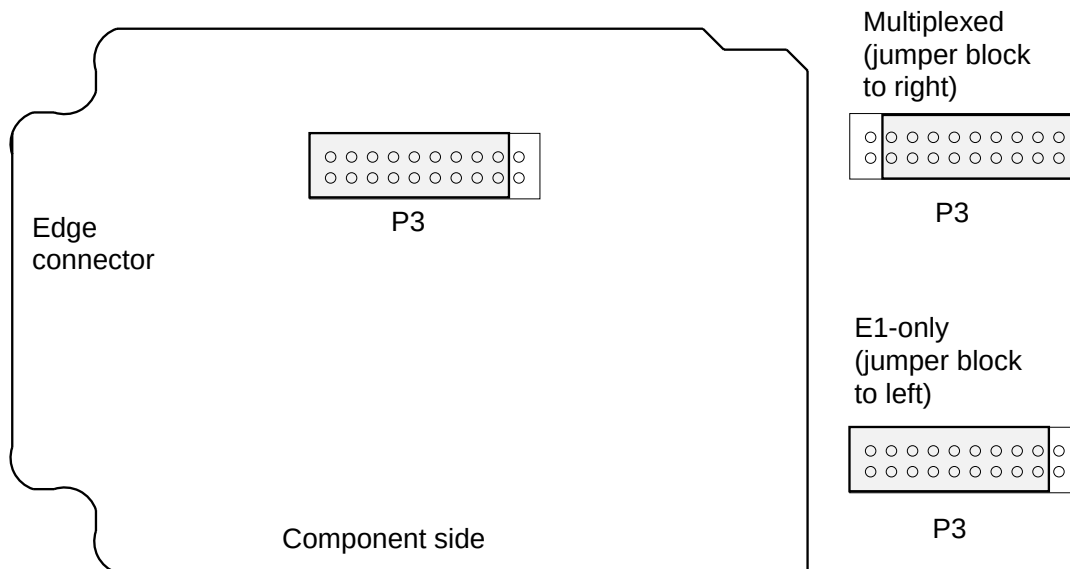


Figure 1. BBG10 OHCTL Option Settings

Replace SYSCTL In-Service

This procedure is used for replacing a **BBG8/BBG8B/BBG5 SYSCTL** in an in-service shelf. For procedures to install the **SYSCTL** in a new shelf (initial installation), refer to **DLP-549**.

1.  **CAUTION:**
***TIMING slot 2** should always be equipped with a **TGS** circuit pack and be active prior to replacing the **SYSCTL**. To clear a "C" condition from the **SYSCTL FE ID** display, procedures will require removal of the **TGS** circuit pack from **TIMING slot 1** to force the system to run the new software.*

Before performing this procedure, ensure that both **TGS** circuit packs are installed in the shelf. If possible, use the **switch-sync:s=circuitpack,pri>manual** command to switch to the protection **TGS** circuit pack in **TIMING slot 2**, if not already **ACTIVE**. Use **rtrv-sync:** command to verify that the **TGS** circuit pack in **TIMING slot 2** is **ACTIVE**.

2. Are you replacing a **BBG8/BBG8B SYSCTL** with another **BBG8/BBG8B SYSCTL** or replacing a **BBG5 SYSCTL** with a **BBG8/BBG8B SYSCTL**?
If **REPLACING BBG8/BBG8B**, then continue with **Step 3**.
If **REPLACING BBG5**, then proceed to **Step 4**.

3. Remove and inspect circuit pack being replaced for proper option switch settings. Set option switches on the replacement **BBG8/BBG8B SYSCTL** the same as the original. See Figure 1.

Proceed to **Step 8**.

4.  **CAUTION:**
*Removing the **BBG5 SYSCTL** 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.*

Momentarily depress the **ACO/TST** pushbutton on the User Panel and the **FE SEL** pushbutton 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, remove the **SYSCTL**. If the **SYSCTL** is failed, the countdown may not occur.

5. Set **SYSCTL** switch **S1** sections **S1-1**, **S1-2**, and **S1-3** to **OFF**, **OFF**, **OFF**, respectively, to set the product (shelf) type. See Figure 1.
6. Set TBOS termination switch **S2** per Table A.
7. Set all **SYSCTL** switch **S2** sections **S2-2**, **S2-3**, **S2-4**, **S2-5**, **S2-6**, **S2-7**, and **S2-8** to **OFF**.

Table A. SYSCTL Switch 2 (S2)
TBOS Link Terminator

Shelf Position	Switch
	S2-1
Last	ON
Not Last	OFF

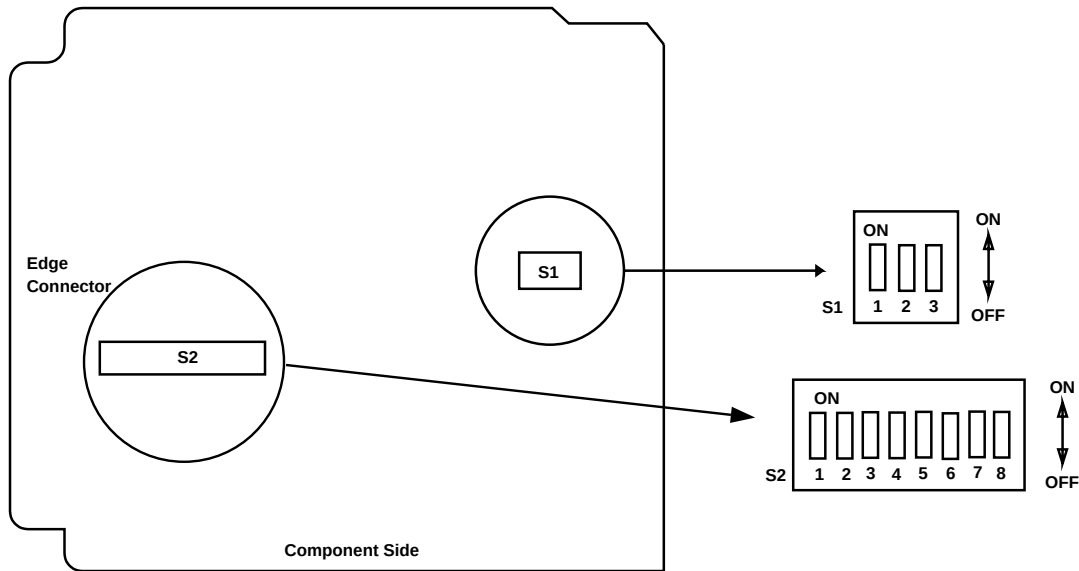


Figure 1. BBG8/BBG8B SYSCtl Option Settings

8.  **NOTE:**
Steps 9 and 10 must be performed without unnecessary delays.
Familiarize yourself with these steps before continuing with the procedure.

Read Steps 9 and 10 before proceeding.

9.  **CAUTION 1:**
*Take care to avoid damaging the LEDs that protrude through the opening in the faceplate of the **SYSCTL**.*

 **CAUTION 2:**
*Initializing the **SYSCTL** in the following steps will momentarily interrupt service if protection switches are activated.*

-  **NOTE:**
The **UPD/INIT** pushbutton on the **SYSCTL** is recessed to prevent its accidental operation. You will need a small pointed object such as a ballpoint pen to operate it.

Read the remainder of Steps 9 and 10 before installing the **SYSCTL**, then seat the **SYSCTL**.

If the following responses do not occur, proceed to **Step 11**.

Response: **FAULT** LED on **BBG8/BBG8B SYSCTL** lights and **ABN** LED on the User Panel lights after approximately 5 seconds. **MJ** and **NE** LEDs may light or flash briefly. **FAULT** LED on the **SYSCTL** goes off after approximately 5 seconds. **ABN** LED goes off after approximately 15 seconds. Approximately 1 minute and 30 seconds after the **ABN** LED goes off, the **FAULT** LED on the **OHCTL** goes off and the **CR** LED on the User Panel begins to flash.

10. Momentarily depress the **UPD/INIT** button on the **SYSCTL** while the **CR** LED is flashing (**you have 10 SECONDS** to do this).

If the following responses do not occur, continue with **Step 11**.

Response: **CR** LED on the User Panel stops flashing when the **UPD/INIT** button is pressed.

FAULT LED on **BBG9 OHCTL** and **ABN** LED on the User Panel are lighted after approximately 15 seconds. **ABN** LED goes off after approximately 30 seconds. Approximately 1 minute and 45 seconds after the **ABN** LED goes off, the **CR** LED on the User Panel flashes again. **DO NOT** depress **UPD/INIT** pushbutton again when the **CR** LED flashes.

All red LEDs on all circuit packs in the **DDM-2000** should be off. Any red LEDs remaining on or flashing represent a failure condition.

Initialization may take 2-3 minutes.

11. **NOTE:**

Compatible software must be installed in both the **BBG9 OHCTL** and the **BBG8/BBG8B 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**, or the software in the **SYSCTL** and **OHCTL** is not compatible with the transmission configuration of the shelf, the letter **P**, **d**, or **C** will be displayed in the **FE ID** display.

Observe one of the following indications on the **FE ID** display. Note the indication and follow the suggested procedure.

A. **Letter "P" in FE ID Display**

Indicates no software installed in **SYSCTL**.

Find circuit packs with compatible software and repeat this procedure, or install new software using the procedures of **DLP-532**.

B. **Letter "P." in FE ID Display**

Letter "**P**" followed by a period (**P.**) indicates a previous download attempt has failed.

Find circuit packs with compatible software and repeat this procedure, or install new software using the procedures of **DLP-532**.

C. **FE ID Display Blank:**

Indicates compatible software is installed in **OHCTL** and **SYSCTL**.

Proceed to **Step 16**.

D. **Letter "d" in FE ID Display:**

Indicates **OHCTL** has no software or that software in **OHCTL** and **SYSCTL** is incompatible.

Find circuit packs with compatible software and repeat this procedure, or install new software using the procedures of **DLP-532**.

E. **Letter "C" in FE ID Display:** _____

Indicates software is installed in **OHCTL** and **SYSCTL**, but it will not support the current shelf provisioning.

Proceed to **Step 12**.

F. **Letter "U" in FE ID Display:** _____

Indicates **SYSCTL** Switch **S1** is not set properly for type of shelf being equipped.

Remove **SYSCTL**. Correct switch settings and repeat this procedure.

G. **Letter "E" in FE ID Display:** _____

Indicates **SYSCTL** must be replaced.

Get replacement **SYSCTL** and repeat this procedure.

H. **Letter "F" in FE ID Display:** _____

Indicates **SYSCTL** faceplate latch is not fully seated. Unplug **SYSCTL** and repeat this procedure properly seating the faceplate latch.

I. **Flashing Letter "L" in FE ID Display:** _____

Indicates a low voltage condition (brownout) on the shelf.

Clear trouble using **Trouble Clearing: TAP-121**.

Letter "C" in FE ID display

12.  **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 13**.

If **YES**, then proceed to **Step 15**.

13. Find circuit packs with compatible software and repeat this procedure, or install new software using the procedures of **DLP-532**.
14. **STOP. YOU HAVE COMPLETED THIS PROCEDURE.**
15. To *force* the system to run the current software, perform the following:
- Ensure that a **TGS** circuit pack is installed in **TIMING** slot **2**.
 - Check that **TGS** circuit pack in **TIMING** slot **2** is active (**ACTIVE** LED lighted)
 - Remove the **TGS** circuit pack in **TIMING** slot **1** and reset (unplug and reseat) the **SYSCTL** to force it to run the current software.
 - After the current software is up and running (no alarm LEDs lighted or you can log into the shelf), reinstall the **TGS** circuit pack in **TIMING** slot **1**.

16. Retrieve generic software version ID by depressing the **ACO** button longer than 2 seconds and observing version code on the **FE ID** display. 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-532**.
17.  **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).

Refer to **DLP-512** and set any required options.

18. **STOP. YOU HAVE COMPLETED THIS PROCEDURE.**

Install STS1E Circuit Packs

1.  **CAUTION:**
*Take care to avoid damaging the LEDs that protrude through the opening in the faceplate of the **BBG6 STS1E**.*

 **NOTE:**
BBG6 STS1E circuit packs may be installed in **FUNCTION UNITS** group slots **A**, **B**, or **C**. Service **BBG6 STS1E** circuit packs are installed in **FUNCTION UNITS** slots labeled () **1**. Protection **BBG6 STS1E** circuit packs are installed in **FUNCTION UNITS** slots labeled () **2(P)**.

Determine which **FUNCTION UNITS** group slots (**A**, **B**, or **C**) are to be equipped with **BBG6 STS1E** circuit packs.

2. Determine from office records the length of the STS1E cabling between the DDM-2000 and the STSX cross-connect point.
3. Refer to Table A and Figure 1. Install the STS1E option jumpers per Table A.
4.  **NOTE:**
The **BBG6 STS1E** circuit pack provides bidirectional transport of one EC-1 signal through the DDM-2000 Multiplexer. **BBG6 STS1E** high speed mode interfaces with the **DS1** circuit packs in a **LOW SPEED GROUP** at the VT-G rate. **BBG6 STS1E** low speed mode interfaces with the **OLIU** circuit packs at the STS-1 rate.

Set switch **S1** to mode of operation required (HIGH-SPEED MODE or LOW-SPEED MODE).

Table A. STS1E LBO Settings

Cable Length (Ft)		LBO Setting
734D Cable	735A Cable	
0 to 225	0 to 125	LBO IN
>225 to 450	>125 to 250	LBO OUT

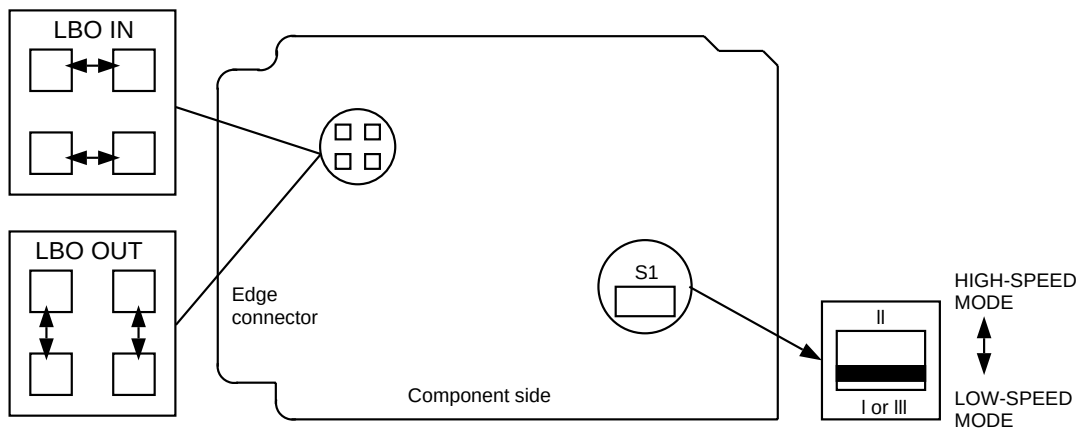


Figure 1. BBG6 STS1E Option Settings

5.  **NOTE:**
If the response is not correct in the following procedures, replace the **BBG6 STS1E** circuit pack.

Seat a **BBG6 STS1E** circuit pack in **FUNCTION UNITS** group slot **A 1**, **B 1**, or **C 1**.

Response: **FAULT** LED on the **BBG6 STS1E** lights for about 20 seconds then goes off. **ACTIVE** LED lights on the first **BBG6 STS1E** circuit pack of the pair installed.

6. If required, seat a second (protection) **STS1E** circuit pack in **FUNCTION UNITS** group slot **A 2(P)**, **B 2(P)**, or **C 2(P)** of the same **FUNCTION UNITS** group.

Response: **FAULT** LED on the **BBG6 STS1E** lights for about 20 seconds then goes off. **ACTIVE** LED remains off.

7. Repeat this procedure from Step 1 for each pair of **BBG6 STS1E** circuit packs to be installed.
8. **STOP. YOU HAVE COMPLETED THIS PROCEDURE.**

Install TGS Circuit Packs

1.  **CAUTION:**
The timing mode of all nodes should be checked before a node is placed in service. Improper timing modes may cause the system to act unpredictably or cause a service interruption (for example, if all nodes are set to line timed mode).

 **NOTE 1:**
The timing mode may be provisioned as Free Running, DS1 External, or Line Timed. In free-running mode, the **TGS** gets timing from an oscillator on the **TGS**. In DS1 external timing mode, the **TGS** gets timing from an external DS1 reference input. In line-timed mode, the **TGS** gets timing from a reference clock recovered from a received OC-3 line rate signal. In Releases 8, 9, and 11, free-running is the factory default. In Releases 8, 9, and 11, when a **BBF2B TGS** is installed, either the **MAIN OLIUs** or **FUNCTION UNIT C OLIUs** can be selected as the synchronization source using the command **set-sync:src={main,fn-c};**.

 **NOTE 2:**
In addition to the same options as the **BBF2 TGS**, the **BBF2B TGS** may be provisioned to provide a DS1 output for intershelf timing distribution (mult mode) or for network timing distribution (sync mode). When in *sync out* mode, the DS1 output signal derives its timing from the incoming OC-3 line signal from the **MAIN OLIUs** or optionally from the **FUNCTION UNIT C OLIUs** using the **set-sync:src={main,fn-c};** command.

 **NOTE 3:**
Tables A and B depict all the possible timing topologies for the **BBF2 TGS** and **BBF2B TGS** which can be encountered on adjacent network elements (NE) with some comments or cautionary notes on their application. When the NE is provisioned for line timing or with the DS1 output in SYNC OUT mode, the assumption is that the NE is deriving its timing from the optical interface shared between the two NE's.

Table A. BBF2 TGS Synchronization Provisioning Topologies

NE 1	NE 2	Application Comments
Free Running	Free Running	This topology is not supported. Both systems are operating asynchronously from each other.
Free Running	Line Timing	This topology is allowed but results in having a SONET subnetwork operating asynchronously with respect to other NE's in the network. The NE's deriving timing off the NE provisioned for Free Running will be synchronized to it but not to a PRS on the network. If automatic synchronization reconfiguration is supported and enabled in a system, the NE 2 system will attempt to switch to another better quality line timing source, if available.
Free Running	External - Mult	This timing topology is not supported. The two network elements will be operating asynchronously from each other.
External - Mult	Line Timing	This topology is used when one of the NE's does not have access to an external synchronous reference and needs to be synchronized to an NE whose timing is traceable to a PRS. The NE provisioned for Line Timing will derive its timing from the NE provisioned for External - Mult timing thus operating synchronously with that respective NE. The NE provisioned for External - Mult timing could use its DS1 output to distribute its incoming DS1 timing reference to other shelves in the bay to conserve ports on the BITS.
External - Mult	External - Mult	This topology is used when both NE's have access to and are receiving its timing from BITS clocks. The recommendation is to have these BITS synchronized to references which are traceable to the same PRS. If these guidelines are followed the subnetwork created by these two NE's would be operating synchronously. Note: DDM-2000 systems are designed to operate in pleisiochronous timing topologies. The DS1 output generated by each NE is regenerated from the input DS1 timing reference and could be used to distribute this reference to other shelves colocated in the same bay to conserve ports on the BITS.

Table A. BBF2 TGS Synchronization Provisioning Topologies (Contd)

NE 1	NE 2	Application Comments
Line Timing	Line Timing	Caution! This topology creates a timing loop and it is not supported. The NE with access to an external timing reference traceable to a PRS, if available, should be provisioned for External - Mult. If the reference available is an optical reference provision to Loop Timing with the proper source using the set-sync command. If automatic synchronization reconfiguration is supported and enabled in a system, both NEs will attempt to switch to another line timing source, if available, to prevent a timing loop.

Table B. BBF2B TGS Synchronization Provisioning Topologies

NE 1	NE 2	Application Comments
Free Running	Free Running	This topology is not supported. Both systems are operating asynchronously from each other.
Free Running	Line Timing	This topology is allowed but results in having a SONET subnetwork operating asynchronously with respect to other NE's in the network. The NE's deriving timing off the NE provisioned for Free Running will be synchronized to it but not to a PRS on the network. If automatic synchronization reconfiguration is supported and enabled in a system, the NE 2 system will attempt to switch to another better quality line timing source, if available.
Free Running	Line Timing - Sync Out	This topology, although not recommended, results in having a SONET subnetwork operating asynchronously with respect to other NE's in the network. The NE's deriving timing off the NE provisioned for Free Running will be synchronized to it but not to the rest of the network. The DS1 timing output is normally used to synchronize other NE's to a PRS. In this topology the timing of the Free Running NE is being distributed by the use of the DS1 output timing reference in the absence of Synchronization Messaging. In the presence of Synchronization Messaging, the DS1 output will carry DS1 AIS. If automatic synchronization reconfiguration is supported and enabled in a system, the NE 2 system will attempt to switch to a better quality line timing source, if available.
Free Running	External - Mult	This timing topology is not supported. The two network elements will be operating asynchronously from each other.

Table B. BBF2B TGS Synchronization Provisioning Topologies (Contd)

NE 1	NE 2	Application Comments
Free Running	External - Sync Out	This timing topology is not supported. The two network elements will be operating asynchronously from each other.
External - Mult	Line Timing	This topology is used when one of the NE's does not have access to an external synchronous reference and needs to be synchronized to an NE whose timing is traceable to a PRS. The NE provisioned for Line Timing will derive its timing from the NE provisioned for External - Mult timing thus operating synchronously with that respective NE. The NE provisioned for External - Mult timing could use its DS1 output to distribute its incoming DS1 timing reference to other shelves in the bay to conserve ports on the BITS.
External - Mult	Line Timing - Sync Out	This topology is used when one of the NE's does not have access to an external synchronous reference, needs to be synchronized to an NE whose timing is traceable to a PRS, and timing is needed to be distributed where NE 2 is located. The NE provisioned for Line Timing - Sync Out will derive its timing from the NE provisioned for External - Mult timing thus operating synchronously with that respective NE. Its DS1 output could serve as a reference to distribute timing to a BITS in that CO. The NE provisioned for External - Mult timing could use its DS1 output to distribute its incoming DS1 timing reference to other shelves in the bay to conserve ports on the BITS.
External - Sync Out	Line Timing	Caution! This topology might create a timing loop. In this topology the NE provisioned for Line Timing will derive its timing from the NE provisioned for External - Sync Out timing thus operating synchronously with that respective NE. The NE provisioned for External - Sync Out should be reprovisioned for External - Mult to prevent the potential timing loop existing in the actual provisioning. If Synchronization Messaging is enabled on both NE's, the DS1 output reference of the NE provisioned for External - Sync out will carry an unframed all ones DS1 signal (DS1 AIS) in the present topology. If automatic synchronization reconfiguration is supported and enabled in a system, both NEs will attempt to break the potential timing loop. NE 1 will attempt to break the timing loop by inserting DS1 AIS on its DS1 output port. NE 2 will attempt to switch to another line timing source, if available, to prevent the timing loop.

Table B. BBF2B TGS Synchronization Provisioning Topologies (Contd)

NE 1	NE 2	Application Comments
External - Sync Out	Line Timing - Sync Out	Caution! This topology might create a timing loop. In this topology the NE provisioned for Line Timing will derive its timing and that of the DS1 output reference from the NE provisioned for External - Sync Out timing thus operating synchronously with that respective NE. The NE provisioned for External - Sync Out should be reprovisioned for External - Mult to prevent the timing loop existing in the actual provisioning. If Synchronization Messaging is enabled on both NE's, the DS1 output reference on NE 1 will carry DS1 AIS and NE 2 will derive its timing and that of the DS1 output port from NE 1. If automatic synchronization reconfiguration is supported and enabled in a system, both NEs will attempt to break the potential timing loop. NE 1 will attempt to break the timing loop by inserting DS1 AIS on its DS1 output port. NE 2 will attempt to switch to another line timing source, if available, to prevent the timing loop.
External - Mult	External - Mult	This topology is used when both NE's have access to and are receiving its timing from BITS clocks. The recommendation is to have these BITS synchronized to references which are traceable to the same PRS. If these guidelines are followed the subnetwork created by these two NE's would be operating synchronously. Note: DDM-2000 systems are designed to operate in pleisiochronous timing topologies. The DS1 output generated by each NE is regenerated from the input DS1 timing reference and could be used to distribute this reference to other shelves colocated in the same bay to conserve ports on the BITS.
External - Mult	External - Sync Out	This topology is used to distribute network timing to a target location from a location with access to a synchronization reference. The NE provisioned for External - Mult, is providing timing to the NE provisioned for External - Sync Out, which in turn generates a DS1 output reference regenerated from the optical interface shared by both NE's. This DS1 output is used to provide a synchronization reference to a BITS.

Table B. BBF2B TGS Synchronization Provisioning Topologies (Contd)

NE 1	NE 2	Application Comments
External - Sync Out	External - Sync Out	Caution! This topology can potentially create a timing loop if synchronization messaging is not enabled on both NE's. In this topology both NE's will derive the DS1 output reference from each other thus creating a timing loop. The NE with access to a BITS, which has an input reference traceable to a PRS, and is sourced from an element other than this NE, should be reprovisioned for External - Mult to prevent the timing loop. If Synchronization Messaging is enabled on both NE's, the DS1 output reference in one of the NE's will carry DS1 AIS and the other NE will generate a DS1 output carrying a framed DS1 all ones signal.
Line Timing	Line Timing	Caution! This topology creates a timing loop and it is not supported. The NE with access to an external timing reference traceable to a PRS, if available, should be provisioned for External - Mult. If the reference available is an optical reference provision to Loop Timing with the proper source using the set-sync command. If automatic synchronization reconfiguration is supported and enabled in a system, both NEs will attempt to switch to another line timing source, if available, to prevent a timing loop.

⇒ **NOTE 4:**

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 5:**

If an invalid switch setting is selected, the **TGS FAULT** LED lights and an alarm is generated.

Refer to Table C and Figure 1 (**BBF2 TGS**) or Table D and Figure 2 (**BBF2B TGS**). Set the timing mode as required for the **TGS** circuit pack being installed.

Table C. BBF2 TGS Timing Mode Switch Setting

Timing Mode	Switch S1 Settings	
	S1-3	S1-4
Free Running	ON	ON
DS1 External, MULT Mode	OFF	ON
Line Timed	ON	OFF
Invalid	OFF	OFF

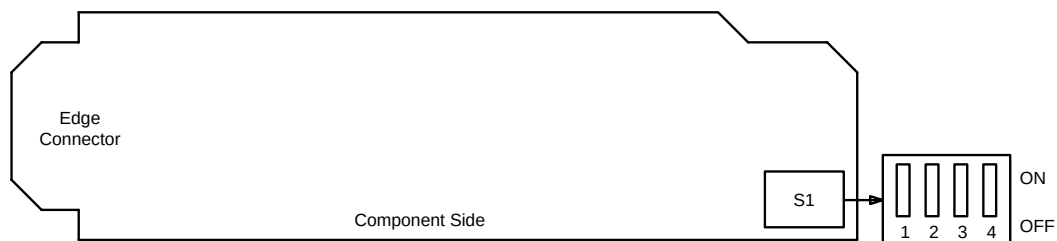


Figure 1. BBF2 TGS Option Switch

Table D. BBF2B TGS Timing Mode Switch Settings

Timing Mode	Switch S1 Settings		
	S1-3	S1-4	S1-5 (DS1 Output)
Free Running*	ON	ON	OFF
DS1 External, MULT Mode	OFF	ON	OFF
Line Timing, MAIN†	ON	OFF	OFF
Line Timing, 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

* Factory default.

† Main **OLI** is default; **FUNCTION UNITS C** by **set -sync** command.

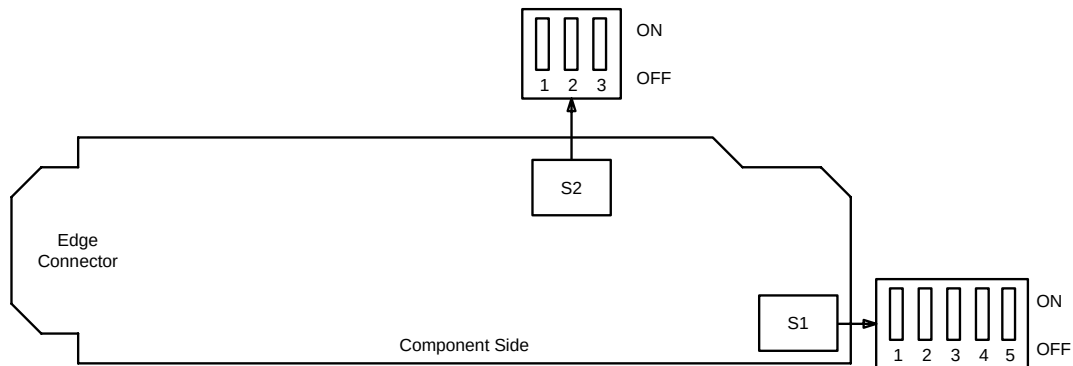


Figure 2. BBF2B TGS Option Switches

2. If the **BBF2B TGS** circuit pack is being installed and is provisioned for either *sync out* mode, refer to Table E and set the equalizer switches for proper cable length.

Table E. Equalizer Switch Settings

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

3.  **NOTE:**
Switches **S1-1** and **S1-2** are ignored by the system unless the timing mode is set to *DS1 External* or *Loop Timed sync out mode*.

Is timing mode set to either *DS1 External* or *Line Timed sync out mode*?

If **YES**, then continue with **Step 4**.

If **NO**, then proceed to **Step 5**.

4. Refer to Table F and set the DS1 line coding and frame format as required for the **TGS** circuit pack. See Figures 1 and 2.

Table F. TGS DS1 Line Coding and Frame Format Switch Settings

DS1 Line Code	Switch	DS1 Frame Format	Switch
	S1-1		S1-2
AMI	ON	SF	ON
B8ZS	OFF	ESF	OFF

5.  **CAUTION:**
*Take care to avoid damaging the LEDs that protrude through the opening in the faceplate of the **TGS**.*

 NOTE 1:

If external timing mode is used and other installed shelves above this shelf are connected together with bay mult cables for DS1 timing, installing a **TGS** circuit pack causes a momentary loss of an incoming DS1 timing reference. This may result in an "inc. DS1 sync. ref. LOS" alarm on all shelves above this shelf that are connected to the same bay mult cabling. This momentary loss of timing reference does not affect transmission.

 NOTE 2:

A **TGS** circuit pack is required in **TIMING** slot **1** to protect against accidentally downloading wrong software and interrupting transmission. Transmission configuration information is stored in the **TGS** circuit pack in **TIMING** slot **1**. During software download procedures the software checks the information stored in the **TGS** circuit pack. If the information is incompatible with the controller software information, an alarm is generated.

 NOTE 3:

If a signal has previously been applied to the original **BBF2B TGS** circuit pack, the **FAULT** lamp will flash when the new **BBF2B TGS** is installed until the signal tests good.

 NOTE 4:

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 tests good. The green **ACTIVE** LED lights on the first **TGS** circuit pack installed. After the **TGS** tests good, the **FAULT** LED goes off.

Install first **TGS** in **TIMING** slot **1**.

Response: **FAULT** LED on the **TGS** lights. **ACTIVE** LED lights.
FAULT LED goes off after about 15 seconds.

6.  **NOTE:**
If the timing mode option switches are not set the same on the two **TGS** circuit packs, the **FAULT** LED will remain lighted on the second circuit pack installed.

Install second (protection) **TGS** in **TIMING** slot **2**.

Response: **FAULT** LED on **TGS** lights for about 15 seconds then goes off. **ACTIVE** LED remains off.

7. Is timing mode set to external DS1?
If **YES**, then continue with **Step 8**.
If **NO**, then **STOP. YOU HAVE COMPLETED THIS PROCEDURE.**
8. If the **NE ACTY** LED on the User Panel remains on, use the CIT command **rtrv-sync** to verify that the operational mode of the system is *External*. If the operational mode is *Holdover*, check the DS1 timing references.
9. **STOP. YOU HAVE COMPLETED THIS PROCEDURE.**

Install OLIU Circuit Packs

1.  **WARNING:**
Unterminated optical connectors may emit invisible laser radiation. Avoid direct exposure to the beam. Do not view beam with optical instruments. Use of controls or adjustments or performance of procedures other than those specified herein may result in hazardous radiation exposure.

 -  **CAUTION 1:**
*The **HIGH/LOW POWER** option switch on a **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 **OLIUs**. **22D-U, 22G-U, 24G-U, 26G2-U, 27G-U, and 27G2-U OLIUs** require a 10 dB LBO when looped.*

 -  **CAUTION 2:**
*Before installing **OLIUs**, ensure all optical fiber connectors and couplings have been properly cleaned [DLP-527]. Signal performance may be degraded if the connectors and couplings are not cleaned properly.*

 -  **NOTE:**
To ensure proper path protection switching in ring configurations, if optical spans terminate in **22F/22F-U/22F2-U OLIUs** at one node and **22G-U/22G2-U/22G3-U OLIUs** at another node, use the "**set-sts1:dgr=**" command to provision the bit error ratio (BER) to 10^{-6} at all nodes in the ring network.
- 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.

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

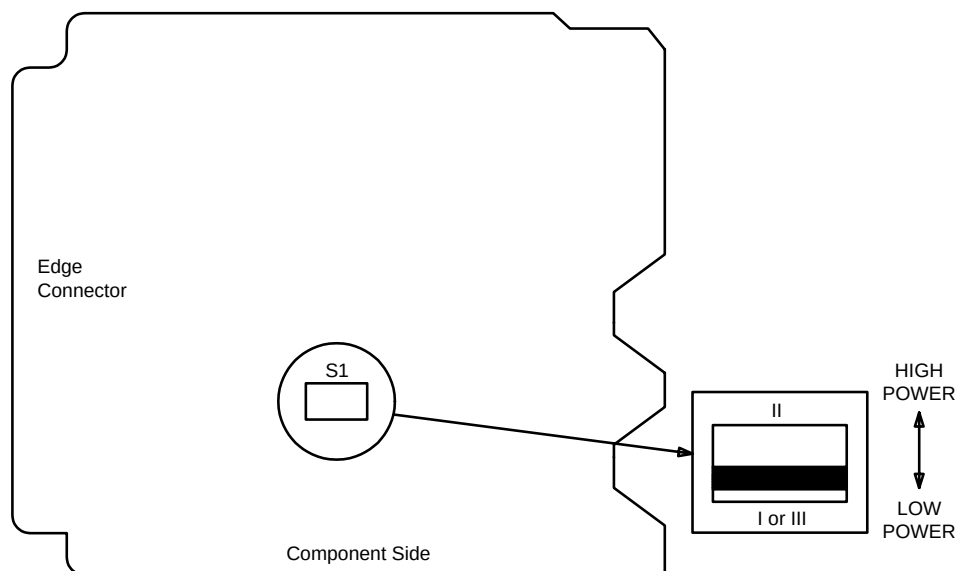


Figure 1. 21G/21G-U OLIU Option Switch

3.  **CAUTION:**
*If optical fiber cables are routed beneath the **OLIUs**, be careful not to pinch or crush the fibers when the **OLIUs** are inserted.*

 **NOTE 1:**
The red **FAULT** LED flashes when no signal is present to the **OLIUs**.

 **NOTE 2:**
When using the following procedures to install the **OLIUs**, if the responses are not correct, check option switches and connections. If switches and connections are correct, replace the **OLIU** that has the wrong response.

 **NOTE 3:**
In a Stand-Alone DDM-2000 OC-1 ring application, the DDM-2000 OC-3 FiberReach host requires **26G2-U** or **27G-U/27G2-U OLIUs** be installed in the **MAIN** slots.

 **NOTE 4:**
The single-homed DDM-2000 OC-3/FiberReach ring configuration requires that the **FUNCTION UNITS () 1 OLIU** on the OC-3 host shelf connect to the **MAIN-1 OLIU** at the first FiberReach shelf from the OC-3 host shelf. **MAIN-2 OLIU** at an adjacent FiberReach shelf (node) connects to the **MAIN-1 OLIU** at an adjacent FiberReach shelf (node). The **MAIN-2 OLIU** at the last FiberReach shelf on the OC-1 ring connects to **FUNCTION UNITS() 2(P) OLIU** on the OC-3 host shelf.

 **NOTE 5:**
A dual-homed ring configuration requires that the first FiberReach **MAIN-1 OLIU** connect to **FUNCTION UNITS () 1 OLIU** on one host OC-3 shelf. The last FiberReach **MAIN-2 OLIU** connects to the **FUNCTION UNITS () 2(P) OLIU** on the other OC-3 host shelf. Intermediate FiberReach shelves on the same OC-1 ring connect from **MAIN-2 OLIU** at one FiberReach shelf to the **MAIN-1 OLIU** at an adjacent FiberReach shelf (node).

⇒ **NOTE 6:**

The DDM-2000 OC-3 shelf OC-12 ring application requires **24G-U OLIUs** be installed in the **MAIN** slots.

Install **OLIU** into required **MAIN 1** or **FUNCTION UNITS () 1** slot.

Response: **FAULT** LED and **ACTIVE** LED lights. **FAULT** LED begins flashing after about 10 seconds.

[**OHCTL FAULT** LED may begin flashing if far-end communications (fecom) is enabled.]

Comment: Critical, major or minor alarm LEDs light depending on the version of software installed. Generally, the **CR** LED will light for linear releases, and the **MJ** (fecom enabled) or **MN** (fecom disabled) LED will light for ring releases.

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 connector (ribbon cable) is not yet installed. To clear the alarm, install the OC-12 connector on the **24G-U OLIUs** seated in the **MAIN 1** and **MAIN 2(P)** slots.

Install second **OLIU** (if required) into **MAIN 2(P)** or **FUNCTION UNITS () 2(P)** slot.

Response: **FAULT** LED and **ACTIVE** LED lights. **FAULT** LED begins to flash after about 10 seconds. (The **FAULT** LED may go off for a few seconds before starting to flash.)

5. Are **24G-U OLIUs** being installed?

If **YES**, then continue with **Step 6**.

If **NO**, then proceed to **Step 9**.

6. Connect OC-12 connector (ribbon cable) between **24G-U OLIUs** in the **MAIN 1** and **MAIN 2(P)** slots.
7. Verify that the connectors on the OC-12 connector cable are properly seated and latched.
8. Verify that the "OC12 connector failed" alarm has cleared.
9. Have all required **OLIUs** been installed?
If **YES**, then **STOP. YOU HAVE COMPLETED THIS PROCEDURE.**
If **NO**, then repeat this procedure for all **OLIUs** being installed.

Connect Optical Loop

1.  **WARNING:**
Unterminated optical connectors may emit invisible laser radiation. Avoid direct exposure to the beam. Do not view beam with optical instruments. Use of controls or adjustments or performance of procedures other than those specified herein may result in hazardous radiation exposure.
-  **CAUTION 1:**
*Take care to avoid damaging the LEDs that protrude through the opening in the faceplate of the **OLIU**.*
-  **CAUTION 2:**
*The level control on the **21G/21G-U OLIU** must be set to **LOW POWER** when the **21G/21G-U OLIU** is looped on itself. Other **OLIUs** have no switch settings. The **22D-U**, **22G-U**, **24G-U**, **26G2-U** and **27G-U/27G2-U OLIUs** require a 10 dB LBO when it is looped on itself.*
-  **CAUTION 3:**
*Avoid excessive bending of the optical jumper used to loop the **OLIU** on itself.*
-  **CAUTION 4:**
*All optical fiber connectors and couplings should be properly cleaned [**DLP-527**]. Signal performance may be degraded if the connectors and couplings are not cleaned properly.*

Which **OLIUs** are being looped?

If **21G/21G-U**, then continue with **Step 2**.

If **21D/21D-U/21G2-U/22F/22F-U/22F2-U/22G2-U/22G3-U**,
then proceed to **Step 3**.

If **22D-U/22G-U/24G-U/26G2-U/27G-U/27G2-U**, then proceed
to **Step 8**.

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. Continue with Step 4.

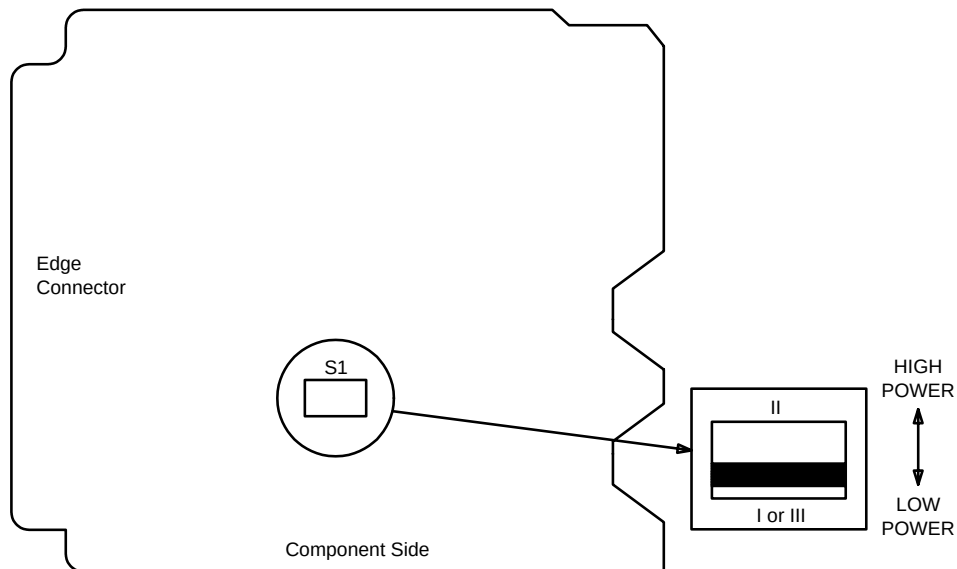


Figure 1. 21G/21G-U OLIU Option Settings

3.  **NOTE 1:**
It may take from 15 seconds to 3 minutes and 25 seconds for the **FAULT** LEDs to stop flashing, depending on the setting of the signal degrade threshold (–5 to –9).
-  **NOTE 2:**
The lightguide jumpers used to loop the **OLIUs** must be equipped with **ST[®]**, FCPC, or SC connectors at both ends, depending on the type of **OLIU** connector. See Figures 2, 3, and 4.
-  **NOTE 3:**
The **21D**, **21G**, and **22F** are equipped with *ST*-type connectors.
-  **NOTE 4:**
The **21D-U**, **21G-U**, **21G2-U**, **22F-U**, **22F2-U**, **22G2-U** and **22G3-U** **OLIUs** are shipped with a 0 dB *ST*-type universal LBO installed (code - **A3070**, comcode - **106795354**). If an SC or FCPC connector is required; the universal 0 dB LBOs can be ordered separately. See Table A.
-  **NOTE 5:**
The **21G**, **21G-U**, **21G2-U**, **22F**, **22F-U**, **22F2-U**, **22G2-U** and **22G3-U** **OLIUs** require single-mode lightguide jumpers. See Table B.
21D/21D-U **OLIUs** require multimode lightguide jumpers. See Table C.

Replace the 0 dB LBO on the **21D-U**, **21G-U**, **21G2-U**, **22F-U**, **22F2-U**, **22G2-U** or **22G3-U** **OLIUs** with a 0 dB LBO with a SC or FCPC connector on the **MAIN 1** or **FUNCTION UNITS () 1** **OLIUs**, if required. See Table A.

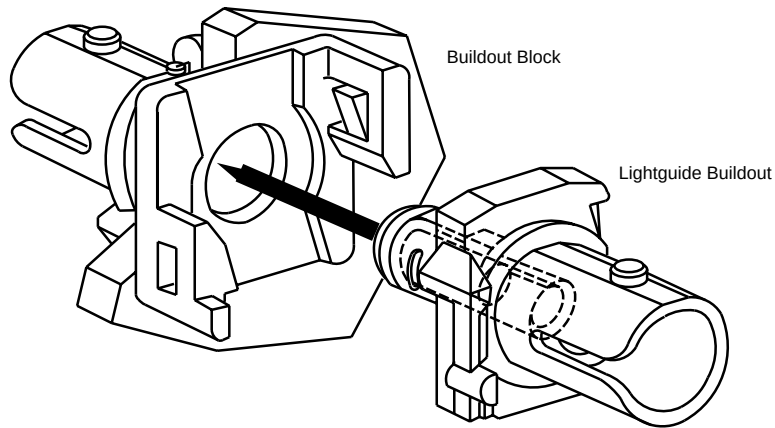


Figure 2. ST[®]-Type Universal Buildout

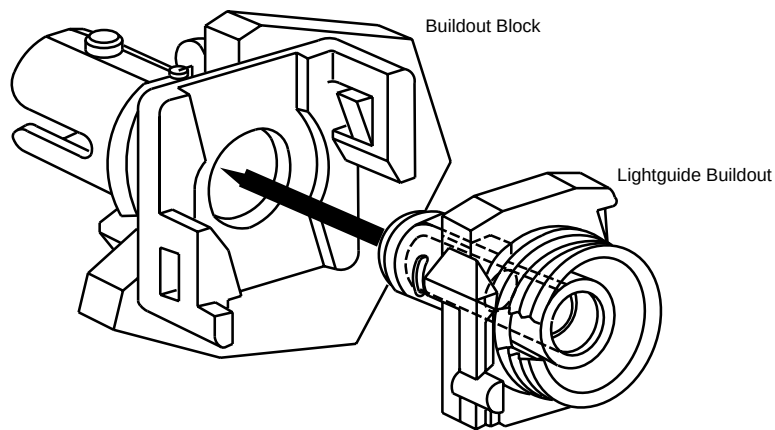


Figure 3. FCPC-Type Universal Buildout

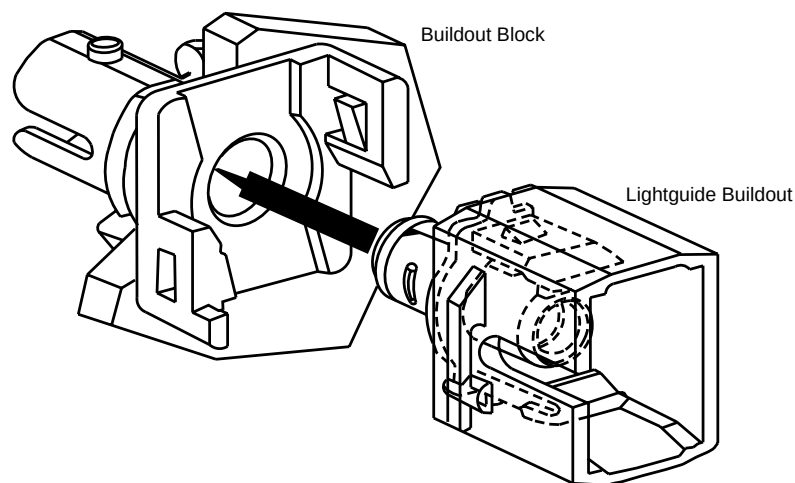


Figure 4. SC-Type Universal Buildout

Table A. Universal 0 dB Lightguide Buildouts

Code	Comcode	Connector Type	Cable Connection	Label Color
A3060	106708951	SC	SM-SM & MM-MM	None
A3070	106795354	ST [®]	SM-SM & MM-MM	None
A3080	106795404	FCPC	SM-SM & MM-MM	None

Table B. Single-Mode Lightguide Jumpers

Code	Comcode	Length (Feet)	Connectors
FS1EP-EP-2	107149494	2	ST [®] -ST
LS1SC-SC-2	106908247	2	SC-SC
LS1FP-FP-10	106593825	10	FCPC-FCPC

Table C. Multimode Lightguide Jumpers

Code	Comcode	Length (Feet)	Connectors
FL1E-E-2	105351795	2	ST [®] -ST
LL1SC-SC-2	106908668	2	SC-SC
LL1FC-FC-10	107095549	10	FC-FC

4. Use lightguide jumpers to loop the **IN** and **OUT** connectors of the **MAIN 1** or **FUNCTION UNITS () 1 OLIU(s)**. See Table B or C.

Response: **FAULT** LED stops flashing.

ACTIVE LED remains on.

(If flashing, **FAULT** LED on **OHCTL** goes off after all number one **OLIUs** are looped.)

If responses are not correct, check connections and looping fibers. Clean connectors and repeat Step 4. If responses are still not correct, replace **OLIU**.

Comment: In linear releases, critical (**CR**) LED goes off and minor (**MN**) LED lights.

In ring releases, the lighted major (**MJ**) or minor (**MN**) LED remains lighted.

It may take 1 minute or more for LEDs and alarms to stabilize after the **OLIU(s)** are looped.

5. Replace the 0 dB LBO on the **21D-U, 21G-U, 21G2-U, 22F-U, 22F2-U, 22G2-U** or **22G3-U OLIUs** with a 0 dB LBO with a SC or FCPC connector on the **MAIN 2(P)** or **FUNCTION UNITS () 2(P) OLIUs**, if required. See Table A.
6. Use lightguide jumpers to loop the **IN** and **OUT** connectors of the **MAIN 2(P)** or **FUNCTION UNITS () 2(P) OLIU(s)**. See Table B or C.

Response: **FAULT** LED stops flashing.

In linear releases, **ACTIVE** LED goes off.

In ring releases, **ACTIVE** LED remains on.

Minor (**MN**) [major/minor (**MJ/MN**), if rings] alarm goes off.

If responses are not correct, check connections and looping fibers. Clean connectors and repeat Step 6.

If responses are still not correct, replace **OLIU**.

It may take 1 minute or more for LEDs and alarms to stabilize after the **OLIU(s)** are looped.

7. **STOP. YOU HAVE COMPLETED THIS PROCEDURE.**

8.  **CAUTION:**
22D-U, 22G-U, 24G-U, 26G2-U and 27G-U/27G2-U OLIUs are shipped with 0 dB ST-type universal LBOs installed (code - **A3070**, comcode - **106795354**). The 0 dB LBO must be replaced with a 10 dB LBO when the **22D-U, 22G-U, 24G-U, 26G2-U or 27G-U/27G2-U OLIU** is looped on itself. See Table D.

 NOTE 1:

It may take from 15 seconds to 3 minutes and 25 seconds for the **FAULT** LEDs to stop flashing, depending on the setting of the signal degrade threshold (–5 to –9).

 NOTE 2:

The lightguide jumpers used to loop the **OLIUs** must be equipped with **ST[®]**, **FCPC**, or **SC** connectors at both ends, depending on the type of **OLIU** connector. See Figures 2, 3, and 4.

 NOTE 3:

The **22D-U OLIU** requires multimode lightguide jumpers. See Table F. The **26G2-U OLIU** requires either single-mode or multimode lightguide jumpers. See Tables E and F. The **22G-U, 24G-U and 27G-U/27G2-U OLIUs** require single-mode lightguide jumpers. See Table E.

For the **22D-U, 22G-U, 24G-U, 26G2-U or 27G-U/27G2-U OLIUs**, replace the 0 dB LBO on the **OUT** buildout block(s) with the required 10 dB LBO on the **MAIN 1** or **FUNCTION UNITS () 1 OLIUs**. See Table D.

Table D. Universal 10 dB Lightguide Buildouts

Code	Comcode	Connector Type	Cable Connection	Label Color
A3060D1	107406159	SC	SM-SM	Black
A3070D1	107406191	ST [®]	SM-SM	Black
A3080D1	107406233	FCPC	SM-SM	Black
A2060D	106795289	SC	MM-MM	Black
A2070D	106795321	ST	MM-MM	Black

Table E. Single-Mode Lightguide Jumpers

Code	Comcode	Length (Feet)	Connectors
FS1EP-EP-2	107149494	2	ST [®] -ST
LS1SC-SC-2	106908247	2	SC-SC
LS1FP-FP-10	106593825	10	FCPC-FCPC

Table F. Multimode Lightguide Jumpers

Code	Comcode	Length (Feet)	Connectors
FL1E-E-2	105351795	2	ST [®] -ST
LL1SC-SC-2	106908668	2	SC-SC
LL1FC-FC-10	107095549	10	FC-FC

9. Use lightguide jumpers to loop the **IN** and **OUT** connectors of the **MAIN 1** or **FUNCTION UNITS () 1 OLIU(s)**. See Tables E and F.

Response: **FAULT** LED stops flashing.

ACTIVE LED remains on.

(If flashing, **FAULT** LED on **OHCTL** goes off after all number one **OLIUs** are looped.)

If responses are not correct, check connections and looping fibers. Clean connectors and repeat Step 9.

If responses are still not correct, replace **OLIU**.

Comment: In linear releases, critical (**CR**) LED goes off and minor (**MN**) LED lights.

In ring releases, the lighted major (**MJ**) or minor (**MN**) LED remains lighted.

It may take 1 minute or more for LEDs and alarms to stabilize after the **OLIU(s)** are looped.

10. For the **22D-U**, **22G-U**, **24G-U**, **26G2-U** or **27G-U/27G2-U OLIUs**, replace the 0 dB LBO on the **OUT** buildout block(s) with the required 10 dB LBO on the **MAIN 2(P)** or **FUNCTION UNITS () 2(P) OLIUs**. See Table D.

11. Use lightguide jumpers to loop the **IN** and **OUT** connectors of the **MAIN 2(P)** or **FUNCTION UNITS () 2(P) OLIU(s)**. See Tables E and F.

Response: **FAULT** LED stops flashing.

In linear releases, **ACTIVE** LED goes off.

In ring releases, **ACTIVE** LED remains on.

Minor (**MN**) [major/minor (**MJ/MN**), if rings] alarm goes off.

If responses are not correct, check connections and looping fibers. Clean connectors and repeat Step 11.

If responses are still not correct, replace **OLIU**.

It may take 1 minute or more for LEDs and alarms to stabilize after the **OLIU(s)** are looped.

12. **STOP. YOU HAVE COMPLETED THIS PROCEDURE.**

Install MXRVO Circuit Packs

1.  **NOTE 1:**
If the response is not correct in the following procedures, replace the **BBG2 MXRVO**.

 **NOTE 2:**
BBG2 MXRVO circuit packs may be installed in **FUNCTION UNITS** group slots **A**, **B**, or **C**.

Determine which **FUNCTION UNITS** group slots (**A**, **B**, or **C**) are to be equipped with **BBG2 MXRVO** circuit packs.

2. Seat a **BBG2 MXRVO** circuit pack into **FUNCTION UNITS** group slot **A 1**, **B 1**, or **C 1**, as required.

Response: **FAULT** LED on the **MXRVO** lights for about 20 seconds then goes off. **ACTIVE** LED lights on first **MXRVO** installed in each **FUNCTION UNITS** group slot.

3.  **NOTE:**
If the **LOW SPEED GROUP ()** is to be equipped with any **BBF3/BBF3B DS1PM** circuit packs, both service and protection **BBG2 MXRVO** circuit packs must be installed.

If required, seat a second **BBG2 MXRVO** into slot **2(P)** of the same **FUNCTION UNITS** group (**A**, **B**, or **C**).

Response: **FAULT** LED on protection **MXRVO** lights for about 13 seconds then goes off. **ACTIVE** LED remains off.

4. Repeat this procedure from Step 1 for each **BBG2 MXRVO** circuit pack being installed.
5. **STOP. YOU HAVE COMPLETED THIS PROCEDURE.**

Install DS3/TMUX Circuit Packs

1.  **CAUTION:**
*Take care to avoid damaging the LEDs that protrude through the opening in the faceplate of the **DS3/TMUX**.*

 **NOTE:**
DS3/TMUX circuit packs may be installed in **FUNCTION UNITS** group slots **A**, **B**, or **C**. **BBG4/BBG4B DS3** and **BBG20 TMUX** service circuit packs are installed in slots labeled **FUNCTION UNITS () 1**. **BBG4/BBG4B DS3** and **BBG20 TMUX** protection circuit packs are installed in slots labeled **FUNCTION UNITS () 2(P)**. **BBG19 DS3** data interface circuit packs are installed in both **FUNCTION UNITS () 1** and **() 2(P)** slots and are independent. There is no protection between the **BBG19 DS3** circuit packs.

Determine which **FUNCTION UNITS** group slot(s) (**A ()**, **B ()**, or **C ()**) is being equipped with **DS3/TMUX** circuit packs.

2. Determine from office records the length of the DS3 cabling between the DDM-2000 and the DSX-3 cross-connect point.
3.  **NOTE:**
The only hardware option settings on DS3 circuit packs are the LBO settings shown in Figures 1 and 2. If there are other jumpers on the circuit pack similar to the LBO jumpers, they are factory test points and should be ignored.

Refer to Table A and Figures 1 and 2. Install the DS3 option jumpers per Table A.

Table A. DS3 LBO Settings

Cable Length (Ft)		LBO Setting
734D Cable	735A Cable	
0 to 225	0 to 125	LBO IN (ON)
>225 to 450	>125 to 250	LBO OUT

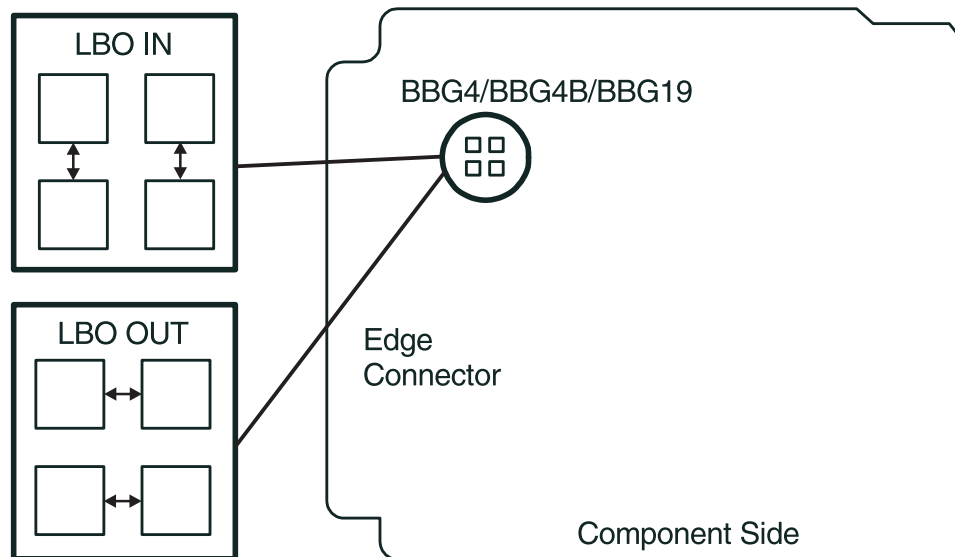


Figure 1. BBG4/BBG4B/BBG19 DS3 LBO Option Settings

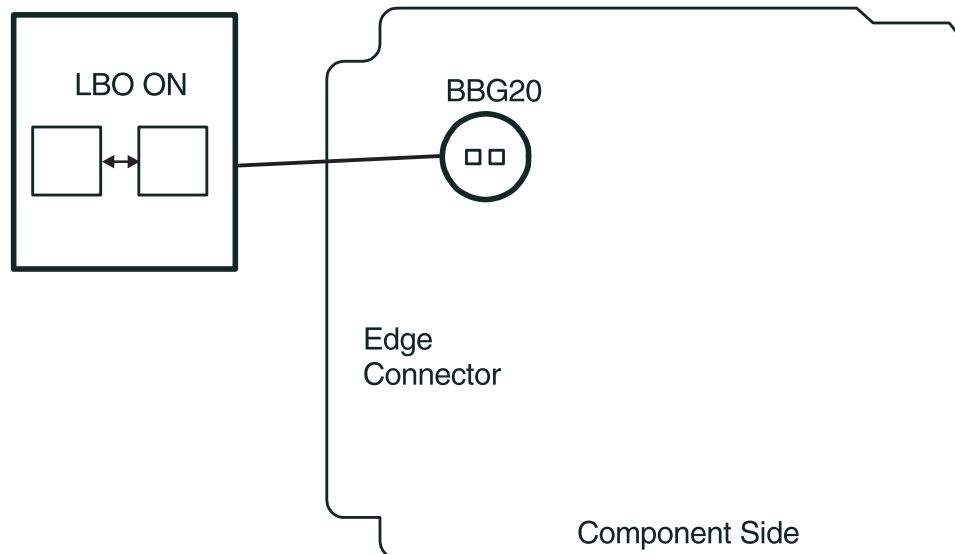


Figure 2. BBG20 TMUX Option Settings

4. Are you installing **BBG4/BBG4B DS3/BBG20 TMUX** circuit packs or **BBG19** DS3 circuit packs?

If **BBG4/BBG4B/BBG20**, continue with **Step 5**.

If **BBG19**, proceed to **Step 9**.

5.  **NOTE:**

If the response is not correct in the following procedures, replace the **DS3/TMUX** circuit pack.

Seat a **DS3/TMUX** circuit pack in **FUNCTION UNITS** group slot **A 1**, **B 1**, or **C 1**.

Response: **FAULT** LED on the **DS3/TMUX** lights for about 20 seconds then goes off. **ACTIVE** LED lights on the first **DS3/TMUX** circuit pack of the pair installed.

6. If required, seat a second (protection) **DS3/TMUX** circuit pack in **FUNCTION UNITS** group slot **A 2(P)**, **B 2(P)**, or **C 2(P)** of the same **FUNCTION UNITS** group.

Response: **FAULT** LED on the **DS3/TMUX** lights for about 20 seconds then goes off. **ACTIVE** LED remains off.

7. Repeat this procedure from Step 1 for each pair of **DS3/TMUX** circuit packs to be installed.
8. **STOP. YOU HAVE COMPLETED THIS PROCEDURE.**

9.  **NOTE 1:**
Since cross-connections associated with **BBG19 DS3** circuit packs are non-path-switched locked cross-connections, a **BBG19 DS3** circuit pack installed in **FUNCTION UNITS** group slot () **1** at one terminating node is associated with the **BBG19 DS3** circuit pack in **FUNCTION UNITS** group slot () **2(P)** at the other terminating node.

-  **NOTE 2:**
If response is not correct in the following procedures, replace the **BBG19 DS3** circuit pack.

Seat **BBG19 DS3** circuit packs in **FUNCTION UNITS** group slots **A ()**, **B ()**, or **C ()** being equipped.

Response: **FAULT** LED on the **DS3** lights for about 20 seconds then goes off. **ACTIVE** LED lights on **DS3** circuit pack.

10. **STOP. YOU HAVE COMPLETED THIS PROCEDURE.**

Install DS1/DS1PM Circuit Packs

1.  **CAUTION:**
*Take care to avoid damaging the LEDs that protrude through the opening in the faceplate of the **DS1/DS1PM** circuit pack.*

Determine from office records the length of the DS1 cabling between the DDM-2000 and the DSX-1 cross-connect point.

2.  **NOTE 1:**
Switch 1, sections 1 through 3 (**S1-1**, **S1-2**, **S1-3**), are set according to the length of DS1 cabling between the DDM-2000 and the DSX-1 cross-connection. 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**) is unused and ignored by the system.

 **NOTE 2:**
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.

Refer to Figure 1 and Table A and set LBO option switches.

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 (Note)		
			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

Note: Invalid switch settings will cause the **FAULT** LED to light and a "DS1 CP failed" alarm.

3. **⇒ NOTE:**

DS1 line coding may be set using either the option switches OR the "**set-t1**" command. It is recommended that a policy be established to set line coding using either the switches OR the command. If DS1 line code (lc) parameters are set using the "**set-t1**" command, a software override will be active and the circuit pack 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				
	S1-4 (Port 1)	S1-5 (Port 2)	S1-6 (Port 3)	S1-7 (Port 4)	S1-8 (Note)
B8ZS	OFF	OFF	OFF	OFF	OFF
AMI	ON	ON	ON	ON	OFF

Note: Switch 1, section 8 (S1-8) is unused and ignored by the system.

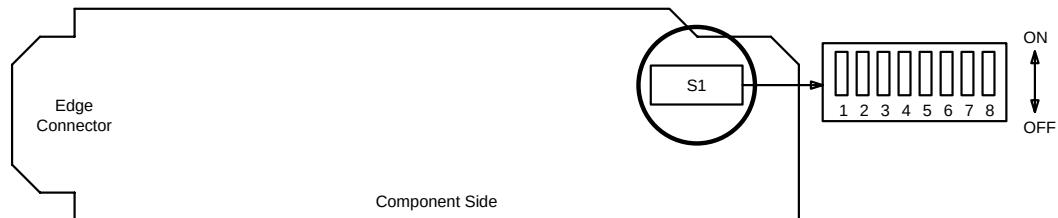


Figure 1. DS1/DS1PM Option Settings

4. **⇒ NOTE:**

If the response is not correct when the **DS1/DS1PM** circuit pack is installed, check option switch setting. If settings are correct, replace the **DS1/DS1PM** circuit pack.

Seat **DS1/DS1PM** circuit pack in required slot of **LOW SPEED GROUP** being equipped.

Response: **FAULT** LED on **DS1/DS1PM** circuit pack lights and may remain lighted for about 40 seconds and then goes off.

5. Repeat this procedure from Step 1 for each service **DS1/DS1PM** circuit pack being installed.

6. **⇒ NOTE 1:**

One protection **DS1/DS1PM** circuit pack may be installed in slot **8(P)** of each **LOW SPEED GROUP** being equipped. The **SYSCTL** automatically provisions the protection **DS1/DS1PM** circuit pack to match the line code setting (B8ZS or AMI) of any service **DS1/DS1PM** circuit pack that it protects.

⇒ NOTE 2:

If **BBF3/BBF3B DS1PM** circuit packs are installed in service slots, then a **BBF3/BBF3B DS1PM** circuit pack must be installed in the protection slot, if protection is required.

Is protection DS1 circuit pack being installed?

If **YES**, then continue with **Step 7**.

If **NO**, then **STOP. YOU HAVE COMPLETED THIS PROCEDURE.**

7. Refer to Figure 1 and Table A and set LBO option switches on protection **DS1/DS1PM** circuit pack.
8. Install protection **DS1/DS1PM** circuit pack into slot **8(P)** of **LOW SPEED GROUP** being equipped.
9. Install **177A** Retainer Cards into all unequipped service DS1 slots in a **LOW SPEED GROUP** equipped with protection **DS1/DS1PM** circuit packs.
10. **STOP. YOU HAVE COMPLETED THIS PROCEDURE.**

Perform LED Test

1.  **CAUTION:**
Take care to avoid damaging the LEDs that protrude through the openings in the faceplates of the circuit packs.

Is a CIT available?

If **YES**, then continue with **Step 2**.

If **NO**, then proceed to **Step 5**.

2. Connect CIT to User Panel.

Reference: **DLP-521**

3. Use the **test-led:address:r=()** command to test LEDs.

Where address = address identifier of the system, slot, or user panel that contains the LEDs to be tested. Default is **all**.

r = number of times (1 through 10) test is repeated.

Response: All LEDs for the specified address identifier light. For a **SYSCTL** LED test, all segments of the **SYSCTL FE ID** display (including the period) light. After 10 seconds, all LEDs go off. After another 10 seconds, a completion message is printed and all LEDs are updated to show the current status of the system.

4. Did LED test pass?

If **YES**, then **STOP. YOU HAVE COMPLETED THIS PROCEDURE.**

If **NO**, then proceed to **Step 7**.

5.  **NOTE:**
When the **ACO** pushbutton is depressed, all LEDs and the 7-segment **FE ID** display on the **SYSCTL** light. If the **ACO** pushbutton is released within 2 seconds, the LED test completes and the 7-segment display and all LEDs revert to normal operation. If the **ACO** pushbutton is depressed longer than 2 seconds, the 7-segment display goes blank for 2 seconds and then each digit of the generic software version code is scrolled through the display. The LEDs remain lighted while the code is being displayed. When the **ACO** pushbutton is released, the LEDs remain lighted until the full software version code is displayed. If the **ACO** pushbutton is still depressed when the software version code has completed cycling, the display goes blank for 2 seconds and starts cycling through the software version code again. This continues as long as the **ACO** pushbutton is depressed.

Depress the **ACO** pushbutton on the User Panel.

Response: All LEDs and the **SYSCTL** 7-segment display light.

6. Was response correct?
If **YES**, then **STOP. YOU HAVE COMPLETED THIS PROCEDURE.**
If **NO**, then continue with **Step 7.**
7. Were you sent here by another procedure to perform an LED test?
If **YES**, then continue with **Step 8.**
If **NO**, then do **Trouble Clearing: TAP-115.**
8. Record the circuit pack(s) (LEDs) that failed the LED test and return to the procedure that sent you here.
9. **STOP. YOU HAVE COMPLETED THIS PROCEDURE.**

Perform DS1 Transmission Test

1.  **NOTE 1:**
This procedure may be used to perform individual DS1 transmission tests in the *mux* (toward the fiber) or *demux* (toward the DSX) direction. When this procedure is being used to perform end-to-end DS1 tests, it is assumed that the complete end-to-end system has already been tested and that only a particular DS1 port is being tested at this time. It is further assumed that the DS1 options (DS1/DS1PM circuit packs) and DS3 options (TMUX circuit packs) have been set correctly (using the **set-t1:** and **set-t3:** command) at both ends of the circuit being tested. The **rtrv-t1:** and **rtrv-t3:** command may be used to check for proper DS1 or DS3 option settings. Ensure proper DS1 line coding settings (AMI/B8ZS) at DS1 ends of the circuit.
-  **NOTE 2:**
Transmission tests in the *mux* direction may be local or end-to-end tests (see Figure 1). Transmission tests in the *demux* direction may be local cross-connect tests (see Figure 2). The "Commands and Reports" section of this manual, under TEST-TRMSN-T1, gives an explanation of commands.
-  **NOTE 3:**
This test can be performed either with a CIT and the automated test command **test-trmsn-t1:** or with a suitable low speed test set (such as a KS-20775, L1 DS1 Error Rate Test Set, a KS-22331, L1/KS-22332, L2 DS1/DS1C/DS2 Error Rate Test Set, or M13 Error Rate Test Set).
-  **NOTE 4:**
When this procedure is used to do end-to-end tests, one DDM-2000 shelf will be referred to as the near end and the other shelf as the far end. These designations are arbitrary; either shelf can be the near-end or the far-end shelf.

⇒ **NOTE 5:**

Proper cross-connections must be made at each shelf to establish the complete end-to-end path for the DS1 circuit being tested. Release 8 linear software supports default and full manual STS-1 and VT1.5 (DS1) cross-connections to support STS-1 add/drop and DS1 add/drop applications. Release 9 and later ring software has no default cross-connections and supports only manual VT1.5 and STS-1 cross-connections. See the description of the following commands in the "Commands and Reports" section of this manual: **cnvt-crs**, **dlt-crs-sts1**, **dlt-crs-vt1**, **ent-crs-sts1**, **ent-crs-vt1**, **rtrv-crs-sts1**, **rtrv-crs-vt1**, **set-ne**, and **rtrv-ne**. See *Cross-Connection Provisioning* in the "Administration and Provisioning" section of this manual for more information on cross-connection provisioning.

⇒ **NOTE 6:**

A CIT is required for this test on a ring configuration because manual cross-connections have to be made at all shelves.

Is a CIT available?

If **YES**, then continue with **Step 2**.

If **NO**, then proceed to **Step 3**.

2. At the near-end **DDM-2000**, connect the CIT to the **CIT** jack on the User Panel, if required.

Reference: **DLP-521**

3. ⇒ **NOTE:**

Work orders, office records, or CIT **ent-crs-{sts1 or vt1}** or **rtrv-crs-{sts1 or vt1}** commands may be used to make or verify cross-connections.

At each shelf in the network, make/verify that proper STS-1/VT1(DS1) terminating and pass-through cross-connections have been made for each DS1 circuit being tested, as required.

4. Are you using CIT and **test-trmsn-t1:** command to perform this test?

If **YES**, then continue with **Step 5**.

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

5. **⇒ NOTE 1:**

If one terminating end is equipped with **STS1E** circuit packs to provide EC-1 service and the other terminating end is equipped with **DS1/DS1PM** circuit packs, the DS1 transmission test is performed from the DS1 terminating end. If the CIT and **test-trmsn-t1:** command is being used to perform the test and you are at the EC-1 terminating end, log into the DS1 end to perform the test using the **test-trmsn-t1:** command.

⇒ NOTE 2:

When both terminating ends are equipped with **STS1E** circuit packs, one end may be temporarily equipped with either **DS1/DS1PM** or **DS3** circuits packs and the procedures of **DLP-510** or **DLP-511** used to perform the transmission tests.

⇒ NOTE 3:

Local tests cannot be performed in the DEMUX direction for **STS1E** circuit packs.

⇒ NOTE 4:

If one terminating end is equipped with a **TMUX** circuit pack to provide for bidirectional termination of one M13 or C-bit formatted DS3 signal and the other terminating end is equipped with **DS1/DS1PM** circuit packs, the DS1 transmission test can be performed from the DS3 terminating end using the **test-trmsn-t1:** command after using the **opr-lpbk-t1:** command at the far end equipped with **DS1/DS1PM** circuit packs to loop back the test signal. The DS1 transmission test can also be performed from the DS1 terminating end using the **test-trmsn-t1:** command after using the **opr-lpbk-t3:** command at the far end equipped with a **TMUX** circuit pack to loop back the test signal.

See Figures 1 and 2. If local tests are being performed, the fiber loopbacks at the near-end **OLIUs** must be in place. If end-to-end tests are being performed, do ONE of the following:

- (a) Connect a patch cord from the **OUT** jack to the **IN** jack at the far-end DSX-1, STSX, or DSX-3 cross-connection associated with the DS1 channel to be tested.
- (b) Use the **r lgn** command to log in to the far-end shelf and use the **opr-lpbk-t1:address**, **opr-lpbk-ec1:address**, or **opr-lpbk-t3:address** command to loop back the DS1, EC-1, or DS3 port(s) at the far end. Use **logout** or **toggle** (ctrl t) command to return control of CIT to near end.

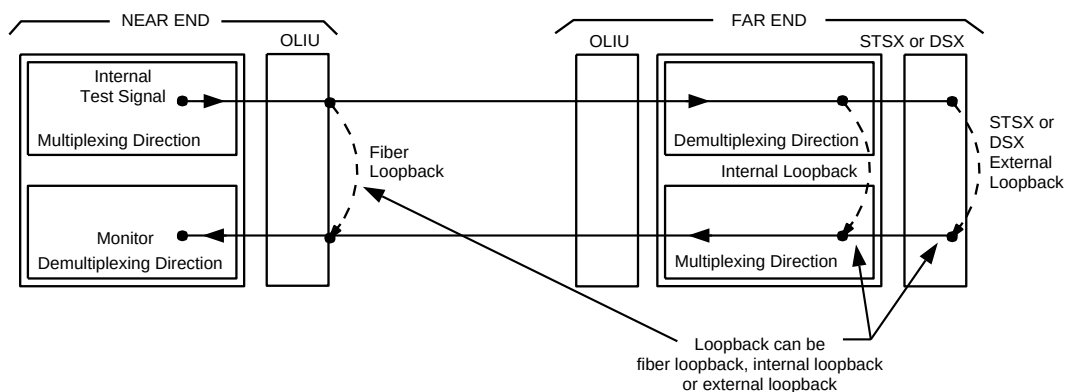


Figure 1. Transmission Test of DS1 Signal in MUX Direction

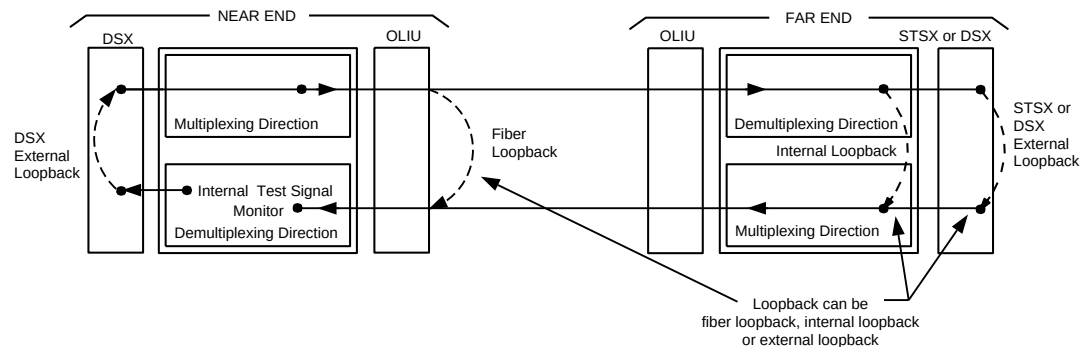


Figure 2. Transmission Test of DS1 Signal in DEMUX Direction

6. Are you doing this test in the mux or demux direction?

If **MUX** direction, then continue with **Step 7**.

If **DEMUX** direction, then proceed to **Step 9**.

7. At the near end, use the following command to perform a test of the DS1 loop in the fiber direction:

```
test-trmsn-t1:address:dirn=mux:dur=( );
```

Where *address* = address identifier of the DS1 signal.

dirn = direction of the test. If **dirn=mux**, direction is toward fiber.

dur = duration of the test in minutes (1-120); default is 1.

8. Was the test successful (error free)?

If **YES**, then proceed to **Step 12**.

If **NO**, then proceed to **Step 34**.

9.  **NOTE:**

The **DS1/DS1PM** circuit packs are connected to a DSX-1 cross connect and the **TMUX** circuit pack is connected to a DSX-3 cross connect.

See Figure 2. At the near-end DSX-1 or DSX-3 cross-connection associated with the DDM-2000 being tested, connect a patch cord from the **OUT** jack to the **IN** jack for the DS1 channel to be tested.

10. Use the following command to perform a DS1 transmission test in the demux direction to test the DS1 loop in the DSX direction:

```
test-trmsn-t1:address:dirn=demux:dur=( );
```

Where *address* = address identifier of the DS1 signal.

dirn = direction of the test. If **dirn=demux**, direction is toward DSX.

dur = duration of the test in minutes (1-120); default is 1.

11. Was the test successful (error free)?

If **YES**, then continue with **Step 12**.

If **NO**, then proceed to **Step 34**.

12. Is this first service being placed on the group and is a protection **DS1/DS1PM/TMUX** circuit pack installed?

If **YES**, then continue with **Step 13**.

If **NO**, then proceed to **Step 17**.

13. Use the following command to switch from service to protection circuit pack:
switch-ls:address:pri=manual;
 14. Repeat the transmission test in the mux (or demux) direction using the following command:
test-trmsn-t1:address:dirn=mux (or demux):dur=();
 15. Was the test successful (error free)?
If **YES**, then continue with **Step 16**.
If **NO**, then proceed to **Step 34**.
 16. Use the following command to clear active switch requests:
switch-ls:address:pri=reset;
 17.  **NOTE:**
If this is a single-ring configuration and the transmission test is being performed in the **mux** direction, use the **switch-path** command to switch the path to the other ring and then repeat this test before releasing loopbacks.
- The DS1 circuit under test has passed the DS1 transmission test. Remove the looping patch cords from the cross-connect point. Use the **rls-lpbk-t1:** or **rls-lpbk-t3:** command to release loopback(s) at the far end, if required.
18. At the near-end (and the far-end) DDM-2000, momentarily depress the **UPD/INIT** button on the **SYSCTL** (or use the **upd** command) to update the **SYSCTL** and remove alarms after the loopbacks have been removed.
 19. Repeat this procedure from Step 2 for any additional DS1 circuits to be tested.
 20. **STOP. YOU HAVE COMPLETED THIS PROCEDURE.**
 21. See Figure 1. If local tests are being performed, the fiber loopback at the near-end **OLI** must be in place. If end-to-end tests are being performed, at the far-end DSX-1, STSX, or DSX-3 cross-connect point associated with the DDM-2000 being tested, connect a patch cord from the **OUT** jack to the **IN** jack for the DS1 channel to be tested.

22.  **NOTE:**
The DS1 test set is used at the end equipped with **DS1/DS1PM** circuit packs and the M13 test set is used at the end equipped with **TMUX** circuit packs.
- At the near-end DDM-2000 cross-connect point, connect the DS1 or M13 test set to the **IN** and **OUT** jacks associated with the circuit under test.
23. Use the DS1 or M13 test set to test for error-free transmission.
24. Was the test successful (error free)?
If **YES**, then continue with **Step 25**.
If **NO**, then proceed to **Step 34**.
25. Is this first service being placed on the group and is protection circuit pack installed?
If **YES**, then continue with **Step 26**.
If **NO**, then proceed to **Step 30**.
26. Unseat the service **DS1/DS1PM/TMUX** circuit pack associated with the circuit under test.
27. Repeat the DS1 transmission test with the DS1 or M13 test set.
28. Was the test successful (error free)?
If **YES**, then continue with **Step 29**.
If **NO**, then proceed to **Step 34**.
29. Reseat the **DS1/DS1PM/TMUX** circuit pack associated with the circuit under test.
30. The DS1 circuit under test has passed the DS1 transmission test. Remove the looping patch cords from the cross-connections.
31. At the near-end (and the far-end) DDM-2000, momentarily depress the **UPD/INIT** button on the **SYSCTL** to update the **SYSCTL**.
32. Repeat this procedure from Step 21 for any additional DS1 circuits to be tested.
33. **STOP. YOU HAVE COMPLETED THIS PROCEDURE.**

34. **⇒ NOTE:**

The line code parameter is not applicable to the **TMUX** circuit pack.

Check for line code (AMI/B8ZS) mismatch at near end and far end. If mismatch is found, set line code [**DLP-513**] to correct value and repeat this test. If no trouble is found, continue with the next step.

35. **⇒ NOTE:**

The dlc parameter is not applicable to the **TMUX** circuit pack.

In some releases, if **dlc=yes** as set by the **set -t1** command, loopbacks are not recognized (loopback not recognized) in this test. Use **rtrv -t1** command to check if **dlc=yes**.

36. Is dlc set to yes?

If **YES**, then continue with **Step 37**.

If **NO**, then proceed to **Step 38**.

37. Use **set -t1** command to temporarily set **dlc=no** and repeat this test. If the test fails again, continue with the next step.

38. Has the **DS1/DS1PM/TMUX** circuit pack that failed the test been replaced?

If **YES**, then proceed to **Step 41**.

If **NO**, then continue with **Step 39**.

39. Replace the **DS1/DS1PM/TMUX** circuit pack that failed the test.

Reference: **DLP-523**

40. Repeat this procedure for the **DS1/DS1PM/TMUX** circuit pack that failed.

41. Trouble may be in the DSX cross-connect wiring, VT1/STS1 cross-connections in the ring network, or the shelf backplane. Use the **rtrv-crs-()** command to ensure proper VT1/STS1 cross-connections have been made at each shelf in the ring for the DS1 being tested. If no trouble found, check DSX cross-connect wiring and backplane connections. If other alarms or trouble indications are present, refer to **Trouble Clearing: IXL-001** to isolate the trouble. If no alarms or indications are present and a CIT is available, use the RETRIEVE commands (for example, **rtrv-alm**, **rtrv-hsty**, etc.) to check for other trouble indications.
42. **STOP. YOU HAVE COMPLETED THIS PROCEDURE.**

Perform DS3 Transmission Test

1.  **NOTE 1:**
This procedure may be used to perform DS3 transmission tests in the *mux* (toward the fiber) or *demux* (toward the DSX) direction. When this procedure is being used to perform end-to-end DS3 tests, it is assumed that the complete end-to-end system has already been tested and that only a particular DS3 channel is being tested at this time. Transmission tests in the *mux* direction may be local or end-to-end tests (See Figure 1). Transmission tests in the *demux* direction are local cross-connect tests (See Figure 2). The "Commands and Reports" section of this manual, under TEST-TRMSN-T3, gives an explanation of commands.
-  **NOTE 2:**
This test can be performed either with a CIT and the automated test command **test-trmsn-t3** or with a DS3 test set or M13 test set.
-  **NOTE 3:**
When this procedure is used to do end-to-end tests, one DDM-2000 shelf will be referred to as the near end and the other shelf as the far end. These designations are arbitrary; either shelf can be the near-end or the far-end shelf.
-  **NOTE 4:**
Proper cross-connections must be made at each shelf to establish the complete end-to-end path for the DS3 circuit being tested. Release 8 linear software supports default and full manual STS-1 and VT1.5 (DS1) cross-connections to support STS-1 add/drop and DS1 add/drop applications. Release 9 ring software has no default cross-connections and supports only manual VT1.5 and STS-1 cross-connections. See the description of the following commands in the "Commands and Reports" section of this manual: **cnvt-crs**, **dlt-crs-sts1**, **dlt-crs-vt1**, **ent-crs-sts1**, **ent-crs-vt1**, **rtrv-crs-sts1**, **rtrv-crs-vt1**, **set-ne**, and **rtrv-ne**. See *Cross-Connection Provisioning* in the "Administration and Provisioning" section of this manual for more information on cross-connection provisioning.

⇒ **NOTE 5:**

A CIT is required for this test if manual cross-connections have to be made at any shelf.

Is a CIT available?

If **YES**, then continue with **Step 2**.

If **NO**, then proceed to **Step 3**.

2. ⇒ **NOTE 1:**

If one terminating end is equipped with **STS1E** circuit packs to provide EC-1 service and the other terminating end is equipped with **DS3** circuit packs, the DS3 transmission test is performed from the DS3 terminating end. If the CIT and **test-trmsn-t3:** command is being used to perform the test and you are at the EC-1 terminating end, the **rlgn** command may be used to log into the DS3 end to perform the test using the **test-trmsn-t3:** command.

⇒ **NOTE 2:**

When both terminating ends are equipped with **STS1E** circuit packs, either DS1 or DS3 transmission tests may be performed. For DS3 tests, one end may be temporarily equipped with **DS3** circuit packs to perform the transmission tests. To perform transmission tests for this configuration, remove the **STS1E** at the near end, perform an update (upd), and install the **DS3** circuit pack(s). This configuration may only be tested in the MUX direction. After the tests are completed, remove the temporary circuit packs, perform an update, and reinstall the **STS1E** circuit packs.

⇒ **NOTE 3:**

If one terminating end is equipped with **TMUX** circuit packs to provide for bidirectional termination of one M13 or C-bit formatted DS3 signal and the other terminating end is equipped with **DS1/DS1PM** circuit packs, either DS1 or DS3 transmission tests may be performed. For DS3 tests, both ends may be temporarily equipped with **TMUX** circuit packs to perform the transmission tests. To perform transmission tests for this configuration, remove the **DS1** circuit packs at the far end, perform an update (upd), and install **TMUX** circuit pack(s). This configuration may only be tested in the MUX direction. After the tests are completed, remove the temporary circuit packs, perform an update, and reinstall the **DS1/DS1PM** circuit packs.

At the near-end **DDM-2000**, connect the CIT to the **CIT** jack on the User Panel, if required.

Reference: **DLP-521**

3. **⇒ NOTE:**
Work orders, office records, or CIT **ent-crs-sts1** or **rtrv-crs-sts1** commands may be used to make or verify STS-1 cross-connections.

At each shelf in the network, make/verify that proper STS-1 cross-connections have been made for each DS3 channel being tested.

4. Are you using CIT and **test-trmsn-t3** command to perform this test?
If **YES**, then continue with **Step 5**.
If **NO**, then proceed to **Step 22**.

5. Are you testing **DS3** or **TMUX** circuit packs?
If **DS3**, then continue with **Step 6**.
If **TMUX**, then proceed to **Step 10**.

6. See Figure 1. If local tests are being performed, the fiber loopback at the near-end **OLIU** must be in place. If end-to-end tests are being performed, do ONE of the following:

- (a) **⇒ NOTE:**
When an end-to-end DS3 test is run in the mux direction and an external loopback is established at the far end, provision the far end DS3 for CC mode with no AIS (**set-t3:address:mode=cc,ais=no**). Otherwise, if the VMR mode is used, then only errors in the receive direction will be monitored and the system may not recognize that a loopback is up.

Connect a patch cord from the **OUT** jack to the **IN** jack at the far-end DSX-3 or STSX cross-connect point associated with the DS3 channel to be tested.

- (b) Use the **rlgn** command to log in to the far-end shelf and use the **opr-lpbk-t3:address** or **opr-lpbk-ec1:address** command to loop back the DS3 or EC-1 port(s) at the far end. Use **logout** or **toggle** (ctrl t) command to return control of CIT to near end.

7. Are you doing this test in the mux or demux direction?

If **MUX** direction, then continue with **Step 8**.

If **DEMUX** direction, then proceed to **Step 10**.

8. At the near end, use the following command to perform a test of the DS3 loop in the fiber direction:

test-trmsn-t3:address:dirn=mux:dur=();

Where *address* = address identifier of the DS3 signal.

dirn = direction of the test. If **dirn=mux**, direction is toward fiber.

dur = duration of the test in minutes (1-120), default is 1.

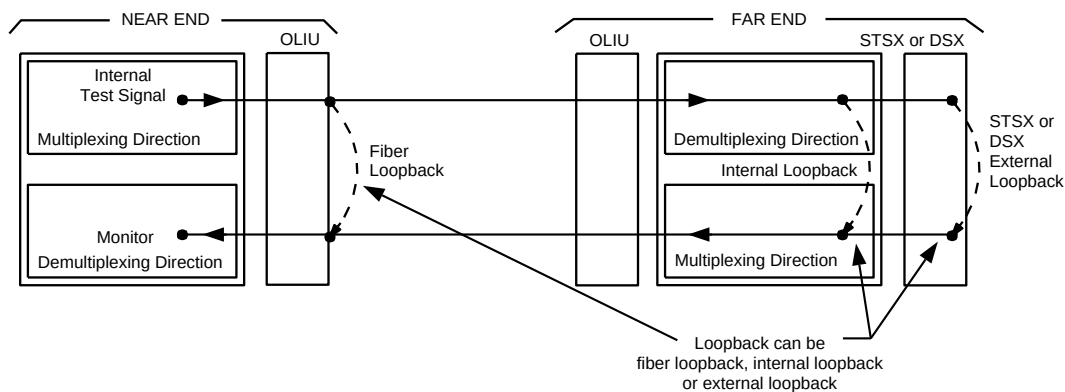


Figure 1. Transmission Test of DS3 Signal in MUX Direction

9. Was the test successful (error free)?

If **YES**, then continue with **Step 13**.

If **NO**, then proceed to **Step 35**.

10. See Figure 2. At the near-end DSX-3 cross-connection associated with the DDM-2000 being tested, connect a patch cord from the **OUT** jack to the **IN** jack for the DS3 channel to be tested.
 11. Use the following command to perform a DS3 transmission test in the demux direction to test the DS3 loop in the DSX direction:
test-trmsn-t3:address:dirn=demux:dur=();
Where *address* = address identifier of the DS3 signal.
dirn = direction of the test. If **dirn=demux**, direction is toward DSX.
dur = duration of the test in minutes (1-120), default is 1.
 12. Was the test successful (error free)?
If **YES**, then continue with **Step 13**.
If **NO**, then proceed to **Step 35**.
-

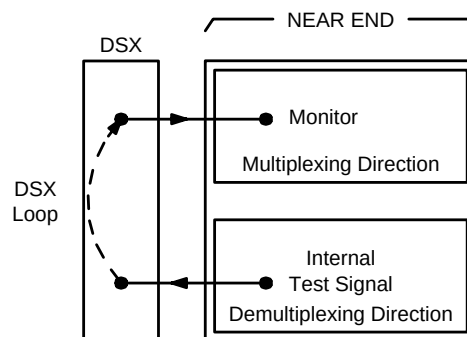


Figure 2. Transmission Test of DS3 Signal in DEMUX Direction

13. Is this the first service being placed on the group and is a protection DS3 circuit pack installed?

If **YES**, then continue with **Step 14**.

If **NO**, then proceed to **Step 18**.

14. Use the following command to switch from service to protection circuit pack:

switch-fn:address:pri=manual;

Response: The green **ACTIVE** LED lights on the protection circuit pack.

15.  **NOTE:**

If this is a single-ring configuration and the transmission test is being performed in the **mux** direction, the **switch-path** command should be used to switch the path to the other ring and then repeat this test.

Repeat the transmission test in the mux (or demux) direction using the following command:

test-trmsn-t3:address:dirn=mux (or demux):dur=();

16. Was the test successful (error free)?

If **YES**, then continue with **Step 17**.

If **NO**, then proceed to **Step 35**.

17. Use the following command to clear active switch requests:

switch-fn:address:pri=reset;

18. The DS3 circuit under test has passed the DS3 transmission test. Remove the looping patch cords from the cross-connect point. Use the **rls-lpbk-t3** command to release loopback(s) at the far end, if required.

19. At the near-end (and the far-end) DDM-2000, momentarily depress the **UPD/INIT** button (or use the **upd** command) on the **SYSCTL** to update the **SYSCTL**.

20. If violation monitor removal mode was set differently than the original mode in Step 5, reprovision the mode to the original or required setting using the **set-t3** command. Repeat this procedure from Step 2 for any additional DS3 circuits to be tested.

21. **STOP. YOU HAVE COMPLETED THIS PROCEDURE.**

22. See Figure 1. If local tests are being performed, the fiber loopback at the near-end **OLI** must be in place. If end-to-end tests are being performed, at the far-end DSX-3 or STSX cross-connect point associated with the DDM-2000 being tested, connect a patch cord from the **OUT** jack to the **IN** jack for the DS3 channel to be tested.
23.  **NOTE:**
The DS3 test set is used at the end equipped with **DS3** circuit packs and the M13 test set is used at end equipped with **TMUX** circuit packs.

At the cross-connection associated with the near-end DDM-2000, connect the DS3 or M13 test set to the **IN** and **OUT** jacks associated with the circuit under test.
24. Use the DS3 or M13 test set to test for error-free transmission.
25. Was the test successful (error free)?
If **YES**, then continue with **Step 26**.
If **NO**, then proceed to **Step 35**.
26. Is this the first service being placed on the group and is protection circuit pack installed?
If **YES**, then continue with **Step 27**.
If **NO**, then proceed to **Step 30**.
27. Unseat the service **DS3** or **TMUX** circuit pack associated with the circuit under test.
28. Repeat the DS3 transmission test with the DS3 or M13 test set.
29. Was the test successful (error free)?
If **YES**, then continue with **Step 30**.
If **NO**, then proceed to **Step 35**.
30. Reseat the **DS3** or **TMUX** circuit pack associated with the circuit under test.
31. The DS3 circuit under test has passed the DS3 transmission test. Remove the looping patch cords from the cross-connections.

32. At the near-end (and the far-end) DDM-2000, momentarily depress the **UPD/INIT** button on the **SYSCTL** to update the **SYSCTL**.
33. Repeat this procedure from Step 22 for any additional DS3 circuits to be tested.
34. **STOP. YOU HAVE COMPLETED THIS PROCEDURE.**
35. Has the **DS3** or **TMUX** circuit pack that failed been replaced?
 If **YES**, then proceed to **Step 38**.
 If **NO**, then continue with **Step 36**.
36. Replace the **DS3** or **TMUX** circuit pack that failed the test.

Reference: **DLP-523**

37. Repeat this procedure for the **DS3** or **TMUX** circuit pack that failed.
38. Trouble may be in the DSX cross-connect wiring, STS1 cross-connections in the ring network, or the shelf backplane. Use the **rtrv-crs-sts1** command to ensure proper STS1 cross-connections have been made at each shelf in the ring for the DS3 being tested. If no trouble found, check DSX cross-connect wiring and backplane connections. If other alarms or trouble indications are present, refer to **Trouble Clearing: IXL-001** to isolate the trouble. If no alarms or indications are present and a CIT is available, use the RETRIEVE commands (for example, **rtrv-alm**, **rtrv-hsty**, etc.) to check for other trouble indications.
39. **STOP. YOU HAVE COMPLETED THIS PROCEDURE.**

Activate Optional System Features Using CIT

1. Connect CIT to **CIT** connector on User Panel and establish session.

Reference: **DLP-521**

2. Refer to the "Commands and Reports" section of this user/service manual for the descriptions and syntax of the various optional features and parameters of the DDM-2000 that may be set using the CIT (see Tables A and B). These optional features and parameters can be found under numerous listings.

The following lists optional features which may be lost if the **SYSCTL** is replaced:

ent-tl1msgmap	Maps the DDM-2000 TL1 message types to the operations systems (OS) for this network element in the subnetwork. Users may change the default mapping by using this command. Users may check the current provisioning by using the rtrv-tl1msgmap command.
ent-osacgmap	Creates entries in the X.25 subnetwork application context map. This map lists the permanent virtual circuits (PVCs) and switched virtual circuit (SVC) available in the X.25 channel and maps them to operation systems (OS) application contexts. Command is available to privileged users only for all CIT or DCC ports on the shelf.
ent-ulsdcc	Provisions the user-settable fields of the network service access point (NSAP) address. Command parameters should not be changed from default values except by users who intend to provision the SONET subnetwork and partition DCC communications.
set-attr-alm	Sets alarm delay and clear delay.
set-attr-env	Names and sets alarm level of miscellaneous discrete input points at RT only.
set-attr-cont	Names miscellaneous discrete control output points at RT only.

set-date	Sets date and time.
set-fecom	Enables or disables far end communication over the data communication channel and sets Network Side/User Side parameters.
set-lgn	Enters, edits, and deletes logins and passwords. Privileged users can change other users' passwords by using this command.
set-link	Sets length of page output on the CIT.
set-ne	Sets the name [Target Identifier (TID)] of the network element. Designates the shelf as a directory services network element (DSNE) for OSI protocol. One , and only one, shelf in the subnetwork must be provisioned as a DSNE. It designates a shelf as an alarm gateway network element (AGNE) and sets alarm group numbers and sets cross-connect mode to default or manual. It designates the Site, Network Element, and Shelf numbers and designates the Central Office/Remote Terminal parameter. It sets the TBOS display address, link function, and remote reporting status. It sets the Idle Channel Signal parameter.
set-passwd	Sets or changes a users' password. All users can change their own passwords.
set-pmthres-line	Sets the thresholds of the line performance parameters. Also enables or disables the processing of the threshold crossings for these performance parameters.
set-pmthres-sect	Sets the thresholds of the section performance parameters. Also enables or disables the processing of the threshold crossings for these performance parameters.
set-pmthres-t1	Sets the thresholds of the DS1 performance parameters. Also enables or disables the processing of the threshold crossings for these performance parameters.

set-pmthres-t3	Sets the thresholds of the DS3 performance parameters. Also enables or disables the processing of the threshold crossings for these performance parameters.
set-pmthres-sts1	Sets the STS-1 path performance parameter thresholds. Available only in Release 2 or later software.
set-pmthres-vt1	Sets the thresholds of the VT1.5 path performance parameters. Also enables or disables the processing of the threshold crossings for these performance parameters.
set-secu	Sets security on each CIT port and DCC interface. Enabling security requires users to enter login and password to access the system.
set-sync	Sets synchronization mode switching to revertive or nonrevertive. After the end-to-end system is established, sets synchronization source to select the line from which shelf loop-timing and/or the DS1 sync output will be derived. Sets output mode to select the source of the DS1 sync output.

Other optional features are set from the CIT but are not lost if the **SYSCTL** is replaced.



CAUTION:

Execution of these commands may be service affecting.

These features may be found under the following listings:

ent-crs-sts1	Specifies STS-1 cross-connect routing. Used in establishing service and/or performing transmission tests.
ent-crs-vt1	Specifies VT1.5 (DS1) cross-connect routing. Used in establishing service and/or performing transmission tests.
set-ec1	Sets the characteristics of an EC-1 port.
set-feat	Enables feature options that are licensed for use: sts3c, vtpm, ds1pm.

set-oc1	Sets the characteristics of a OC-1 line. Sets the signal degrade threshold of the OC-1 line as a bit error rate (BER).
set-oc3	Sets the characteristics of an OC-3 line pair. Sets the signal degrade threshold of the OC-3 line as a bit error rate (BER). Specifies if sync message signaling uses kbyte or sbyte or is enabled or disabled. Specifies if the concatenation mode (concat) of the OC-3 line is to be independent STS-1 channels or an sts-3c channel.
set-oc12	Sets the characteristics of an OC-12 line pair. Sets the signal degrade threshold of the OC-12 line as a bit error rate (BER). Specifies if sync message signaling uses kbyte or sbyte or is enabled or disabled.
set-ow	Sets the orderwire routing for the network element.
set-state-oc1	Sets the state of OC-1 line(s) to be monitored (IS) for a good signal or not monitored (NMON).
set-state-ec1	Sets the state of a low-speed EC-1 port to be automatically monitored (AUTO) for a good signal or not monitored (NMON).
set-state-t1	Sets the state of a low-speed port to be automatically monitored (AUTO) for a good signal or not monitored (NMON).
set-state-t3	Sets the state of a DS3 port to be automatically monitored (AUTO) for a good signal or not monitored (NMON).
set-state-sts1	Sets the state of a STS-1 channel to be automatically monitored (AUTO) for a good signal or not monitored (NMON).
set-state-vt1	Sets the state of a VT1.5 channel to be automatically monitored (AUTO) for a good signal or not monitored (NMON).
set-sts1	Sets the signal degrade characteristics of an STS-1 channel.

set - t1	Sets the characteristics of a DS1 port.
set - t3	Sets the characteristics of a DS3 port.
set - vt1	Sets the signal degrade characteristics of a VT1.5 channel.
set - x25	Sets the packet size of X.25 link to either 128 or 256.

3. Determine options required from office records.
4. Set options using the syntax of the "Commands and Reports" section in this manual.
5. **STOP. YOU HAVE COMPLETED THIS PROCEDURE.**

Table A. DDM-2000 OC-3 Parameters Provisionable Via 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
DSNE ¶¶	yes, no	no	set -ne
Alarm group number	1-255	255	set -ne
AGNE	yes, no	no	set -ne
Site number	1-64	64	set -ne
Network element #	1-5	5	set -ne
Shelf number	1-8	1	set -ne
Cross-connect mode §§	default, manual	default	set -ne
CO/RT select	CO, RT	RT	set -ne
TBOS address	1-8	1	set -ne
TBOS link	normal, primary, secondary, no TBOS	no TBOS	set -ne
TBOS remote	enabled, disabled	disabled	set -ne
IdleChannelSignal	AIS, Uneqpd.	AIS	set -ne
CIT page length	0 (pager off), 3-150 rows	24	set -link
PM thresholds	See PM Table	-	set -pmthres
Alarm holdoff delay	0-30 sec	2	set -attr -alm
Alarm clear delay	0-30 sec	15	set -attr -alm
Power minor almn. level	MN, MJ	MN	set -attr -alm
OC1 degrade threshold	10^{-5} to 10^{-9}	10^{-6}	set -oc1
AIS almn. level of NSA OC-1			
AIS alarm	CR, MJ, MN, NA	NA	set -oc1
OC3 degrade threshold	10^{-5} to 10^{-9}	10^{-6}	set -oc3
Kbyte¶¶¶¶	enabled, disabled	enabled	set -oc3
Sync messaging	K byte, S byte, disabled	K byte	set -oc3
Concatenation mode §§	enabled, disabled	disabled	set -oc3
Radio for MegaStar**** 2000	yes, no	no	set -oc3
AIS almn. level of NSA OC-3			
Line AIS	CR, MJ, MN, NA	NA	set -oc3
OC12 degrade threshold§§§	10^{-5} to 10^{-9}	10^{-6}	set -oc12
Kbyte¶¶¶¶	enabled, disabled	enabled	set -oc12
Sync messaging§§§	K byte, S byte, disabled	K byte	set -oc12
AIS almn. level of NSA OC-12			
Line AIS§§§	CR, MJ, MN, NA	NA	set -oc12
Orderwire* (E1-Only)	thru, e1dropmain, e1dropfnc, eldropmain1, eldropmain2	e1dropmain (Linear) thru (Ring)	set -ow set -ow set -ow
Orderwire* (Multiplexed)	thru, muxdrop	muxdrop (Linear) muxdrop (Ring)	set -ow set -ow

See notes and footnotes at end of table.

Table A. DDM-2000 Parameters Provisionable Via the CIT (Contd)

Parameter	Range	Default (Note 1)	Command (Note 2)
STS-1 path signal degrade threshold †††	10^{-5} to 10^{-9}	0 (disabled)(R9.0)	set-sts1
STS-1 path signal failure	10^{-3} to 10^{-6}	-6 (R9.1 & Later)	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†††	NMON, IS	IS	set-state-oc1
VT1.5 path signal degrade threshold***	10^{-5} to 10^{-8}	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 AIS alm.†	CR, MJ, MN, NA	NA	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 Xbit†	1, 0	1	set-t3
DS3 port state†	NMON, AUTO‡	AUTO	set-state-t3
DS1 line coding†	AMI, B8ZS, noOverride§	noOverride	set-t1
DS1 alarm level†	MJ, MN, NA	NA	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 AIS insertion†	yes, no	yes	set-t1
DS1 PM Mode†	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, NA	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
Far end communication over DCC	enabled, disabled	enabled	set-fecom**
DCC identity for OSI ntws.	userside, networkside	see command pgs.	set-fecom**
Set security	enabled, disabled, lockout	disabled	set-secu**
CIT/DCC security	enabled, disabled, lockout	disabled	set-secu**
CIT/DCC timeout (minutes)	0-120	15	set-secu**

See notes and footnotes at end of table.

Table A. DDM-2000 Parameters Provisionable Via the CIT (Contd)

Parameter	Range	Default (Note 1)	Command (Note 2)
SYNC mode switching	revertive, nonrevertive	revertive	set - sync
Sync Timing Source §§ ‡‡	main, fn-c,	main	set - sync
Sync Output Mode §§	lock1, lock2, track¶	track	set - sync
AIS Threshold	level 5, level 4, level 3. level 2	level 5	set - sync
Sync Timing Source †† ‡‡	main-1, main-2, fn-c	main-1	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 - state - ec1
Feature package **	enabled, disabled	disabled	set - feat
VT PM, DS1 PM, or STS3c			
X.25 packet size	128, 256	256	set - x25
NSAP			
OrganizationID (Operator ID)	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.	PVC, SVC	PVC	ent - osacmap
SNPA: LCN for PVCs	LCN, DTE	see command pgs.	ent - osacmap
or DTE address for SVC	see command pgs.	see command pgs.	ent - osacmap
OS type (ACID)	see command pgs.	see command pgs.	ent - osacmap
ACID (OS type or funct.)	see command pgs.		ent - tl1msgmap
TL1 message type	see command pgs.		ent - tl1msgmap
Action to assoc. message type to OS	enabled, disabled	enabled	ent - tl1msgmap
Cross-connection type	twoway, dc, locked	twoway	ent - crs - sts1
Ring ID for drop&continue	m1, m2	see command pgs.	ent - crs - sts1
Cross-connection type	twoway, dc, locked	twoway	ent - crs - vt1
Ring ID for drop&continue	m1, m2	see command pgs.	ent - crs - vt1
Outgoing STS-1 path trace message	62 characters	see command pgs.	set - trace - sts1
Expected STS-1 path trace message	62 characters	see command pgs.	set - trace - sts1

See notes and footnotes at end of table.

Table A. DDM-2000 Parameters Provisionable Via the CIT (Contd)

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-**.
- * **BBG10 OHCTL** required for Release 8.1 and 9.1. MegaStar**** applications only.
- † Parameter can be set for each port.
- ‡ AUTO means the port or channel is ready to be automatically provisioned via signal detection.
- § noOverride means read and use switch settings on circuit pack.
- ¶ Track means the source for timing will be selected from the active received OC-3 line specified.
- ** This command is available to privileged users only.
- †† Rings.
- ‡‡ Setting this parameter also affects DS1 output source and DS1 sync output mode. See **set-sync** command in Section 11, "Commands and Reports".
- §§ Linear releases.
- ¶¶ One and only one shelf in a subnetwork must be set to "yes" for proper DCC communications.
- ***
Parameters can be set for each channel.
- †††
Ring releases. Requires **22D-U/22G-U/22G2-U/22G3-U OLIUs**.
- ‡‡‡
Ring releases.
- §§§
With **24G-U OLIUs** in **MAIN** slots.
- ¶¶¶
Applicable to OC-3 Release 8.0 and 9.0 and OC-12 Release 5.0 only.
-

Table B. DDM-2000 OC-3 Performance Monitoring Parameters Provisionable Via the CIT

Parameter Definition		Threshold Range [Default]		Command
Facility	Measure	Current Quarter Hour	Current Day	set-pmthres-
OC-3 Optics	Optical Transmit Power* (21G/21G-U only)	-1 dB, -2 dB	-1 dB, -2 dB	sect
	Laser Bias Current* (21G/21G-U only)	enable/disable	enable/disable	sect
OC-12 Section	SE Frame Seconds (SEFS)	1-63[10]	1-4095[30]	sect
OC-3 Section	SE Frame Seconds (SEFS)	1-63[10]	1-4095[30]	sect
OC-1 Section	SE Frame Seconds (SEFS)	1-63[10]	1-4095[30]	sect
OC-12 Line	B2 Coding Violations (CV)	1-55365[5537]	1-5315040[531504]	line
	B2 Errored Seconds (ES)	1-900[40]	1-65535[900]	line
	B2 Errored Seconds Type A (ESA)	1-900[30]	1-65535[90]	line
	B2 Errored Seconds Type B (ESB)	1-900[30]	1-65535[90]	line
	B2 Severely Errored Seconds (SES)	1-63[20]	1-4095[60]	line
	B2 Unavailable Seconds (UAS)	1-63[30]	1-4095[90]	line
	Line Protection Switch Counts (PSC-L)	1-63[2]	1-255[4]	line
	STS Pointer Justification (PJC)	1-65535[60]	1-9999999[5760]	line
OC-3 Line	B2 Coding Violations (CV)	1-13841[1384]	1-1328736[132874]	line
	B2 Errored Seconds (ES)	1-900[40]	1-65535[900]	line
	B2 Errored Seconds Type A (ESA)	1-900[30]	1-65535[90]	line
	B2 Errored Seconds Type B (ESB)	1-900[30]	1-65535[90]	line
	B2 Severely Errored Seconds (SES)	1-63[20]	1-4095[60]	line
	B2 Unavailable Seconds (UAS)	1-63[30]	1-4095[90]	line
	Line Protection Switch Counts (PSC-L)	1-63[2]	1-255[4]	line
	STS Pointer Justification (PJC)	1-65535[60]	1-9999999[5760]	line
OC-1 Line	B2 Coding Violations (CV)	1-4613[461]	1-442848[44285]	line
	B2 Errored Seconds (ES)	1-900[40]	1-65535[900]	line
	B2 Errored Seconds Type A (ESA)	1-900[30]	1-65535[90]	line
	B2 Errored Seconds Type B (ESB)	1-900[30]	1-65535[90]	line
	B2 Severely Errored Seconds (SES)	1-63[20]	1-4095[60]	line
	B2 Unavailable Seconds (UAS)	1-63[30]	1-4095[90]	line
	Line Protection Switch Counts (PSC-L)	1-63[2]	1-255[4]	line
	STS Pointer Justification (PJC)	1-65535[60]	1-9999999[5760]	line
EC-1 Line	B2 Coding Violations (CV) EC-1	1-4613[461]	1-442848 [44285]	line
	B2 Errored Seconds (ES)	1-900[40]	1-65535[900]	line
	B2 Errored Seconds Type A (ESA)	1-900[30]	1-65535[90]	line
	B2 Errored Seconds Type B (ESB)	1-900[30]	1-65535[90]	line
	B2 Severely Errored Seconds (SES)	1-63[20]	1-4095[60]	line
	B2 Unavailable Seconds (UAS)	1-63[30]	1-4095[90]	line
	Line Protection Switch Counts (PSC-L)	1-63[2]	1-255[4]	line
	STS Pointer Justification (PJC)	1-65535[60]	1-9999999[5760]	line
STS-1 Path	B3 Coding Violations (CV)	1-4510[451]	1-432960 [43296]	sts1
	B3 Errored Seconds (ES)	1-900[40]	1-65535[900]	sts1
	B3 Errored SecondsType A (ESA)	1-900[30]	1-65535[90]	sts1
	B3 Errored SecondsType B (ESB)	1-900[30]	1-65535[90]	sts1
	B3 Severely Errored Seconds (SES)	1-63[20]	1-4095[60]	sts1
	B3 Unavailable Seconds (UAS)	1-63[30]	1-4095[90]	sts1

See footnotes at end of table.

Table B. Performance Monitoring Parameters Provisionable Via the CIT (Contd)

Parameter Definition		Threshold Range [Default]		Command
Facility	Measure	Current Quarter Hour	Current Day	set - pmthres
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]	t3
	ES-P Errored Seconds	1-900[25]	1-65535[250]	t3
	SES-P Severely Errored Seconds	1-63[4]	1-4095[40]	t3
	UAS-P Unavailable Seconds	1-63[10]	1-4095[10]	t3
	SEFS Severely Errored Seconds	1-63[2]	1-4095[8]	t3
	CV-FM Coding Violations	1-16383[40]	1-1048575[3820]	t3
	CP Coding Violations	1-16383[40]	1-1048575[3820]	t3
DS3 Line	CV-L Coding Violations	1-16383[40]	1-1048575[3865]	t3
	Errored Seconds, Line (ES-L)	1-900[25]	1-65535[250]	t3
	Severely Errored Seconds, Line (SES-L)	1-63[4]	1-4095[40]	t3
VT1.5 Path	V5 Errored Seconds (ES)	1-900 [40]	1-65535 [900]	vtl
	V5 Severely Errored Seconds (SES)	1-63[20]	1-4095 [60]	vtl
	V5 Unavailable Seconds (UAS)	1-63[30]	1-4095 [90]	vtl
DS-1 Path	CV-P (SF) Coding Violations	1-16383[72]	1-1048575 [691]	tl
	CV-P (ESF) Coding Violations	1-16383[13296]	1-1048575 [132960]	tl
	ES-P Errored Seconds	1-900[65]	1-65535 [648]	tl
	SES-P Severely Errored Seconds	1-63[10]	1-4095 [100]	tl
	UAS-P Unavailable Seconds	1-63[10]	1-4095 [10]	tl
	CV-PFE Coding Violations	1-16383[13296]	1-1048575 [132960]	tl
	ES-PFE Errored Seconds	1-900[65]	1-65535 [648]	tl
	SES-PFE Severely Errored Seconds	1-63[10]	1-4095 [100]	tl
	UAS-PFE Unavailable Seconds	1-63[10]	1-4095 [10]	tl
DS-1 Line	ES-L Line Errored Seconds	1-900[65]	1-65535 [648]	tl

* Threshold is set once for both current quarter hour and current day.

Set Circuit Pack Options

1.  **NOTE:**
When a replacement circuit pack (except the **SYSCTL**) is configured the same as the original circuit pack, it may be inserted with no further action. When a replacement circuit pack is different (different code or different switch options) from the original, the **SYSCTL UPD/INIT** button must be momentarily depressed (or use the "update" command) to update the inventory.

Find the circuit pack in Table A and go to the indicated step. If you were sent here from another procedure, return to that procedure after setting options.

Table A. Circuit Packs

Circuit Pack	Step
BBG8/BBG8B SYSCTL	Step 2
BBG9 OHCTL*	—
BBG10 OHCTL	Step 8
BBF2 TGS	Step 10
BBF2B TGS	Step 14
BBF5 JMPR*	—
21G/21G-U OLIU	Step 19
21G2-U/21D/21D-U OLIU*	—
22D-U/22F/22F-U/22F2-U OLIU*	—
22G-U/22G2-U/22G3-U/24G-U OLIU*	—
26G2-U/27G-U/27G2-U OLIU*	—
BBG2 MXRVO*	—
BBG4/BBG4B/BBG19 DS3	Step 21
BBG20 TMUX	Step 21
BBF1/BBF1B DS1	Step 24
BBF3/BBF3B DS1PM	Step 24
BBG6 STS1E	Step 28
BBF8 HDSL	Step 33
177A Retainer Card*	—

*There are no option switches on these circuit packs.

SYSCTL

2. **⇒ NOTE:**

The **BBG8/BBG8B SYSCTL** is required for Releases 8, 9, or later.

Determine the desired **SYSCTL** option switch settings from office records and see Figure 1.

3. **⇒ 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.

4. If **SYSCTL** is being installed in shelf for the first time (initial shelf turnup, only **OHCTL** installed at this time) and switches have not been set, set TBOS termination switch **S2-1** per Table B. See Figure 1.

Table B. SYSCTL Switch 2 (S2)
TBOS Link Terminator

Shelf Position	Switch
	S2-1
Last	ON
Not Last	OFF

5. Set all remaining **S2** switch sections, **S2-2**, **S2-3**, **S2-4**, **S2-5**, **S2-6**, **S2-7**, and **S2-8** to **OFF**. See Figure 1.
6. Set all **SYSCTL S1** switch sections, **S1-1**, **S1-2**, and **S1-3** to **OFF**, to set the product (shelf) type.

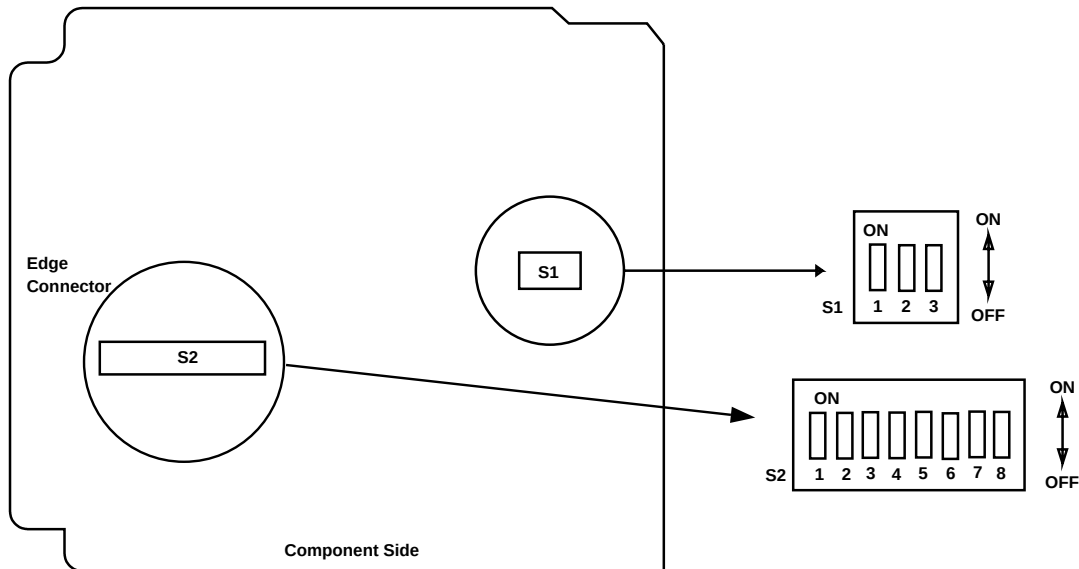


Figure 1. SYSCTL Option Settings

7. STOP. YOU HAVE COMPLETED THIS PROCEDURE.

BBG10 OHCTL

8. Set orderwire option jumper on **BBG10** plug **P3** for type of orderwire interface required (Multiplexed or E1-only). See Figure 2.
-

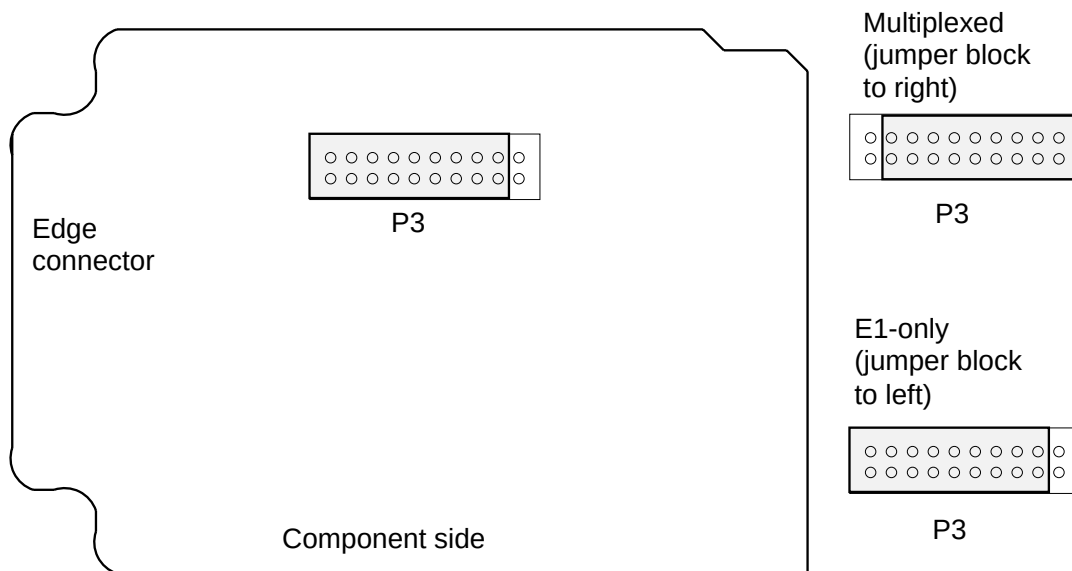


Figure 2. BBG10 OHCTL Option Settings

9. **STOP. YOU HAVE COMPLETED THIS PROCEDURE.**

BBF2 TGS

10. ➤ **NOTE 1:**
The timing mode of all nodes should be checked before the system is placed in service. Improper timing modes may cause the system to act unpredictably or cause a service interruption (for example, if all nodes are set to line timed mode).
- **NOTE 2:**
The **BBF2 TGS** timing mode may be provisioned as *Free Running*, *DS1 External*, or *Line Timed*. In free-running mode, the **BBF2 TGS** gets timing from an oscillator on the **BBF2 TGS**. In external timing, the **BBF2 TGS** gets timing from an external DS1 reference input. In line-timed mode, the **BBF2 TGS** gets timing from an **OLI**U from a reference clock recovered from the received OC-3 line rate signal.
- **NOTE 3:**
Table C depicts all the possible timing topologies which can be encountered on adjacent network elements (NE) with some comments or cautionary notes on their application.

Table C. BBF2 TGS Synchronization Provisioning Topologies

NE 1	NE 2	Application Comments
Free Running	Free Running	This topology is not supported. Both systems are operating asynchronously from each other.
Free Running	Line Timing	This topology is allowed but results in having a SONET subnetwork operating asynchronously with respect to other NE's in the network. The NE's deriving timing off the NE provisioned for Free Running will be synchronized to it but not to a PRS on the network. If automatic synchronization reconfiguration is supported and enabled in a system, the NE 2 system will attempt to switch to another better quality line timing source, if available.
Free Running	External - Mult	This timing topology is not supported. The two network elements will be operating asynchronously from each other.
External - Mult	Line Timing	This topology is used when one of the NE's does not have access to an external synchronous reference and needs to be synchronized to an NE whose timing is traceable to a PRS. The NE provisioned for Line Timing will derive its timing from the NE provisioned for External - Mult timing thus operating synchronously with that respective NE. The NE provisioned for External - Mult timing could use its DS1 output to distribute its incoming DS1 timing reference to other shelves in the bay to conserve ports on the BITS.
External - Mult	External - Mult	This topology is used when both NE's have access to and are receiving its timing from BITS clocks. The recommendation is to have these BITS synchronized to references which are traceable to the same PRS. If these guidelines are followed the subnetwork created by these two NE's would be operating synchronously. Note: DDM-2000 systems are designed to operate in pleisiochronous timing topologies. The DS1 output generated by each NE is regenerated from the input DS1 timing reference and could be used to distribute this reference to other shelves colocated in the same bay to conserve ports on the BITS.

Table C. BBF2 TGS Synchronization Provisioning Topologies (Contd)

NE 1	NE 2	Application Comments
Line Timing	Line Timing	Caution! This topology creates a timing loop and it is not supported. The NE with access to an external timing reference traceable to a PRS, if available, should be provisioned for External - Mult. If the reference available is an optical reference provision to Line Timing with the proper source using the " set - sync " command. If automatic synchronization reconfiguration is supported and enabled in a system, both NEs will attempt to switch to another line timing source, if available, to prevent a timing loop.

⇒ NOTE 4:

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.

Determine the timing mode from work order or office records. Refer to Table D and Figure 3 and set the timing mode as required for the **TGS** circuit pack(s).

Table D. BBF2 TGS Timing Mode Switch Setting

Timing Mode	Switch S1 Settings	
	S1-3	S1-4
Free Running	ON	ON
DS1 External, MULT Mode	OFF	ON
Line Timed	ON	OFF
Invalid*	OFF	OFF

* If an invalid setting is selected, **FAULT** LED is lighted and an alarm is generated ("unexpected CP type" or "unexpected CP switches")

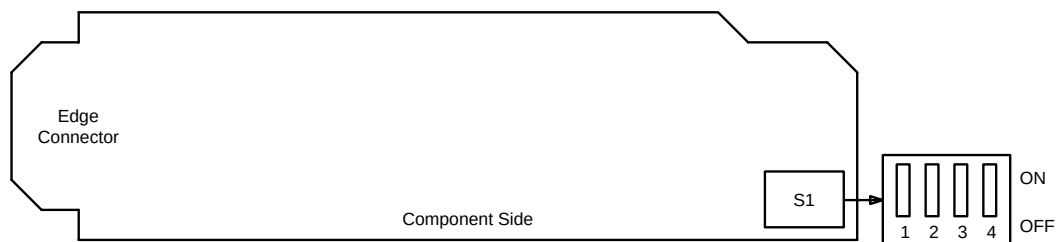


Figure 3. BBF2 TGS Option Switch

11. **⇒ NOTE:**
Switches **S1-1** and **S1-2** are ignored by the system the first time the **TGS** is installed unless the timing mode is set to *DS1 External*. Subsequent removal or replacement of the **TGS** requires that switches **S1-1** and **S1-2** be set the same as the original settings or an update ("upd") command must be performed.

Is timing mode set to *DS1 External*?

If **YES**, then continue with **Step 11**.

If **NO**, **STOP. YOU HAVE COMPLETED THIS PROCEDURE.**

12. Refer to Table E and Figure 3 and set the DS1 line coding and frame format as required for the **TGS** circuit pack.

Table E. BBF2 TGS DS1 Line Coding and Frame Format Switch Settings

DS1 Line Code	Switch	DS1 Frame Format	Switch
	S1-1		S1-2
AMI	ON	SF	ON
B8ZS	OFF	ESF	OFF

13. **STOP. YOU HAVE COMPLETED THIS PROCEDURE.**

BBF2B TGS

14.  **NOTE 1:**
The timing mode of all nodes should be checked before the system is placed in service. Improper timing modes may cause the system to act unpredictably or cause a service interruption (for example, if all nodes are set to line timed mode).

 **NOTE 2:**
The **BBF2B TGS** timing mode may be provisioned as *Free Running*, *DS1 External*, or *Line Timed*. In free-running mode, the **BBF2B TGS** gets timing from an oscillator on the **BBF2B TGS**. In external timing mode, the **BBF2B TGS** gets timing from an external DS1 reference input.

 **NOTE 3:**
In line-timed mode, the **BBF2B TGS** gets timing from a reference clock recovered from a received OC-3 line rate signal. Either the **MAIN 1**, **MAIN 2(P)**, or **FUNCTION UNIT C OLIU** can be selected as the synchronization source using the command
`"set-sync:src={main,main-1,main-2,fn-c};"`.

 **NOTE 4:**
Table F depicts all the possible timing topologies which can be encountered on adjacent network elements (NE) with some comments or cautionary notes on their application. When the NE is provisioned for line timing or with the DS1 output in SYNC OUT mode, the assumption is that the NE is deriving its timing from the optical interface shared between the two NE's.

Table F. BBF2B TGS Synchronization Provisioning Topologies

NE 1	NE 2	Application Comments
Free Running	Free Running	This topology is not supported. Both systems are operating asynchronously from each other.
Free Running	Line Timing	This topology is allowed but results in having a SONET subnetwork operating asynchronously with respect to other NE's in the network. The NE's deriving timing off the NE provisioned for Free Running will be synchronized to it but not to a PRS on the network. If automatic synchronization reconfiguration is supported and enabled in a system, the NE 2 system will attempt to switch to another better quality line timing source, if available.
Free Running	Line Timing - Sync Out	This topology, although not recommended, results in having a SONET subnetwork operating asynchronously with respect to other NE's in the network. The NE's deriving timing off the NE provisioned for Free Running will be synchronized to it but not to the rest of the network. The DS1 timing output is normally used to synchronize other NE's to a PRS. In this topology the timing of the Free Running NE is being distributed by the use of the DS1 output timing reference in the absence of Synchronization Messaging. In the presence of Synchronization Messaging, the DS1 output will carry DS1 AIS. If automatic synchronization reconfiguration is supported and enabled in a system, the NE 2 system will attempt to switch to a better quality line timing source, if available.
Free Running	External - Mult	This timing topology is not supported. The two network elements will be operating asynchronously from each other.
Free Running	External - Sync Out	This timing topology is not supported. The two network elements will be operating asynchronously from each other.
External - Mult	Line Timing	This topology is used when one of the NE's does not have access to an external synchronous reference and needs to be synchronized to an NE whose timing is traceable to a PRS. The NE provisioned for Line Timing will derive its timing from the NE provisioned for External - Mult timing thus operating synchronously with that respective NE. The NE provisioned for External - Mult timing could use its DS1 output to distribute its incoming DS1 timing reference to other shelves in the bay to conserve ports on the BITS.

Table F. BBF2B TGS Synchronization Provisioning Topologies (Contd)

NE 1	NE 2	Application Comments
External - Mult	Line Timing - Sync Out	This topology is used when one of the NE's does not have access to an external synchronous reference, needs to be synchronized to an NE whose timing is traceable to a PRS, and timing is needed to be distributed where NE 2 is located. The NE provisioned for Line Timing - Sync Out will derive its timing from the NE provisioned for External - Mult timing thus operating synchronously with that respective NE. Its DS1 output could serve as a reference to distribute timing to a BITS in that CO. The NE provisioned for External - Mult timing could use its DS1 output to distribute its incoming DS1 timing reference to other shelves in the bay to conserve ports on the BITS.
External - Sync Out	Line Timing	Caution! This topology might create a timing loop. In this topology the NE provisioned for Line Timing will derive its timing from the NE provisioned for External - Sync Out timing thus operating synchronously with that respective NE. The NE provisioned for External - Sync Out should be reprovisioned for External - Mult to prevent the potential timing loop existing in the actual provisioning. If Synchronization Messaging is enabled on both NE's, the DS1 output reference of the NE provisioned for External - Sync out will carry an unframed all ones DS1 signal (DS1 AIS) in the present topology. If automatic synchronization reconfiguration is supported and enabled in a system, both NEs will attempt to break the potential timing loop. NE 1 will attempt to break the loop by inserting DS1 AIS on its DS1 output port. NE 2 will attempt to switch to another line timing source, if available, to prevent the timing loop.

Table F. BBF2B TGS Synchronization Provisioning Topologies (Contd)

NE 1	NE 2	Application Comments
External - Sync Out	Line Timing - Sync Out	Caution! This topology might create a timing loop. In this topology the NE provisioned for Line Timing will derive its timing and that of the DS1 output reference from the NE provisioned for External - Sync Out timing thus operating synchronously with that respective NE. The NE provisioned for External - Sync Out should be reprovisioned for External - Mult to prevent the timing loop existing in the actual provisioning. If Synchronization Messaging is enabled on both NE's, the DS1 output reference on NE 1 will carry DS1 AIS and NE 2 will derive its timing and that of the DS1 output port from NE 1. If automatic synchronization reconfiguration is supported and enabled in a system, both NEs will attempt to break the potential timing loop. NE 1 will attempt to break the loop by inserting DS1 AIS on its DS1 output port. NE 2 will attempt to switch to another line timing source, if available, to prevent the timing loop.
External - Mult	External - Mult	This topology is used when both NE's have access to and are receiving its timing from BITS clocks. The recommendation is to have these BITS synchronized to references which are traceable to the same PRS. If these guidelines are followed the subnetwork created by these two NE's would be operating synchronously. Note: DDM-2000 systems are designed to operate in pleisiochronous timing topologies. The DS1 output generated by each NE is regenerated from the input DS1 timing reference and could be used to distribute this reference to other shelves colocated in the same bay to conserve ports on the BITS.
External - Mult	External - Sync Out	This topology is used to distribute network timing to a target location from a location with access to a synchronization reference. The NE provisioned for External - Mult, is providing timing to the NE provisioned for External - Sync Out, which in turn generates a DS1 output reference regenerated from the optical interface shared by both NE's. This DS1 output is used to provide a synchronization reference to a BITS.

Table F. BBF2B TGS Synchronization Provisioning Topologies (Contd)

NE 1	NE 2	Application Comments
External - Sync Out	External - Sync Out	Caution! This topology can potentially create a timing loop if synchronization messaging is not enabled on both NE's. In this topology both NE's will derive the DS1 output reference from each other thus creating a timing loop. The NE with access to a BITS, which has an input reference traceable to a PRS, and is sourced from an element other than this NE, should be reprovisioned for External - Mult to prevent the timing loop. If Synchronization Messaging is enabled on both NE's, the DS1 output reference in one of the NE's will carry DS1 AIS and the other NE will generate a DS1 output carrying a framed DS1 all ones signal.
Line Timing	Line Timing	Caution! This topology creates a timing loop and it is not supported. The NE with access to an external timing reference traceable to a PRS, if available, should be provisioned for External - Mult. If the reference available is an optical reference provision to Line Timing with the proper source using the " set - sync " command. If automatic synchronization reconfiguration is supported and enabled in a system, both NEs will attempt to switch to another line timing source, if available, to prevent a timing loop.

➡ **NOTE 5:**

To set switch to ON, depress rocker or slide switch toward side labeled **ON** in figure. To set switch to OFF, depress rocker or slide switch toward side labeled **OFF** in figure.

Determine timing mode from work order or office records. Refer to Table G and Figure 4 and set timing mode as required for **BBF2B TGS** circuit pack(s).

Table G. BBF2B TGS Timing Mode Switch Settings

Timing Mode	Switch S1 Settings		
	S1-3	S1-4	S1-5 (DS1 Output)
Free Running*	ON	ON	OFF
DS1 External, MULT Mode	OFF	ON	OFF
Line Timing, MAIN†	ON	OFF	OFF
Line Timing, 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

* Factory default.

† Main **OLI** is default; **FUNCTION UNIT C** by "set - sync" command.

‡ If an invalid setting is selected, **FAULT** LED is lighted and an alarm is generated ("unexpected CP type" or "unexpected CP switches").

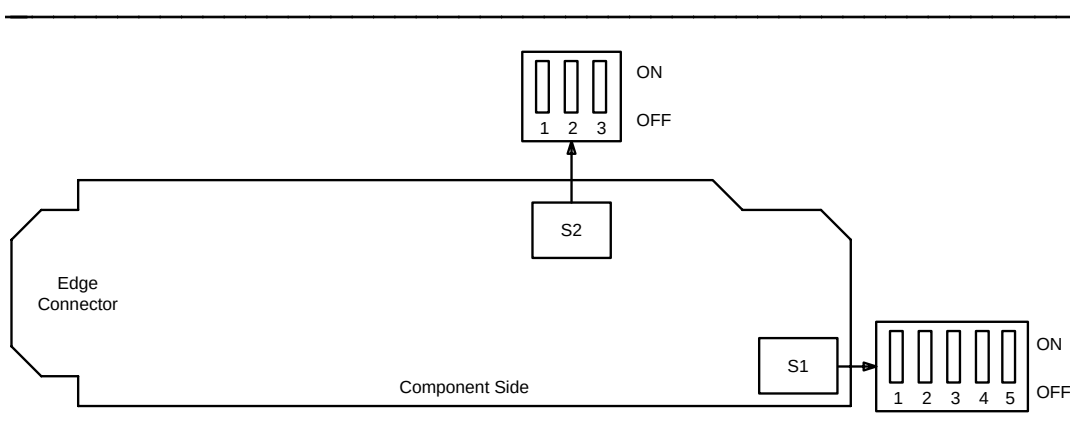


Figure 4. BBF2B TGS Option Switch

15. If the **BBF2B TGS** is provisioned for *sync out mode*, refer to Table H and Figure 4 and set equalizer switches for the proper cable length.

Table H. Equalizer Switch Settings

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

* If an invalid setting is selected, **FAULT** LED is lighted and an alarm is generated ("unexpected CP type" or "unexpected CP switches").

16. **⇒ NOTE:**
Switches **S1-1** and **S1-2** are ignored by the system the first time the **TGS** is installed unless the timing mode is set to *DS1 External* or *Line Timing sync out mode*. Subsequent removal or replacement of the **TGS** requires that switches **S1-1** and **S1-2** be set the same as the original settings or an update ("**upd**") command must be performed.

Is timing mode set to either *DS1 External* or *Line Timed sync out*?

If **YES**, then continue with **Step 16**.

If **NO**, then **STOP. YOU HAVE COMPLETED THIS PROCEDURE.**

17. Refer to Table I and Figure 4 and set the DS1 line coding and frame format as required for the **TGS** circuit pack.

Table I. BBF2B TGS DS1 Line Coding and Frame Format Switch Settings

DS1 Line Code	Switch	DS1 Frame Format	Switch
	S1-1		S1-2
AMI	ON	SF	ON
B8ZS	OFF	ESF	OFF

18. **STOP. YOU HAVE COMPLETED THIS PROCEDURE.**

21G/21G-U OLIU

19.



WARNING:

Use of controls or adjustments or performance of procedures other than those specified herein may result in hazardous radiation exposure. Unterminated optical connectors may emit invisible laser radiation. Do not view beam with optical instruments. Avoid direct exposure to the beam.



CAUTION:

*Before installing **OLIUs**, ensure all optical fiber connectors and couplings have been properly cleaned [DLP-527]. Signal performance may be degraded if the connectors and couplings are not cleaned properly.*



NOTE 1:

The **HIGH/LOW POWER** option switch on the **21G/21G-U OLIU** must be set to the **LOW POWER** position when the **OLIU** is looped on itself.



NOTE 2:

It is assumed that the loss of the optical facility is known from office records or that a measurement has been made.

Refer to Table J and Figure 5 and set the **HIGH/LOW POWER** option switch to proper setting.

Table J. 21G/21G-U OLIU Option Switch

Facility Loss	Transmitter Switch
0 - 6 dB	LOW Power
Greater than 6 dB	HIGH Power

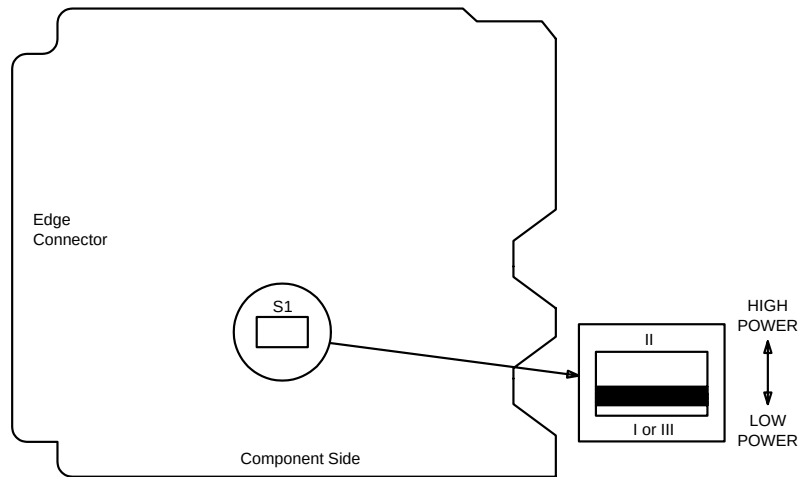


Figure 5. 21G/21G-U OLIU Option Switch

20. **STOP. YOU HAVE COMPLETED THIS PROCEDURE.**

BBG4/BBG4B/BBG19 DS3/BBG20 TMUX

21. Determine from office records the length of the DS3 cabling between the DDM-2000 and the DSX-3 cross-connect point.
22. **⇒ NOTE:**
The only option settings on the **DS3/TMUX** circuit pack are the LBO settings shown in Figure 6. If there are other jumpers on the circuit pack similar to the LBO jumpers, they are factory test points and should be ignored.

Install the **DS3** option jumpers per Table K and Figures 6 and 7.

Table K. DS3 LBO Settings

Cable Length (Ft)		LBO Setting
734D Cable	735A Cable	
0 to 225	0 to 125	LBO IN (ON)
>225 to 450	>125 to 250	LBO OUT

23. **STOP. YOU HAVE COMPLETED THIS PROCEDURE.**

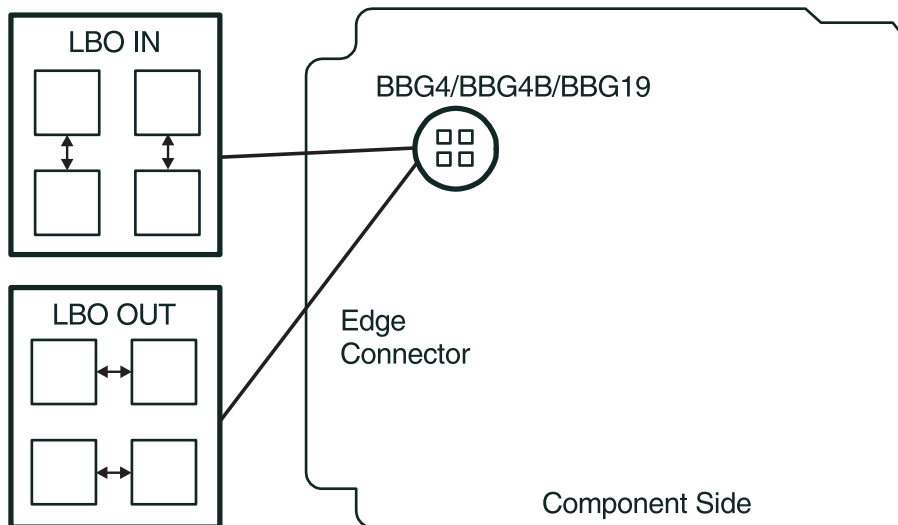


Figure 6. BBG4/BBG4B/BBG19 DS3 Option Settings

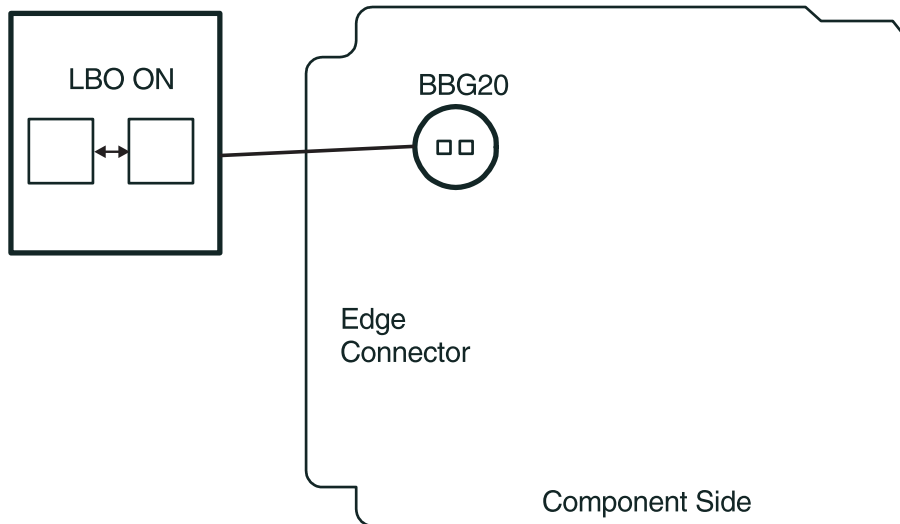


Figure 7. BBG20 TMUX Option Settings

BBF1/BBF1B DS1/BBF3/BBF3B DS1PM

24. Determine from office records the length of the DS1 cabling between the DDM-2000 and the DSX-1 cross-connect point.
25.  **NOTE 1:**
Switch 1, sections 1 through 3 (**S1-1, S1-2, S1-3**), are set according to the length of DS1 cabling between the DDM-2000 and the DSX-1 cross-connection. 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**) is unused and ignored by the system.
-  **NOTE 2:**
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.

Refer to Table L and Figure 8 and set LBO option switches.

Table L. DS1/DS1PM Cable LBO Settings

613C (608C) Cable Length (feet)	1249C Cable Length (feet)	Other Cable dB Loss at 772 kHz	Switch S1 Settings (Note)		
			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

Note: Invalid switch settings will cause the **FAULT** LED to light and a "DS1 CP failed" alarm.

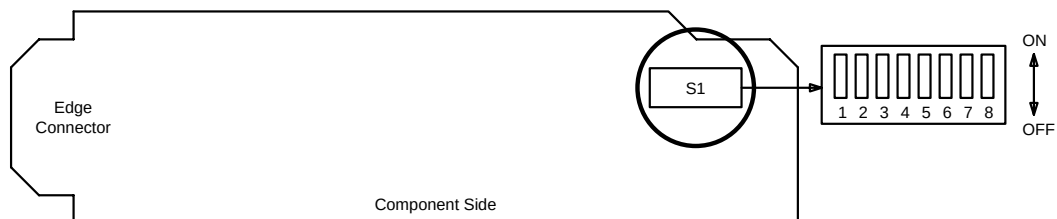


Figure 8. DS1/DS1PM Option Settings

26. **NOTE:**
It is recommended that a policy be established to set line coding either using the option switches OR using the "**set -t1**" command. If line code (lc) parameters are set using the "**set -t1**" command, the circuit pack switch settings will have no effect. The "**rtrv -t1**" command may be used to check line code settings.

Refer to Table M and Figure 8 and set the line code option switches, if required.

Table M. DS1/DS1PM Line Code Settings

Line Code Format	Switch S1 Settings				
	S1-4 (Port 1)	S1-5 (Port 2)	S1-6 (Port 3)	S1-7 (Port 4)	S1-8 (Note)
B8ZS	OFF	OFF	OFF	OFF	OFF
AMI	ON	ON	ON	ON	

Note: Switch 1, section 8 (**S1-8**) is unused and ignored by the system.

27. **STOP. YOU HAVE COMPLETED THIS PROCEDURE.**

BBG6 STS1E

28. Determine from office records the length of the STS1E cabling between the DDM-2000 and the STSX cross-connect point.
29. Install the **STS1E** option jumpers per Table N and Figure 9.

Table N. STS1E LBO Settings

Cable Length (Ft)		
734D Cable	735A Cable	LBO Setting
0 to 225	0 to 125	LBO IN
>225 to 450	>125 to 250	LBO OUT

30.  **NOTE:**
The **STS1E** circuit pack provides bidirectional transport of one EC-1 signal through the DDM-2000 Multiplexer. **STS1E** high speed mode interfaces with the **DS1/DS1PM** circuit packs at the VT-G rate. **STS1E** low speed mode interfaces with the **OLI** circuit packs at the STS-1 rate.

Determine **STS1E** mode of operation (high speed or low speed).

31. Set switch **S1** to mode of operation required (**HIGH-SPEED MODE** or **LOW-SPEED MODE**).
32. **STOP. YOU HAVE COMPLETED THIS PROCEDURE.**

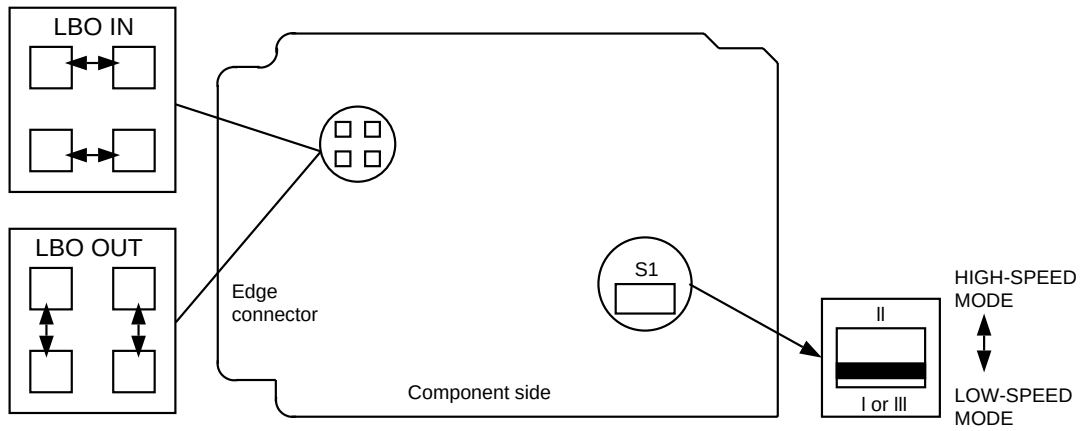


Figure 9. BBG6 STS1E Line Build-Out Jumpers and Mode Switch

BBF8 HDSL

33. Determine circuit pack option switch settings from office records or work order.
34. Set **HDSL** option switches per Table O and Figure 10.

Table O. HDSL Control Switch Settings

Control Settings	Switch S1 Settings			
	S1-1	S1-2	S1-3	S1-4
Master	—	OFF	—	OFF
Slave	—	ON	—	ON
Local	OFF	—	OFF	—
Remote	ON	—	ON	—

35. **STOP. YOU HAVE COMPLETED THIS PROCEDURE.**
-

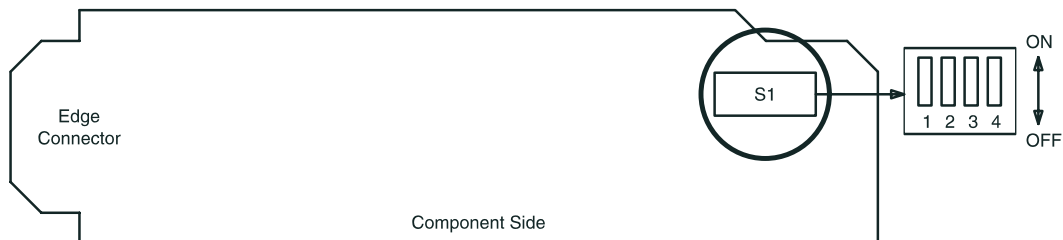


Figure 10. BBF8 HDSL Control Switch

Perform Optical Fiber Connections and Verification of Optical Facility

1.  **WARNING:**
Unterminated optical connectors may emit invisible laser radiation. Avoid direct exposure to the beam. Do not view beam with optical instruments. Use of controls or adjustments or performance of procedures other than those specified herein may result in hazardous radiation exposure.

 **CAUTION:**
When handling optical pigtails or jumpers, take care to keep bending radius as large as possible.

 **NOTE 1:**
This procedure is used to connect OC-12, OC-3, and OC-1 optical fiber spans. For each span, determine the loss of each optical fiber and install the proper LBO. Then connect the fibers to the associated **IN** and **OUT** connectors of each **OLI**U at the end of the span.

 **NOTE 2:**
When installing LBOs, the rule for single-mode optical fibers is for the LBO to be installed on the **OUT** transmit connector of the **OLI**U. For multimode optical fibers, install the LBO on the **IN** receive connector of the **OLI**U.

 **NOTE 3:**
It is assumed that the optical jumpers used to connect the DDM-2000 OC-3 Multiplexer to an optical interconnection point are equipped with *ST*[®], FCPC, or SC lightguide cable connectors.

Dress optical cables at bottom front of the shelf.

2. Route the optical jumpers up through the slotted hole(s) at the bottom left-front corner of the shelf and up to the **OLIUs**. See Tables A and B.

Table A. Single-Mode Lightguide Jumpers

Code	Comcode	Length (Feet)	Connectors
FS1EP-EP-2	107149494	2	ST [®] -ST
FS1EP-EP-10	107149536	10	ST-ST
FS1EP-EP-25	107149569	25	ST-ST
FS1EP-EP-50	107149601	50	ST-ST
FS1EP-EP-100	107149627	100	ST-ST
FS1E-A-2	105420905	2	ST-2016A Biconic
FS1E-A-10	105420947	10	ST-2016A Biconic
FS1E-A-25	105423958	25	ST-2016A Biconic
FS1E-A-50	105424006	50	ST-2016A Biconic
FS1E-A-100	105424022	100	ST-2016A Biconic
LS1SC-SC-2	106908247	2	SC-SC
LS1SC-SC-10	106908270	10	SC-SC
LS1SC-SC-25	106908304	25	SC-SC
LS1SC-SC-50	106908346	50	SC-SC
LS1SC-SC-100	106908395	100	SC-SC
LS1FP-FP-10	106593825	10	FCPC-FCPC
LS1FP-FP-25	106932908	25	FCPC-FCPC
LS1FP-FP-50	106932916	50	FCPC-FCPC
LS1FP-FP-100	106932924	100	FCPC-FCPC

Table B. Multimode Lightguide Jumpers

Code	Comcode	Length (Feet)	Connectors
FL1E-E-2	105351795	2	ST [®] -ST
FL1-EP-EP-04	107150161	4	ST-ST
FL1-EP-EP-10	107150195	10	ST-ST
FL1-EP-EP-25	107150229	25	ST-ST
FL1-EP-EP-50	107150260	50	ST-ST
FL1-EP-EP-100	107150286	100	ST-ST
FL1E-A-2	105613954	2	ST-2016A Biconic
FL1E-A-10	105613988	10	ST-2016A Biconic
FL1E-A-25	105614010	25	ST-2016A Biconic
FL1E-A-50	105614051	50	ST-2016A Biconic
FL1E-A-100	105614119	100	ST-2016A Biconic
LL1SC-SC-2	106908668	2	SC-SC
LL1SC-SC-10	106908692	10	SC-SC
LL1SC-SC-25	106908734	25	SC-SC
LL1SC-SC-50	106908775	50	SC-SC
LL1SC-SC-100	10690879	100	SC-SC
LL1FC-FC-10	107095549	10	FC-FC
LL1FC-FC-25	107095556	25	FC-FC
LL1FC-FC-50	107095564	50	FC-FC
LL1FC-FC-100	107095572	100	FC-FC

3. Establish communication with technician at other end of the optical span.

4. **⇒ NOTE 1:**

The optical connector labeled **OUT** is the output from the **OLIU**. The optical connector labeled **IN** is the input to the **OLIU**.

⇒ NOTE 2:

For DDM-2000 **21G/21G-U/21G2-U/22F/22F-U/22F2-U** OLIUs, the recommended optical fiber is single mode, but multimode can be used. DDM-2000 **22G-U/22G2-U/22G3-U** OLIUs require single-mode optical fibers. DDM-2000 **24G-U** OLIU and FT-2000 **T939A OC12** Optical Interface require single-mode optical fibers. DDM-2000 **21D/21D-U/22D-U** OLIUs and FT-2000 **LAA5 IS3** Optical Interface require multimode optical fibers. For the FT-2000 **LAA10 OC3** Optical Interface the recommended optical fiber is single mode, but multimode can be used. For the DDM-2000 FiberReach **26G2-U** and DDM-2000 **27G-U/27G2-U** OLIUs the recommended optical fiber is single mode, but multimode can be used. For the DDM-2000 FiberReach **28G-U** OLIU the recommended optical fiber is single mode, but multimode can be used.

⇒ **NOTE 3:**

Optical fibers connecting this shelf with a far end shelf should not be connected to the **OLI** until at least 45 seconds after an optical loopback is removed.

⇒ **NOTE 4:**

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-12, OC-3, or OC-1 signal degrade threshold (–5 to –9).

Remove protective covers from transmit optical jumper cables and lightguide buildout(s) [LBO(s)] and clean *ST*, *FCPC*, or *SC* connectors and LBO(s).

Reference: **DLP-527**

5. Have you determined the value of the lightguide buildouts (LBOs) for this span?

If **YES**, then proceed to **Step 9**.

If **NO**, then continue with **Step 6**.

Optical Power Measurement

Steps 6 through 9 are used to measure optical power. Replace LBOs with 0 dB LBOs per Figures 1, 2, 3, and/or 4. Connect the optical fiber transmit cable to the **OLI** **OUT** connection. Measure the optical power of the optical fiber receive cables at the other ends using an optical power meter.

6. At both ends of the optical span, replace the *ST*, *FCPC*, or *SC* LBOs with 0 dB LBOs per Figures 1, 2, 3, and/or 4 [**DLP-552**].

7.  **NOTE 1:**
For DDM-2000 OC-3 ring configurations, optical fibers extend in two different directions to make up the ring. At each shelf (node) in the ring, the **MAIN 1 OLIU** will connect to the **MAIN 2(P) OLIU** in one adjacent node, and the **MAIN 2(P) OLIU** will connect to the **MAIN 1 OLIU** in the other adjacent node. In Dual 0x1 configurations, the **MAIN 1 OLIU** will connect to the OC-12 **FUNCTION UNITS () 1 OLIU** and the **MAIN 2(P) OLIU** will connect to the OC-12 **FUNCTION UNITS () 2(P) OLIU**.
-  **NOTE 2:**
For DDM-2000 OC-3 & OC-12 to FT-2000 single-homing and dual-homing configurations, the DDM-2000 OC-3 Multiplexer **MAIN 1 OLIU** and/or **MAIN 2(P) OLIU** will connect to the FT-2000 Low Speed Shelf **LS INTFC** slots **1A, 1B, 2A, 2B, 3A, 3B, 4A, 4B, 5A, 5B, 6A, 6B, 7A, 7B, 8A, or 8B** depending on the application.
-  **NOTE 3:**
For DDM-2000 OC-3 to DDM-2000 FiberReach Wideband single-homing, dual-homing configurations, and stand alone optical fibers connect from DDM-2000 FiberReach Wideband **MAIN-1** and **MAIN-2** slots to the DDM-2000 OC-3 Multiplexer **FUNCTION UNITS A 1** and **A 2(P), B 1** and **B 2(P), or C 1** and **C 2(P) or MAIN 1** and **MAIN 2(P)** slots depending on the application.
-  **NOTE 4:**
For DDM-2000 OC-12 ring configurations, optical fibers extend in two different directions to make up the ring. At each shelf (node) in the ring, the DDM-2000 OC-3 **MAIN 1 OLIU** or DDM-2000 OC-12 **MAIN B 1 OLIU** will connect to the OC-3 **MAIN 2(P) OLIU** or OC-12 **MAIN B 2(P) OLIU** in another node, and the OC-3 **MAIN 2(P) OLIU** or OC-12 **MAIN B 2(P) OLIU** will connect to the OC-3 **MAIN 1 OLIU** or OC-12 **MAIN B 1 OLIU** in a separate node.

⇒ **NOTE 5:**

For DDM-2000 FiberReach Wideband OC-3 ring configurations, optical fibers extend in two different directions to make up the ring. At each shelf (node) in the ring, the DDM-2000 FiberReach OC-3 **MAIN-1 OLIU** will connect to the DDM-2000 OC-3 **MAIN 2(P) OLIU** or DDM-2000 FiberReach **MAIN-2** in another node, and the FiberReach OC-3 **MAIN-2 OLIU** will connect to the DDM-2000 OC-3 **MAIN 1 OLIU** or DDM-2000 FiberReach **MAIN-1**.

At each end of the span, connect the optical fiber transmit cables to the **OLIU OUT** connections.

8. At each end of the span, measure the optical power of the optical fiber receive cables using an optical power meter.
9. Replace the lightguide buildout assemblies with the correct buildout assemblies per Figures 1, 2, 3, and/or 4 and Tables C, D, E, F, G, H, I, J, K, L, M, and/or N [**DLP-552**].

Reconnect the optical fiber transmit cables at both ends.

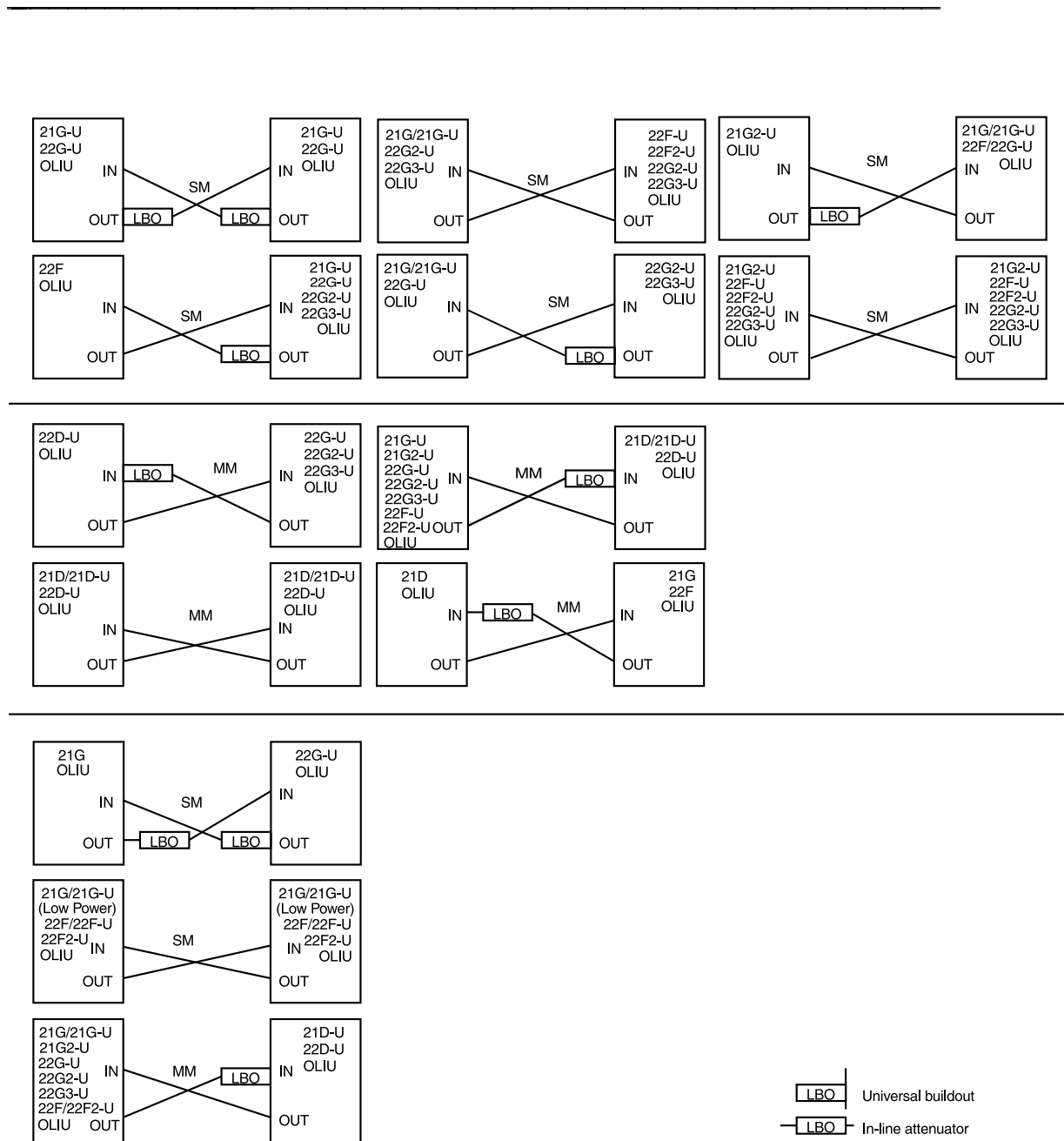


Figure 1. DDM-2000 OC-3 to OC-3 or OC-3 to OC-12 FN Fiber Optic Connections and Line Buildouts

Table C. DDM-2000 OC-3 to OC-3 or OC-3 to OC-12 FN Measured Optical Power and Required LBO

Transmitter	Receiver							
	22F OLIU 22G-U OLIU 21G/21G-U OLIU (High/Low Power)		21G2-U OLIU 22F-U OLIU 22F2-U OLIU 22G2-U OLIU 22G3-U OLIU		21D/21D-U/22D-U OLIU (Controlled Env.)		21D/21D-U/22D-U OLIU (Uncontrolled Env.)	
	Received Power(dBm)	LBO (dB)	Received Power(dBm)	LBO (dB)	Received Power(dBm)	LBO (dB)	Received Power(dBm)	LBO (dB)
21G/21G-U OLIU (High Power)					-2.5 to -5.0	15	-2.5 to -5.0	15
	-2.5 to -3.0	10			-5.0 to -10.0	10	-5.0 to -10.0	10
	-3.0 to -8.0	5			-10.0 to -15.0	5	-10.0 to -15.0	5
	-8.0 to -34.0	0	-2.5 to -34.0	0	-15.0 to -33.8	0	-15.0 to -31.8	0
21G/21G-U OLIU (Low Power)					-7.5 to -10.0	10	-7.5 to -10.0	10
	-7.5 to -8.0	5			-10.0 to -15.0	5	-10.0 to -15.0	5
	-8.0 to -34.0	0	-7.5 to -34.0	0	-15.0 to -33.8	0	-15.0 to -31.8	0
21G2-U OLIU					0.0 to -5.0	15	0.0 to -5.0	15
	0.0 to -3.0	10			-5.0 to -10.0	10	-5.0 to -10.0	10
	-3.0 to -8.0	5			-10.0 to -15.0	5	-10.0 to -15.0	5
	-8.0 to -34.0	0	0.0 to -34.0	0	-15.0 to -33.8	0	-15.0 to -31.8	0
22F/22F-U/22F2-U OLIU					-8.0 to -10.0	10	-8.0 to -10.0	10
					-10.0 to -15.0	5	-10.0 to -15.0	5
	-8.0 to -34.0	0	-8.0 to -34.0	0	-15.0 to -33.8	0	-15.0 to -31.8	0
22G-U/22G2-U/22G3-U OLIU					0.0 to -5.0	15	0.0 to -5.0	15
	0.0 to -3.0	10			-5.0 to -10.0	10	-5.0 to -10.0	10
	-3.0 to -8.0	5			-10.0 to -15.0	5	-10.0 to -15.0	5
	-8.0 to -34.0	0	0.0 to -34.0	0	-15.0 to -33.8	0	-15.0 to -31.8	0
21D/21D-U/22D-U OLIU (Controlled & Uncontrolled Env.) (MM Fiber Only)					-14.0 to -15.0	5	-14.0 to -15.0	5
	-14.0 to -34.0	0	-14.0 to -34.0	0	-15.0 to -33.8	0	-15.0 to -31.8	0

Notes:

1. Measured power is defined to be the measured power of the light emitted from receive fiber connector at OLIU.
2. The minimum measured received power allows for optical path penalty and unallocated margin. Connector loss is not allotted for; it should already be accounted for in the optical power measurement.
3. The margin for falling within the max rx power is 1.0 dB.

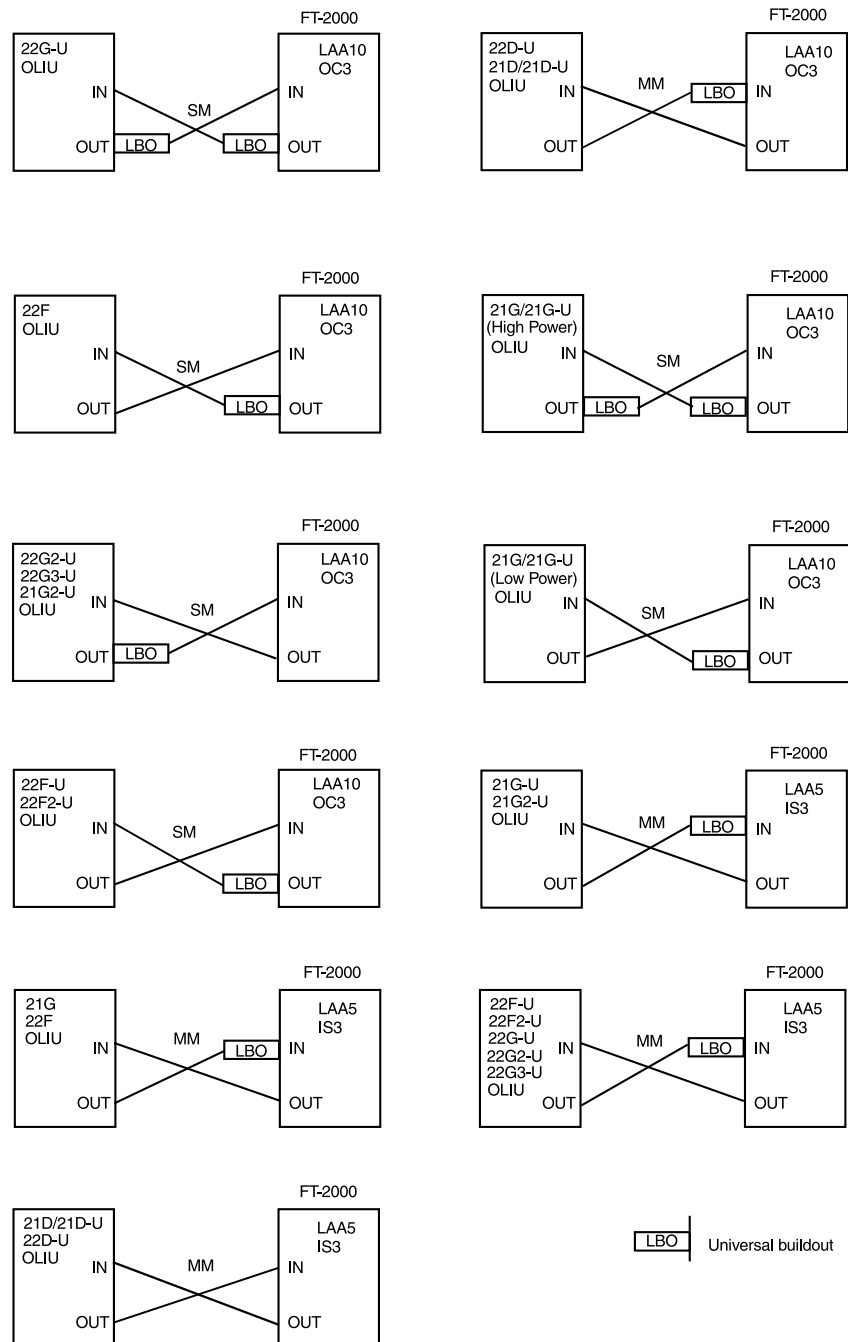


Figure 2. DDM-2000 OC-3 to FT-2000 LS INTFC Fiber Optic Connections and Line Buildouts

Table D. DDM-2000 OC-3 to FT-2000 LS INTFC Measured Optical Power and Required LBO

Transmitter	Receiver							
	LAA10 OC3 (FT-2000)	LAA5 IS3 (FT-2000)	22F-U OLIU	22F2-U OLIU 22G2-U OLIU 21G2-U OLIU	21D/21D-U/22D-U OLIU (Controlled Env.)	21G/21G-U OLIU (High/Low Power)		
LAA10 OC3 (FT-2000)	Received Power(dBm)	LBO Power(dBm)	Received Power(dBm)	LBO Power(dBm)	Received Power(dBm)	LBO Power(dBm)	Received Power(dBm)	LBO Power(dBm)
			0.0 to -5.0	15	0.0 to -5.0	15	0.0 to -3.0	10
			-5.0 to -10.0	10	-5.0 to -10.0	10	-3.0 to -8.0	5
			-10.0 to -15.0	5	-10.0 to -15.0	5	-8.0 to -34.0	0
			-15.0 to -34.0	0	-7.0 to -34.0	0		
LAA5 IS3 (FT-2000)					-5.0 to -14.0	10		
			-14.0 to -15.0	5	-14.0 to -15.0	5	-14.0 to -15.0	5
			-15.0 to -34.0	0	-15.0 to -34.0	0	-15.0 to -34.0	0
22G-U/22G2-U/22G3-U OLIU		0.0 to -5.0						
	0.0 to -3.0	10	-5.0 to -10.0	10				
	-3.0 to -8.0	5	-10.0 to -15.0	5				
	-8.0 to -34.0	0	-15.0 to -30.8	0				
21D/21D-U/22D-U OLIU		-14.0 to -15.0						
	-14.0 to -34.0	0	-15.0 to -30.8	0				
		-8.0 to -10.0						
22F/22F-U/22F2-U OLIU		-10.0 to -15.0						
	-8.0 to -34.0	0	-15.0 to -30.8	0				
		-2.5 to -5.0						
21G/21G-U OLIU (High Power)		-5.0 to -10.0						
	-2.5 to -3.0	10	-10.0 to -15.0	10				
	-3.0 to -8.0	5	-15.0 to -30.8	0				
	-8.0 to -34.0	0	-7.5 to -10.0	10				
21G/21G-U OLIU (Low Power)		-7.5 to -8.0						
	-8.0 to -34.0	0	-10.0 to -15.0	5				
		0.0 to -5.0						
	0.0 to -3.0	10	-5.0 to -10.0	10				
	-3.0 to -8.0	5	-10.0 to -15.0	5				
	-8.0 to -34.0	0	-15.0 to -30.8	0				

- Notes:
1. Measured power is defined to be the measured power of the light emitted from receive fiber connector at OLIU.
 2. The minimum measured received power allows for optical path penalty and unallocated margin. Connector loss is not allotted for; it should already be accounted for in the optical power measurement.
 3. The margin for failing within the max rx power is 1.0 dB.

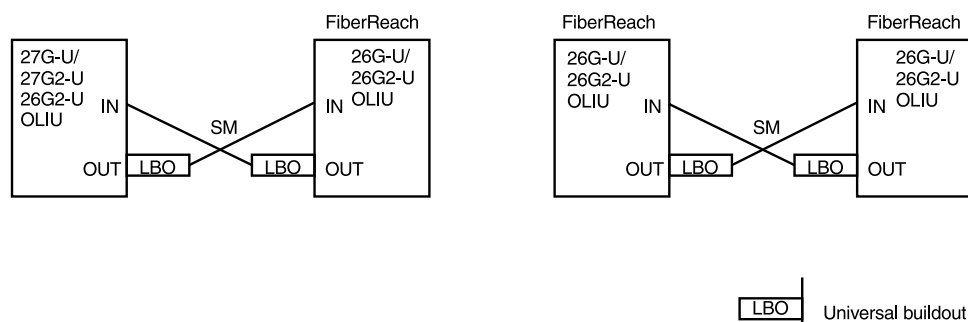


Figure 3. DDM-2000 OC-3 to DDM-2000 FiberReach OC-1 Optic Connections and Line Buildouts

Table E. DDM-2000 OC-3 to DDM-2000 FiberReach OC-1 Measured Optical Power and Required LBO

Transmitter	Receiver			
	26G-U/26G2-U OLIU (FiberReach)		27G-U/27G2-U OLIU (DDM-2000)	
	Received Power(dBm)	LBO (dB)	Received Power(dBm)	LBO (dB)
26G-U/26G2-U OLIU (FiberReach)	0.0 to -5.0	15	0.0 to -5.0	15
	-5.0 to -10.0	10	-5.0 to -10.0	10
	-10.0 to -15.0	5	-10.0 to -15.0	5
	-15.0 to -31.0	0	-15.0 to -31.0	0
27G-U/27G2-U OLIU (DDM-2000)	0.0 to -5.0	15		
	-5.0 to -10.0	10		
	-10.0 to -15.0	5		
	-15.0 to -31.0	0		
26G2-U OLIU (DDM-2000)	0.0 to -5.0	15		
	-5.0 to -10.0	10		
	-10.0 to -15.0	5		
	-15.0 to -31.0	0		

Notes:

1. Measured power is defined to be the measured power of the light emitted from receive fiber connector at OLIU.
2. The minimum measured received power allows for optical path penalty and unallocated margin. Connector loss is not allotted for; it should already be accounted for in the optical power measurement.
3. The margin for falling within the max rx power is 1.0 dB.

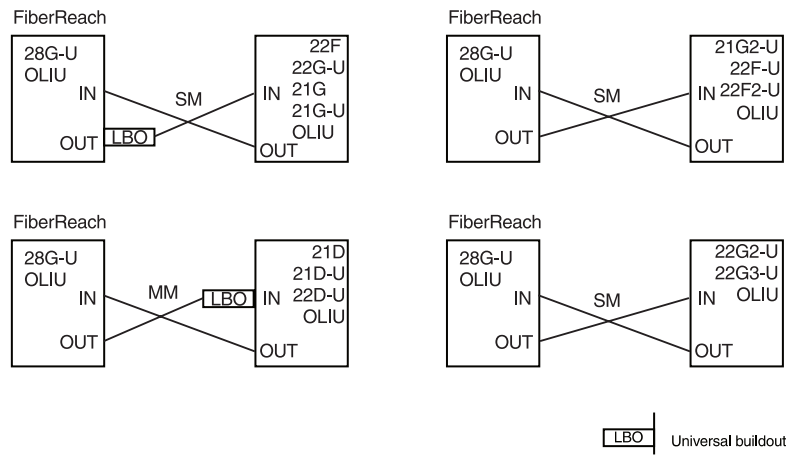


Figure 4. DDM-2000 OC-3 to DDM-2000 FiberReach OC-3 Fiber Optic Connections and Line Buildouts

Table F. DDM-2000 OC-3 to DDM-2000 FiberReach OC-3 Measured Optical Power and Required LBO

Transmitter	Receiver									
	28G-U OLIU		22F OLIU 22G-U OLIU 21G/21G-U OLIU (High/Low Power)		21G2-U OLIU 22F-U OLIU 22F2-U OLIU 22G2-U OLIU 22G3-U OLIU		21D/21D-U/22D-U OLIU (Controlled Env.)		21D/21D-U/22D-U OLIU (Uncontrolled Env.)	
	Received Power(dBm)	LBO (dB)	Received Power(dBm)	LBO (dB)	Received Power(dBm)	LBO (dB)	Received Power(dBm)	LBO (dB)	Received Power(dBm)	LBO (dB)
28G-U OLIU							0.0 to -5.0	15	0.0 to -5.0	15
			0.0 to -3.0	10			-5.0 to -10.0	10	-5.0 to -10.0	10
			-3.0 to -8.0	5			-10.0 to -15.0	5	-10.0 to -15.0	5
	0.0 to -34.0	0	-8.0 to -34.0	0	0.0 to -34.0	0	-15.0 to -33.8	0	-15.0 to -31.8	0
21G/21G-U OLIU (High Power)										
	-2.5 to -34.0	0								
21G/21G-U OLIU (Low Power)										
	-7.5 to -34.0	0								
21G2-U OLIU										
	0.0 to -34.0	0								
22F/22F-U/22F2-U OLIU										
	-8.0 to -34.0	0								
22G-U/22G2-U/22G3-U OLIU										
	0.0 to -34.0	0								
21D/21D-U/22D-U OLIU (Controlled & Uncontrolled Env.) (MM Fiber Only)										
	-14.0 to -34.0	0								

Notes:

1. Measured power is defined to be the measured power of the light emitted from receive fiber connector at OLIU.
2. The minimum measured received power allows for optical path penalty and unallocated margin. Connector loss is not allotted for; it should already be accounted for in the optical power measurement.
3. The margin for falling within the max rx power is 1.0 dB.

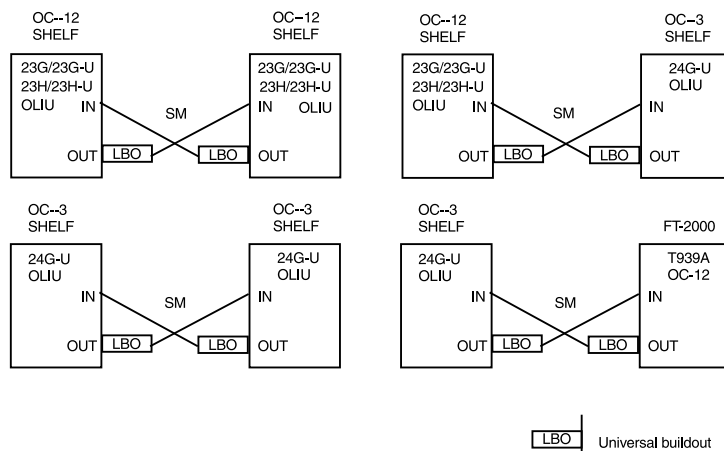


Figure 5. DDM-2000 OC-3 Shelf to OC-12 Shelf or FT-2000 OC-12 LS INTFC Fiber Optic Connections and Line Buildouts

Table G. DDM-2000 OC-3 Shelf to FT-2000 OC-12 LS INTFC Measured Optical Power and Required LBO

Transmitter	Receiver			
	T939A OC12 (FT-2000)		24G-U OLIU (OC-3 Shelf)	
	Received Power(dBm)	LBO (dB)	Received Power(dBm)	LBO (dB)
T939A OC12 (FT-2000)				
			2.0 to 1.0	15
			1.0 to -4.0	10
			-4.0 to -9.0	5
			-9.0 to -31.0	0
24G-U OLIU (OC-3 Shelf)				
	2.0 to 1.0	15		
	1.0 to -4.0	10		
	-4.0 to -9.0	5		
	-9.0 to -31.0	0		

Notes:

1. Measured power is defined to be the measured power of the light emitted from receive fiber connector at OLIU.
2. The minimum measured received power allows for optical path penalty and unallocated margin. Connector loss is not allotted for; it should already be accounted for in the optical power measurement.
3. The margin for falling within the max rx power is 1.0 dB.

Table H. DDM-2000 OC-3 Shelf to OC-12 Shelf OC-12 Measured Optical Power and Required LBO

Transmitter	Receiver					
	24G-U OLIU (OC-3 Shelf)		23G/23G-U OLIU (OC-12 Shelf)		23H/23H-U OLIU (OC-12 Shelf)	
	Received Power(dBm)	LBO (dB)	Received Power(dBm)	LBO (dB)	Received Power(dBm)	LBO (dB)
24G-U OLIU (OC-3 Shelf)					2.0 to -3.0	20
	2.0 to 1.0	15	2.0 to 1.0	15	-3.0 to -8.0	15
	1.0 to -4.0	10	1.0 to -4.0	10	-8.0 to -13.0	10
	-4.0 to -9.0	5	-4.0 to -9.0	5	-13.0 to -18.0	5
	-9.0 to -31.0	0	-9.0 to -31.0	0	-18.0 to -34.0	0
23G/23G-U OLIU (OC-12 Shelf)					2.0 to -3.0	20
	2.0 to 1.0	15	2.0 to 1.0	15	-3.0 to -8.0	15
	1.0 to -4.0	10	1.0 to -4.0	10	-8.0 to -13.0	10
	-4.0 to -9.0	5	-4.0 to -9.0	5	-13.0 to -18.0	5
	-9.0 to -31.0	0	-9.0 to -31.0	0	-18.0 to -34.0	0
23H/23H-U OLIU (OC-12 Shelf)					2.0 to -3.0	20
	2.0 to 1.0	15	2.0 to 1.0	15	-3.0 to -8.0	15
	1.0 to -4.0	10	1.0 to -4.0	10	-8.0 to -13.0	10
	-4.0 to -9.0	5	-4.0 to -9.0	5	-13.0 to -18.0	5
	-9.0 to -31.0	0	-9.0 to -31.0	0	-18.0 to -34.0	0

Notes:

1. Measured power is defined to be the measured power of the light emitted from receive fiber connector at OLIU.
2. The minimum measured received power allows for optical path penalty and unallocated margin. Connector loss is not allotted for; it should already be accounted for in the optical power measurement.
3. The margin for falling within the max rx power is 1.0 dB.

Table I. In-Line Single-Mode (SM) and Multimode (MM) Lightguide Buildouts

Lightguide Buildout (LBO)	Code	Comcode	Connector Type	Fiber Connection	Label Color
5 dB	A2000B	106597297	<i>ST</i>	MM-MM	Blue
10 dB	A2000D	106597446	<i>ST</i>	MM-MM	Black
5 dB	A3000B	106060718	<i>ST</i>	SM-SM	Blue
10 dB	A3000D	106060734	<i>ST</i>	SM-SM	Black

Table J. Universal Single-Mode (SM) *ST*[®] Lightguide Buildouts

Lightguide Buildout (LBO)	Code	Comcode	Connector Type	Fiber Connection	Label Color
0 dB	A3070	106795354	<i>ST</i>	SM-SM & MM-MM	None
5 dB	A3070B1	107406183	<i>ST</i>	SM-SM	Blue
10 dB	A3070D1	107406191	<i>ST</i>	SM-SM	Black
15 dB	A3070F1	107406209	<i>ST</i>	SM-SM	Green

Table K. Universal Single-Mode (SM) FCPC Lightguide Buildouts

Lightguide Buildout (LBO)	Code	Comcode	Connector Type	Fiber Connection	Label Color
0 dB	A3080	106795404	FCPC	SM-SM & MM-MM	None
5 dB	A3080B1	107406225	FCPC	SM-SM	Blue
10 dB	A3080D1	107406233	FCPC	SM-SM	Black
15 dB	A3080F1	107406241	FCPC	SM-SM	Green

Table L. Universal Single-Mode (SM) SC Lightguide Buildouts

Lightguide Buildout (LBO)	Code	Comcode	Connector Type	Fiber Connection	Label Color
0 dB	A3060	106708951	SC	SM-SM & MM-MM	None
5 dB	A3060B1	107406142	SC	SM-SM	Blue
10 dB	A3060D1	107406159	SC	SM-SM	Black
15 dB	A3060F1	107406167	SC	SM-SM	Green

Table M. Universal Multimode (MM) ST[®] Lightguide Buildouts

Lightguide Buildout (LBO)	Code	Comcode	Connector Type	Fiber Connection	Label Color
5 dB	A2070B	106795313	ST	MM-MM	Blue
10 dB	A2070D	106795321	ST	MM-MM	Black
15 dB	A2070F	106795339	ST	MM-MM	Green

Table N. Universal Multimode (MM) SC Lightguide Buildouts

Lightguide Buildout (LBO)	Code	Comcode	Connector Type	Fiber Connection	Label Color
5 dB	A2060B	106795271	SC	MM-MM	Blue
10 dB	A2060D	106795289	SC	MM-MM	Black
15 dB	A2060F	106795297	SC	MM-MM	Green

Fiber Connection

10. At far end, connect the input optical fiber to the proper **OLIU IN** (receive) connector.
11. Did **FAULT** LED go off on the far-end **OLIU**?
If **NO**, then continue with **Step 12**.
If **YES**, then proceed to **Step 13**.
12. Check optical fiber connections. Verify integrity of fiber connections by ensuring correct output at one end is connected to correct input at the other end. Replace **OLIU** with flashing LED. Continue with this procedure when trouble is cleared.
13. At near end, connect the input optical fiber(s) to the corresponding **OLIU IN** (receive) connector.
14. Did **FAULT** LED go off on the near-end **OLIU**?
If **NO**, then continue with **Step 15**.
If **YES**, then proceed to **Step 16**.
15. Check optical fiber connections at both ends of the fiber. Verify the integrity of the fiber connections by ensuring **OLIU** output at one end is connected to the correct **OLIU** input at the other end. Verify proper systems have been connected by using the "**rtrv-map-neighbor**" command (Figure 6).

Fiber Verification

16. Disconnect the fiber cable from the **OUT** connector on the **OLIU** at one end of the span. At the other end, verify that the associated **FAULT** LED is flashing, indicating a loss of signal. Reconnect the fiber and repeat the process for the other direction of transmission.
17. Verify proper systems have been connected by using the "**rtrv-map-network**" and "**rtrv-map-neighbor**" commands to retrieve a map of the network (Figures 5 and 6).

```
Site6NE1 98-05-27 13:09:53 DDM-2000 OC-3, R11.1.1
M rtrv-map-network: COMPLD
/* Network Map for Site6NE1
=====
System Name      Comm.   Product      NE      Alarm
(TID)           Status  Type          Type    Group
=====
Site6NE1                DDM-2000 OC-3      DSNE      3
Site7NE1                FT-2000              3
Site3NE1                DDM-2000 OC-12      3
Site4NE1      FAILED   DACS IV-2000        3
Site5NE1                FT-2000              201
Site8NE1                DDM-2000 OC-12      201
Site9NE1                FiberReach           250
Site10NE1               FiberReach           250
Site11NE1               FiberReach           250
*/
```

Figure 6. Sample Report From rtrv-map-network Command

```
Site6NE1 98-05-27 13:09:53 DDM-2000 OC-3, R11.1.1
M rtrv-map-neighbor: COMPLD
/* Neighbor Map for Site6NE1
=====
System Name      Connected  Link      Product
(TID)           Through   Comm.     Type
Status
=====
Site6NE1                main-1    FAILED   DDM-2000 OC-3
Site7NE1                main-2    FAILED   DDM-2000 OC-3
Site5NE1                main-2    FAILED   DDM-2000 OC-3
*/
```

Figure 7. Sample Report From rtrv-map-neighbor Command

18. After all connections and tests have been made, verify optical fiber cables are placed correctly in fiber tray/rings and properly routed in bay framework. Reinstall front cover and tighten three screws.
19. Repeat this procedure for each fiber span to be connected until the end-to-end system is established.
20. **STOP. YOU HAVE COMPLETED THIS PROCEDURE.**

Perform End-to-End Optical Line Test

1.  **WARNING:**
Unterminated optical connectors may emit invisible laser radiation. Avoid direct exposure to the beam. Do not view beam with optical instruments. Use of controls or adjustments or performance of procedures other than those specified herein may result in hazardous radiation exposure.

 **NOTE 1:**
This test is used in ring releases to verify the integrity of the OC-3 or OC-12 fiber lines between two DDM-2000 shelves and may be performed with the DDM-2000 in service or out of service. It is also used in linear releases when adding a shelf in the middle of an optical span. Refer to **DLP-525** for optical line tests in other cases.

 **NOTE 2:**
It is assumed that each DDM-2000 has passed the local (looped) transmission tests and a CIT is available. If these tests have not been completed, refer to the appropriate procedure and perform the tests.

 **NOTE 3:**
This test must be performed locally at each shelf location associated with the optical span(s) being tested. See Figure 1.

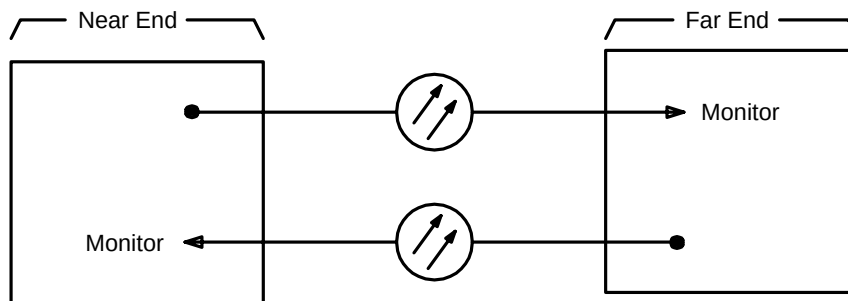


Figure 1. End-to-End Optical Line Test Monitoring

2. At test location, connect CIT to User Panel **CIT** connector and establish session.

Reference: **DLP-521**

3. **CAUTION:**
*The **init-pm:reg=all** command initializes (clears) all current day and/or all current quarter-hour performance-monitoring storage registers.*

NOTE:
If local procedures prohibit you from doing the **init-pm:reg=all** command, you may perform the following in Steps 5 and 6. Use the **rtrv-pm-line** command to obtain the line performance monitoring status report, note the readings on the Today line in the report, wait 20 seconds and then obtain another report. There should be no change in readings from the first report.

Enter the command **init-pm:reg=all**, if allowed.

4. Wait 20 seconds.

5. Enter one of the following commands:

- **rtrv-pm-line:main-1** if service line is being tested.
- **rtrv-pm-line:main-2** if protection line is being tested.
- **rtrv-pm-line:main-all** if both lines are being tested.

Response: The following CIT report will indicate the status of the equipment. The Today line should indicate that there are no errors. Other Time lines may exist with numbers greater than zero. (The "Commands and Reports" section of this manual under **RTRV-PM-LINE** describes this report.)

For OC-3 Release 9.1 and earlier, the output report appears as follows:

```
/* Line Performance Monitoring Status Report
   Last initialized: day registers at yy-mm-dd hh:mm:ss
                   quarter hour registers at yy-mm-dd hh:mm:ss
=====
Address      Start  B2 CV  B2 ES  B2 ES  B2 ES  B2 SES  B2 UAS  PSC-L
              Time
              Type A  Type B
=====
address      time    nn..   nn..   nn..   nn..   nn..   nn..   nn..
.            .       .       .       .       .       .       .       .
.            .       .       .       .       .       .       .       .
.            .       .       .       .       .       .       .       .
-----
address      time    nn..   nn..   nn..   nn..   nn..   nn..   nn..
.            .       .       .       .       .       .       .       .
.            .       .       .       .       .       .       .       .
.            .       .       .       .       .       .       .       .
*/
```

For OC-3 Release 11.0 and later, the output report appears as follows:

```

/* Line Performance Monitoring Status Report
   Last initialized:  day registers at yy-mm-dd hh:mm:ss
                     quarter hour registers at yy-mm-dd hh:mm:ss
=====
Address      Start   B2 CV   B2 ES   B2 ESA  B2 UAS  PSC-L  PJC
              Time
              B2 SES  B2 ESB
=====
address      time    nn..   nn..   nn..   nn..   nn..   nn..
.            .       .       .       .       .       .       .
.            .       .       .       .       .       .       .
.            .       .       .       .       .       .       .
-----
address      time    nn..   nn..   nn..   nn..   nn..   nn..
.            .       .       .       .       .       .       .
.            .       .       .       .       .       .       .
.            .       .       .       .       .       .       .
*/

```

6. If test is being performed on **OLIU(s)** installed in **FUNCTION UNIT** slot(s), enter one of the following commands:
 - **rtrv-pm-line:fn-{a or b or c}-1** if service line is being tested.
 - **rtrv-pm-line:fn-{a or b or c}-2** if protection line is being tested.
 - **rtrv-pm-line:fn-{a or b or c}-all** if both lines are being tested.
7. Has performance-monitoring report been obtained from all shelf locations associated with optical span(s) being tested?
 - If **NO**, then continue with **Step 8**.
 - If **YES**, then proceed to **Step 9**.
8. Repeat this procedure from Step 3 at other locations.
9. Did report indicate errors?
 - If **YES**, then continue with **Step 10**.
 - If **NO**, then **STOP. YOU HAVE COMPLETED THIS PROCEDURE.**

10. Trouble may be in optical fiber and/or connections. Trouble may also be in **OLIUs**. If the report indicated trouble when the report was obtained from the near end of the span, trouble may be in the receive direction (see Figure 1). If the report indicated trouble when the report was obtained from the far end of the span, trouble may be in the transmit direction. Check optical fiber and connections. Clean optical fiber connections [**DLP-527**]. If no trouble found in the optical fibers, replace **OLIU(s)** [**DLP-523**] associated with the address indicated in the report.
11. **STOP. YOU HAVE COMPLETED THIS PROCEDURE.**

Check Local Office Alarms

1.  **CAUTION:**
This test will interrupt service if it is performed without a CIT. If done with a CIT, this test can be performed on an in-service system.

-  **NOTE:**
It is assumed that you were sent here by another procedure to test the DDM-2000 alarms.

- Is a CIT available?
If **YES**, then continue with **Step 2**.
If **NO**, then proceed to **Step 5**.
2. Connect CIT to **CIT** connector on the User's Panel.
3.  **NOTE:**
The "Commands and Reports" section of this user's manual under **TEST-ALM** gives a description of the **test-alm** command.

Use the **test-alm** command to perform alarm tests. Note the audible and visual alarm indications during the test.
4. Did the **DDM-2000** pass the alarm tests?
If **YES**, then **STOP. YOU HAVE COMPLETED THIS PROCEDURE**.
If **NO**, then proceed to **Step 17**.

5. **NOTE:**

It is assumed that the DDM-2000 is powered and running with loops at the low-speed cross-connections and that the high-speed terminations are either looped on themselves or connected in an end-to-end looped configuration. It is also assumed that protection circuit packs are installed and that no alarms or other diagnostic indications are activated.

Unseat the service circuit pack in **FUNCTION UNITS** slot **A 1**, **B 1**, or **C 1**.

6. Wait 30 seconds.

7. Is the minor (**MN**) alarm activated?

If **YES**, then continue with **Step 8**.

If **NO**, then proceed to **Step 16**.

8. Leave the service circuit pack unseated and unseat the protection circuit pack in **FUNCTION UNITS** slot **A 2(P)**, **B 2(P)**, or **C 2(P)**.

9. Wait 30 seconds.

10. **NOTE:**

In some offices the critical and major alarms may be wired together if a separate critical alarm is not available. The following step will activate a critical (**CR**) alarm on the User Panel.

Is the critical (**CR**) or major (**MJ**) office alarm activated?

If **YES**, then continue with **Step 11**.

If **NO**, then proceed to **Step 16**.

11. Reseat both circuit packs. Take care to avoid damaging the LEDs protruding through the openings in the faceplates of the circuit packs.

12. Unseat the protection **DS1/DS1PM** and service **DS1/DS1PM** circuit pack in the same **LOW SPEED GROUP** (**A ()** and **8(P)**, **B ()** and **8(P)**, or **C ()** and **8(P)**).
13. Is the major (**MJ**) alarm activated?
 If **YES**, then continue with **Step 14**.
 If **NO**, then proceed to **Step 16**.
14. Reseat both circuit packs. Take care to avoid damaging the LEDs protruding through the openings in the faceplates.
15. **STOP. YOU HAVE COMPLETED THIS PROCEDURE.**
16. Reseat both circuit packs. Take care to avoid damaging the LEDs protruding through the openings in the faceplates.
17. The **DDM-2000** has failed the alarm test. The most likely source of the problem is the alarm wiring. Check that the alarms are connected correctly. If the wiring is correct and the failure persists, refer to **Trouble Clearing: TAP-108** to clear the failure.
18. **STOP. YOU HAVE COMPLETED THIS PROCEDURE.**

Check Parallel Telemetry

1.  **CAUTION:**
This test will interrupt service if it is done without a CIT. If done with a CIT, this test can be done on an in-service system.

 **NOTE:**
It is assumed that you were sent here by another procedure to test the DDM-2000 parallel telemetry.

Is a CIT available?

If **YES**, then continue with **Step 2**.

If **NO**, then proceed to **Step 6**.

2. Connect the CIT to the **CIT** connector on the User Panel.
3. Refer to the "Commands and Reports" section of this user's manual under **TEST-TLM-PAR** for a description of the tests.
4. Contact the monitoring location and use the **test-tlm-par** command to perform the parallel telemetry tests as described in the "Commands and Reports" section of this manual.
5. Did the DDM-2000 pass the parallel telemetry tests?
If **YES**, then **STOP. YOU HAVE COMPLETED THIS PROCEDURE.**
If **NO**, then proceed to **Step 18**.

6. **⇒ NOTE 1:**

It is assumed that the DDM-2000 is powered and running with loops at the low-speed cross-connection and that the high speed terminations are either looped on themselves or connected in an end-to-end looped configuration. It is also assumed that the system is equipped with protection circuit packs and that no alarms or other diagnostic indications are activated.

⇒ NOTE 2:

It is assumed that the DDM-2000 is connected to a telemetry system and that the state of the telemetry inputs and outputs to that system can be determined.

Unseat the service circuit pack in **FUNCTION UNITS** slot **A 1**, **B 1**, or **C 1**.

7. Wait 30 seconds.
8. Is the minor (**MN**) alarm telemetry point activated?
If **YES**, then continue with **Step 9**.
If **NO**, then proceed to **Step 17**.
9. Leave the service circuit pack unseated and unseat the protection circuit pack in **FUNCTION UNITS** slot **A 2(P)**, **B 2(P)**, or **C 2(P)**.
10. Wait 30 seconds.
11. Is the critical (**CR**) alarm telemetry point activated?
If **YES**, then continue with **Step 12**.
If **NO**, then proceed to **Step 17**.
12. Reseat both circuit packs. Take care to avoid damaging the LEDs protruding through the openings in the faceplates.
13. Unseat the protection **DS1/DS1PM** and service **DS1/DS1PM** circuit pack in the same **LOW SPEED GROUP** (**A ()** and **8(P)**, **B ()** and **8(P)**, or **C ()** and **8(P)**).
14. Is the major (**MJ**) alarm activated?
If **YES**, then continue with **Step 15**.
If **NO**, then proceed to **Step 17**.

15. The remaining telemetry points can be tested in the same manner. For example, to check the **INC** telemetry point, disconnect one or more of the incoming DS1 signals. To test the **CLF** point, disconnect one of the receive optical fibers.
16. **STOP. YOU HAVE COMPLETED THIS PROCEDURE.**
17. Reseat both circuit packs. Take care to avoid damaging the LEDs protruding through the openings in the faceplates.
18. The **DDM-2000** has failed the parallel telemetry alarm test. The most likely source of the problem is the telemetry wiring. Check that the telemetry is connected correctly. If the wiring is correct and the failure persists, refer to **Trouble Clearing: TAP-108** to clear the failure.
19. **STOP. YOU HAVE COMPLETED THIS PROCEDURE.**

Check Telemetry Byte-Oriented Serial (TBOS) Telemetry

1.  **NOTE 1:**
It is assumed that the DDM-2000 under test is powered and running and that no alarms or other diagnostic indicators are activated.
-  **NOTE 2:**
It is assumed that the DDM-2000 under test is connected to a serial telemetry system and that access to the central telemetry equipment is available.

Is a CIT available?

If **YES**, then continue with **Step 2**.

If **NO**, then proceed to **Step 7**.

2. Connect the CIT to the **CIT** connector on the User Panel.
3. Refer to the "Commands and Reports" section of this manual under **TEST-TLM-SER** for a description of the tests.
4. Contact the monitoring location and use the **test-tlm-ser** command to perform the serial telemetry tests as described in the "Commands and Reports" section of this manual.
5. Did the DDM-2000 pass the serial telemetry tests?
If **YES**, then continue with **Step 6**.
If **NO**, then proceed to **Step 15**.
6. **STOP. YOU HAVE COMPLETED THIS PROCEDURE.**
7. At the central telemetry equipment send a message to the DDM-2000 to Lockout Switching - LS-A (Command **22**).

8. Is scan point **58** (Valid Command Received) raised?
If **YES**, then continue with **Step 9**.
If **NO**, then proceed to **Step 15**.
9. Is scan point **56** (Lockout LS Equipment Protection Switching) raised?
If **YES**, then continue with **Step 10**.
If **NO**, then proceed to **Step 15**.
10. At the central telemetry equipment send a message to the DDM-2000 to Reset Switching - LS-A (Command **25**).
11. Is scan point **58** (Valid Command Received) raised?
If **YES**, then continue with **Step 12**.
If **NO**, then proceed to **Step 15**.
12. Is scan point **56** (Lockout LS Equipment Protection Switching) retired?
If **YES**, then continue with **Step 13**.
If **NO**, then proceed to **Step 15**.
13. The DDM-2000 has passed the serial telemetry test.
14. **STOP. YOU HAVE COMPLETED THIS PROCEDURE.**
15. The DDM-2000 has failed the serial telemetry test. A likely source of the trouble is the telemetry wiring. Check the connections. If the wiring is correct and the trouble persists, refer to **Trouble Clearing: TAP-108** to clear the failure condition.
16. **STOP. YOU HAVE COMPLETED THIS PROCEDURE.**

Test Protection Switching Function

1. Is a CIT available?
 If **YES**, then continue with **Step 2**.
 If **NO**, then proceed to **Step 7**.
2. To test for a switch to protection using a CIT, connect the CIT to the **CIT** connector on the User Panel. Enter the command: "**rtrv-state-eqpt**". The terminal will display the current protection status.
3. Use one of the switch commands (for example, "**switch-ls:address:pri>manual**", "**switch-line:address:pri>manual**" (linear) or "**switch-fn:address:pri>manual**" to perform a switch.
4. Enter the command: "**rtrv-state**" to verify the switch was done.
5. Use the "**switch-():address:pri=reset**" command to reset switch.
6. **STOP. YOU HAVE COMPLETED THIS PROCEDURE.**
7.  **NOTE:**
 The alarm delay is provisionable from 0 to 30 seconds. This procedure assumes the alarm delay is set for the default of 2 seconds.

To test a low-speed switch to protection, unseat one of the **DS1/DS1PM** circuit packs, if installed.

Response: **NE ACTY** LED on User Panel lights. **MN** LED lights after 2 seconds.

8. Reseat the circuit pack that was removed.

Response: All LEDs go OFF after 2 seconds.

9. Repeat Step 7 for each equipped muldem.

10. To test a high-speed switch to protection, unseat a **MXRVO/STS1E** circuit pack with a lighted **ACTIVE** LED.

Response: The green **ACTIVE** LED on the companion circuit pack lights. The **NE ACTY** LED on User Panel lights. The **MN** alarm lights after 2 seconds.

11. Reseat the circuit pack that was removed.

Response: After 2 seconds, all LEDs go OFF.

12. Is the system a linear or ring configuration?

If **linear** configuration , then continue with **Step 13**.

If **ring** configuration, **STOP. YOU HAVE COMPLETED THIS PROCEDURE.**

13.  **WARNING:**

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.

Are both **ACTIVE** LEDs lighted on a pair of **OLIUS**?

If **YES**, then continue with **Step 14**.

If **NO**, then proceed to **Step 17**.

14. Remove and immediately reconnect the upper **IN** fiber from one **OLIU**. Wait for the red **FAULT** LED to stop flashing.

15. Did the green **ACTIVE** LED go off on the **OLIU**.

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

If **YES**, then proceed to **Step 17**.

16. Remove and immediately reconnect the upper **IN** fiber from the other **OLIU**. Wait for the red **FAULT** LED to stop flashing.

17. Remove the upper **IN** fiber from the **OLI**U with the lighted **ACTIVE** LED.

Response: The **NE ACTY** LED on User Panel and **ACTIVE** LED on companion **OLI**U light. **MN** LED lights after 2 seconds. **ACTIVE** LED remains lighted on **OLI**U with fiber disconnected.

18. Reconnect the fiber.
19. Remove and immediately reconnect the upper **IN** fiber from the other **OLI**U.

Response: **ACTIVE** LED goes off on the **OLI**U that just had the fiber removed.

20. **STOP. YOU HAVE COMPLETED THIS PROCEDURE.**

Condition DS1/DS1PM Circuit Pack/Port for New DS1 Service

1.  **NOTE 1:**
The commands "**rtrv-alm**" and "**rtrv-state-eqpt**" may be used to check for alarms, locks, loops, and switches.
-  **NOTE 2:**
If line code (lc) parameters have been previously set using the "**set-t1**" command, the circuit pack line code switch settings will have no effect. There will be no indication of improper switch settings until you try to establish service. It is recommended that a policy be established to set line coding either using the switches OR using CIT commands. Use the "**rtrv-t1**" command to check line code settings.

Use "**rtrv-alm**" command to verify that no alarms, locks, loops, or switches are present.

2. Is a new **DS1/DS1PM** circuit pack being installed?
If **YES**, then proceed to **Step 12**.
If **NO**, then continue with **Step 3**.
3.  **CAUTION 1:**
*To minimize hits on in-service ports on the **DS1/DS1PM** circuit pack having a DS1 port added, it is recommended to either use a CIT to manually switch the DS1 to protection if the **DS1/DS1PM** circuit pack must be removed, or use the CIT to set DS1 port options without removing the circuit pack.*
-  **CAUTION 2:**
*If the protection **DS1/DS1PM** circuit pack is not available for a protection switch, removing a service **DS1/DS1PM** circuit pack will interrupt service on all DS1 ports on that circuit pack. If a CIT is available, use the "**rtrv-state-eqpt**" command to check the status of the protection switch.*



CAUTION 3:

*When a **DS1/DS1PM** circuit pack is switched to protection, removal of any other **DS1/DS1PM** circuit pack or **177A Retainer Card** in the same **LOW SPEED GROUP** will result in a loss of service to the protected **DS1/DS1PM** circuit pack and the removed **DS1/DS1PM** circuit pack.*

Are line code (AMI or B8ZS) settings set manually (with switches) or with a CIT?

If **MANUALLY**, then continue with **Step 4**.

If **CIT**, then proceed to **Step 10**.

4. Is protection **DS1/DS1PM** circuit pack available for protection switch?

If **YES**, then continue with **Step 5**.

If **NO**, then proceed to **Step 8**.

5. Remove service **DS1/DS1PM** circuit pack, set option switches as required and reinstall **DS1/DS1PM** circuit pack.

Reference: **DLP-513**

6. Momentarily depress **UPD/INIT** pushbutton on **SYSCTL** to update equipment list.
7. **STOP. YOU HAVE COMPLETED THIS PROCEDURE.**
8. Option settings on the **DS1/DS1PM** circuit pack must be set or verified as set before placing the DS1 port in service. Wait until the protection **DS1/DS1PM** circuit pack is available or obtain a CIT to set the options.
9. **STOP. YOU HAVE COMPLETED THIS PROCEDURE.**
10. Use "**set - t1**" command to set **DS1/DS1PM** circuit pack port options.
11. **STOP. YOU HAVE COMPLETED THIS PROCEDURE.**

12.  **CAUTION 1:**
*When a **DS1/DS1PM** circuit pack is switched to protection, removal of any other **DS1/DS1PM** circuit pack or **177A** Retainer Card in the same **LOW SPEED GROUP** will result in a loss of service to the protected **DS1/DS1PM** circuit pack and the removed **DS1/DS1PM** circuit pack.*

-  **CAUTION 2:**
*No service **DS1/DS1PM** circuit pack locations (slots) should be left empty.*

-  **NOTE:**
177A Retainer Cards are used to disconnect the cross-connect wiring associated with unused service DS1 **LOW SPEED GROUP** slots from the DDM-2000's internal protection bus.

Remove **177A** Retainer Card from the DS1 slot being equipped.

13. Set option switches and install new **DS1/DS1PM** circuit pack.

Reference: **DLP-508**

14. **STOP. YOU HAVE COMPLETED THIS PROCEDURE.**

Connect CIT and Establish Session

1.  **CAUTION:**
You must wear an ESD wrist strap plugged into the grounding jack on the right side of the assembly whenever working with the DDM-2000.

 NOTE 1:

If all shelves in a bay are connected together with CIT bay mult cabling, the CIT may be connected to the front or rear **CIT** connector on any shelf equipped with new **BBG8/BBG9** controllers to gain access to any other shelf by entering a shelf number. If the CIT is connected to the rear **CIT** connector, it must be connected through a null modem.

If you connect the CIT to a shelf with old **BBG5/BBG7** controllers, you cannot access other bay shelves with new **BBG8/BBG9** controllers unless you first log into the old controller shelf, then log out. Shelves with new controllers can then be accessed.

 NOTE 2:

If shelves are connected together with bay mult cabling and ANY shelf in the chain becomes unpowered with the **SYSCTL** inserted, CIT communications will be lost to all shelves. Once the shelf is repowered, CIT communications are restored without established login sessions being dropped. If shelves are not powered, the **SYSCTL** should not be inserted.

 NOTE 3:

With a CIT baud rate of 19200, CIT communication to a shelf may fail if the CIT bay mult cabling is connected to the shelf but not terminated on the next shelf. This condition is only present at baud rates greater than 9600 and does not affect communication at lower baud rates.

Connect CIT to the RS-232C **CIT** connector on the DDM-2000 User Panel or rear **CIT** connector.

2. Turn on CIT and set 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 setting is automatically set by DDM-2000 when connection is made.
3.  **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] =
```

4.  **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 <

5. **NOTE 1:**

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 2:

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 8.1 and 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 DDM-2000. The login banner for Release 9.0 and earlier reads:
AT&T, DDM-2000 OC-3 Multiplexer, Release a.b.c.

Were you sent here from **DLP-541** to connect CIT?

If **YES**, then **STOP. YOU HAVE COMPLETED THIS PROCEDURE.**

If **NO**, then continue with **Step 6**.

6. 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: CIT prints the following message followed by an alarm and status report:

```

/*****
*
*      Lucent Technologies
*      DDM-2000 OC-3 Multiplexer
*
*      Release a.b.c
*
*****/

```

•
•
•

```

TID date time
M  rtrv-alm:all COMPLD
/* Active Alarms and Status Report

```

7. **⇒ NOTE 1:**
The system prompt may be something other than < if there is an alarm condition (for example, if there is an MJ alarm condition on the system, the prompt will be MJ <).
- ⇒ NOTE 2:**
After the prompt (<), the system will respond to commands entered. The command **set-link:pg=()** may be used to set the vertical size of the displayed page on the CIT. Page (pg) length may be set from 3 to 150 lines with a default length of 24 lines. The page length is set to default each time a new CIT session is started.

See the "Commands and Reports" section of this manual for a description of the command formats.

8. **STOP. YOU HAVE COMPLETED THIS PROCEDURE.**

Establish Remote Login

1. Connect CIT and establish session with near-end DDM-2000.

Reference: **DLP-521**

2.  **NOTE 1:**
The command **toggle** (CTRL T) may be used to toggle back and forth between a remote DDM-2000 terminal and the near-end terminal. If no remote session is in progress, the toggle command will be rejected.

 **NOTE 2:**
A remote login within a remote login or a remote login entered to the near end while a remote session is suspended by the toggle command is not allowed. (A remote session is suspended when a remote session is under way and **toggle** (CTRL T) is entered to toggle control to the near end.) A remote login will also be denied if one is already in progress at the remote site.

 **NOTE 3:**
If security has been enabled on the DCC port being accessed, a login and password are required to do the remote login.

 **NOTE 4:**
Far-end communications (fecom) must be enabled in the far-end shelf in order to remote login to that shelf. The command **rtrv-fecom** can be used locally at the far-end shelf to determine if *fecom* (DCC/LAN) is enabled or disabled. The command **set-fecom** can be used at the far-end shelf to enable DCC/LAN communications. If security is enabled, the **set-fecom** command can be executed by privileged users only.

⇒ **NOTE 5:**

Remote login to FT-2000 OC-48 systems are not allowed from the DDM-2000 OC-3 system.

⇒ **NOTE 6:**

A remote login session may be terminated in some cases due to events in distant shelves and may not be noticeable until you begin typing in the *rlgn* session. Events such as disabling fecom, failure of the DCC or LAN, **init-sys** or **reset**, removing **OLIUs**, etc., may abruptly terminate a remote login session. This is normal because all the network elements must relearn the network after one of these events.

⇒ **NOTE 7:**

To set baud rate automatically if security has not been enabled, enter two carriage returns (<cr>), two lowercase "a"s (**aa**), or two uppercase "A"s (**AA**) after the login prompt. All other characters are ignored.

Enter command **rlgn:tid**

Where tid = the target identifier (shelf or site/shelf name) of the remote terminal.

Response: **CIT** prompts with: login <

3. If security has been enabled, enter your login and password when you are prompted.

If security has not been enabled, enter two carriage RETURNS.

Response: System responds with:

```

/*****
*
*      Lucent Technologies
*      DDM-2000 OC-3 Multiplexer
*
*      Release a.b.c
*
*****/

      .
      .
      .

TID date time
M rtrv-alm:all COMPLD
/* Active Alarms and Status Report
```

4.  **NOTE:**
After the prompt, the remote system will respond normally to any commands entered just as if you were physically connected to the remote terminal.

See the "Commands and Reports" section of this manual for a description of the commands formats.

5.  **NOTE:**
A logout entered to the remote terminal will end the remote session and return control to the near-end CIT. A logout entered to the near-end terminal will terminate the local and remote sessions.

Use the command **logout** to log out of the remote terminal session and return control to the near-end terminal.

6. **STOP. YOU HAVE COMPLETED THIS PROCEDURE.**

Replace Circuit Pack

1.  **CAUTION 1:**
*Circuit packs must not be installed or replaced if the **SYSCTL** is not installed and operating normally. If the **SYSCTL** is not installed and operating normally, unpredictable provisioning of the replaced/installed circuit pack can result.*

-  **CAUTION 2:**
*Ensure that protection switching is available (protection circuit pack and/or line good and no locks, inhibits, or forced switches in effect). When available, use a CIT and a protection "**switch-line:**" command to do a protection switch.*

-  **CAUTION 3:**
*When removing circuit packs, always remove the one without the lighted **ACTIVE** LED first.*

-  **NOTE:**
When a replacement circuit pack (except the **SYSCTL**) is configured the same as the original circuit pack, it may be inserted with no further action. When a replacement circuit pack is different (different code or different switch options) from the original, the **SYSCTL UPD/INIT** button must be momentarily depressed to update the inventory.

Find the circuit pack in Table A and go to the indicated step.

Table A. Circuit Pack Replacement

Circuit Pack	Step
BBG8/BBG8B SYSCTL	Step 2
BBG2 MXRVO	Step 4
BBG9 OHCTL	Step 6
BBG10 OHCTL	Step 6
BBF2 TGS	Step 8
BBF2B TGS	Step 13
21G/21G-U/21G2-U OLIU	Step 19
21D/21D-U/22D-U OLIU	Step 19
22F/22F-U/22F2-U OLIU	Step 19
22G-U/22G2-U/22G3-U OLIU	Step 19
26G2-U/27G-U/27G2-U OLIU	Step 19
24G-U OLIU	Step 19
BBG4/BBG4B/BBG19 DS3	Step 32
BBG20 TMUX	Step 32
BBF1 DS1/BBF1 DS1	Step 36
BBF3/BBF3B DS1PM	Step 36
BBF5 JMPR	Step 41
BBG6 STS1E	Step 43
BBF8 HDL	Step 49

BBG8/BBG8B SYSCTL

2. Refer to **DLP-501** to replace the **BBG8/BBG8B SYSCTL**.
3. **STOP. YOU HAVE COMPLETED THIS PROCEDURE.**

BBG2 MXRVO

4.  **CAUTION:**
*To prevent errors, use the "sw-fn:address:pri>manual" command to switch service to the standby slot before removing the **MXRVO** circuit pack being replaced.*

There are no options to be set on the **BBG2 MXRVO** circuit pack. Remove old **MXRVO** and install replacement **MXRVO**.

Response: **FAULT** LED on the **MXRVO** lights for about 13 seconds and then goes off.

5. **STOP. YOU HAVE COMPLETED THIS PROCEDURE.**

BBG9/BBG10 OHCTL

6. **⇒ NOTE 1:**
For Release 8 or later standard applications, the **OHCTL** must be a **BBG9 OHCTL**. For special applications with MegaStar* 2000 SONET Radio Systems (Releases 8.1 (linear) or 9.1 (ring) or later), the **OHCTL** must be a **BBG10 OHCTL**. Refer to **DLP-500** for option settings on the **BBG10 OHCTL**. There are no options to be set on the **BBG9 OHCTL**.

- ⇒ NOTE 2:**
If no software is installed in the **OHCTL** or if the software is not compatible with the software in the **SYSCTL**, the letter **d** will be displayed in the **FE ID** display on the **SYSCTL**. If this occurs, you must find circuit packs with compatible software or install new software in both the **OHCTL** and **SYSCTL** [**DLP-532**].

Install **OHCTL** into **AUXCTL** slot. (If software is not loaded or is incompatible, load new software using **DLP-532**).

7. **STOP. YOU HAVE COMPLETED THIS PROCEDURE.**

* Trademark of Harris Corporation.

BBF2 TGS

8.  **CAUTION:**
BBF2 TGS and **BBF2B TGS** *timing mode switch settings are not set the same. Check switch settings carefully.*
-  **NOTE 1:**
The timing mode of all nodes should be checked before the system is placed in service. Improper timing modes may cause the system to act unpredictably or cause a service interruption (for example, if all nodes are set to line timed mode).
-  **NOTE 2:**
The **BBF2 TGS** timing mode may be provisioned as *Free Running*, *DS1 External*, or *Line Timed*. In free-running mode, the **BBF2 TGS** gets timing from an oscillator on the **BBF2 TGS**. In external timing, the **BBF2 TGS** gets timing from an external DS1 reference input. In line timing, the **BBF2 TGS** gets timing from an **OLI** from a reference clock recovered from the received OC-3 line rate signal.
-  **NOTE 3:**
Table B depicts all the possible timing topologies which can be encountered on adjacent network elements (NE) with some comments or cautionary notes on their application.

Table B. BBF2 TGS Synchronization Provisioning Topologies

NE 1	NE 2	Application Comments
Free Running	Free Running	This topology is not supported. Both systems are operating asynchronously from each other.
Free Running	Line Timing	This topology is allowed but results in having a SONET subnetwork operating asynchronously with respect to other NE's in the network. The NE's deriving timing off the NE provisioned for Free Running will be synchronized to it but not to a PRS on the network. If automatic synchronization reconfiguration is supported and enabled in a system, the NE 2 system will attempt to switch to another better quality line timing source, if available.
Free Running	External - Mult	This timing topology is not supported. The two network elements will be operating asynchronously from each other.
External - Mult	Line Timing	This topology is used when one of the NE's does not have access to an external synchronous reference and needs to be synchronized to an NE whose timing is traceable to a PRS. The NE provisioned for Line Timing will derive its timing from the NE provisioned for External - Mult timing thus operating synchronously with that respective NE. The NE provisioned for External - Mult timing could use its DS1 output to distribute its incoming DS1 timing reference to other shelves in the bay to conserve ports on the BITS.
External - Mult	External - Mult	This topology is used when both NE's have access to and are receiving its timing from BITS clocks. The recommendation is to have these BITS synchronized to references which are traceable to the same PRS. If these guidelines are followed the subnetwork created by these two NE's would be operating synchronously. Note: DDM-2000 systems are designed to operate in pleisiochronous timing topologies. The DS1 output generated by each NE is regenerated from the input DS1 timing reference and could be used to distribute this reference to other shelves colocated in the same bay to conserve ports on the BITS.

Table B. BBF2 TGS Synchronization Provisioning Topologies (Contd)

NE 1	NE 2	Application Comments
Line Timing	Line Timing	Caution! This topology creates a timing loop and it is not supported. The NE with access to an external timing reference traceable to a PRS, if available, should be provisioned for External - Mult. If the reference available is an optical reference provision to Line Timing with the proper source using the " set - sync " command. If automatic synchronization reconfiguration is supported and enabled in a system, both NEs will attempt to switch to another line timing source, if available, to prevent a timing loop.

Refer to Table C and Figure 1 and set the timing mode as required for the new **BBF2 TGS** circuit pack(s).

Table C. BBF2 TGS Timing Mode Switch Setting

Timing Mode	Switch S1 Settings	
	S1-3	S1-4
Free Running	ON	ON
DS1 External, MULT Mode	OFF	ON
Line Timed	ON	OFF
Invalid*	OFF	OFF

* If an invalid setting is selected, **FAULT** LED is lighted and an "unexpected CP type" or "unexpected CP switches" alarm is generated.

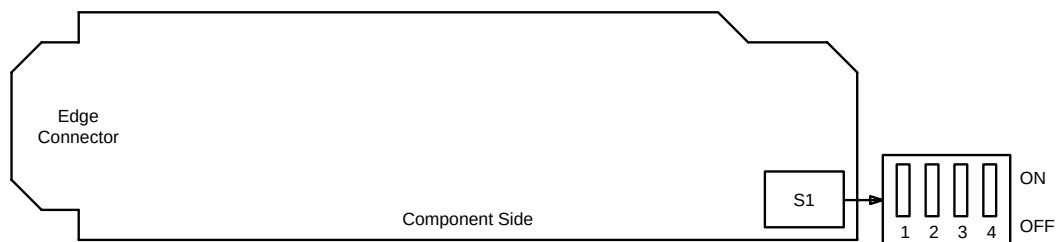


Figure 1. BBF2 TGS Option Switch

9. **NOTE:**
Switches **S1-1** and **S1-2** were ignored by the system the first time the **TGS** was installed unless the timing mode was set to *DS1 External*. Subsequent removal or replacement of the **TGS** requires that switches **S1-1** and **S1-2** be set the same as the original settings or an update ("upd") must be performed.

Is timing mode set to *DS1 External*?

If **YES**, then continue with **Step 10**.

If **NO**, then proceed to **Step 11**.

10. Refer to Table D and Figure 1 and set the DS1 line coding and frame format as required for the **TGS** circuit pack.

Table D. TGS DS1 Line Coding and Frame Format Switch Settings

DS1 Line Code	Switch	DS1 Frame Format	Switch
	S1-1		S1-2
AMI	ON	SF	ON
B8ZS	OFF	ESF	OFF

11.  **CAUTION:**
*When all OC-3 shelves in a bay are timed from a common external timing supply, removal of the bottom shelf **TGS** circuit pack will cause a momentary transmission hit on all shelves in the bay.*

 **NOTE 1:**
A **TGS** circuit pack is required in **TIMING** slot **1** to protect against accidentally downloading wrong software and interrupting transmission. Transmission configuration information is stored in the **TGS** circuit pack in **TIMING** slot **1**. During software download procedures the software checks the information stored in the **TGS** circuit pack in **TIMING** slot **1**. If the information is incompatible with the controller software information, an alarm is generated.

 **NOTE 2:**
If a signal has previously been applied to the original **TGS** circuit pack, the **FAULT** lamp will flash when the new **TGS** is installed until the signal tests good.

Remove old **TGS** and install replacement **TGS**.

Response: **FAULT** LED on the **TGS** lights (flashes) for about 15 seconds and then goes off.

12. **STOP. YOU HAVE COMPLETED THIS PROCEDURE.**

BBF2B TGS

13.  **CAUTION:**
BBF2 TGS and **BBF2B TGS** timing mode switch settings are not set the same. Check switch settings carefully.
-  **NOTE 1:**
The timing mode of all nodes should be checked before the system is placed in service. Improper timing modes may cause the system to act unpredictably or cause a service interruption (for example, if all nodes are set to line timed mode).
-  **NOTE 2:**
In line-timed mode, the **BBF2B TGS** gets timing from a reference clock recovered from a received OC-3 line rate signal. Either the **MAIN 1**, **MAIN 2(P)**, or **FUNCTION UNITS C OLIU** can be selected as the synchronization source using the command
`"set-sync:src={main, main-1, main-2, or fn-c};"`.
-  **NOTE 3:**
Table E depicts all the possible timing topologies which can be encountered on adjacent network elements (NE) with some comments or cautionary notes on their application. When the NE is provisioned for line timing or with the DS1 output in SYNC OUT mode, the assumption is that the NE is deriving its timing from the optical interface shared between the two NE's.

Table E. BBF2B TGS Synchronization Provisioning Topologies

NE 1	NE 2	Application Comments
Free Running	Free Running	This topology is not supported. Both systems are operating asynchronously from each other.
Free Running	Line Timing	This topology is allowed but results in having a SONET subnetwork operating asynchronously with respect to other NE's in the network. The NE's deriving timing off the NE provisioned for Free Running will be synchronized to it but not to a PRS on the network. If automatic synchronization reconfiguration is supported and enabled in a system, the NE 2 system will attempt to switch to another better quality line timing source, if available.
Free Running	Line Timing - Sync Out	This topology, although not recommended, results in having a SONET subnetwork operating asynchronously with respect to other NE's in the network. The NE's deriving timing off the NE provisioned for Free Running will be synchronized to it but not to the rest of the network. The DS1 timing output is normally used to synchronize other NE's to a PRS. In this topology the timing of the Free Running NE is being distributed by the use of the DS1 output timing reference in the absence of Synchronization Messaging. In the presence of Synchronization Messaging, the DS1 output will carry DS1 AIS. If automatic synchronization reconfiguration is supported and enabled in a system, the NE 2 system will attempt to switch to a better quality line timing source, if available.
Free Running	External - Mult	This timing topology is not supported. The two network elements will be operating asynchronously from each other.
Free Running	External - Sync Out	This timing topology is not supported. The two network elements will be operating asynchronously from each other.
External - Mult	Line Timing	This topology is used when one of the NE's does not have access to an external synchronous reference and needs to be synchronized to an NE whose timing is traceable to a PRS. The NE provisioned for Line Timing will derive its timing from the NE provisioned for External - Mult timing thus operating synchronously with that respective NE. The NE provisioned for External - Mult timing could use its DS1 output to distribute its incoming DS1 timing reference to other shelves in the bay to conserve ports on the BITS.

Table E. BBF2B TGS Synchronization Provisioning Topologies (Contd)

NE 1	NE 2	Application Comments
External - Mult	Line Timing - Sync Out	This topology is used when one of the NE's does not have access to an external synchronous reference, needs to be synchronized to an NE whose timing is traceable to a PRS, and timing is needed to be distributed where NE 2 is located. The NE provisioned for Line Timing - Sync Out will derive its timing from the NE provisioned for External - Mult timing thus operating synchronously with that respective NE. Its DS1 output could serve as a reference to distribute timing to a BITS in that CO. The NE provisioned for External - Mult timing could use its DS1 output to distribute its incoming DS1 timing reference to other shelves in the bay to conserve ports on the BITS.
External - Sync Out	Line Timing	Caution! This topology might create a timing loop. In this topology the NE provisioned for Line Timing will derive its timing from the NE provisioned for External - Sync Out timing thus operating synchronously with that respective NE. The NE provisioned for External - Sync Out should be reprovisioned for External - Mult to prevent the potential timing loop existing in the actual provisioning. If Synchronization Messaging is enabled on both NE's, the DS1 output reference of the NE provisioned for External - Sync out will carry an unframed all ones DS1 signal (DS1 AIS) in the present topology. If automatic synchronization reconfiguration is supported and enabled in a system, both NEs will attempt to break the potential timing loop. NE 1 will attempt to break the loop by inserting DS1 AIS on its DS1 output port. NE 2 will attempt to switch to another line timing source, if available, to prevent the timing loop.

Table E. BBF2B TGS Synchronization Provisioning Topologies (Contd)

NE 1	NE 2	Application Comments
External - Sync Out	Line Timing - Sync Out	Caution! This topology might create a timing loop. In this topology the NE provisioned for Line Timing will derive its timing and that of the DS1 output reference from the NE provisioned for External - Sync Out timing thus operating synchronously with that respective NE. The NE provisioned for External - Sync Out should be reprovisioned for External - Mult to prevent the timing loop existing in the actual provisioning. If Synchronization Messaging is enabled on both NE's, the DS1 output reference on NE 1 will carry DS1 AIS and NE 2 will derive its timing and that of the DS1 output port from NE 1. If automatic synchronization reconfiguration is supported and enabled in a system, both NEs will attempt to break the potential timing loop. NE 1 will attempt to break the loop by inserting DS1 AIS on its DS1 output port. NE 2 will attempt to switch to another line timing source, if available, to prevent the timing loop.
External - Mult	External - Mult	This topology is used when both NE's have access to and are receiving its timing from BITS clocks. The recommendation is to have these BITS synchronized to references which are traceable to the same PRS. If these guidelines are followed the subnetwork created by these two NE's would be operating synchronously. Note: DDM-2000 systems are designed to operate in pleisiochronous timing topologies. The DS1 output generated by each NE is regenerated from the input DS1 timing reference and could be used to distribute this reference to other shelves colocated in the same bay to conserve ports on the BITS.
External - Mult	External - Sync Out	This topology is used to distribute network timing to a target location from a location with access to a synchronization reference. The NE provisioned for External - Mult, is providing timing to the NE provisioned for External - Sync Out, which in turn generates a DS1 output reference regenerated from the optical interface shared by both NE's. This DS1 output is used to provide a synchronization reference to a BITS.

Table E. BBF2B TGS Synchronization Provisioning Topologies (Contd)

NE 1	NE 2	Application Comments
External - Sync Out	External - Sync Out	Caution! This topology can potentially create a timing loop if synchronization messaging is not enabled on both NE's. In this topology both NE's will derive the DS1 output reference from each other thus creating a timing loop. The NE with access to a BITS, which has an input reference traceable to a PRS, and is sourced from an element other than this NE, should be reprovisioned for External - Mult to prevent the timing loop. If Synchronization Messaging is enabled on both NE's, the DS1 output reference in one of the NE's will carry DS1 AIS and the other NE will generate a DS1 output carrying a framed DS1 all ones signal.
Line Timing	Line Timing	Caution! This topology creates a timing loop and it is not supported. The NE with access to an external timing reference traceable to a PRS, if available, should be provisioned for External - Mult. If the reference available is an optical reference provision to Line Timing with the proper source using the " set - sync " command. If automatic synchronization reconfiguration is supported and enabled in a system, both NEs will attempt to switch to another line timing source, if available, to prevent a timing loop.

➡ **NOTE 4:**

To set switch to ON, depress rocker or slide switch toward side labeled **ON** in figure. To set switch to OFF, depress rocker or slide switch toward side labeled **OFF** in figure.

Determine timing mode from work order or office records. Refer to Table F and Figure 2 and set timing mode as required for **BBF2B TGS** circuit pack(s).

Table F. BBF2B TGS Timing Mode Switch Settings

Timing Mode	Switch S1 Settings		
	S1-3	S1-4	S1-5 (DS1 Output)
Free Running*	ON	ON	OFF
DS1 External, MULT Mode	OFF	ON	OFF
Line Timing, MAIN†	ON	OFF	OFF
Line Timing, 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

* Factory default.

† **MAIN (MAIN 1) OLIU** is default; **FUNCTION UNITS C** by "set -sync" command.

‡ If an invalid setting is selected, **FAULT** LED is lighted and an alarm is generated ("unexpected CP type" or "unexpected CP switches").

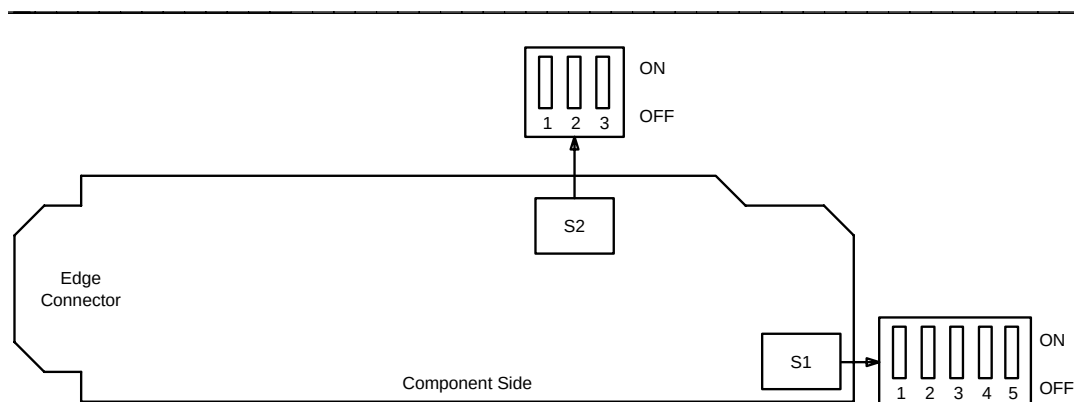


Figure 2. BBF2B TGS Option Switch

14. If the **BBF2B TGS** is provisioned for *sync out mode*, refer to Table G and Figure 2 and set equalizer switches for the proper cable length.

Table G. Equalizer Switch Settings

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

* If an invalid setting is selected, **FAULT** LED is lighted and an alarm is generated ("unexpected CP type" or "unexpected CP switches").

15.  **NOTE:**
Switches **S1-1** and **S1-2** were ignored by the system the first time the **TGS** was installed unless the timing mode was set to *DS1 External* or *Line Timed sync out mode*. Subsequent removal or replacement of the **TGS** requires that switches **S1-1** and **S1-2** be set the same as the original settings or an update ("**upd**") must be performed.

Is timing mode set to either *DS1 External* or *Line Timed sync out*?

If **YES**, then continue with **Step 16**.

If **NO**, then proceed to **Step 17**.

16. Refer to Table H and Figure 2 and set the DS1 line coding and frame format as required for the **TGS** circuit pack.

Table H. BBF2B TGS DS1 Line Coding and Frame Format Switch Settings

DS1 Line Code	Switch	DS1 Frame Format	Switch
	S1-1		S1-2
AMI	ON	SF	ON
B8ZS	OFF	ESF	OFF

17.  **CAUTION:**
*When all OC-3 shelves in a bay are timed from a common external timing supply, removal of the bottom shelf **TGS** circuit pack will cause a momentary transmission hit on all shelves in the bay.*

 NOTE 1:

A **TGS** circuit pack is required in **TIMING** slot **1** to protect against accidentally downloading wrong software and interrupting transmission. Transmission configuration information is stored in the **TGS** circuit pack in **TIMING** slot **1**. During software download procedures the software checks the information stored in the **TGS** circuit pack in **TIMING** slot **1**. If the information is incompatible with the controller software information, an alarm is generated.

 NOTE 2:

If a signal has previously been applied to the original **BBF2B TGS** circuit pack, the **FAULT** lamp will flash when the new **BBF2B TGS** is installed until the signal tests good.

Remove old **BBF2B TGS** and install replacement **BBF2B TGS**.

Response: **FAULT** LED on the **BBF2B TGS** lights (flashes) for about 15 seconds and then goes off.

18. **STOP. YOU HAVE COMPLETED THIS PROCEDURE.**

OLIU

19.  **WARNING:**
Unterminated optical connectors may emit invisible laser radiation. Do not view beam with optical instruments. Avoid direct exposure to the beam. Use of controls or adjustments or performance of procedures other than those specified herein may result in hazardous radiation exposure.
-  **CAUTION 1:**
*Ensure that protection switching is available (protection line good and no locks, inhibits, or forced switches in effect). When available, use a CIT and the "**switch-path:**" command to do a protection switch. The line protection switching request is unidirectional. It may be necessary to perform a "**switch-path:**" command at the near end and far end to switch both transmit and receive to the same line.*
-  **CAUTION 2:**
*When removing circuit packs, always remove the one without the lighted **ACTIVE** LED first. Remove optical fiber cables before removing circuit pack and take care to avoid damage to fibers during removal or installation of the circuit pack.*
-  **CAUTION 3:**
*Before installing **OLIUS**, ensure all optical fiber connectors and couplings have been properly cleaned [**DLP-527**]. Signal performance may be degraded if the connectors and couplings are not cleaned properly.*
-  **NOTE:**
It is assumed that the loss of the optical facility is known from office records or that a measurement has been made.

Use "**rtrv-state-eqpt**" command to ensure service has been switched to the other line then remove optical cables from **OLIU** to be replaced.

20. Is a **21G/21G-U OLIU** being replaced?
If **YES**, then continue with **Step 21**.
If **NO**, then proceed to **Step 22**.
21. Refer to Table I and Figure 3 and set the **HIGH/LOW POWER** option switch on replacement **21G/21G-U OLIU** to proper setting.

Table I. 21G/21G-U OLIU Option Switch

Facility Loss	Transmitter Switch
0 - 6 dB	LOW Power
Greater than 6 dB	HIGH Power

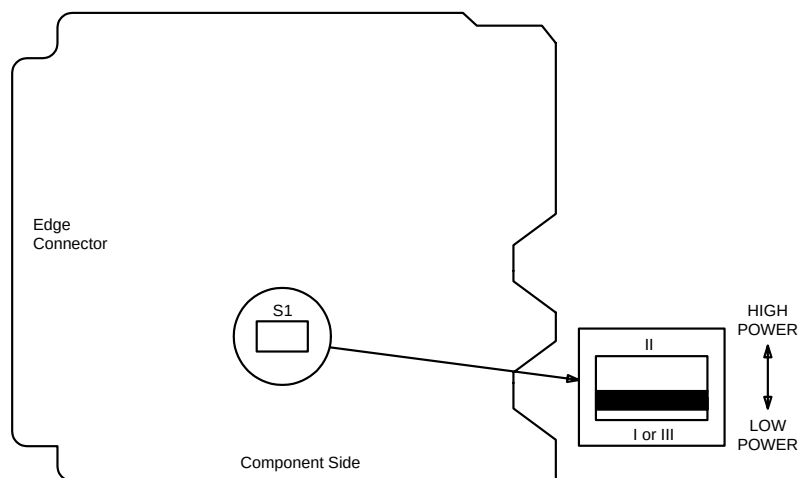


Figure 3. 21G/21G-U OLIU Option Switch

22. Is a **24G-U OLIU** being replaced?
If **YES**, then proceed to **Step 26**.
If **NO**, then continue with **Step 23**.
23. Remove old **OLIU** and install same type replacement **OLIU**.

Response: **FAULT** LED on **OLIU** flashes.

24.  **NOTE:**
The **FAULT** LED on the **OLIU** may flash from 15 seconds to 3 minutes and 25 seconds depending on the provisioned signal degrade threshold.

Connect optical cables to replacement **OLIU**.

Response: **FAULT** LED on the **OLIU** goes off.

25. **STOP. YOU HAVE COMPLETED THIS PROCEDURE.**

26. Disconnect the OC-12 connector (ribbon cable) from the **24G-U OLIU** being replaced.

Response: **MN** LED ("OC12 connector failed") alarm will light.

27. Remove old **OLIU** and install same type replacement **OLIU**.

Response: **FAULT** LED on **OLIU** flashes.

28.  **NOTE:**
The **FAULT** LED on the **OLIU** may flash from 15 seconds to 3 minutes and 25 seconds depending on the provisioned signal degrade threshold.

Connect optical cables to replacement **OLIU**.

Response: **FAULT** LED on the **OLIU** goes off.

29. Connect the OC-12 connector (ribbon cable) to the **24G-U OLIU** being replaced.

Response: **MN** LED ("OC12 connector failed") alarm should go off.

30. Verify that the connectors on the OC-12 connector cable are properly seated and latched.

31. **STOP. YOU HAVE COMPLETED THIS PROCEDURE.**

BBG4/BBG4B/BBG19 DS3/BBG20 TMUX

32. Determine from office records the length of the DS3 cabling between the **DDM-2000** and the **DSX-3** cross-connect point.
33. **⇒ NOTE:**
The only option settings on the **DS3/TMUX** circuit pack are the LBO settings shown in Figures 4 and 5. If there are other jumpers on the circuit pack similar to the LBO jumpers, they are factory test points and should be ignored.

Refer to Table J and Figures 4 and 5 and install the DS3 option jumpers.

Table J. DS3 LBO Settings

Cable Length (Ft)		LBO Setting
734D Cable	735A Cable	
0 to 225	0 to 125	LBO IN (ON)
>225 to 450	>125 to 250	LBO OUT

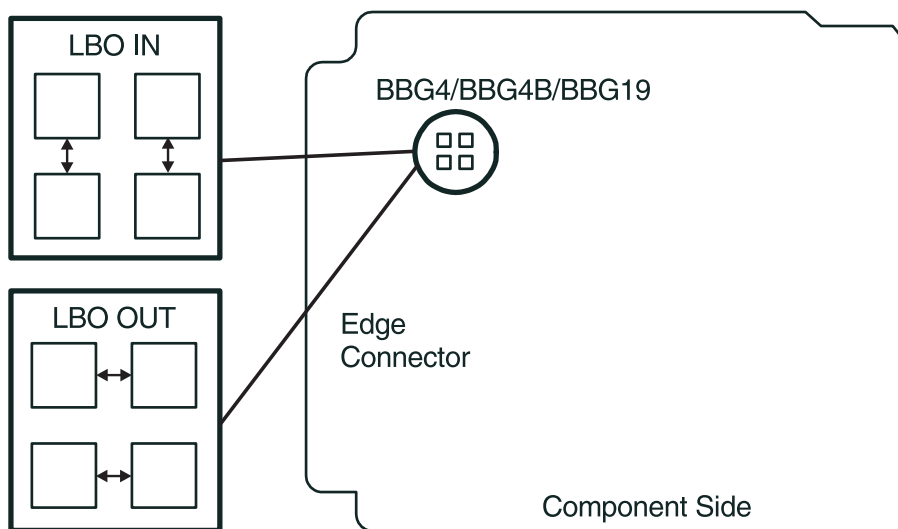


Figure 4. BBG4/BBG4B/BBG19 DS3 Option Settings

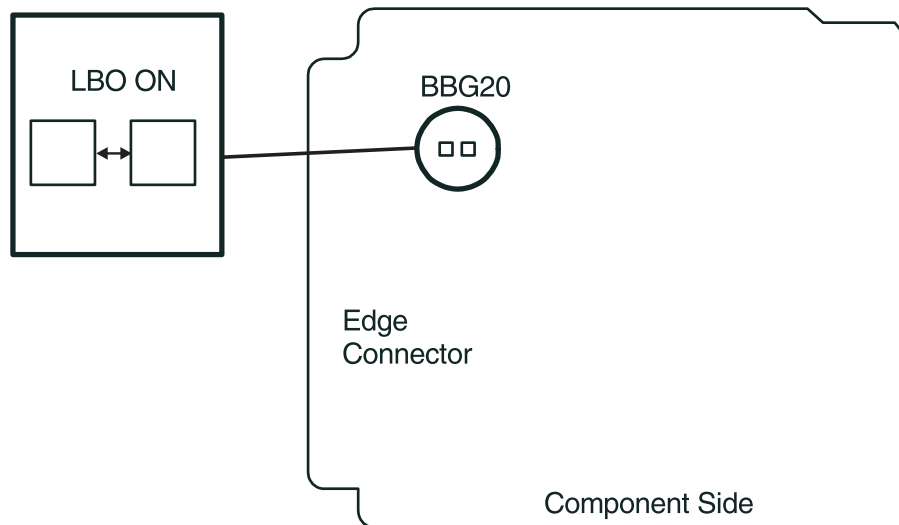


Figure 5. BBG20 TMUX Option Settings

34. **⇒ NOTE:**
If a signal has previously been applied to the original **DS3/TMUX** circuit pack, the **FAULT** lamp will flash when the new **DS3/TMUX** is installed until the signal tests good.

Remove old **DS3/TMUX** and install replacement **DS3/TMUX**.

Response: **FAULT** LED on the **DS3/TMUX** flashes for about 15 seconds and then goes off.

35. **STOP. YOU HAVE COMPLETED THIS PROCEDURE.**

BBF1/BBF1B DS1/BBF3/BBF3B DS1PM

36. Determine from office records the length of the DS1 cabling between the DDM-2000 and the DSX-1 cross-connect point.
37.  **NOTE 1:**
Switch 1, sections 1 through 3 (**S1-1, S1-2, S1-3**), are set according to the length of DS1 cabling between the DDM-2000 and the DSX-1 cross-connection. 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**) on the **BBF1/BBF1B DS1** is unused and ignored by the system. On the **BBF3/BBF3B DS1PM**, **S1-8** must be set to OFF.
-  **NOTE 2:**
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.

Refer to Table K and Figure 6 and set LBO option switches.

Table K. DS1/DS1PM Cable LBO Settings (Note)

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

Note: Invalid switch settings will cause the **FAULT** LED to light and a "DS1 CP failed" alarm.

38. **⇒ NOTE:**
If line code (lc) parameters are generally set using the "**set -t1**" command, the circuit pack switch settings will have no effect. The "**rtrv-t1**" command may be used to check line code settings.

Refer to Table L and Figure 6 and set the line code option switches, if required.

Table L. DS1/DS1PM Line Code Settings

Line Code Format	Switch S1 Settings				
	S1-4 (Port 1)	S1-5 (Port 2)	S1-6 (Port 3)	S1-7 (Port 4)	S1-8 Unused (Note)
B8ZS	OFF	OFF	OFF	OFF	OFF
AMI	ON	ON	ON	ON	OFF

Note: Switch 1, section 8 (**S1-8**) on the **BBF1/BBF1B DS1** is unused and ignored by the system. On the **BBF3 DS1PM**, **S1-8** must be set to OFF.

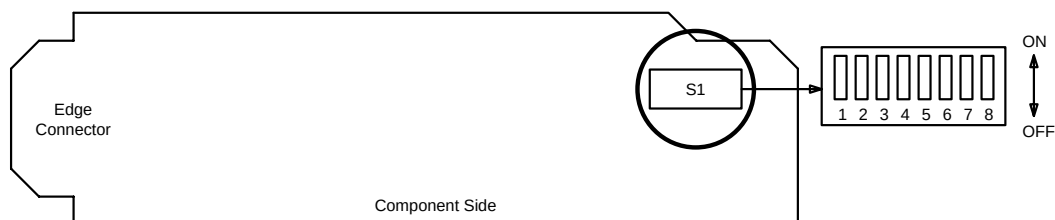


Figure 6. DS1/DS1PM Option Settings

39.  **CAUTION:**
*When a **DS1/DS1PM** circuit pack is switched to protection, removal of any other **DS1/DS1PM** circuit pack or **177A Retainer Card** in the same group will result in a loss of service to the protected **DS1/DS1PM** circuit pack and the removed **DS1/DS1PM** circuit pack.*

 **NOTE 1:**
If a signal has previously been applied to the original **DS1/DS1PM** circuit pack, the **FAULT** lamp will flash when the new **DS1/DS1PM** circuit pack is installed until the signal tests good.

 **NOTE 2:**
A **DS1PM** circuit pack must be replaced with the same type circuit pack to retain the proper feature applications. Also, if protection is required and **DS1PM** circuit packs are installed in the service slots, the protection circuit pack must be a **DS1PM** circuit pack. A "*CP not allowed (eqpt)*" alarm will be generated if a **DS1PM** circuit pack is installed in a service slot with no **DS1PM** circuit pack in the protection slot.

Remove old **DS1/DS1PM** circuit pack and install replacement **DS1/DS1PM** circuit pack.

Response: **FAULT** LED on the **DS1/DS1PM** circuit pack may light (flash) for up to 40 seconds and then goes off.

40. **STOP. YOU HAVE COMPLETED THIS PROCEDURE.**

BBF5 JMPR

41. There are no options to be set on the **BBF5 JMPR** circuit pack. Remove old **JMPR** and install replacement **JMPR**.
42. **STOP. YOU HAVE COMPLETED THIS PROCEDURE.**

BBG6 STS1E

43. Determine from office records the length of the STS1E cabling between the DDM-2000 and the STSX cross-connect point.
44. Install the **BBG6 STS1E** option jumpers per Table M and Figure 7.
45.  **NOTE:**
The **STS1E** circuit pack provides bidirectional transport of one EC-1 signal through the DDM-2000 Multiplexer. **STS1E** high speed mode interfaces with the **DS1/DS1PM** circuit packs at the VT-G rate. **STS1E** low speed mode interfaces with the **OLIU** circuit packs at the STS-1 rate.

Determine **STS1E** mode of operation (high speed or low speed).

46. Set switch **S1** to mode of operation required (**HIGH-SPEED MODE** or **LOW-SPEED MODE**).
47.  **NOTE:**
If a signal has previously been applied to the original **STS1E** circuit pack, the **FAULT** LED will flash when the new **STS1E** is installed until the signal tests good.

Remove old **STS1E** circuit pack and install replacement **STS1E** circuit pack.

Response: **FAULT** LED on the **STS1E** may light (flash) for about 15 seconds and then goes off.

48. **STOP. YOU HAVE COMPLETED THIS PROCEDURE.**

Table M. STS1E LBO Settings

Cable Length (Ft)		
734D Cable	735A Cable	LBO Setting
0 to 225	0 to 125	LBO IN
>225 to 450	>125 to 250	LBO OUT

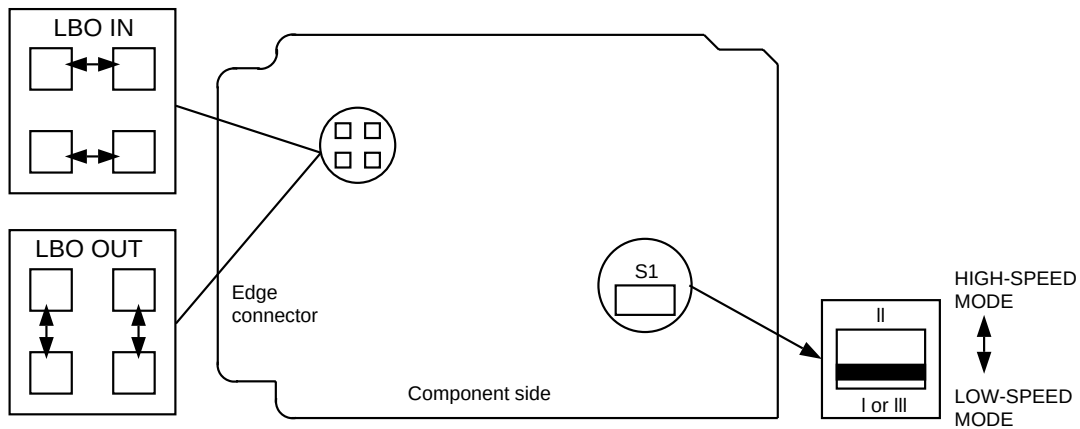


Figure 7. BBG6 STS1E Option Settings

BBF8 HDSL

49. Determine circuit pack option switch settings from office records, work order, or old circuit pack settings.
50. Set **BBF8 HDSL** option switches per Table N and Figure 8.

Table N. HDSL Control Switch Settings

Control Settings	Switch S1 Settings			
	S1-1	S1-2	S1-3	S1-4
Master	—	OFF	—	OFF
Slave	—	ON	—	ON
Local	OFF	—	OFF	—
Remote	ON	—	ON	—

51. **⇒ NOTE:**
If a signal has previously been applied to the original **HDSL** circuit pack, the **FAULT** LED may flash when the new **HDSL** is installed until the signal tests good.

Remove old **HDSL** and install replacement **HDSL**.

Response: **FAULT** LED on the **HDSL** flashes for about 15 seconds and then goes off.

52. **STOP. YOU HAVE COMPLETED THIS PROCEDURE.**

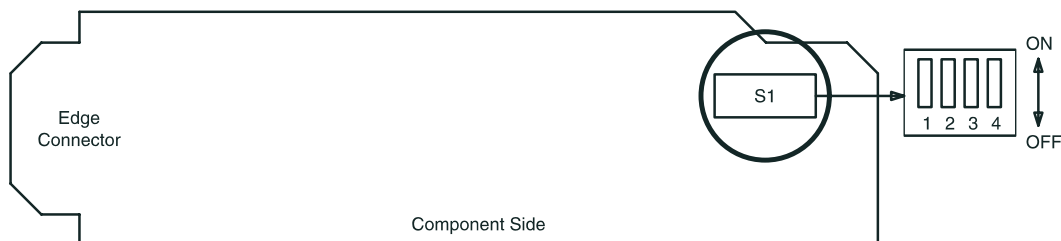


Figure 8. BBF8 HDSL Control Switch

Check –48 V DC Office Battery

1. Obtain multimeter capable of measuring DC voltage in the 40 to 60 volt range.

2.  **WARNING:**
–48 V DC is present in the fuse holders and the P1 and P2 power connections at rear of User Panel.

 **CAUTION:**
If system is in service, service interruption will occur if both fuses are removed or both power feeders are disconnected while in service.

Are fuses installed in User Panel?

If **YES**, then continue with **Step 3**.

If **NO**, then proceed to **Step 4**.

3. Remove ONE of the –48 V fuses at the top of the User Panel.

Reference: **DLP-555**

4.  **CAUTION:**
Exercise care not to short meter probe across fuse contacts in fuse holder.

Use multimeter to measure DC voltage at front of fuse holder(s). Place negative probe on top fuse contact (G3 or G4 shelves) and the other probe to a solid chassis ground.

Requirement: Voltage must be between –40.00 V and –60.0 V DC

5. Was requirement met?
If **YES**, then proceed to **Step 8**.
If **NO**, then continue with **Step 6**.
6. Trouble in User Panel, power feeder(s), or office battery distribution. Refer trouble to organization that installed the shelf.
7. **STOP. YOU HAVE COMPLETED THIS PROCEDURE.**

8. Have both fuse holders been checked?
If **YES**, then proceed to **Step 10**.
If **NO**, then continue with **Step 9**.
9. Reinstall fuse if removed. Remove other fuse if installed and repeat this procedure from **Step 4** for other fuse holder.
10. Are fuses installed?
If **YES**, then proceed to **Step 12**.
If **NO**, then continue with **Step 11**.
11.  **NOTE:**
The fuses on the G3 or G4 shelf User Panel are 5 amp fuses, COMCODE 406203976. The fuses on the G1 shelf User Panel are 5 amp indicator type fuses, COMCODE 405697442.

Install –48 V DC fuses in User Panel fuse holders.
12. Is any fuse blown?
If **YES**, then continue with **Step 13**.
If **NO**, then proceed to **Step 17**.
13. Replace blown fuse.

Reference: **DLP-555**
14. Did fuse blow again?
If **YES**, then continue with **Step 15**.
If **NO**, then proceed to **Step 17**.
15. Trouble in User Panel or backplane connector. Refer trouble to the organization that installed the shelf.
16. **STOP. YOU HAVE COMPLETED THIS PROCEDURE.**
17. Are **PWR ON A** and **B** LEDs lighted?
If **YES**, then **STOP. YOU HAVE COMPLETED THIS PROCEDURE**.
If **NO**, then continue with **Step 18**.
18. Trouble in User Panel. Refer trouble to organization that installed the shelf.
19. **STOP. YOU HAVE COMPLETED THIS PROCEDURE.**

Perform Automatic End-to-End OC-3 Line Test

1.  **WARNING:**
Unterminated optical connectors may emit invisible laser radiation. Avoid direct exposure to the beam. Do not view beam with optical instruments. Use of controls or adjustments or performance of procedures other than those specified herein may result in hazardous radiation exposure.

 **NOTE 1:**
This test is used to verify the integrity of the OC-3 optical fiber lines between two DDM-2000 shelves. It may be performed with the DDM-2000 in service or out of service. This test checks the transmission across the optical interfaces in the **MAIN** and **FUNCTION UNITS** slots equipped with **OLI** circuit packs. For example, this test performed at an intermediate shelf checks the optical span from both the **MAIN** and **FUNCTION UNITS C** slots.

 **NOTE 2:**
It is assumed that each DDM-2000 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 3:**
Far-end communications (fecom) must be enabled at both shelves in the optical span being tested. See SET-FECOM in the "Commands and Reports" section of this manual.

At each end of the optical span being tested, ensure that both the service and protection **OLI**Us have been connected to the optical facility (a total of four connections at each end of the span). See Figure 1.

Reference: **DLP-514**

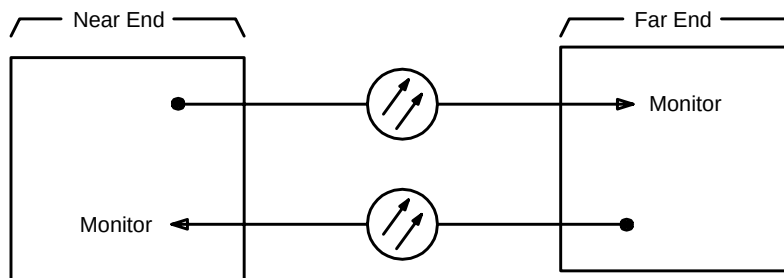


Figure 1. Automated End-to-End Line Test (test-auto:md=optics)

2. Is a CIT available?
If **YES**, then continue with **Step 3**.
If **NO**, then proceed to **Step 8**.
3. Connect CIT to User Panel **CIT** connector.
4. Enter the command **test-auto:md=optics**.
5. The following CIT report will indicate the status of the equipment. It should indicate that there are no failures. If report indicates a failure with **OLIUS**, do **Trouble Clearing: TAP-111**.

```

/* Auto-Turnup Report -- Optical Span Test
=====
EQUIPMENT  -----Main-----  -----Function Units-----
main-1 main-2 a-1 a-2 b-1 b-2 c-1 c-2
          g      g      g      g      g      F      -      -

TRANSMIT   -----Main-----  -----Function Units-----
main-1 main-2 a-1 a-2 b-1 b-2 c-1 c-2
          g      g      g      g      g      F      -      -

RECEIVE    -----Main-----  -----Function Units-----
main-1 main-2 a-1 a-2 b-1 b-2 c-1 c-2
          g      g      g      g      g      F      -      -

DCC        -----Main-----  -----Function Units-----
          g      a      b      c
          g      g      g      -

*/

```

where g stands for *good* and F stands for *Failed*, ? stands for *unknown due to other failures*, and - stands for *not applicable* (that is, slots not equipped with **OLIUS**).

6.  **NOTE:**
Optical span tests for other shelves in the network may be made physically at each shelf or by remote login (**rlgn**).

If other spans are being tested, log in to other shelves in the same network and repeat this test for all optical spans.

7. **STOP. YOU HAVE COMPLETED THIS PROCEDURE.**

8.  **NOTE 1:**
The **UPD/INIT** pushbutton on the **SYSCTL** is recessed to prevent its accidental operation. You will need a small pointed object such as a ball-point pen to depress it.

 **NOTE 2:**
The following five steps (9 through 13) must be performed with no unnecessary delays. Read through them to familiarize yourself with the sequence of operations and the expected responses.

Read Steps 9 through 13 before continuing.

9. On the User Panel, depress and hold the **ACO** pushbutton.

Response: All LEDs on the DDM-2000 are lighted.

10. With the **ACO** pushbutton still depressed, momentarily depress the **UPD/INIT** pushbutton. Then release both pushbuttons.

Response: All lighted **ACTIVE** LEDs remain lighted.

11. While all the LEDs are lighted, momentarily depress the **UPD/INIT** pushbutton one time. You have **1 MINUTE** to do this.

Response: On User Panel, **CR** LED is flashing. **MJ** LED is lighted. All other LEDs, except **PWR ON** LED on User Panel, go off.

12. **⇒ NOTE:**

The **CR** LED will flash for 10 SECONDS. The **UPD/INIT** pushbutton must be momentarily depressed two times while the **CR** LED is flashing. You have **10 SECONDS** to do this.

While the **CR** LED is flashing, momentarily depress the **UPD/INIT** pushbutton two times.

Response: On User Panel, **CR** LED is flashing. **MJ** LED is lighted. After push button is depressed the first time, **MN** LED lights. After push button is depressed the second time, **PMN** LED lights. All other LEDs, except **ACTIVE** LEDs and **PWR ON** LED on User Panel, are off.

⇒ NOTE:

10 seconds after the **UPD/INIT** pushbutton is depressed the last time, the **CR** LED will stop flashing and remain lighted; the **MJ**, **MN**, and **PMN** LEDs also remain lighted. This indicates the beginning of the automatic end-to-end transmission test. The **CR**, **MJ**, **MN**, and **PMN** LEDs remain lighted for the duration of the test. The **ACTIVE** LEDs go off. The test may take as long as 5 minutes.

13. **⇒ NOTE:**

During the test, any failure will be indicated by a lighted or flashing **FAULT** LED on the affected **OLI** circuit pack. This indication will remain on for 1 minute. If no failures are detected, the green **ACO** LED on the User Panel will be lighted for 1 minute.

Wait until the test ends as described above. Was the **ACO** LED lighted?

If **YES**, then continue with **Step 14**.

If **NO**, then proceed to **Step 16**.

14. The DDM-2000 has passed the automatic end-to-end transmission test. Repeat this procedure from Step 8 for all shelves in the network requiring optical spans to be tested.
15. **STOP. YOU HAVE COMPLETED THIS PROCEDURE.**
16.  **NOTE:**
A lighted or flashing **FAULT** LED on an **OLI** indicates that either an **OLI** circuit pack is failed or there is trouble in the optical fiber line or connections between the DDM-2000 shelves.

Clean optical fiber connections.

Reference: **DLP-527**

17. Is **FAULT** LED lighted or flashing on any **OLI**?
If **YES**, then do **Trouble Clearing: TAP-111**.
If **NO**, then continue with **Step 18**.
18. There is an inconsistent set of diagnostic indications. Refer to **Trouble Clearing: TAP-108** to clear the failure condition.
19. **STOP. YOU HAVE COMPLETED THIS PROCEDURE.**

Condition and Connect Modems to Establish Communication From Remote CIT Location

1.  **CAUTION:**
*DDM-2000 circuit packs contain static sensitive components which can be damaged by electrostatic discharge. A static ground wrist strap must be worn when handling the circuit packs. See electrostatic discharge considerations in **Trouble Clearing: TAD-100**.*

-  **NOTE 1:**
This procedure may be used to connect modems and a craft interface terminal (CIT) to the DDM-2000 OC-3 Multiplexer system for use in provisioning the system from a remote location.

-  **NOTE 2:**
This procedure must be performed at both the DDM-2000 location and remote CIT location to set the parameters of modems and terminal.

-  **NOTE 3:**
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.

Verify the generic parameters of the modem are set to the following:

- 300, 1200, 2400, 4800, 9600, or 19,200 baud

The Lucent Technologies 4024 and Lucent Technologies 2224 CEO modems support 1200 and 2400 baud rates. The Lucent Technologies 2296 modem supports 4800 or 9600 baud rates.

- Full duplex
- 8 data bits
- No parity bits
- 1 start bit
- 1 stop bit
- No flow control
- Transparent data mode - ON (Required for software download on some modems.)
- Direct operating mode - ON (Required for software download on some modems.).

2. Are you at the DDM-2000 location or remote CIT location?

If **DDM-2000 LOCATION**, continue with **Step 3**.

If **REMOTE CIT LOCATION**, proceed to **Step 7**.

3. 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:

a. **⇒ NOTE:**

It is assumed the PC and modem ("AT" command compatible) are powered and the PC is loaded with communications software.

Set all front panel switches to DOWN (factory default) for AT command mode.

- b. Connect PC serial port to the modem RS-232C port using modem cable or using a null modem adapter.
- c. Establish communications between the PC and modem using the communications software set for the generic parameters in Step 2.
- d. At the prompt, enter the following "AT" commands.

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

4. Remove the connector at the PC serial port and plug into the front (requires null modem) or rear access port on the DDM-2000 shelf. Dialup access to the network element via the modem is now ready. Tables A and B show the EIA-232-D pins required for use with the DDM-2000.

Table A. Pin Connections for Modem Using DB-25 Cable

EIA-232-D Pin	Front Access CIT (DCE)	Rear Access CIT (DTE) Modem Port
Pin 2 - Circuit BA Transmitted Data	Carries data from terminal or modem to DDM-2000	Carries data from DDM-2000 to modem or terminal
Pin 3 - Circuit BB Received Data	Carries data from DDM-2000 to terminal or modem	Carries data from modem or terminal to DDM-2000
Pin 7 - Circuit AB Signal Ground	Signal ground	Signal ground
Pin 8 - Circuit CF Received Line Signal Detector	Not used	Indicates to DDM-2000 that Modem or terminal is connected
Pin 20 - Circuit CD DTE Ready	Indicates to DDM-2000 that modem or terminal is connected	Indicates to modem or terminal that DDM-2000 is connected (always ON when SYSCTL is powered)

Table B. Pin Connections for Modem Using DB-9 Cable

PC DB-9 Connector	CIT
Pin 1 - Carrier Detect	This modem detects carrier from the remote modem.
Pin 2 - Receive Data	Receives data from modem
Pin 3 - Transmit Data	Transmits data to the modem
Pin 4 - Data Terminal Ready	CIT notifies the modem that they are connected
Pin 5 - Signal ground	Signal ground
Pin 6 - Data Set Ready	Modem notifies the CIT that the modem is connected and ready to receive data.
Pin 7 - Request to Send	CIT is requesting clearance from the modem so it can send data.
Pin 8 - Clear to Send	Modem notifies the CIT that it is clear to send.
Pin 9 - Ring indicator	Modem notifies the CIT that ring signal is present when the modem is in an auto-answer mode.

5. Verify the telephone line is plugged into the modem.
6. **STOP. YOU HAVE COMPLETED THIS PROCEDURE.**

Remote CIT Location

7. At the remote CIT location, set the terminal parameters to match those set at the DDM-2000 location. Refer to manufacturer's manual for instructions on setting modem parameters.

8. Connect the remote modem to the CIT terminal using the appropriate modem cable. Tables B and C list the pins for the DB-25 connector and DB-9 connector, respectively.
9. Verify the telephone line is plugged into the modem.
10. **⇒ NOTE 1:**
Characters other than a question mark (?), carriage return (<cr>), semicolon (;), dollar sign (\$), or the numbers 1 through 8 are ignored. Typing a carriage return more than twice by mistake will cause the system to start a session with the default shelf. The default shelf is the shelf that is physically connected to the CIT.

⇒ NOTE 2:
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 3:
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.

Dial into the DDM-2000 system by entering the correct telephone number. When the modem at the DDM-2000 end answers, establish a login session by pressing RETURN (<cr>) until the system answers. CIT should return with the following prompt:

```
/* Enter a shelf number from 1 to 8 */  
shelf [default] =
```

11. **⇒ NOTE:**
Entering just a carriage RETURN at the shelf prompt will connect you to the shelf physically connected to the CIT.

Enter the shelf number and/or carriage RETURN for the shelf being accessed.

Response: CIT prompts with login <

12. **NOTE:**

Systems with security always have 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 Release 8.1 and 9.1 or later are LUC01 (uppercase LUC-zero-one), LUC02 (uppercase LUC-zero-two), and LUC03 (uppercase LUC-zero-three). For Release 9.0 or earlier, the defaults for the privileged user logins are ATT01 (uppercase ATT-zero-one), ATT02 (uppercase ATT-zero-two), and ATT03 (uppercase ATT-zero-three). The login banner for Release 9.0 and earlier reads: AT&T, DDM-2000 OC-3 Multiplexer, Release a.b.c.

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: CIT prints the following message followed by a proprietary system message and an alarm and status report:

```

/*****
*
*          Lucent Technologies
*      DDM-2000 OC-3 Multiplexer
*
*          Release a.b.c
*
*****/

      .
      .
      .

TID date time
M rtrv-alm:all COMPLD
/* Active Alarms and Status Report
```


13.  **NOTE 1:**
The system prompt may be something other than `<` if there is an alarm condition (for example, if there is an MJ alarm condition on the system, the prompt will be `MJ <`).
-  **NOTE 2:**
After the prompt (`<`), the system will respond to commands entered. The command "**set-link:pg=()**" may be used to set the vertical size of the displayed page on the CIT. Page (**pg**) length may be set from 3 to 150 lines with a default length of 24 lines. The page length is set to default each time a new CIT session is started.
- See the "Commands and Reports" section of this manual for a description of the command formats.
14. **STOP. YOU HAVE COMPLETED THIS PROCEDURE.**

Clean Optical Fibers, Connectors, and Lightguide Buildouts (LBOs)

1.  **WARNING:**
Unterminated optical connectors may emit invisible laser radiation. Avoid direct exposure to the beam. Do not view beam with optical instruments. Use of controls or adjustments or performance of procedures other than those specified herein may result in hazardous radiation exposure.

 **NOTE:**
All optical fiber connectors (*ST*[®], FC/PC, and SC types), lightguide buildouts, and buildout blocks or equivalent should be cleaned before making initial connections or reconnections per the following instructions. Only the components being assembled at this particular time should be cleaned.

Keep all dust caps and plugs in place until time to make connections.

Clean optical fibers and connectors on **OLIU** or LBOs.

If **21G/21D/22F OLIU**, go to **Step 2**.

If **21G-U/21G2-U/21D-U/22F-U/22F2-U/22G-U/22G2-U/22G3-U/22D-U/24G-U/26G2-U/27G-U/27G2-U OLIU** using universal LBOs, go to **Step 7**.

If in-line **LBOs**, go to **Step 15**.

If **lightguide fibers**, go to **Step 21**.

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 at least 3 inches (8 cm) from face of connector.
6. **STOP. YOU HAVE COMPLETED THIS PROCEDURE.**
7. Remove lightguide connector from buildout (if necessary).
8. Remove lightguide buildout from buildout block by unlocking tab and pushing in and turning in counter-clockwise direction (if necessary).

Reference: **DLP-552**

9. Clean the end and the sides of the connectors, buildouts, and blocks with a lint-free, optical quality tissue dampened with isopropyl alcohol.
10. Carefully wipe the connector, buildouts, and blocks again with a clean, dry, lint-free optical quality tissue.
11. Blow any lint or dust from the connectors, buildouts, and blocks using canned air held at least 3 inches (8 cm) away.
12. Clean the inside of the block using a pipe cleaner moistened with isopropyl alcohol.
13. Blow any lint or dust from inside the block, using canned air at least 3 inches (8 cm) away.
14. **STOP. YOU HAVE COMPLETED THIS PROCEDURE.**
15. Is LBO 0 dB or attenuated?
 If **0 dB LBO**, go to **Step 16**.
 If **attenuated LBO**, go to **Step 19**.
16. Clean LBO by placing a pipe cleaner, moistened with isopropyl alcohol, inside LBO and rotating the pipe cleaner.
17. Blow any lint or dust from inside the LBO, using canned air at least 3 inches (8 cm) from LBO.
18. **STOP. YOU HAVE COMPLETED THIS PROCEDURE.**

19.  **CAUTION:**
Attenuated LBO has lens. Do not use pipe cleaner.

Clean LBO by canned air only. Blow any lint or dust from inside LBO, using canned air at least 3 inches (8 cm) from LBO.

20. **STOP. YOU HAVE COMPLETED THIS PROCEDURE.**
21. Clean fiber-end face and sides of connector with lint-free, optical quality tissue moistened with isopropyl alcohol.
22. Carefully wipe fiber-end face and sides of connector again with clean, dry, lint-free optical quality tissue.
23. Blow any lint or dust from fiber-end face and sides of connector using canned air at least 3 inches (8 cm) from connector.
24. **STOP. YOU HAVE COMPLETED THIS PROCEDURE.**

Perform Automatic Local Transmission Test

1.  **WARNING:**
Unterminated optical connectors may emit invisible laser radiation. Avoid direct exposure to the beam. Do not view beam with optical instruments. Use of controls or adjustments or performance of procedures other than those specified herein may result in hazardous radiation exposure.
-  **CAUTION 1:**
*This test may only be performed with the DDM-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 2:**
Unterminated ports should be terminated or looped back before performing this test. Reflections from unterminated low-speed cross-connections can cause low-speed circuit packs to incorrectly appear failed.
-  **NOTE 1:**
Automatic local turnup tests will **not** operate properly if a local DDM-2000 shelf is provisioned for line-timed mode. The timing mode must be set to external or free running (**DLP-513**) before executing the **test-auto:** command. The timing mode should be returned to the correct state after these tests have been run.
-  **NOTE 2:**
It is assumed that the DDM-2000 is installed, powered, and running and that no alarms or LED indicators are activated.

⇒ **NOTE 3:**

This test is automatically performed on all groups and cannot be done on an individual group.

⇒ **NOTE 4:**

It is recommended that all group slots and signal paths be equipped and tested before the shelf is put into service. If circuit packs are not available for all groups, test one group, move the circuit packs to another group and do an update (**upd**), then repeat this test on the next group. If a **FUNCTION UNITS** group is equipped with a **DS3** or **OLI** circuit pack, it is recommended that the group first be tested with the **DS3** or **OLI** circuit pack, then the circuit pack be replaced with a **MXRVO** circuit pack and the test be repeated with all **LOW SPEED GROUP** slots equipped with **DS1/DS1PM** circuit packs. This will ensure that all **LOW SPEED GROUP** slots are good if you later want to convert a group to DS1 service.

⇒ **NOTE 5:**

This test assumes that default STS-1 cross-connections are in place (see **ent-crs-sts1** command). If cross-connections have been manually entered prior to this test, they may have to be deleted and new ones entered before performing this test. See the "Commands and Reports" section of this manual for a description of the following commands: **cnvt-crs**, **dlt-crs-sts1**, **dlt-crs-vt1**, **ent-crs-sts1**, **ent-crs-vt1**, **rtrv-crs-sts1**, **rtrv-crs-vt1**, and **set-ne**.

Use **rtrv-crs-sts1** command to verify proper cross-connections are in place for each group. Use **ent-crs-sts1** command to make proper cross-connections.

2. Install optical loops on all **OLI**s, if not already installed. See Figure 1.

Reference: **DLP-505**

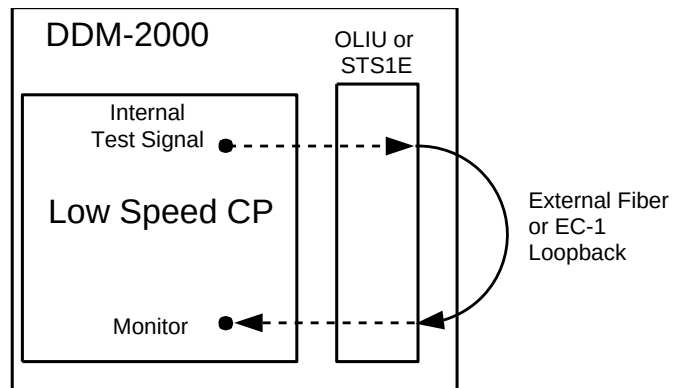


Figure 1. Automated Internal Test of Local Equipment (test-auto:md=local)

3. If **STS1E** circuit packs are installed, loopback the electrical EC-1 signal at the STSX cross-connect point or at the backplane BNC connectors [**J38-J39** (Group A)] [**J40-J41** (Group B)] [**J42-J43** (Group C)]. See Figure 1.
4. Is a CIT available?
If **YES**, then continue with **Step 5**.
If **NO**, then proceed to **Step 9**.
5. Connect the CIT to the **CIT** connector on the User Panel.

Reference: **DLP-521**

6. Enter the command: **test-auto:md=local**.

7. **⇒ NOTE 1:**

If question marks appear in all places except tg-1, tg-2 and --Control--, timing may be set for line-timed instead of free run or external. Also, if the looping fibers on the **MAIN OLIUS** are crossed, all **OLIUS** will appear failed (F) and all Low Speed slots and Function Units slots will show a question mark.

⇒ NOTE 2:

An inconsistent DCC switches alarm will occur when the test is completed and the DDM-2000 OC-3 shelf resets. To clear the alarm, use the **set-fecom:address:com=disable** command to disable the DCC.

The following CIT report will indicate the status of the equipment. It should indicate that there are no failures. If there is a failure, refer to the Trouble Clearing section of this manual. Replace any circuit pack that fails the automatic test [DLP-523].

```
/* Auto-Turnup Report -- Local Equipment Test and Timing Ref. Check
=====
-----Timing-----      -----Main-----      -----Function Units-----
tg-1 tg-2 ref-1 ref-2    main-1 main-2    a-1 a-2 b-1 b-2 c-1 c-2
g   F   g   ?         g       g       g   g   g   F   -   -

Low Speed Group A  Low Speed Group B  Low Speed Group C  --Control--
 1 2 3 4 5 6 7 8   1 2 3 4 5 6 7 8   1 2 3 4 5 6 7 8   sysctl auxctl
- - - g g F g g   - - - - - - - - - - - - - - - -   g       g
*/
```

where g stands for *good* and F stands for *Failed*, ? stands for *unknown due to other failures*, and - stands for *not applicable* (that is, slots not equipped).

8. **STOP. YOU HAVE COMPLETED THIS PROCEDURE.**

9.  **NOTE 1:**
The **UPD/INIT** pushbutton on the **SYSCCTL** is recessed to prevent its accidental operation. You will need a small pointed object, such as a ballpoint pen, to depress it.

-  **NOTE 2:**
Steps 10 through 12 must be performed with no unnecessary delays. Read the steps first to familiarize yourself with the sequence of operations and the expected responses.

Read Steps 10 through 12 before continuing.

10. Depress and hold the **ACO** pushbutton on the User Panel.

Response: All LEDs on the DDM-2000 are lighted.

11. With the **ACO** pushbutton still depressed, momentarily depress the **UPD/INIT** pushbutton. Then release both pushbuttons.

Response: All User Panel LEDs and **ACTIVE** LEDS remain lighted.

12. While all the LEDs are lighted, momentarily depress the **UPD/INIT** pushbutton ONE time. You have **1 MINUTE** to do this.

Response: On the User Panel, **CR** LED is flashing and **MJ** LED is lighted. All other LEDs, except **PWR ON** LED and **ACTIVE** LEDs, go off. 10 seconds after the **UPD/INIT** pushbutton is depressed, **CR** LED will stop flashing and remain lighted. **MJ** LED also remains lighted. **ACTIVE** LEDs go off. This indicates the beginning of the automatic looped transmission test. **CR** and **MJ** LEDs remain lighted for duration of test. The test may take as long as 5 minutes.

-  **NOTE:**
During the test, any failure will be indicated by a lighted **FAULT** LED on the affected circuit pack. This indication will remain on for 1 minute at the end of the test. If no failures are detected, the **ACO** LED on the User Panel will be lighted for 1 minute at the end of the test.

13. Wait until the test ends as described above. Was **ACO** LED lighted?
If **YES**, then continue with **Step 14**.
If **NO**, then proceed to **Step 16**.
14. The DDM-2000 has passed the automatic looped transmission test.
15. **STOP. YOU HAVE COMPLETED THIS PROCEDURE.**
16. Was any LED on the DDM-2000 lighted besides the **ACTIVE** LEDs and **CR**, **MJ**, and **ACO** LEDs on the User Panel?
If **YES**, then continue with **Step 17**.
If **NO**, then proceed to **Step 19**.
17. Lighted LED(s) in addition to the LEDs mentioned above indicates the circuit pack(s) that failed the automatic looped transmission test. Replace any circuit pack that failed the automatic looped transmission test.

Reference: **DLP-523**

18. **STOP. YOU HAVE COMPLETED THIS PROCEDURE.**
19. There is an inconsistent set of diagnostic indications. Refer to **Trouble Clearing: TAP-108** to clear the failure condition.
20. **STOP. YOU HAVE COMPLETED THIS PROCEDURE.**

Perform Automatic Cross-Connect Wiring Test

1.  **WARNING:**
Unterminated optical connectors may emit invisible laser radiation. Avoid direct exposure to the beam. Do not view beam with optical instruments. Use of controls or adjustments or performance of procedures other than those specified herein may result in hazardous radiation exposure.

-  **CAUTION:**
*This test may only be performed with the DDM-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.*

-  **NOTE 1:**
Automatic cross-connect turnup tests will **not** operate properly if a local DDM-2000 shelf is provisioned for line-timed mode. The timing mode must be set to external or free running (**DLP-513**) before executing the "**test-auto:**" command. The timing mode should be returned to the correct state after these tests have been run.

-  **NOTE 2:**
It is assumed that the DDM-2000 is installed, powered and running, connected to the cross-connect points, and that no alarms or LED indicators are activated. It is also assumed that the DDM-2000 has passed the automatic local transmission test. If this test has not been completed, refer to the appropriate installation procedure and perform that test.

-  **NOTE 3:**
This test is automatically performed on all groups and cannot be done on an individual group.

⇒ **NOTE 4:**

This test assumes that default STS-1 cross-connections are in place. Default cross-connections are automatically made when each **FUNCTION UNITS** slot is equipped. If cross-connections have been manually entered prior to this test, they may have to be deleted and new ones entered before performing this test. See the "Commands and Reports" section of this manual for a description of the following commands: "**cnvt-crs**", "**dlt-crs-sts1**", "**dlt-crs-vt1**", "**ent-crs-sts1**", "**ent-crs-vt1**", "**rtrv-crs-sts1**", "**rtrv-crs-vt1**", and "**set-ne**".

Use "**rtrv-crs-sts1**" command to verify proper cross-connections are in place for each group.

2. Install **OLI** optical loops, if not already installed.

Reference: **DLP-505**

3. ⇒ **NOTE:**

When an external DS3 loopback is established, provision for CC mode with no AIS ("**set-t3:address:mode=cc,ais=no**"). Otherwise, if the VMR mode is used, an inc. DS3 00F alarm will be generated.

At the low-speed cross-connect point (DSX-1, DSX-3 or STSX), install a patch cord from the **OUT** jack to the **IN** jack for each DS1, DS3, or EC-1 (STS1E) circuit associated with the DDM-2000 under test. See Figure 1.

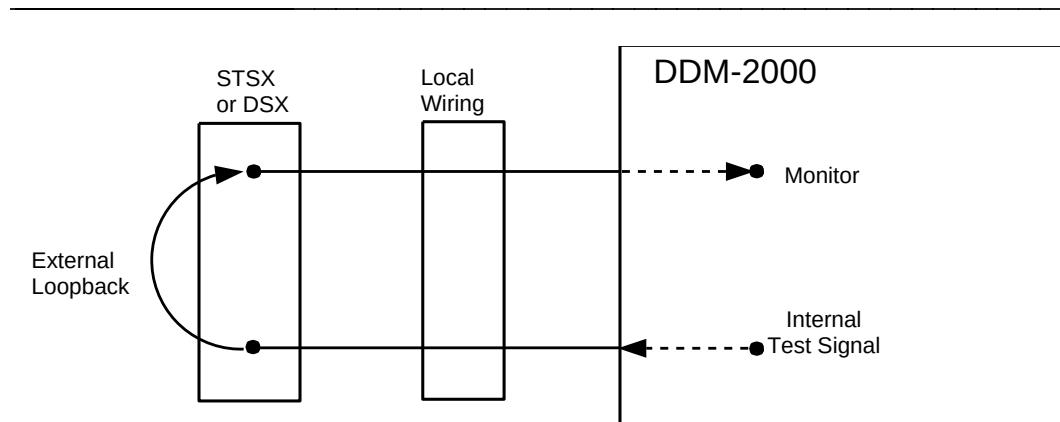


Figure 1. Automated Test of Local Wiring to Cross-Connection (test-auto:md=dsx)

4. Is a CIT available?

If **YES**, then continue with **Step 5**.

If **NO**, then proceed to **Step 10**.

5. Connect the CIT to the **CIT** connector on the User Panel.

Reference: **DLP-521**

6. Enter the command: "**test-auto:md=dsx**".

7.  **NOTE:**

An "inconsistent DCC switches" alarm may occur when the test is completed and the DDM-2000 OC-3 shelf resets. To clear the alarm, use the "**set-fecom:address:com=disable**" command to disable the DCC.

The following CIT report will indicate the status of the equipment. It should indicate that there are no failures. If report indicates a failure, disconnect the cross-connect cables from the DDM-2000 and use an ohmmeter to further isolate the failure in the cross-connect wiring.

```
/* Auto-Turnup Report -- Local Wiring Cross-Connect Test
=====
--Function Units--
fn-a  fn-b  fn-c
-      F      -

      Low Speed Group A      Low Speed Group B      Low Speed Group C
port  1 2 3 4 5 6 7      1 2 3 4 5 6 7      1 2 3 4 5 6 7
1      - - - g g ? g      - - - - - -      - - - - - -
2      - - - g F ? g      - - - - - -      - - - - - -
3      - - - g g ? g      - - - - - -      - - - - - -
4      - - - g F ? g      - - - - - -      - - - - - -
*/
```

where *g* stands for *good* and *F* stands for *Failed*, *?* stands for *unknown due to other failures*, and *-* stands for *not applicable* (that is, slots not equipped).

8. If violation monitor removal mode was set differently than the original mode in Step 3, reprovision the mode to the original or required setting using the "**set-t3**" command.
9. **STOP. YOU HAVE COMPLETED THIS PROCEDURE.**

10.  **NOTE 1:**
The **UPD/INIT** pushbutton on the **SYSCTL** is recessed to prevent its accidental operation. You will need a small pointed object such as a ballpoint pen to depress it.

-  **NOTE 2:**
Steps 11 through 14 must be performed with no unnecessary delays. Read the steps first to familiarize yourself with the sequence of operations and the expected responses.

Read Steps 11 through 14 before continuing.

11. Depress and hold the **ACO** pushbutton on the User Panel.

Response: All LEDs on the DDM-2000 are lighted.

12. With the **ACO** pushbutton still depressed, momentarily depress the **UPD/INIT** pushbutton. Then release both pushbuttons.

Response: All User Panel LEDs and **ACTIVE** LEDs remain lighted.

13. While all the LEDs are lighted, momentarily depress the **UPD/INIT** pushbutton one time. You have **1 MINUTE** to do this.

Response: On the User Panel, **CR** LED is flashing and **MJ** LED is lighted. All other LEDs, except **PWR ON** LED and **ACTIVE** LEDs, go off.

14. While the **CR** LED is flashing, momentarily depress **UPD/INIT** pushbutton ONE time. You have **10 SECONDS** to do this.

Response: On the User Panel, **MN** LED is lighted, **MJ** LED remains lighted, and **CR** LED is flashing. All other LEDs, except **PWR ON** LED and **ACTIVE** LEDs, are off. 10 seconds after the **UPD/INIT** pushbutton is depressed this last time, the **CR** LED will stop flashing and remain lighted, **MJ** and **MN** LEDs also remain lighted, and **ACTIVE** LEDs go off. This indicates the beginning of the automatic looped cross-connect test. **CR**, **MJ**, and **MN** LEDs remain lighted for duration of the test. The test may take as long as 5 minutes.

⇒ **NOTE:**

During the test, any failure will be indicated by a flashing **FAULT** LED on the affected circuit pack. This indication will remain on for 1 minute. If no failures are detected, the **ACO** LED on the User Panel will be lighted for 1 minute.

15. Wait until the test ends as described above. Was **ACO** LED lighted?
If **YES**, then continue with **Step 16**.
If **NO**, then proceed to **Step 19**.
16. The DDM-2000 has passed the automatic looped transmission test. Remove DSX/STX patch cords and momentarily depress the **UPD/INIT** pushbutton.
17. If violation monitor removal mode was set differently than the original mode in Step 3, reprovision the mode to the original or required setting using the "**set - t3**" command.
18. **STOP. YOU HAVE COMPLETED THIS PROCEDURE.**
19. Was any **FAULT** LED on any DS1 circuit pack flashing?
If **YES**, then continue with **Step 20**.
If **NO**, then proceed to **Step 22**.
20. The flashing LED(s) on the DS1 circuit pack(s) indicates the circuit pack(s) that failed the automatic cross-connect transmission test. Disconnect the cross-connect cables from the DDM-2000 and use an ohmmeter to further isolate the failure in the cross-connect wiring.
21. **STOP. YOU HAVE COMPLETED THIS PROCEDURE.**
22. There is an inconsistent set of diagnostic indications. Refer to **Trouble Clearing: TAP-108** to clear the failure condition.
23. **STOP. YOU HAVE COMPLETED THIS PROCEDURE.**

Operate FE SEL Pushbutton on SYSCTL

1. **NOTE 1:**

The **FE SEL** pushbutton on the **SYSCTL** can be used to display the near-end and far-end alarm/status condition. The 7-segment **FE ID** display indicates which site/shelf conditions are currently being displayed on the local User Panel. When the 7-segment display is blank, a composite of the local and far-end alarm and status conditions is displayed on the User Panel.

 NOTE 2:

When the **FE SEL** pushbutton is pushed for the first time, the **FE ID** display shows **L.** and the User Panel LEDs show the conditions of the local shelf only.

If the **FE SEL** pushbutton is pushed again within 15 seconds, the **FE ID** display shows the local shelf SITE address (with the decimal point), and the User Panel LEDs show the alarm and status condition of all shelves at this site. In OC-3 applications, there will be only one shelf at each site and the set of LEDs lighted will be the same for the first and second button pushes. In OC-3/OC-12 applications, there may be up to five shelves at one site. The first button push allows isolation of a fault to a single shelf at the local site, and subsequent button pushes allow isolation of a fault to the local site or one of the remote sites.

In OC-3/OC-12 applications, each time the **FE SEL** button is pushed again within 15 seconds, the **FE ID** display and User Panel increment to display the next highest SITE address in the network and the alarm or status condition of the shelves at that site. If the local DDM-2000 OC-12 Multiplexer cannot communicate with another site due to a failure, all LEDs on the User Panel will be lighted when the FE ID display shows that site number. In OC-3 applications, each time the **FE SEL** button is pushed again within 15 seconds, the **FE ID** display increments to display the next highest SITE address in the network and the User Panel LEDs show the composite alarm and status condition of the shelves in the network at that site. If the local DDM-2000 OC-3 Multiplexer cannot communicate with another site due to a failure, then all LEDs on the User Panel will be lighted when the **FE ID** display shows that site number.

If there are more than eight sites, a dash will appear in the **FE ID** display for each site greater than eight. After cycling through the sites, **L.** and the conditions of the local shelf are again displayed.

When the **FE SEL** is released and not pushed again for 15 seconds, or if the **ACO/TST** pushbutton is pushed, the **FE ID** display will go blank and the User Panel will return to the composite display.

Momentarily depress and release the **FE SEL** pushbutton until the required SITE address and conditions are displayed.

2. Note the alarm LEDs displayed on the local User Panel. You have **15 SECONDS** to observe the alarm indications.
3. **STOP. YOU HAVE COMPLETED THIS PROCEDURE.**

Retrieve Generic Software Version ID

1. Is a CIT available?

If **YES**, then continue with **Step 2**.

If **NO**, then proceed to **Step 5**.

2. Connect CIT to User Panel and establish session.

Reference: **DLP-521**

3. Use the **rtrv-eqpt:sysctl** command to retrieve generic software version number.

Response: System outputs an "Equipage and Version Report" which contains the program version presently loaded into the system.

4. **STOP. YOU HAVE COMPLETED THIS PROCEDURE.**

5. **NOTE:**

When the **ACO** pushbutton is depressed, all LEDs and the 7-segment display on the **SYSCTL** light. If the **ACO** pushbutton is released within 2 seconds, the LED test completes and the 7-segment display and all LEDs will revert to normal operation. If the **ACO** pushbutton is depressed longer than 2 seconds, the 7-segment display goes blank for 2 seconds and then each digit of the generic software version code is scrolled through the display. The LEDs remain lighted while the code is being displayed. When the **ACO** pushbutton is released, the LEDs remain lighted until the full software version code is displayed. If the **ACO** pushbutton is still depressed when the software version code has completed cycling, the display goes blank for 2 seconds and starts cycling through the software version code again. This continues as long as the **ACO** pushbutton is depressed. When the **ACO** pushbutton is released the cycle will complete and the display and all LEDs go to normal operation.

Depress and hold (for longer than 2 seconds) the **ACO** pushbutton on the User Panel.

Response: All LEDs and the 7-segment display light. The display goes blank for 2 seconds and then scrolls through the full software version code.

6. **STOP. YOU HAVE COMPLETED THIS PROCEDURE.**

Install New Software Generic Program In-Service System Local Shelf Download

1. Before beginning the software installation, refer to the "Software Installation and Upgrade Procedure" section of the Software Release Description. This section contains a description of any special considerations required when installing this version of software.
2.  **NOTE:**
This procedure is used to install a new software program in a local in-service DDM-2000 OC-3 shelf. For procedures to download software in a new shelf (initial installation), see **DLP-561**. For procedures to download software to a remote shelf (using **ins-prog** or **cpy-prog** command), see **DLP-562**.

Verify that no DCC failures or transmission failures (OC-3 LOS, flashing **OLIUFault** LEDs, etc.) are present on the network element or system receiving the program.

3.  **CAUTION:**
TIMING slot 2 should always be equipped with a **TGS** circuit pack and be active prior to software download. To clear a "**C**" condition from the **SYSCTL FE ID** display, procedures will require removal of the **TGS** circuit pack from **TIMING slot 1** to force the system to run the new software. See Table A.

-  **NOTE 1:**
- When upgrading from releases without synchronization messaging to releases with this feature, it is suggested to upgrade first the shelves which are provisioned for "external timed" or "external mult" timed. This is to prevent timing "holdover" conditions at nodes that derive timing from the OC-3 line.

Table A. DDM-2000 OC-3 In-Service Upgrade Compatibility

Current Release in Shelf (OLD)	Software Release To Be Installed (NEW)						
	Linear		Ring				
	8.0	8.1.n	7.2.n	9.0.n	9.1.n	11.0.n	11.1.n
7.1.n or earlier	NA	NA	C	C	C	C	C
7.2.n (Ring)	NA	NA	X	C	C	C	C
8.0.n (Linear)	X	X	C	C	C	C	C
8.1.n (Linear)	NA	X	NA	C	C	C	C
9.0.n (Ring)	NA	NA	NA	X	X	X	X
9.1.n (Ring)	NA	NA	NA	NA	X	X	X
11.0.n (Ring)	NA	NA	NA	NA	NA	X	X
11.1.n (Ring)	NA	NA	NA	NA	NA	NA	X

C - Indicates software incompatibility. Upon completion of the software download, a "C" will be displayed in the **SYSCTL FE ID** display. This is a caution indicating that the newly installed software has major changes from the previous release. Transmission will not be affected but shelf access, protection switching, alarm reporting, and control functions will be disabled while the "C" is displayed. You must verify that the correct software version has been downloaded and that a "C" was expected as a result of the download (See Table above). After verifying that the correct software download occurred, the system may be forced to run the new software by following the steps provided in this procedure.

NA - Not Applicable. If an NA conversion is required, contact your local technical support organization.

X - Indicates software compatibility. Download procedures will not require the system to be forced to run the software installed. No "C" should appear in the **SYSCTL FE ID** display. Other equipment/fiber changes and/or software/equipment provisioning may be required before and/or after the upgrade. See **System Turnup: IXL-001** for particular upgrade procedures and the Software Release Description for the software release being installed.

⇒ **NOTE 2:**

If a linear shelf is in the STS3c mode (**concat** mode enabled by the **set-oc3** command) and a different software generic that does not have the STS3c feature is loaded, the **OLIUs** will stay in the **concat** mode until they are removed and resealed.

⇒ **NOTE 3:**

If the **ins-prog** command is used for software upgrades from Release 9.1 to Release 11, or later, the software is loaded as a dormant copy in the **SYSTL** receiving the software. At the end of the download, the **rtrv-alm** report will show a status message of "*dormant/exec code mismatch*". The **apply** command must be used to overwrite the original executing copy of software with the new dormant software version. See the "Commands and Reports" section in 363-206-280, *DDM-2000 OC-3 Multiplexer, Releases 8.0 through 11.1, User/Service Manual—Volume 1*, for a description of the **apply** command.

Before performing this procedure, ensure that both **TGS** circuit packs are installed in the shelf, then use the **switch-sync:s=circuitpack,pri>manual** command to switch to the protection **TGS** circuit pack in **TIMING** slot 2, if not already **ACTIVE**. Use **rtrv-sync:** command to verify that the **TGS** circuit pack in **TIMING** slot 2 is **ACTIVE**.

4. ⇒ **NOTE:**

If you are using a PC operating in a *Windows*^{*} environment, you must **exit Windows** and restart your PC in *MS-DOS*^{*} mode before performing these download procedures. For example, if your PC is running *Windows 95* you must exit *Windows* by clicking on the **Start** button, then **Shut Down**, then **Restart the computer in MS-DOS mode**.

Obtain equipment, check software, and connect PC for download if new software is being loaded from floppies or hard disk. Connect CIT to login to shelf if **APPLY** command is being used to load a dormant copy of software (Release 9.1 or later).

Reference: **DLP-566** to connect PC.

Reference: **DLP-521** to connect CIT.

* Registered trademark of Microsoft Corporation.

5. Observe one of the following indications on the **FE ID** display. Note the indication and follow the suggested procedure.

A. **Letter "P" in FE ID Display**

Indicates no software installed in **SYSCTL**. Software must be downloaded locally using these procedures.

Continue with **Step 6**.

B. **Letter "P." in FE ID Display**

Letter "**P**" followed by a period (**P.**) indicates a previous download attempt has failed. New software must be downloaded locally using these procedures.

Proceed to **Step 20**.

C. **FE ID Display Blank:**

Indicates compatible software is installed in **OHCTL** and **SYSCTL**. This procedure assumes the installed executing software version is not the correct version. (Depress **ACO** button for longer than 2 seconds to display software version on the **FE ID** display.)

Proceed to **Step 9**.

D. **Letter "d" in FE ID Display:**

Indicates **OHCTL** has no software or that software in **OHCTL** and **SYSCTL** is incompatible.

Proceed to **Step 20**.

E. **Letter "C" in FE ID Display:**

Indicates software is installed in **OHCTL** and **SYSCTL**, but it will not support the current shelf provisioning.

Proceed to **Step 24**.

F. Letter "U" in FE ID Display:

Indicates **SYSCTL** Switch **S1** is not set properly for type of shelf being equipped.

Remove **SYSCTL**. Repeat procedures of **DLP-501** to correct switch settings and to reinstall **SYSCTL**.

G. Letter "E" in FE ID Display:

Indicates **SYSCTL** must be replaced.

Get replacement **SYSCTL** and repeat procedures of **DLP-501**.

H. Letter "F" in FE ID Display:

Indicates **SYSCTL** faceplate latch is not fully seated. If **SYSCTL** has just been replaced, unplug **SYSCTL** and repeat procedures of **DLP-501**. If original **SYSCTL** has just been unplugged and reseated, properly seat the faceplate latch. (A reset occurs after the faceplate is seated.)

I. Flashing Letter "L" in FE ID Display:

Indicates a low voltage condition (brownout) on the shelf.

Clear trouble using **Trouble Clearing: TAP-121**.

Letter "P" in FE ID Display

6.  **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 front CIT
(CIT-1) 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 a.b.c is installed */
```

The **SYSCTL** resets and the terminal is logged off the
system.

7. Was response correct?

If **YES**, then continue with **Step 8**.

If **NO**, then proceed to **Step 28**.

8. 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 24**.

FE ID Display Blank

9. Is new software being loaded from a PC or are you using the **apply** command to install a dormant copy of software as an executing copy?

If **PC**, then continue with **Step 10**.

If **APPLY COMMAND**, then proceed to **Step 34**.

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.

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.

11.



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] =
```

12. Was response correct?

If **YES**, then continue with **Step 13**.

If **NO**, then proceed to **Step 29**.

13. Enter the shelf number for the shelf being used for new program download.

Response: PC responds with:

```
login<
password<

/*****
*
*
*      Lucent Technologies      *
*      DDM-2000 OC-3 Multiplexer  *
*
*      Release a.b.c          *
*
*****/

      .
      .
      .

TID date time
M  rtrv-alm: all COMPLD
/* Active Alarms and Status Report
```

14.  **NOTE:**

After the system prompt (<), the system will respond normally to commands entered. The "Commands and Reports" section in 363-206-280, *DDM-2000 OC-3 Multiplexer, Releases 8.0 through 11.1, User/Service Manual—Volume I*, gives 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.

15. Enter the command **ins-prog:tid**

Where tid = the target identifier (shelf name) for the DDM-2000 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 =.

16. Was response correct?

If **YES**, then continue with **Step 17**.

If **NO**, then do **Trouble Clearing: TAP-116**.

17. 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 User Panel and a **P** is displayed in **SYSCTL 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 a.b.c is installed */

18. Was response correct?
 If **YES**, then continue with **Step 19**.
 If **NO**, then do **Trouble Clearing: TAP-116**.
19. Did the letter "**C**" appear in the **FE ID** display?
 If **NO**, then proceed to **Step 34**.
 If **YES**, then proceed to **Step 24**.

Letter "d" or "P." in FE ID Display

20.  **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 front CIT
 (CIT-1) connector.*

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.

21. 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 a.b.c is installed */
```

The **SYSCTL** resets and the terminal is logged off the system.

22. Was response correct?
If **YES**, then continue with **Step 23**.
If **NO**, then proceed to **Step 28**.
23. Did the letter "C" appear in the **FE ID** display?
If **NO**, then proceed to **Step 34**.
If **YES**, then continue with **Step 24**.

Letter "C" in FE ID display

24.  **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 (See Table A). 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 25**.

If **YES**, then proceed to **Step 26**.

25. Exit TERM (Alt-F2). Find new version of software and repeat this procedure from Step 20.
26. To *force* the system to run the current software, perform the following:
- Ensure that a **TGS** circuit pack is installed in **TIMING** slot **2**.
 - Remove the **TGS** circuit pack in **TIMING** slot **1**.
 - Reset (unplug and reseat) the **SYSCTL** to force it to run the current software.
 - After the current software is up and running (no alarm LEDs lighted or you can log into the shelf), reinstall the **TGS** circuit pack in **TIMING** slot **1**.
27. **STOP. YOU HAVE COMPLETED THIS PROCEDURE.**

28. Did the download start as indicated by the In progress message and rows of dots?

If **NO**, then continue with **Step 29**.

If **YES**, then proceed to **Step 31**.

29. Perform the following:

- A. Check that the DDM-2000 is connected to the PC through the **COM** port. If it is not, reconnect the PC to DDM-2000 using the **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 9600, change it to 4800 or if the baud rate is currently set to 4800, change it to 9600. The baud rate is changed by:
 1. Momentarily depress 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 depress the "Escape/Esc" key to activate the new baud rate.
- G. If the download still does not start, refer to **Trouble Clearing: TAP-116**.

30. **STOP. YOU HAVE COMPLETED THIS PROCEDURE.**

31. If the download *starts and fails* during its progress, exit term (Alt-F2) and then restart a new term session.
32. Unplug and reseat the **SYCTL** 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).

If the download still does not complete, refer to
Trouble Clearing: TAP-116.

33. **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 later releases, 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.

See the "Commands and Reports" section of 363-206-280, *DDM-2000 OC-3 Multiplexer, Releases 8.0 through 11.1, User/Service Manual—Volume I*, 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. Use the **rtrv-ne:** command to verify the *Dormant_Version* release.

38. Is the *Dormant_Version* release number listed and correct?

If **YES**, then continue with **Step 39**.

If **NO**, then proceed to **Step 41**.

39. 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.

LEDs and **FE ID** display go off on **SYSCTL** and User Panel.

You are logged off the system.

After approximately 5 minutes you can log back into the shelf and reestablish communications.

40. Was response correct?

If **YES**, then **STOP. YOU HAVE COMPLETED THIS PROCEDURE.**

If **NO**, then proceed to **Step 42**.

41. If the *Dormant_Version* release number is not listed, the dormant software is missing or corrupted. You will have to load new software.

42. Repeat this procedure to load new software using the **cpy-prog** or **ins-prog** command. If software installation fails again, perform trouble clearing procedures. You may need to replace the **SYSCTL**. If the letter "**C**" appeared in the **FE ID** display, then repeat this procedure from **Step 24**.

43. **STOP. YOU HAVE COMPLETED THIS PROCEDURE.**

Introduction to the Personal Computer (PC)

General

This Detailed Level Procedure (DLP) provides a brief introduction to the PC. It includes proper handling and storage of diskettes and some of the important procedures you should follow when working with your PC. This DLP is a brief review of PC concepts. Refer to your PC user's guide for a complete description.

Anatomy of a PC

PCs vary in physical appearance and size, most *IBM** compatible PCs consist of three basic parts — a main unit, a monitor, and a keyboard. Note that some PCs, particularly portables, integrate the keyboard, monitor, and main unit into a briefcase-size package. The DDM-2000 generic program may be installed with either a desktop PC or a portable PC. The diskettes may be either 3-½ inch floppy disks or 5-¼ inch floppy disks.

Main Unit

The main unit of the PC contains the CPU (central processing unit), disk drive(s), and memory, among other things. All main units have some common features which include:

- **ON/OFF Switch** — This switch is used to switch the PC **ON** or **OFF**. It is usually located on the back of the PC, near where the AC power cord plugs in to the PC.
- **Serial Port** — This is the port which the PC uses to communicate with the customer equipment. When using the PC to install a new generic program to DDM-2000, the COM1 port must be used. Refer to your PC documentation to determine which port is the COM1 port. There are two types of serial port connectors:
 - 25-pin RS-232 connector (male)
 - 9-pin connector (male).

* Registered trademark of International Business Machines Corporation.

If your PC has the 9-pin connector, you will need a serial port adapter which converts the 9-pin connector to a 25-pin connector. This is a cable which has a 9-pin connector on one end and a 25-pin male connector on the other end.

- **Parallel Port** — This port is used to connect to some printers.
- **Disk Drives** — PCs come in several basic types, some of which are as follows:
 - **Single floppy disk, no hard disk** — This type PC is the most basic configuration. The PC has a single floppy disk drive, with no hard (fixed) disk. The floppy drive is referred to as drive **A**.
 - **Dual floppy disk, no hard disk** — This type PC is identified by the two floppy disk drives installed. One floppy drive is referred to as drive **A**. The second is referred to as drive **B**.
 - **Single floppy disk with hard disk** — This type PC has a single floppy disk drive and a hard disk, which can typically store 10 or more megabytes of data. The single floppy disk drive is referred to as drive **A**, and the hard disk is usually referred to as drive **C**.

Other combinations of floppy and hard drives are possible but all that is required is a single floppy drive as a minimum. The procedures in this manual for installing a new generic program indicate using drive **A**.

Monitor

The monitor, sometimes called a display screen, may be either monochrome or color.

Keyboard

The keyboard is used to enter commands. This section reviews some of the features of the keyboard and points out some of the special keys.

The keyboard is divided into two different sections:

- *Typewriter section* — This area has the alphanumeric keys that resemble the layout of a typewriter. In particular, you should locate the **ENTER** key (sometimes referred to as **RETURN**). This key is located on the right side of the typewriter section. It usually has the word **ENTER** or **RETURN** printed on the key. When you are asked to select **<ENTER>** or **RETURN**, you should momentarily depress that key, or equivalent.
- *Special Keys* — The keyboard has many special keys which are interpreted differently by various software packages. Locate the **CANCEL** or **DELETE** key. This key may be used to abort a command.

Rebooting the PC

Occasionally, you may have to reboot the PC. There are three ways to accomplish this:

- Power **ON/OFF** switch — If the PC is **OFF**, you should set the **ON/OFF** switch to the **ON** position. If the PC is already **ON**, it is preferable to reset it using one of the following two methods:
- **RESET** button — Not all PCs have a **RESET** button, but if yours does, it provides an easy way to reset the PC. Alternatively, the following method may work.
- Hold down the **CTRL**, **ALT**, and **DELETE** keys all at the same time.

If **RESET** or **CTRL**, **ALT**, and **DEL** keys are not effective, turn **OFF** the PC, wait a few seconds, and turn it back **ON**. Rebooting the PC clears all data you had in memory. If the time of day clock is not indicating the current time and date, set the time of day clock.

Diskettes — Care and Handling

Diskettes are sometimes called floppy disks, or floppies for short. Diskettes are similar to cassette tapes—magnetically encoded information is stored on the diskette for later retrieval. By adhering to the following guidelines you will increase the useful life of your diskettes:

DO:

- Keep the diskette in a protective envelope when not in use.
- Keep the diskette in a dry place.
- Keep the diskettes away from magnetic fields or objects (for example, magnetic screwdriver.)

DO NOT:

- Touch any of the exposed surfaces of the diskette itself; handle it by the edge of the jacket. Very tiny scratches, fingerprints, or dust can ruin a diskette.
- Bend a diskette.
- Write on a diskette label with a ballpoint pen or pencil. Use a felt-tipped pen instead. Write the label before applying it to the diskette if possible.
- Erase the diskette label with a pencil eraser. The dust may destroy the diskette. Instead, place a new label over the old one.

Inserting Diskettes

You should **never** remove or insert a diskette while the disk drive indicator light is on. (The computer turns the indicator light on to let you know that it is reading or writing from the disk.) Always wait for the indicator light to go off before opening the disk drive door. Failure to do this may result in damaging the diskette or loss of data on the diskette. Insert a diskette into a disk drive as follows:

1. Open the diskette drive door.
2. Gently insert the diskette with the label facing up and the notch on the left, if provided.
3. Slide the diskette in as far as it will go, but do not force it. You may hear a click when the diskette is all the way in.



CAUTION:

Do not attempt to force the diskette into the drive.

If resistance is felt or it does not slide in easily, remove the diskette and insert it again.

4. Close (latch) the disk drive door.

When you are instructed to insert a diskette into a drive, it is implied that you should open the door, slide the diskette in all the way, and close (latch) the door.

Removing Diskettes

Wait for the indicator light on the disk drive to go off. Open the disk drive door. The diskette may pop out for easy removal. (Opening up a disk drive door is similar to ejecting a cassette from a cassette recorder.) After the diskette has been removed, place it into its protective envelope or storage facility.

Copy Diskettes and Make Backups

General

If you are using new generic program diskettes for the first time, there are two things that you should do:

1. Create a working copy.
2. Make backup copies.

Before installing the program, it is a good idea to make backup copies of the working copy. If the working copy is ever lost or damaged, you will have a backup copy and will not have to create a new working copy from the original.

Create a Working Copy

The diskette(s) sent to you contains the new generic program software. However, before you can install this new program, you have to load the *MS-DOS*^{*} operating system software. (If you are not sure how to do this, instructions are given in the "Starting *MS-DOS* Software" section.) The new generic program software requires *MS-DOS* software (Release 2.1 or later).

To load the version of *MS-DOS* software, you can copy the *MS-DOS* onto the first diskette, and then copy the new generic program software to that diskette also. Once you have done that, simply insert that diskette into the drive and reboot the PC. The new diskette(s) that you create will be your working copy of the new generic program. The original diskette(s) that you received should be stored in a clean, dry place.

You will need the following to create a working copy:

- The *MS-DOS* software disk with Release 2.1 or later.
- A blank diskette(s) (this will become the working copy).
- The original diskette(s) containing the new generic program.

* Registered trademark of Microsoft Corporation.

There are three steps required to create a working copy:

1. Start *MS-DOS* software.
2. Format a new diskette(s).
3. Copy the original diskette(s) that you received with your package to the working diskette(s).

Starting *MS-DOS* Software

Starting *MS-DOS* on some PCs may require you to insert your copy of the *MS-DOS* diskette into your floppy drive, close the door, and reboot or turn on the PC. The disk drive indicator light will come on, and the PC may print out diagnostic results on the monitor. PCs which operate in a *Windows*^{*95} environment require you to exit *Windows* by clicking on the **Start** button, then **Shut Down**, then **Restart the computer in *MS-DOS* mode**. In *Windows 3.1*, exit windows using the **File** menu to operate your PC in *MS-DOS* mode. When *MS-DOS* software is ready, a prompt (for example, **A>**) appears on the display screen. This is how *MS-DOS* software lets you know it is ready for you to type a command.

Formatting a New Diskette

You will need a blank diskette(s). It is a good practice to label diskettes so that you can keep track of them. You should prepare a label for the diskette(s) marked as DDM-2000 OC-3 Release a.b.c - working copy. The a.b.c is the release version that you are copying.



WARNING:

Do not write on diskette label using a ballpoint pen or pencil.

When the prompt **A>** appears, type the following command, and then press **<ENTER>**. (If you make a mistake while entering this command, you can press the **BACKSPACE** key, or equivalent, which will erase one character at a time.)

format a:/s <ENTER>

* Registered trademark of Microsoft Corporation.

You will see a message similar to the following (the exact wording of the message may vary depending on which PC you are using):

```
Insert new diskette for drive A:  
and strike any key when ready
```

Now open the drive door and remove the *MS-DOS* diskette. Place the *MS-DOS* diskette in its envelope, and set it aside for the time being.

Next, insert the blank diskette into the drive and close the door. Depress any key on the keyboard to begin formatting. After you depress a key, a message similar to the following will appear:

```
Formatting...
```

You will see the disk drive indicator light come on. The formatting process takes several minutes. When the formatting is complete, a message appears to tell you that the format is complete. In addition, you will see several lines of messages about total disk space available. Finally, you will be prompted to format another disk with the following message:

```
Format another (Y/N)?
```

If you do not need to format another disk, type **n** and **<ENTER>**. The system will respond with a prompt **A>** display.

Remove the diskette from the disk drive and place it in a protective envelope or storage location. If you have not already done so, label the diskette(s) as DDM-2000 OC-3 Release a.b.c - working copy. You are now ready to copy the files from the original diskette(s) to the working copy diskette(s).

Copying Files — General

The process of copying files from one diskette to another varies slightly depending on whether you have one or two floppy disk drives.

If you have a dual floppy PC, *MS-DOS* software refers to one disk drive as drive **A** and the other disk drive as drive **B**. If you have a single floppy PC (one floppy drive, with or without a hard disk), *MS-DOS* software treats the floppy disk drive as both drive **A** and drive **B**. The hard disk is usually referred to as drive **C**.

To do the new generic program installation using floppy diskettes, all the following files must be on a single diskette:

CHECKPGM.EXE	CRTM.EXE	CTRM.INI	CTRM.SCR	GENERIC.0
PCLOAD.EXE	README	TERM.BAT	STAGE_1.0	STAGE_10.0

The remaining files similar to the following can be on the same diskette or on another diskette:

GENERIC.1	GENERIC.2	GENERIC.3	GENERIC.4	GENERIC.5 ...
GENERIC0.0	GENERIC0.1	GENERIC0.2 ...		

To do the new generic program installation using the PC hard disk, all the files listed in the README file must be on the hard disk in the directory from which you will do the installation.

To read the contents of the README file, use the **more < README** command. To list the files on the hard disk or floppy diskette, use the **dir/p** command.

Copying Files — Hard Disk System

Set up your hard disk so that when you turn on your computer, it starts up using the hard disk instead of the *MS-DOS* system diskette. When prompt **C:>** appears, type the following commands:

```
mkdir ngp <ENTER>  
cd ngp <ENTER>
```

Insert the original generic program diskette in drive **A**, and close the door. Type the following command:

```
copy a:*. * <ENTER>
```

This command tells *MS-DOS* software to copy all of the files from the **A** drive to the **C** drive (hard disk). Open the drive door, and remove the original diskette from the drive. Repeat this procedure for all diskettes.

Copying Files — Single Floppy System

If you have a single floppy system (with or without a hard disk), insert the original new generic program diskette into drive **A**, and close the door. Type the following command after the prompt:

```
copy a:*. * b: <ENTER>
```

This command tells *MS-DOS* software to copy all of the files from drive **A** to drive **B**. Since there is no drive **B** physically installed, *MS-DOS* software will pretend that there is one. It does this by copying a file from drive **A** (as much as it can fit) into the PC's memory. It then displays the following message:

```
Insert diskette for drive B:  
Strike any key when ready...
```

Open the drive door, and remove the original diskette from the drive. Insert the working copy diskette into the drive, and close the door. Depress any key. The *MS-DOS* software now copies the file from the PC memory to the working copy diskette which you inserted into drive **A**. When the copy is complete, it will display the following message:

```
Insert diskette for drive A:  
Strike any key when ready...
```

Open the drive door, and remove the working copy diskette from the drive. Insert the original diskette into the drive, and close the door. Depress any key. The *MS-DOS* software now begins where it left off. This process repeats until the entire diskette has been copied. In summary:

- When you are prompted to insert diskette for drive **A**, insert the original diskette into the floppy drive.
- When you are prompted to insert diskette for drive **B**, insert the working copy diskette into the floppy drive.
- Repeat until the prompt **A>** appears on the display screen.

When the process is complete, the prompt **A>** will be displayed on the screen. Repeat this procedure for all original diskettes. Before using the diskette(s) to install the new program, it is a good idea to make backup copies of the working copy. If the working copy is ever lost or damaged, you will have a backup copy and will not have to create a new working copy from the original(s).

Making Backups — Single Floppy System

Insert the *MS-DOS* diskette into drive **A**. Type:

diskcopy a: b: <ENTER>

A message similar to the following appears:

Insert SOURCE diskette in drive A:
Strike any key when ready

Wait for the disk drive indicator light to go off. Remove the *MS-DOS* disk from drive **A** and insert the working copy diskette (the source) into the drive. Press any key. The disk drive indicator light will come on to indicate that the copying is in progress. The *MS-DOS* software copies as much of the diskette as it can into the PC's memory and then displays the following message:

Insert TARGET diskette in drive A:
Strike any key when ready

Remove the working copy (source) diskette, insert the new (target) diskette, and press any key. It is not necessary to preformat the new diskette; the diskcopy command will do this for you. Depending on the amount of memory in your computer, you may be prompted to repeat this several times. When the copy is complete, the following message will appear:

Copying complete

Copy another (Y/N)?

If you wish to make additional backups, type **y** and follow the same instructions. If you are done, type an **n** and **<ENTER>**. When the prompt **A>** appears, wait for the disk drive indicator light to go OFF and remove floppy. Label the backup floppy with an appropriate label (for example, DDM-2000 OC-3 Release a.b.c - working copy backup).

Copying Files — Dual Floppy System

Insert the first original new generic program diskette into drive **A** and close the door. Insert the formatted copy diskette into drive **B** and close the door. Type the following command:

```
copy a:*. * b: <ENTER>
```

The files from the original diskette will be copied to the working diskette one at a time. When the process is complete, the prompt **A>** will be displayed on the screen. Repeat the procedure for all remaining original diskettes. Label all diskettes.

Making Backups — Dual Floppy System

Insert the *MS-DOS* diskette into drive **A**. Type in the following command:

```
diskcopy a: b: <ENTER>
```

A message similar to the following is displayed:

```
Insert SOURCE diskette in drive A:  
Insert TARGET diskette in drive B:  
Strike any key when ready
```

Wait for the disk drive indicator light to go off. Remove the *MS-DOS* disk from drive **A** and insert the working copy diskette (the source). Insert a new diskette into drive **B** (the target). It is not necessary to preformat the new diskette; the disk copy command will do this for you. Press any key when ready.

The disk drive indicators on both the **A** and **B** drives will light, indicating that the copying is in progress. Do not open a drive door while the disk drive indicator light is on. When copying is complete, a message similar to the following appears:

```
Copying complete  
Copy another (Y/N)?
```

If you wish to make additional backups, type **y** and follow the same instructions. If you are done, type **n** and **<ENTER>**. When the prompt **A>** appears, wait for the disk drive indicator light to go OFF and remove both floppies. Label the backup floppy with an appropriate label (for example, DDM-2000 OC-3 Release a.b.c - working copy backup).

Upgrade BBF2 TGS To BBF2B TGS

1.  **CAUTION:**
If shelves in a bay are connected together with timing mult cabling, changing the timing mode on one system may affect the timing for other systems. Ensure that proper timing arrangements are made for all affected shelves.

 **NOTE:**
This procedure may be used to replace existing **BBF2 TGS** circuit packs with **BBF2B TGS** circuit packs.

Verify that there are no alarms or protection switches present on the system.

2. Set new **BBF2B TGS** circuit pack option switches as required.

Reference: **DLP-513**

3. Is timing mode DS1 External?
If **YES**, then continue with **Step 4**.
If **NO**, then proceed to **Step 6**.

4. Check external timing references to ensure they are good.

5.  **NOTE 1:**
ED-8C724-20, G339, G340, or G341 cables are used to connect timing references to shelf 1 in a bay. ED-8C724-20, G373 or G374 (rear access) or ED-8C724-21, G414 and G415 (front access) cables are used to multiple timing references to subsequent shelves in the bay (for example, from shelf 1 to shelf 2, from shelf 2 to shelf 3, etc.). The cable from the timing reference source to shelf 1 is connected to jack **J37** on the shelf backplane (or **J237** of the front access cable). The cable from shelf 1 (or lower shelf) to the next higher shelf is connected from jack **J44** (**P237**) of the lower shelf to jack **J37** (**J237**) of the next higher shelf.

➡ **NOTE 2:**

If the **BBF2B TGS** timing mode is set to DS1 External sync out mode, an ED-8C724-20, G394 cable must be connected to jack **J37** on the shelf backplane (or **J237** of the front access cable). This cable has a relay to disconnect the incoming external timing supply if the **TGS** circuit pack is removed.

Make DS1 external timing reference connections as shown in Table A.

Table A. DS1 External Timing Reference Source Connections

Name	Desig.	Conn.	Term.	Color
Receive from Primary DS1 Reference	T	P37	6	BK
	R		1	O
Receive from Secondary DS1 Reference	T		7	R
	R		2	G

- Make synchronization DS1 timing output connections as shown in Table B, if required.

Table B. DS1 Timing Output Connections

Name	Desig.	Conn.	Term.	Color
Transmit Primary DS1 Reference	T	P44	6	BK
	R		1	O
Transmit Secondary DS1 Reference	T		7	R
	R		2	G

- CAUTION:**
*A momentary transmission hit (error) will occur when the **TGS** circuit pack is switched.*

Is a CIT available?

If **YES**, then continue with **Step 8**.

If **NO**, then proceed to **Step 9**.

- Use **switch-sync:s=circuitpack,pri>manual** command to switch timing to protection **TGS** in **TIMING** slot 2, if not already active.

Response: **ACTIVE** LED lights on **TGS** circuit pack in **TIMING** slot 2.

9.  **NOTE:**
If external timing mode is used and bay mult cables for DS1 timing references connect shelves in a bay, removing a **TGS** circuit pack causes a momentary loss of the associated incoming DS1 timing reference. This may result in a "inc. DS1 sync. ref. LOS" alarm on all shelves above this shelf that are connected to the same bay mult cabling. This momentary loss of timing reference does not affect transmission.

Remove old **TGS** circuit pack from **TIMING** slot 1.

10. Momentarily depress the **UPD/INIT** pushbutton on the **SYSCTL**.
11. Insert new **BBF2B TGS** circuit pack into **TIMING** slot 1.

Response: **FAULT** LED lights on **TGS** circuit pack in slot 1.

12.  **NOTE:**
The critical (**CR**) alarm LED may light for up to 15 seconds after the **UPD/INIT** button is depressed on the **SYSCTL**. This does not indicate a service interruption.

Momentarily depress the **UPD/INIT** pushbutton on the **SYSCTL**.

Response: **FAULT** LED lights on **TGS** circuit pack in **TIMING** slot 2.
FAULT LED goes off on **TGS** circuit pack in **TIMING** slot 1 after about 15 seconds. **ACTIVE** LED goes off on **TGS** circuit pack in **TIMING** slot 2 and lights on **TGS** circuit pack in **TIMING** slot 1.

13. Remove old **TGS** circuit pack from **TIMING** slot 2.
14. Insert new **BBF2B TGS** circuit pack into **TIMING** slot 2.

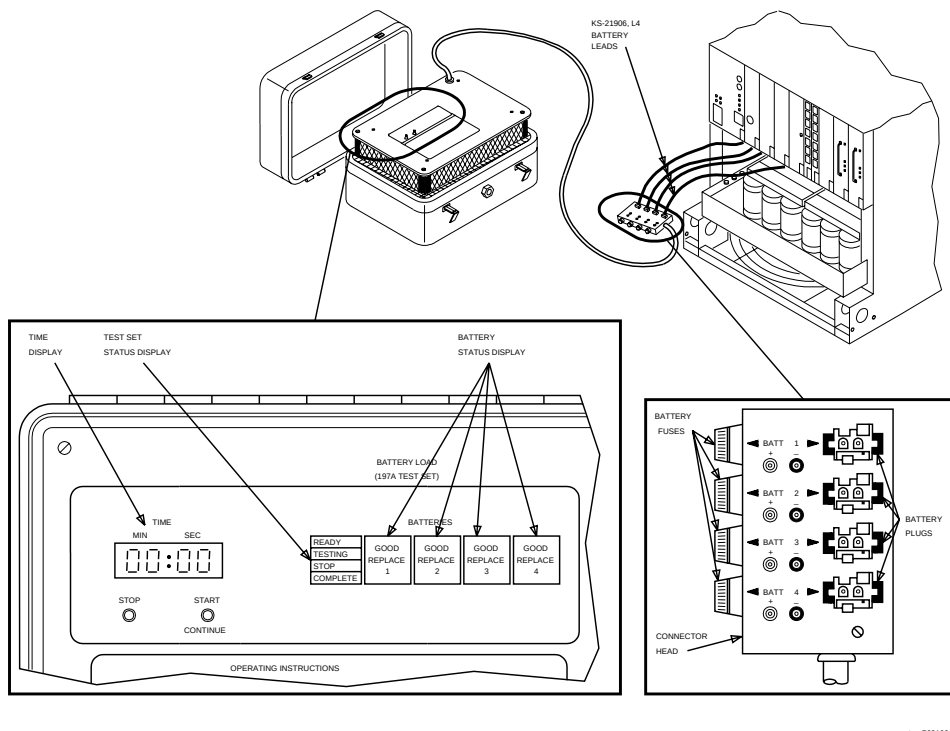
Response: Red **FAULT** LED on **TGS** circuit pack in slot 2 lights for about 15 seconds then goes off.

15. If a CIT is available, use the **rtrv-sync** command to display the provisioning and operational information of the synchronization interface.
16. **STOP. YOU HAVE COMPLETED THIS PROCEDURE.**

Perform Test of RT Batteries Using 197A BATTERY LOAD TEST SET

1. **CAUTION:**
Service interruption will occur if batteries are disconnected and AC power is not available.

Obtain **197A BATTERY LOAD TEST SET (197A)** and place near batteries to be tested (Figure 1).



tpa 769169/01

Figure 1. 197A Battery Load Test Set Test Connections

2.  **NOTE:**
The **197A** test set is intended to test batteries that are fully charged. A minimum of two days must be allowed between the time the batteries (new or replacement) are put on high rate charge and this test is made. After testing is completed, the batteries must be put on high rate charge using the **337A BATTERY CHARGER**.

Remove cover from **197A** test set.

3. Check **197A** test set for proper operation (if not already performed).

Reference: **DLP-537**

4. Ensure that system(s) associated with batteries to be tested has AC power available (**PMN** or **P/M** indicator on **BCU** circuit pack not lighted).
5. On **337A BATTERY CHARGER** associated with batteries to be tested, is **HIGH RATE CHG/ON** indicator lighted?
If **YES**, then continue with **Step 6**.
If **NO**, then proceed to **Step 7**.
6. Batteries are on high charge and may require up to 24 hours to charge. Do not perform this procedure until **HIGH RATE CHG/ON** indicator on **BATTERY CHARGER** goes off.
7.  **CAUTION:**
Service interruption will occur if batteries are disconnected and AC power is not available.

Disconnect battery leads of batteries to be tested from battery shelf.

8.  **NOTE:**
Under normal conditions, when the first battery is connected, the following occurs: (a) The test set **TIME** display indicates **00 MIN:00 SEC**; (b) the status display indicates which test set **BATT** plug the battery is connected to, status of the battery (**GOOD** or **REPLACE**), and the **READY** indicator lights; (c) test set fan operates.

At test set connector head (Figure 1), connect battery leads (up to four) to **BATT 1, 2, 3, and 4** plugs.

9.  **NOTE:**
If status display does not indicate battery number of battery status, **BATT** fuse may be blown, connector head or test set may be defective, or battery pack is defective.

Does test set display indicate **REPLACE** for all batteries being tested?

If **YES**, then continue with **Step 10**.

If **NO**, then proceed to **Step 12**.

10. Replace all batteries and connect good batteries to battery shelf.
11. Place batteries on high charge by depressing **HIGH RATE CHG/ACTIVATE** pushbutton on **BATTERY CHARGER** and repeat from Step 6.
12.  **DANGER:**
*A high discharge current is present at connector head if **TESTING** indicator is lighted. Batteries must not be connected or disconnected when **TESTING** indicator is lighted.*

-  **NOTE:**
This test must run for a full 15 minutes to be valid or until all batteries indicate **REPLACE**. The **STOP** button should only be used if a problem occurs during the test, if the test is to be terminated early because of loss of AC power, or all batteries indicate **REPLACE**. The **START/CONTINUE** button is used to continue the test if no problem is found.

Depress **197A** test set **START/CONTINUE** button.

Response: At **197A** test set, **TESTING** indicator is lighted, **READY** indicator is off, and **TIME** display is counting time.

13.  **NOTE:**
If one, two, or three, but not all, batteries show **REPLACE** during the test period, the remaining batteries still must be tested for the full 15 minutes.

Does test set show **REPLACE** for all batteries within the 15-minute test period shown on **TIME** display?

If **YES**, then continue with **Step 14**.

If **NO**, then proceed to **Step 15**.

14.  **DANGER:**
*A high discharge current is present at connector head if **TESTING** indicator is lighted. Batteries must not be connected or disconnected when **TESTING** indicator is lighted.*

Depress test set **STOP** button. Proceed to **Step 17**.

Response: **STOP** indicator on test set lights

15. After 15 minutes, the test set **COMPLETE** indicator lights.
16. Is any **REPLACE** indicator on test set lighted?
If **YES**, then continue with **Step 17**.
If **NO**, then **STOP. YOU HAVE COMPLETED THIS PROCEDURE.**
17. Unplug and set aside all defective batteries.
18. Install and connect replacement batteries to battery shelf. Reconnect any remaining good batteries to battery shelf.
19. Place batteries on high charge by depressing **HIGH RATE CHG ACTIVATE** pushbutton on **BATTERY CHARGER** and repeat from Step 6.

Check 197A BATTERY LOAD TEST SET

1. Obtain **197A BATTERY LOAD TEST SET**. See Figure 1.

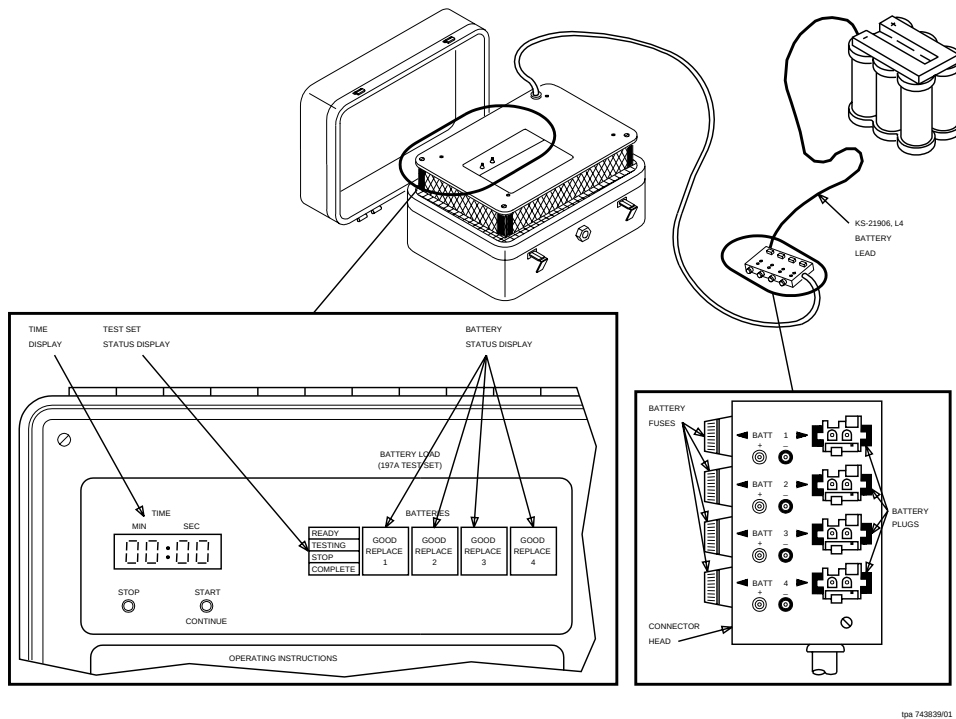


Figure 1. 197A Battery Load Test Set Arrangement

2. Remove cover from test set.
3. At test connector head, verify battery fuse holders each contain a 20 Amp fast-blow fuse.
4. Obtain one KS-21906, L4 battery.

5.  **NOTE:**
Under normal conditions, when the first battery is connected, the following occurs: (a) Test set **TIME** display indicates **00 MIN: 00 SEC**; (b) status display indicates which test set **BATT** plug that battery is connected to, status of the battery (**GOOD** or **REPLACE**), and the **READY** indicator lights; (c) test set fan operates.

At test set connector head, connect battery lead to **BATT 1, 2, 3, or 4** plug being tested.

6.  **WARNING:**
Damage will occur if test set is operated without fan operating.

Does test set fan operate?

If **YES**, then proceed to **Step 15**.
If **NO**, then continue with **Step 7**.

7. Connect battery lead to remaining **BATT** plugs, one at a time, and note if fan operates.
8. Did test set fan operate for any **BATT** plug connection?
If **YES**, then proceed to **Step 11**.
If **NO**, then continue with **Step 9**.
9.  **NOTE:**
The test set is intended to test fully charged batteries. Before new batteries or replacement batteries are tested, a minimum of two days must have passed between the time the batteries were put on high rate charge and this test is made.

Disconnect lead. Using a different battery pack, connect battery lead to any **BATT** plug.

10. Does test set fan operate?
If **YES**, then proceed to **Step 15**.
If **NO**, then proceed to **Step 35**.

11. On test set connector head, remove battery lead and check for blown fuse(s).
12. Is fuse(s) blown?
 If **YES**, then continue with **Step 13**.
 If **NO**, then proceed to **Step 14**.
13. Replace fuse(s) and repeat from Step 5.
14.  **NOTE:**
 Test set may be used for testing using one, two, three, or all four **BATT** plug positions.

There is a defective test set or connector head. Note defective **BATT** plug position(s). Continue with test procedures using remaining **BATT** plugs.

15. Does test set **TIME** display indicate **00 MIN:00 SEC** without blinking?
 If **YES**, then continue with **Step 16**.
 If **NO**, then proceed to **Step 35**.
16. Does status display indicate which battery was connected, status (**GOOD** or **REPLACE**) of the battery, and is **READY** indicator lighted?
 If **YES**, then continue with **Step 17**.
 If **NO**, then proceed to **Step 35**.
17. Does status display indicate **GOOD** or **REPLACE**?
 If **YES**, then proceed to **Step 19**.
 If **NO**, then continue with **Step 18**.
18.  **DANGER:**
 *A high discharge current is present at connector head if **TESTING** indicator is lighted. Batteries must not be connected or disconnected when **TESTING** indicator is lighted.*

Battery pack is defective. Ensure that **TESTING** indicator is not lighted (**READY** indicator lighted), unplug and set aside defective battery pack, and repeat from Step 5.

19. Have **TIME** display and **STATUS** indicators been tested for each good **BATT** plug position?

If **YES**, then proceed to **Step 21**.

If **NO**, then continue with **Step 20**.

20.  **DANGER:**
*A high discharge current is present at connector head if **TESTING** indicator is lighted. Batteries must not be connected or disconnected when **TESTING** indicator is lighted.*

Ensure that **TESTING** indicator is not lighted. (**READY** indicator lighted).
Unplug battery pack and repeat from Step 5.

21.  **DANGER:**
*A high discharge current is present at connector head if **TESTING** indicator is lighted. Batteries must not be connected or disconnected when **TESTING** indicator is lighted.*

Depress test set **START/CONTINUE** button.

22. Does test set **TESTING** indicator light, **READY** indicator go off, and **TIME** display start counting time?
If **YES**, then proceed to **Step 24**.
If **NO**, then continue with **Step 23**.

23.  **DANGER:**
*A high discharge current is present at connector head if **TESTING** indicator is lighted. Batteries must not be connected or disconnected when **TESTING** indicator is lighted.*

There is a defective test set. Depress **STOP** button, unplug battery, and return test set for repair.

24. Depress test set **STOP** button.

25. Does test set **STOP** indicator light and **TIME** display stop counting time?
If **YES**, then proceed to **Step 27**.
If **NO**, then continue with **Step 26**.

26.  **DANGER:**
*A high discharge current is present at connector head if **TESTING** indicator is lighted. Batteries must not be connected or disconnected when **TESTING** indicator is lighted.*

There is a defective test set. Allow test to run for 15 minutes as shown on **TIME** display. When **COMPLETE** indicator lights, unplug battery, and return test set for repair.

27.  **DANGER:**
*A high discharge current is present at connector head if **TESTING** indicator is lighted. Batteries must not be connected or disconnected when **TESTING** indicator is lighted.*

Depress test set **START/CONTINUE** button.

28. Does test set **TESTING** indicator light, **STOP** indicator go off, and **TIME** display start counting time?
If **YES**, then continue with **Step 29**.
If **NO**, then proceed to **Step 34**.
29. Allow test set to run for 15 minutes as shown on **TIME** display.
30. During 15-minute test period, does test set show **REPLACE**?
If **YES**, then continue with **Step 31**.
If **NO**, then proceed to **Step 32**.
31. Note that battery being used is defective.
32. After 15 minutes, does **COMPLETE** indicator light?
If **YES**, then continue with **Step 33**.
If **NO**, then proceed to **Step 34**.
33. Unplug battery. Store connector head in test set cover. Reinstall cover.

STOP. YOU HAVE COMPLETED THIS PROCEDURE

34.  **DANGER:**
*A high discharge current is present at connector head if **TESTING** indicator is lighted. Batteries must not be connected or disconnected when **TESTING** indicator is lighted.*

Defective test set. Depress **STOP** button, unplug battery, and return test set for repair.

35. There is a defective test set. Return for repair.

Upgrade Telemetry Byte-Oriented Serial (TBOS)/Parallel Telemetry to TL1/X.25

1.  **NOTE:**
The "Technical Specifications" section of this manual, under TL1/X.25 Telemetry, describes the parameters and connections for the TL1/X.25 telemetry interface.

At central office operations interface shelf, connect the TL1/X.25 cable to **J45** on the shelf backplane.

2. Connect CIT and establish session.

Reference: **DLP-521**

3. Are you upgrading TBOS or parallel telemetry to TL1/X.25.
If **PARALLEL**, continue with **Step 4**.
If **TBOS**, proceed to **Step 6**.
4. Disconnect parallel telemetry and discrete cables from **P54**, **P55**, and **P61** on the shelf backplane.
5. **STOP. YOU HAVE COMPLETED THIS PROCEDURE.**
6. Use the **set-ne:tb link=noTBOS** command to disable the TBOS link.
7. Disconnect TBOS cable from **J53** on shelf backplane, if required.
8. **STOP. YOU HAVE COMPLETED THIS PROCEDURE.**

Test ED-8C733-30, G7 Fan Shelf

1. On fan shelf, verify that only green **POWER ON** LED is lighted. If other LEDs are lighted, refer trouble to organization that installed shelf.
2. Depress and hold **ALARM TEST** button.

Response: All LEDs, except **CONTROL FAULT**, light. All fans slow down during time button is depressed.

3. Release **ALARM TEST** button.
4. Momentarily depress **ALARM RESET** button to reset alarms.
5.  **CAUTION:**
Exercise care in removing the fiber tray or fiber support bracket to prevent damage to the optical fibers.

 NOTE:

To remove the front cover of a fan shelf located between two OC-3 shelves it may be necessary to remove either the fiber tray from the top OC-3 shelf, if it is a G1 shelf, or the fiber support bracket, if the shelf is a G3 or G4 shelf.

Remove front cover of fan shelf.

6. Locate 4-part switch to left of center on front of fan shelf. See Figure 1.

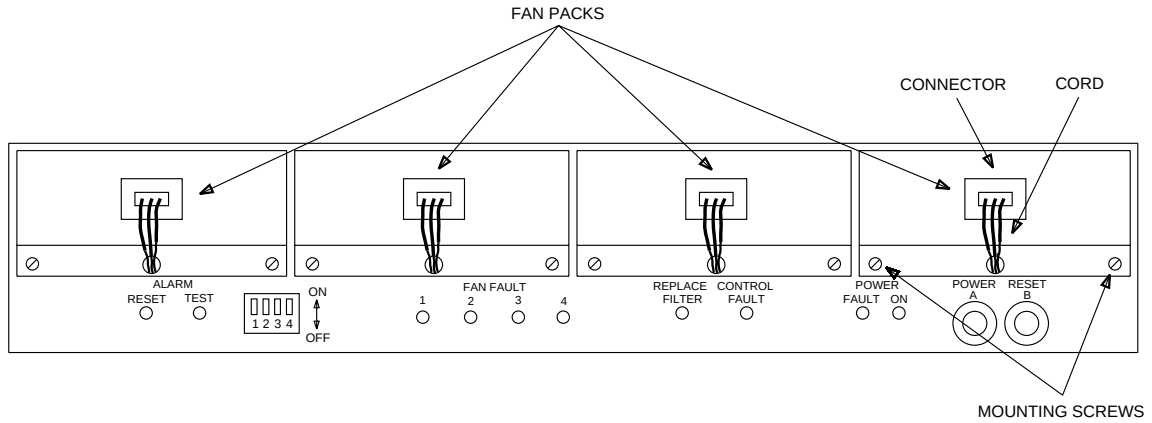


Figure 1. DDM-2000 Fan Shelf — Front Cover Removed

7. Set switches as shown in Table A.

Table A. DDM-2000 Fan Shelf Switch Settings

Cooling Arrangement	Set Point	Switch Settings			
		S1	S2	S3	S4
DDM-2000 OC-3	400 fpm	ON	OFF	ON	ON
DDM-2000 OC-12	400 fpm	ON	OFF	ON	ON

8. If switch settings are changed, depress and hold the **RESET** button on the fan shelf for 5 seconds to allow the fan shelf controller to recognize the change in switch setting.
9. **NOTE:**
The fan filter is located on the bottom of the DDM-2000 OC-3 shelf that is installed immediately below the fan shelf. Magnetic strips around the perimeter of the filter hold the filter in place in the bottom cavity of the DDM-2000 OC-3 shelf.

Verify that fan filter is properly installed.

10. Reinstall front cover of shelf.
11. **STOP. YOU HAVE COMPLETED THIS PROCEDURE.**

Replace ED-8C733-30, G4 Fan Filter

1.  **NOTE:**
The fan filter is located on the bottom of the DDM-2000 OC-3 shelf that is installed immediately below the fan shelf. Magnetic strips around the perimeter of the filter hold the filter in place in the bottom cavity of the DDM-2000 OC-3 shelf.

Remove fan filter by pulling on it.

2. Install new filter, with magnetic strips facing up, into the bottom cavity of the DDM-2000 shelf.
3. Momentarily depress the **ALARM RESET** button to reset alarms, if required.
4. **STOP. YOU HAVE COMPLETED THIS PROCEDURE.**

Enable or Disable System Security and/or Edit, Delete, or Enter a User's Login

1.  **CAUTION:**
You must wear an ESD wrist strap plugged into the grounding jack on the right side of the assembly whenever working with the DDM-2000.

 **NOTE:**
If all shelves in a bay are connected together with CIT bay mult cabling, the CIT may be connected to any shelf front or rear **CIT** connector and gain access to any other shelf by entering a shelf address. If the CIT is connected to the rear **CIT** connector, it must be connected through a null modem.

Connect CIT and establish session.

Reference: **DLP-521**

2. Are you going to enable or disable system security or are you going to edit, delete, or enter a user's login?

If **Enable or Disable System Security**, continue with **Step 3**.

If **Edit, Delete, or Enter a User's Login**, proceed to **Step 15**.

3.  **NOTE 1:**
You must be logged into the system as one of the three privileged users to enable or disable system security. Initially, the defaults for the privileged user logins (Release 9.1 or later) are LUC01 (uppercase LUC-zero-one), LUC (uppercase LUC-zero-two), and LUC03 (uppercase ATT-zero-three); however, these defaults may have been changed. For Release 9.0 or earlier, the defaults for the privileged user logins are ATT01 (uppercase ATT-zero-one), ATT02 (uppercase ATT-zero-two), and ATT03 (uppercase ATT-zero-three). The login banner for Release 9.0 and earlier reads: AT&T, DDM-2000 OC-3 Multiplexer, Release a.b.c.

⇒ NOTE 2:

System security requires the defaults for the privileged user logins/password to be changed and CIT and/or DCC port security to be enabled.

At the login< prompt, enter a valid privileged user login (provided by your DDM-2000 administrator).

Response: password<

4. **⇒ NOTE 1:**

Initially, the default for the privileged user password is DDM-2000; however, this default may have been changed.

⇒ NOTE 2:

Passwords are not displayed on the CIT.

At the password< prompt, enter a valid privileged user password (provided by your DDM-2000 administrator).

Response: CIT prints the following message followed by an Alarm and Status Report:

```

/*****
*
*      Lucent Technologies
*      DDM-2000 OC-3 Multiplexer
*
*      Release a.b.c
*
*****/

      .
      .
      .

TID date time
M  rtrv-alm:all COMPLD
/* Active Alarms and Status Report
```

5.  **NOTE:**
After the prompt (<), the system will respond to commands entered. The **set-link:pg=()** command may be used to set the vertical size of the displayed page on the CIT. Page (**pg**) length may be set from 3 to 150 lines with a default length of 24 lines.

Did you use the default privileged user login (LUC01, LUC02, or LUC03) and password (DDM-2000) to log into the system?

If **YES**, continue with **Step 6**.

If **NO**, proceed to **Step 8**.

6.  **NOTE:**
The defaults for privileged user logins (LUC01, LUC02, and LUC03) and password (default DDM-2000) must be changed for system security. There are always three privileged user logins. (Privileged user logins cannot be added or deleted.) See the "Commands and Reports" section of this manual for a description of the **set-lgn** command format.

Use the **set-lgn:** command to change the defaults for the privileged user logins (LUC01, LUC02, and LUC03) and password (default DDM-2000).

7.  **NOTE:**
The **rtrv-lgn:** command retrieves the "Login Provisioning Report". This report lists each user's login and authorization level (user type). The report does not contain passwords. See the "Commands and Reports" section of this manual for a description of the **rtrv-lgn:** command format.

Use the **rtrv-lgn:** command to obtain the "Login Provisioning Report" and verify that the privileged user logins have been changed.

8.  **NOTE:**
The **rtrv-secu:** command retrieves the "Port Security Configuration Report". This report provides CIT and DCC port security and timeout information. See the "Commands and Reports" section of this manual for a description of the **rtrv-secu:** command format.

Use the **rtrv-secu:** command to obtain the "Port Security Configuration Report" and note the CIT/DCC port security and timeout information.

9.  **NOTE 1:**
The **set-secu:** command determines whether security is enabled or disabled or in lockout state on each CIT and DCC interface using one or more CIT and/or DCC port addresses [**dcc-all** or **cit-{1,2,all}**]. This command is also used to specify the timeout period for each port address. The timeout period is the time, in minutes, before an inactive session is automatically terminated. See the "Commands and Reports" section of this manual for a description of the command format. For example, **set-secu:cit-1:sec=enabled** enables security on the front CIT port.

 **NOTE 2:**
When security is enabled for a CIT or DCC port address, a valid login and password must be entered to access the system through that port. When security is in lockout state, only a privileged user can access the system through the locked out CIT/DCC port.

 **NOTE 3:**
For applications that have a remote terminal located on a customer premise site, you may want to disable security on the DCC interface at the remote terminal. This allows the user at the terminal in the central office to login remotely (via the DCC) to the remote terminal without a login/password. At the terminal in the central office, you may want to enable security on the DCC. This means that a user at the remote terminal must have a valid login/password to login remotely (via the DCC) to the terminal at the central office.

Use the **set-secu:** command to enable or disable security on each CIT and/or DCC port and specify the corresponding timeout period, as required.

10. Use the **rtrv-secu:** command to obtain the "Port Security Configuration Report" and verify the security and timeout information for the CIT and/or DCC ports.

11. **⇒ NOTE 1:**

There are four types of users:

General users may execute any commands that are not restricted to privileged users.

Maintenance users may execute commands that obtain nonprivileged system reports, perform protection switching, loopback activities, and perform some other maintenance activities.

Privileged users may execute any command, including restricted commands.

Reports-only users may only execute commands that obtain nonprivileged system reports.

Refer to *Security* in the "Administration and Provisioning" section of this manual for more information about restricted commands.

⇒ NOTE 2:

Three privileged and up to 100 nonprivileged (general, maintenance, and/or reports-only) logins are supported. If a user attempts to enter another login when the maximum supported logins already exist, the command will be denied. See the "Commands and Reports" section of this manual for a description of the **set -lgn** command format.

Use the **set -lgn:** command to enter, edit, or delete nonprivileged (general, maintenance, and/or reports-only) logins/passwords and user types, as required.

12. Use the **rtrv-lgn:** command to obtain the "Login Provisioning Report" and verify the nonprivileged user logins and user types.
13. See the "Commands and Reports" section of this manual for descriptions of related security commands: **set-passwd**, **rtrv-lgn**, and **rtrv-secu**.
14. **STOP. YOU HAVE COMPLETED THIS PROCEDURE.**

15. **⇒ NOTE:**
You must be logged into the system as one of the three privileged users to edit, delete, or enter a user's login. Initially, the defaults for the privileged user logins are LUC01 (uppercase LUC-zero-one), LUC02 (uppercase LUC-zero-two), and LUC03 (uppercase LUC-zero-three); however, these defaults may have been changed.

At the `login<` prompt, enter a valid privileged user login (provided by your DDM-2000 administrator).

Response: `password<`

16. **⇒ NOTE 1:**
Initially, the default for the privileged user password is DDM-2000; however, this default may have been changed.

⇒ NOTE 2:
Passwords are not displayed on the CIT.

At the `password<` prompt, enter a valid password (provided by your DDM-2000 administrator).

Response: CIT prints the following message followed by an Alarm and Status Report:

```

/*****
*
*          Lucent Technologies
*      DDM-2000 OC-3 Multiplexer
*
*          Release a.b.c
*
*****/

      .
      .
      .

TID date time
M  rtrv-alm:all COMPLD
/* Active Alarms and Status Report
```

17. **⇒ NOTE 1:**
After the prompt (<), the system will respond to commands entered. The **set-link:pg=()** command may be used to set the vertical size of the displayed page on the CIT. Page (**pg**) length may be set from 3 to 150 lines with a default length of 24 lines.

⇒ NOTE 2:

There are four types of users:

General users may execute any commands that are not restricted to privileged users.

Maintenance users may execute commands that obtain nonprivileged system reports, perform protection switching, loopback activities, and perform some other maintenance activities.

Privileged users may execute any command, including restricted commands.

Reports-only users may only execute commands that obtain nonprivileged system reports.

Refer to *Security* in the "Administration and Provisioning" section of this manual for more information about restricted commands.

⇒ NOTE 3:

Three privileged and up to 100 nonprivileged (general, maintenance, and/or reports-only) logins are supported. If a user attempts to enter another login when the maximum supported logins already exist, the command will be denied.

⇒ NOTE 4:

The three privileged user logins may be edited to change the login name and/or password, but privileged user logins cannot be added or deleted. See the "Commands and Reports" section of this manual for a description of the **set-lgn** command format.

Use the **set-lgn:** command to edit, delete, or enter logins/passwords and user types, as required.

18. **⇒ NOTE:**
The **rtrv-lgn:** command retrieves the "Login Provisioning Report". This report lists each user's login and authorization level (user type). The report does not contain passwords. See the "Commands and Reports" section of this manual for a description of the **rtrv-lgn:** command format.

Use the **rtrv-lgn:** command to obtain the "Login Provisioning Report" and verify the user logins and user types.

19. **⇒ NOTE:**
Setting logins/passwords does not set system security. In addition to assigning valid logins/passwords, CIT and/or DCC port security must be enabled to secure a system.

Repeat this procedure to enable system security, if required.

20. See the "Commands and Reports" section of this manual for descriptions of related security commands: **set-passwd**, **rtrv-lgn**, and **rtrv-secu**.
21. **STOP. YOU HAVE COMPLETED THIS PROCEDURE.**

Replace Existing OLIU With Different Type OLIU

1.  **WARNING 1:**
Open optical connectors may emit invisible laser radiation. Do not view beam with optical instruments. Avoid direct exposure to the beam.
-  **WARNING 2:**
Use of controls or adjustments or performance of procedures other than those specified herein may result in hazardous radiation exposure.
-  **CAUTION 1:**
*Circuit packs must not be installed or replaced if the **SYSCTL** is not installed and operating normally. If the **SYSCTL** is not installed and operating normally, unpredictable provisioning of the replaced/installed circuit pack can result.*
-  **CAUTION 2:**
*Ensure that protection switching is available (**OLIU** installed in slot **2(P)**, protection line good, and no locks, inhibits, or forced switches in effect).*
-  **CAUTION 3:**
*Before installing **OLIUs**, ensure all optical fiber connectors and couplings have been properly cleaned [**DLP-527**]. Signal performance may be degraded if the connectors and couplings are not cleaned properly.*
-  **CAUTION 4:**
*Ensure that necessary optical power levels will be met with different type of **OLIU** installed. Use optical line power measurements and check **OLIU** output specifications.*

⇒ **NOTE 1:**

This procedure may be used to replace existing **OLIUs** with **22-Type OLIUs** to convert a shelf to a DS1 add/drop shelf. It may also be used to replace existing **OLIUs** with **21D/21D-U/22D-U OLIUs** to provide a cost effective interconnect for intraoffice applications such as OC-3 optical extensions from an OC-12 shelf.

⇒ **NOTE 2:**

Not all **OLIUs** are supported by every software release. For example, **21G/21G-U/21G2-U OLIUs** are supported by all releases, but **21D/21D-U, 22D-U, 22G-U/22G2-U/22G3-U, 22F/22F-U/22F2-U, 24G-U, 26G2-U, and 27G-U/27G2-U OLIUs** are supported only by Release 3 and later.

⇒ **NOTE 3:**

If this procedure is being used to replace **OLIUs** with **21D/21D-U/22D-U OLIUs**, note that the **21D/21D-U/22D-U OLIU** uses only multimode optical fiber connections.

If new software is required to support the **OLIU** being installed, download the required new software to the system.

Reference: **DLP-532**

2. ⇒ **NOTE:**

When available, use a CIT and the **^"switch-line:address:pri>manual"** (linear) or **^"switch-path-(sts1/vt1):address:pri>manual"** (rings) command to do a protection switch. The line protection switching request is unidirectional. It may be necessary to perform a switch command at both the near end and far end to switch both transmit and receive to the same line.

Is a CIT available?

If **YES**, then continue with **Step 3**.

If **NO**, then proceed to **Step 5**.

3.  **NOTE:**
The "**rtrv-state-eqpt**" command may be used to verify that only the protection line is active. In the Equipment State Report report, the Switch State should show active only for the protection **OLI****U**. Also, the green **ACTIVE** LEDs should be lighted only on protection **OLI****U**s in slot **2(P)**.

Use the "**switch-line:**" or "**switch-path:**" command to switch service to protection slot **2(P)**, if not already performed.

4. Use the "**rtrv-state-eqpt**" command to ensure that service is switched to protection slot **2(P)**.
5. Disconnect optical fiber from **OLI****U** in service slot **1** of **MAIN** or **FUNCTION UNITS** slots being equipped.
6. Remove service **OLI****U** from slot **1**.
7.  **NOTE 1:**
The optical connector labeled **OUT** is the output from the **OLI****U**. The connector labeled **IN** is the input to the **OLI****U**.

 **NOTE 2:**
Optical fibers connecting the system with the other end should not be connected to the **OLI****U** until at least 45 seconds after an optical loopback is removed.

Remove the protective covers from the new **OLI****U** connectors. Clean the fibers and connectors with optical quality, lint-free tissue and a compressed air duster.

Reference: **DLP-527**

8.  **NOTE:**
When a different **OLI** replaces an existing **OLI**, the **FAULT** LED on the new **OLI** will light until the **UPD/INIT** button is momentarily depressed in the following step.

Install new **OLI** into service slot **1** and connect optical fibers. Ensure **OLI** output at one end is connected to the correct **OLI** input at the other end.

Reference: **DLP-514**

9. Momentarily depress the **UPD/INIT** button on the **SYSCTL**.

Response: **FAULT** LED lights on **OLI** in slot **2(P)**. **FAULT** LED goes off on **OLI** in slot **1**.

10. Did **FAULT** LED go off on **OLI** in service slot **1**?

If **YES**, then continue with **Step 11**.

If **NO**, then do **TAP-111**.

11.  **NOTE:**
If existing cross-connections to the new circuit pack are not supported, the new circuit pack will be declared bad and the switch to the new circuit pack will not be completed. For example, if a **22-Type OLI** is being replaced by a **21D/21D-U OLI** and DS1 cross-connections exist, the new **21D/21D-U OLI** circuit pack will fail and service will continue on the old circuit pack in slot **2(P)**. All cross-connections not supported by the new circuit pack have to be deleted before the switch will be successful.

Use the "**rtrv-state-eqpt**" command to ensure service has switched to **OLI** in service slot **1**.

12. Disconnect optical fiber from **OLI** in protection slot **2(P)** and remove the **OLI**.

13. Remove the protective covers from the new **OLIU** connectors. Clean the fibers and connectors with optical quality, lint-free tissue and a compressed air duster.

Reference: **DLP-527**

14. Install new **OLIU** into protection slot **2(P)** and connect optical fibers. Ensure **OLIU** output at one end is connected to the correct **OLIU** input at the other end.

Reference: **DLP-514**

15. Did **FAULT** LED go off on **OLIU** in protection slot **2(P)**?
If **YES**, then continue with **Step 16**.
If **NO**, then do **TAP-111**.
16. Verify optical fiber cables are placed correctly in the fiber tray and are properly routed in the bay framework.
17. **STOP. YOU HAVE COMPLETED THIS PROCEDURE.**

Change Timing Mode on TGS Circuit Pack

1.  **CAUTION:**
If shelves in a bay are connected together with timing mult cabling, changing the timing mode on one system may affect the timing for other systems. Ensure that proper timing arrangements are made for all affected shelves.

-  **NOTE:**
This procedure may be used to change the timing mode on an installed **TGS** circuit pack. For example, you may want to change the timing mode on an installed **TGS** from Free Running to DS1 External, or you may want to provision the DS1 timing output on the **BBF2B TGS** to *sync out mode*. The DS1 timing output on the **BBF2B TGS** can be provisioned for *sync out mode* only when the timing mode is set to *DS1 External sync out* or *Line Timing sync out*. See the Transmission and Synchronization Interfaces section of this manual for a description of DS1 timing outputs.

Verify that there are no alarms or protection switches present on the system.
2. Are you changing timing mode to *DS1 External*?
 If **YES**, then continue with **Step 3**.
 If **NO**, then proceed to **Step 5**.
3. Check external timing references to ensure they are good.
4.  **NOTE 1:**
ED-8C724-20, G339, G340, or G341 cables are used to connect timing references to shelf 1 in a bay. ED-8C724-20, G373 or G374 (rear access) or ED-8C724-21, G414 and G415 (front access) cables are used to multiple timing references to subsequent shelves in the bay (for example, from shelf 1 to shelf 2, shelf 2 to shelf 3, etc.). The cable from the timing reference source to shelf 1 is connected to jack **J37** on the shelf backplane (or **J237** of the front access cable). The cable from shelf 1 (or lower shelf) to the next higher shelf is connected from jack **J44 (P237)** of the lower shelf to jack **J37 (J237)** of the next higher shelf.

⇒ **NOTE 2:**

If **BBF2B TGS** circuit packs are installed and the timing mode is set to DS1 External sync out mode, an ED-8C724-20, G394 cable must be connected to jack **J37** on the shelf backplane (or **J237** of the front access cable). This cable has a relay to disconnect the external timing supply if the **TGS** circuit pack is removed.

Make DS1 external timing reference connections as shown in Table A.

Table A. DS1 Timing Reference Source Connections

Name	Desig.	Conn.	Term.	Color
Receive from Primary DS1 Reference	T R	P37	6 1	BK O
Receive from Secondary DS1 Reference	T R		7 2	R G

5. Make synchronization DS1 timing output connections as shown in Table B, if required.

Table B. DS1 Timing Output Connections

Name	Desig.	Conn.	Term.	Color
Transmit Primary DS1 Reference	T R	P44	6 1	BK O
Transmit Secondary DS1 Reference	T R		7 2	R G

6.  **CAUTION:**
*A momentary transmission hit will occur whenever the **TGS** circuit pack is switched.*

Is a CIT available?

If **YES**, then continue with **Step 7**.

If **NO**, then proceed to **Step 8**.

7. Use the **switch-sync:s=circuitpack,pri>manual** command to switch timing to **TIMING** slot 2, if not already active.

Response: **ACTIVE** LED lights on **TGS** circuit pack in **TIMING** slot 2.

8. If Sync Autoreconfiguration has been enabled (**rtrv-sync**) on a line-timed shelf and you are changing timing to DS1 External or Free Running, use the (**set-sync**) command to disable Sync Autoreconfiguration.
9. Remove **TGS** circuit pack from **TIMING** slot **1** and set option switches to timing mode required.

Reference: **DLP-513**

10. Momentarily depress the **UPD/INIT** pushbutton on the **SYSCTL**.
11. Reinsert **TGS** circuit pack into **TIMING** slot **1**.

Response: **FAULT** LED lights on **TGS** circuit pack in **TIMING** slot **1**.

12.  **NOTE:**
The critical (**CR**) alarm LED may light for up to 15 seconds after the **UPD/INIT** button is depressed on the **SYSCTL**. This does not indicate a service interruption.

Momentarily depress the **UPD/INIT** pushbutton on the **SYSCTL**.

Response: **FAULT** LED goes off on **TGS** circuit pack in **TIMING** slot **1** and lights on **TGS** circuit pack in **TIMING** slot **2**.
ACTIVE LED goes off on **TGS** circuit pack in **TIMING** slot **2** and lights on **TGS** circuit pack in **TIMING** slot **1**.

13. Remove **TGS** circuit pack from **TIMING** slot **2** and set option switches to timing mode required.

Reference: **DLP-513**

14. Reinsert **TGS** circuit pack into **TIMING** slot **2**.

Response: **FAULT** LED on **TGS** circuit pack in **TIMING** slot **2** lights for about 15 seconds then goes off.

15. If a CIT is available, use the **rtrv-sync** command to display the provisioning and operational information of the synchronization interface.
16. **STOP. YOU HAVE COMPLETED THIS PROCEDURE.**

Perform OC-3c (STS-3c) Transmission Test

1.  **NOTE 1:**
Ensure that the OC-3c feature has been enabled.

 -  **NOTE 2:**
This procedure may be used to perform OC-3c transmission tests in the mux (toward the fiber) direction. When this procedure is being used to perform end-to-end OC-3c tests, it is assumed that the complete end-to-end system has already been tested and that only the OC-3c signal is being tested at this time. Transmission tests in the *mux* direction may be local or end-to-end tests (see Figure 1).

 -  **NOTE 3:**
This test is performed with a SONET test set.

 -  **NOTE 4:**
When this procedure is used to do end-to-end tests, one DDM-2000 OC-3 Multiplexer will be referred to as the near end and the other assembly as the far end. These designations are arbitrary; either assembly can be the near-end or the far-end assembly.
2. See Figure 1. If local tests are being performed, the fiber loopback at the near-end **21G/21G-U/21G2-U** or **21D/21D-U OLIU** must be in place. If end-to-end tests are being performed, at the far-end *LGX*[®] cross-connection associated with the DDM-2000 OC-3 Multiplexer being tested, connect a patch cord from the **OUT** jack to the **IN** jack for the OC-3c signal to be tested.
 3. At the cross-connection associated with the near-end DDM-2000 OC-12 Multiplexer, connect the SONET test set to the **IN** and **OUT** jacks associated with the circuit under test.

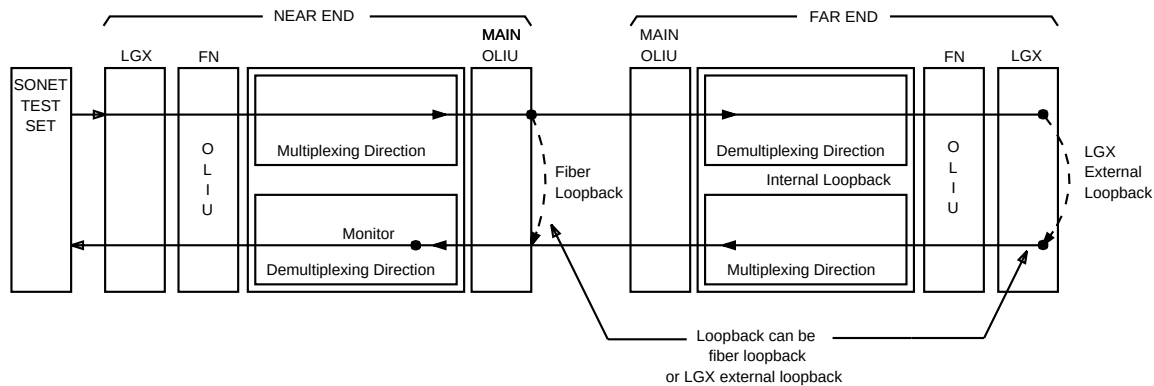


Figure 1. Transmission Test of OC-3c Signal in MUX Direction

4. Use the SONET test set to test for error-free transmission.
5. Was the test successful (error free)?
 - If **YES**, then continue with **Step 6**.
 - If **NO**, then proceed to **Step 15**.
6. Is this first service being placed on the group and is protection circuit pack installed?
 - If **YES**, then continue with **Step 7**.
 - If **NO**, then proceed to **Step 11**.
7. Unseat the service **21G/21G-U/21G2-U** or **21D/21D-U OLIU** circuit pack associated with the circuit under test.
8. Repeat the OC-3c transmission test with the SONET test set.
9. Was the test successful (error free)?
 - If **YES**, then continue with **Step 10**.
 - If **NO**, then proceed to **Step 15**.
10. Reseat the **21G/21G-U/21G2-U** or **21D/21D-U OLIU** circuit pack associated with the circuit under test.

11. The **21G/21G-U/21G2-U** or **21D/21D-U OLIU** circuit pack under test has passed the OC-3c transmission test. Remove the looping patch cords from the cross-connections.
12. At the near-end (and the far-end) DDM-2000 OC-3 Multiplexer, momentarily depress the **UPD/INIT** pushbutton on the **SYSCTL** to update the **SYSCTL**.
13. Repeat this procedure from Step 1 for any additional OC-3c circuits to be tested.
14. **STOP. YOU HAVE COMPLETED THIS PROCEDURE.**
15. Has the **21G/21G-U/21G2-U** or **21D/21D-U OLIU** circuit pack that failed been replaced?
 If **YES**, then proceed to **Step 18**.
 If **NO**, then continue with **Step 16**.
16. Replace the **21G/21G-U/21G2-U** or **21D/21D-U OLIU** circuit pack that failed the test.

Reference: **DLP-518**

17. Repeat this procedure for the **21G/21G-U/21G2-U** or **21D/21D-U OLIU** circuit pack that failed.
18. Trouble may be in the *LGX* cross-connections or the shelf backplane. If other alarms or trouble indications are present, refer to **Trouble Clearing: IXL-001** to isolate the trouble. If no alarms or indications are present and a CIT is available, use the **RETRIEVE** commands (for example, **rtrv-alm**, **rtrv-hsty**, etc.) to check for other trouble indications.
19. **STOP. YOU HAVE COMPLETED THIS PROCEDURE.**

Make VT1.5 (DS1) or STS1 (DS3) Cross-Connections Using CIT Linear or Add/Drop Configuration

1. **⇒ NOTE 1:**

If you are not familiar with doing cross-connections using the CIT commands, it is strongly suggested that you read *Cross-Connection Provisioning* in the "Administration and Provisioning" section of this manual. Also, read the description of the following commands in the "Commands and Reports" section of this manual: **"ent-crs-sts1"**, **"ent-crs-vt1"**, **"rtrv-crs-sts1"**, **"rtrv-crs-vt1"**, **"dlt-crs-sts1"**, **"dlt-crs-vt1"**, **"set-ne"**, and **"cnvt-crs"**.

⇒ NOTE 2:

You may have to log in to more than one node to get a complete map of the network using the **"rtrv-map-network"** and **"rtrv-map-neighbor"** commands. If a drawing of the network is not provided with the work order, it is recommended that you draw a simple schematic of the network before making cross-connections. List the TID of each node and how they are connected to each other. Figure 1 shows an example of a simple schematic.

Log in to any node in the network and use the **"rtrv-map-network"** and **"rtrv-map-neighbor"** commands to retrieve a map of the network which lists all the systems and how they are connected to each other. See Figures 2 and 3.

```
Site1NE1 97-04-27 13:09:53 DDM-2000 OC-3, R8.1.1
M rtrv-map-network: COMPLD
/* Network Map for Site1NE1
=====
System Name      Comm.   Product      NE      Alarm
(TID)            Status  Type          Type    Group
=====
Site1NE1         Failed  DDM-2000 OC-3          3
Site2NE1         DDM-2000 OC-3          3
Site3NE1         DDM-2000 OC-3          3
Site4NE1         DDM-2000 OC-3          3
Site5NE1         DDM-2000 OC-3      DSNE    3
Site6NE1         DDM-2000 OC-3          3
*/
```

Figure 1. Sample Report From rtrv-map-network Command

```
Site2NE1 97-04-27 13:09:53 DDM-2000 OC-3, R8.1.1
M rtrv-map-neighbor: COMPLD
/* Neighbor Map for Site4NE1
=====
System Name      Connected  Link      Product
(TID)            Through   Comm.     Type
Status
=====
Site4NE1         main      Failed    DDM-2000 OC-3
Site2NE1         fn-c     DDM-2000 OC-3
Site3NE1         DDM-2000 OC-3
*/
```

Figure 2. Sample Report From rtrv-map-neighbor Command

2. Verify system configuration is same as specified on work order or circuit order.
3. From work order or circuit order, determine the terminating (drop) nodes for the service being established.
4.  **NOTE:**
In configurations other than point-to-point, cross-connections may consist of pass-through cross-connections in addition to the terminating cross-connections. For example in Figure 1, if the terminating nodes are at Site1NE1 and Site5NE1, then pass-through cross-connections will have to be made at Site2NE1 and Site3NE1.

From work order, circuit order, and the sketch made in Step 1, determine the pass-through nodes for the service being established.

5. Use the "**rtrv-eqpt**:" command at each node to verify that each shelf is properly equipped for the service being established. For example, is the group or slot being used for service at the terminating ends equipped with the proper **MXRVO** and/or **DS1** circuit packs?

6. **NOTE 1:**

Cross-connections supporting DS3 services are STS1 cross-connections. Cross-connections supporting DS1 services may be either STS1 or VT1.5 cross-connections. Use VT1.5 cross-connections for DS1 services if you expect to cross-connect only a portion of the VT1.5 signals in the STS-1 channel. If STS-1 cross-connections are made at a shelf, there is a fixed mapping of all 28 VT1.5 cross-connections to a specific shelf group (see "**ent-crs-sts1**" command). In order to make manual cross-connections, the cross-connect mode must be set to manual using the "**set-ne:crs>manual**" command. If STS-1 cross-connections are already made and individual VT1.5 cross-connections are required, the "**cnvt-crs:**" command may be used to convert the STS-1 cross-connection to 28 individual VT1.5 cross-connections. Certain restrictions and requirements must be followed before converting an STS-1 cross-connect to individual VT1.5 cross-connections. See **NTP-020** to convert an OC-3 shelf to a DS1 add/drop shelf. Also see the descriptions of the "**set-ne**" and "**cnvt-crs**" commands in the "Commands and Reports" section of this manual.

 NOTE 2:

The following commands may be used to delete, enter, and retrieve cross-connections: "**dlt-crs-vt1**", "**ent-crs-sts1**", "**ent-crs-vt1**", "**ent-crs-sts1**", "**rtrv-crs-vt1**", and "**rtrv-crs-sts1**". See the "Commands and Reports" section of this manual for a description of commands.

From work order or circuit order, determine the cross-connections to be made at each node associated with the service being established.

7. Starting at one of the terminating nodes for the DS1/DS3 circuit being established, use the "**rtrv-crs-()**:" command at each node to verify that the cross-connections specified on the work order or circuit order may be made. For example, if the DS1 #2 low speed port in the **DS1** circuit pack in slot #1 of **LOW SPEED GROUP A** (a-1-2) is to be connected to timeslot m-1-1-2 and the "**rtrv-crs-vt1**" command shows that the cross-connection is already established, you should determine from office records if this port is already in-service before continuing with this procedure.

If cross-connections are already assigned or improperly assigned, refer trouble to the organization responsible for facility design. Improperly assigned cross-connections may have to be deleted using the "**dlt-crs-()**" commands.

8.  **NOTE 1:**
Channel state provisioning provides IS, AUTO, and NMON channel states for VT1.5 and STS-1 channels similar to the port states for DS1 and DS3 ports. At installation or when a cross-connection is made to a point of termination the channel is in the AUTO state and alarming is disabled. The channel must receive a good signal from the fiber to cause the channel to transition to in-service (IS).

At the first terminating node, use the "**ent-crs-vt1**:" or "**ent-crs-sts1**:" command to make the terminating cross-connection. For example, "**ent-crs-vt1:a-1-2,m-1-1-2**".

9. Use the "**rtrv-crs-vt1**:" or "**rtrv-crs-sts1**:" command to verify that the proper connection has been made. If an improper cross-connection is made, use the "**dlt-crs-vt1**:" or "**dlt-crs-sts1**:" command to delete the improper cross-connection, then reenter the cross-connection.

10. At the next node closest to the terminating node, use the "**ent-crs-vt1:**" or "**ent-crs-sts1:**" command to make the pass-through cross-connection, as required. For example, "**ent-crs-vt1:m-1-1-2,c-1-1-2**".
11. Continue logging into each node in the path of the service being established and using the "**ent-crs-vt1:**" command to make the required cross-connections.
12. After all cross-connections are made, use the "**rtrv-alm:**" command to verify no alarms are present.
13. If DS3 cross-connections have been established and the terminating nodes are equipped with **BBG4B DS3** circuit packs, use "**set-trace-sts1**" command to check integrity of cross-connect path.

Reference: **DLP-563**

14. If "ne-acty", "inc. VT AIS", or "inc. STS1 AIS" alarms are present, look for missing or improperly made cross-connections. Use **TAP-120** to locate missing cross-connections, if required.
15. **STOP. YOU HAVE COMPLETED THIS PROCEDURE.**

Make VT1.5 (DS1) or STS1 (DS3) Cross-Connections Using CIT Single OC-3 Ring Configuration

1. **⇒ NOTE 1:**

If you are not familiar with doing cross-connections using the CIT commands, it is strongly suggested that you read *Cross-Connection Provisioning* in the "Administration and Provisioning" section and read the description of the following commands in the "Commands and Reports" section of 363-206-280, *DDM-2000 OC-3 Multiplexer, Releases 8.0 through 11.1, User/Service Manual—Volume I*:
**"ent-crs-sts1", "ent-crs-vt1", "rtrv-crs-sts1",
"rtrv-crs-vt1", "dlt-crs-sts1", "dlt-crs-vt1", and
"cnvt-crs".**

⇒ NOTE 2:

You may have to log in to more than one node to get a complete map of the network using the **"rtrv-map-network"** and **"rtrv-map-neighbor"** command. If a drawing of the network is not provided with the work order, it is recommended that you draw a simple schematic of the network before making cross-connections. List the TID of each node and how they are connected to each other. Figure 1 shows an example of a simple schematic.

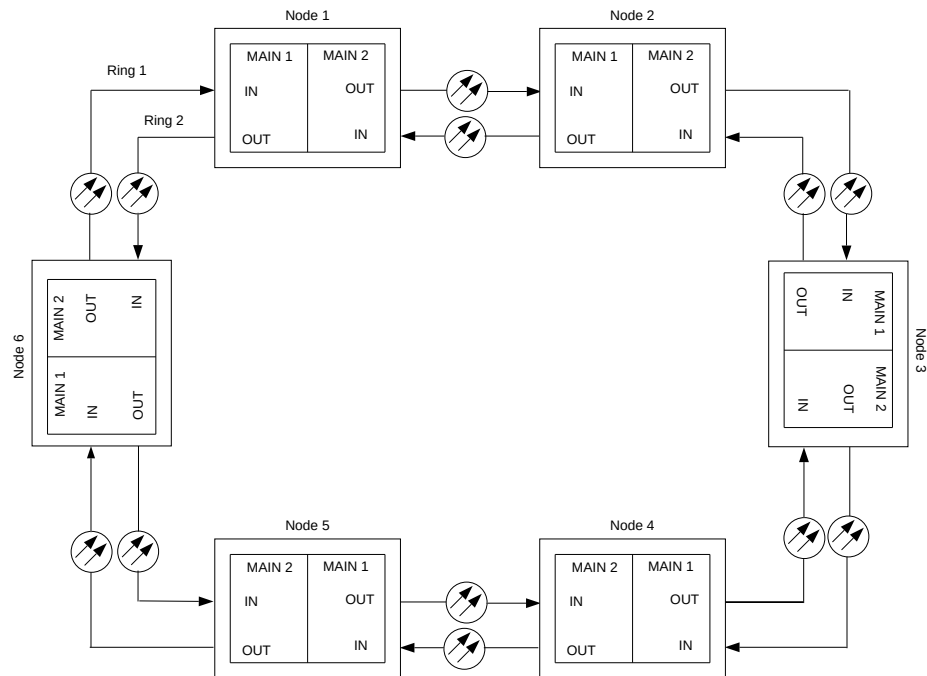


Figure 1. Sample Network Schematic

Log in to any node in each ring in the network and use the **"rtrv-map-network"** and **"rtrv-map-neighbor"** command to retrieve a map of the network which lists all the systems and how they are connected to each other.

Sample output reports are shown in Figures 2 and 3:

```
Node6 98-05-27 13:09:53 DDM-2000 OC-3, R11.1.1
M  rtrv-map-network: COMPLD
/* Network Map for Node6
=====
System Name      Comm.  Product      NE      Alarm
(TID)            Status Type          Type    Group
=====
Node6                        DDM-2000 OC-3      DSNE      3
Node5                        DDM-2000 OC-3              3
Node4                        DDM-2000 OC-3              3
Node3      Failed          DDM-2000 OC-3              3
Node2                        DDM-2000 OC-3              3
Node1                        DDM-2000 OC-3              3
*/
```

Figure 2. Sample Report From rtrv-map-network Command

```
Node6 98-05-27 13:09:53 DDM-2000 OC-3, R11.1.1
M  rtrv-map-neighbor: COMPLD
/* Neighbor Map for Node6
=====
System Name      Connected  Link      Product
(TID)            Through   Comm.     Type
Status
=====
Node6                        DDM-2000 OC-3
Node5      main-1          DDM-2000 OC-3
Node1      main-2      Failed    DDM-2000 OC-3
*/
```

Figure 3. Sample Report From rtrv-map-neighbor Command

2. Verify system configuration is same as specified on work order or circuit order.
3. From work order or circuit order, determine the terminating (drop) nodes for the service being established.
4.  **NOTE 1:**
In single ring configurations, cross-connections consist of pass-through cross-connections in addition to the terminating cross-connections. For example in Figure 1, if the terminating nodes are at Node 1 and Node 5, then pass-through cross-connections will have to be made at Nodes 2, 3, 4 and 6.

 NOTE 2:

In ring configurations, you should use the following rules in establishing cross-connections in each ring:

1. All drop connections (including DRI, if present) from the same STS-1 timeslot must be provisioned the same, either all VT1.5 or STS-1.
2. If all 28 VT1.5s (DS1s) in an STS-1 are being passed through at a node in a VT1.5 path-switched ring, then the cross-connection may be provisioned as either a pass-through STS-1 or VT1.5. However, if you anticipate dropping VT1.5s from the pass-through node in the future, you should provision the pass-throughs as VT1.5 cross-connections. Also, provisioning now as a VT1.5 cross-connect will avoid a hit on traffic if the STS-1 cross-connect has to be converted ("**cnvt - crs**") to 28 VT1.5 cross-connects to drop DS1s at a later time.
3. On STS-1 path-switched rings, all nodes in the ring must be provisioned as STS-1 cross-connections.

From work order, circuit order, and the sketch made in Step 1, determine the pass-through nodes for the service being established.

5. Use the "**rtrv-eqpt:**" command at each node to verify that each shelf is properly equipped for the service being established. For example, is the group or slot being used for service at the terminating ends equipped with the proper **MXRVO** and/or **DS1/DS1PM** circuit packs if DS1 service is being established?

6. **⇒ NOTE 1:**

Cross-connections supporting DS3 services are STS1 cross-connections. Cross-connections supporting DS1 services may be either STS1 or VT1.5 cross-connections. Use VT1.5 cross-connections for DS1 services if you expect to cross-connect only a portion of the VT1.5 signals in the STS-1 channel. If STS1 cross-connections are made at a shelf, there is a fixed mapping of all 28 VT1.5 cross-connections to a specific shelf group (see "**ent-crs-sts1**" command). If STS1 cross-connections are already made and individual VT1.5 cross-connections are required, the "**cnvt-crs:**" command may be used to convert the STS1 cross-connection to 28 individual VT1.5 cross-connections. Certain restrictions and requirements must be followed before converting an STS1 cross-connection to individual VT1.5 cross-connections. See the description of the "**cnvt-crs**" command in the "Commands and Reports" section of this manual.

⇒ NOTE 2:

The following commands may be used to delete, enter, and retrieve cross-connections: "**dlt-crs-vt1**", "**ent-crs-sts1**", "**ent-crs-vt1**", "**ent-crs-sts1**", "**rtrv-crs-vt1**", and "**rtrv-crs-sts1**". See the "Commands and Reports" section of this manual for a description of commands.

From work order or circuit order, determine the cross-connections to be made at each node associated with the service being established. See Figures 4 through 10 for examples.

7. Starting at one of the terminating nodes for the DS1/DS3 circuit being established, use the "**rtrv-crs-():**" command at each node in the ring to verify that the cross-connections specified on the work order or circuit order may be made. For example, if the DS1 #3 low speed port in the **DS1** circuit pack in slot #2 of **LOW SPEED GROUP A** (a-2-3) is to be connected to timeslot m-1-2-3 and the "**rtrv-crs-vt1**" command shows that the cross-connection is already established, you should determine from office records if this port is already in-service before continuing with this procedure.

If cross-connections are already assigned or improperly assigned, refer trouble to the organization responsible for facility design. Improperly assigned cross-connections may have to be deleted using the "**dlt-crs-()**" commands.

8. **NOTE:**

The channel state provisioning feature provides IS, AUTO, and NMON states for VT and STS channels similar to the channel states for DS1 and DS3 ports. At installation, or when a cross-connection is made to a point of termination, the channel is in the AUTO state and alarming is disabled. The channel must receive a good signal from either ring to cause the channel to transition to in-service (IS).

At all nonterminating nodes in the network, use the "**ent-crs-vt1:**" or "**ent-crs-sts1:**" command to provision pass-through connections. [For example, to make the DS1 pass-through cross-connection for channel m-1-2-3, use the "**ent-crs-vt1:m-1-2-3,m-1-2-3**" command. To make pass-through cross-connections for STS-1 #1, use the "**ent-crs-sts1:m-1,m-1**" command.]

9. At the terminating (drop) nodes of the circuit being established, use the "**ent-crs-vt1:**" or "**ent-crs-sts1:**" command to make the terminating cross-connections (for example, "**ent-crs-vt1:m-1-2-3,a-2-3**") or "**ent-crs-sts1:m-1,a**")
10. Use the "**rtrv-crs-vt1:**" or "**rtrv-crs-sts1:**" command to verify that the proper connection has been made. If an improper cross-connection is made, use the "**dlt-crs-vt1:**" or "**dlt-crs-sts1:**" command to delete the improper cross-connection and reenter the cross-connection.
11. After all cross-connections are made, use the "**rtrv-alm:**" command to verify no alarms are present.
12. If DS3 cross-connections have been established and the terminating nodes are equipped with **BBG4B DS3** circuit packs, use "**set-trace-sts1**" command to check integrity of cross-connect path.

Reference: **DLP-563**

13. If "ne-acty", "inc. VT AIS", "inc. STS1 AIS", "inc. VT unequipped", or "inc. STS1 unequipped", alarms are present, look for missing or improperly made cross-connections. Use **TAP-120** to locate missing cross-connections, if required.
14. **STOP. YOU HAVE COMPLETED THIS PROCEDURE.**

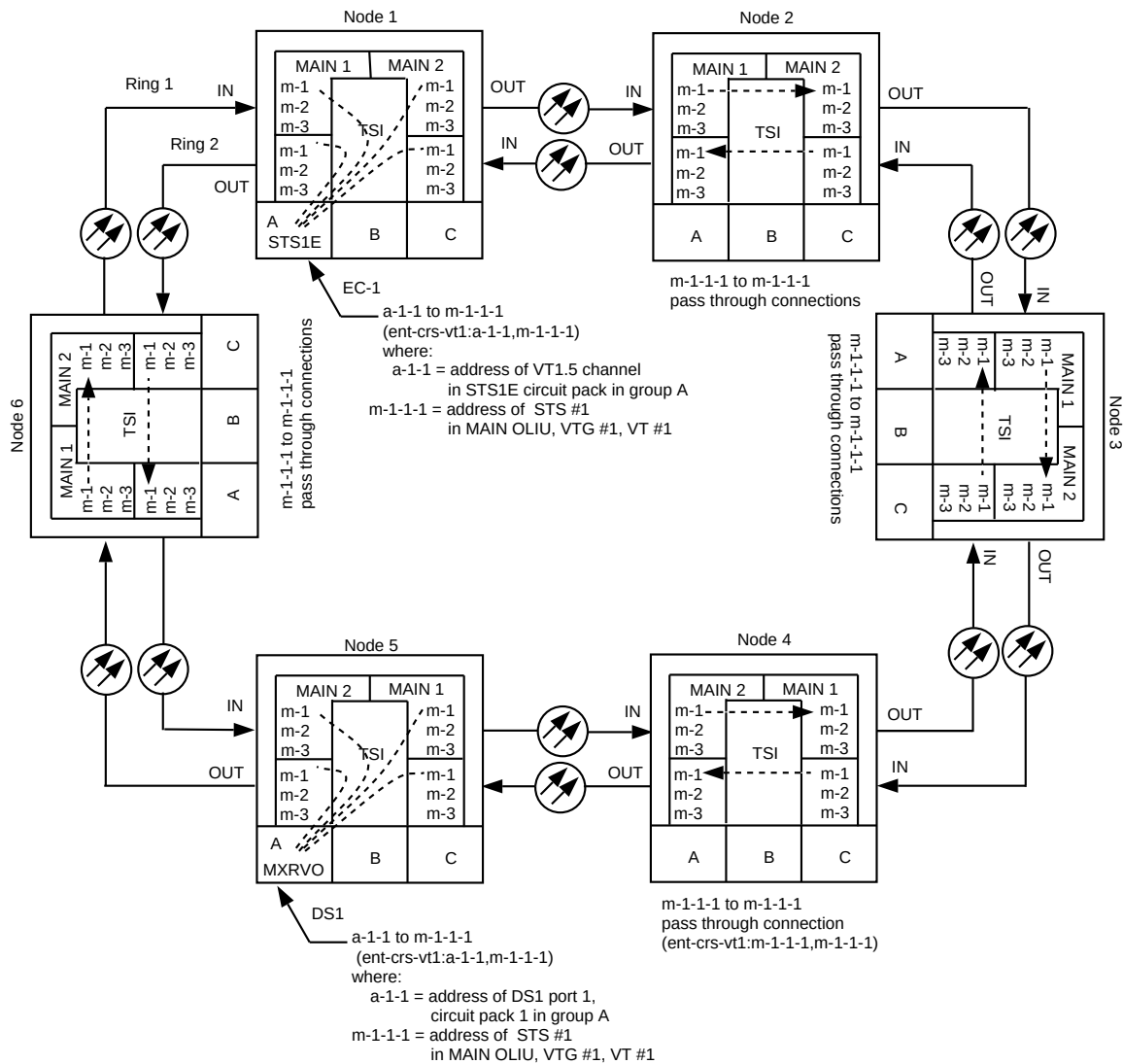


Figure 4. Path Protected Ring Network (DS1 to DS1) with VT1.5 Cross-Connections

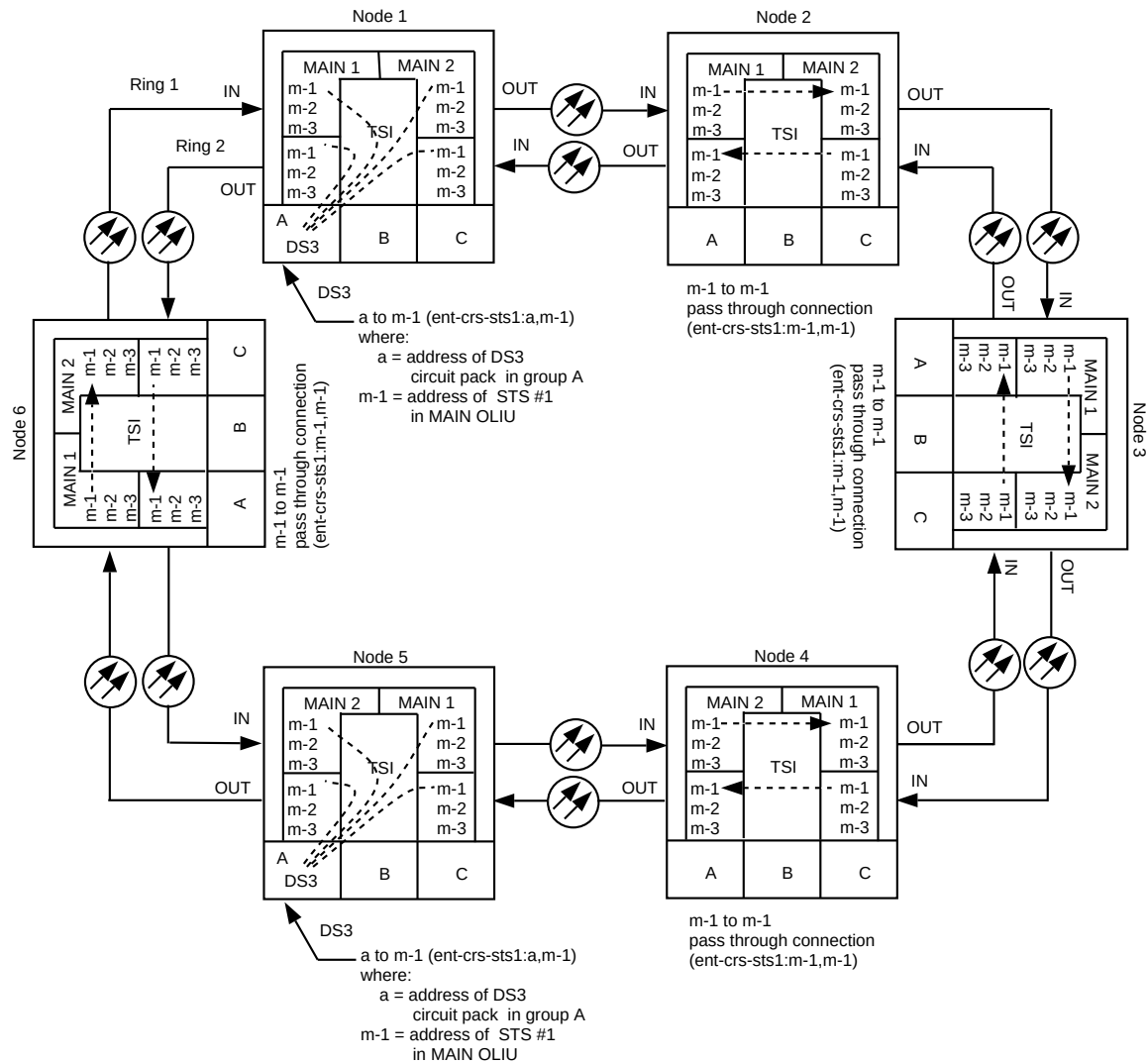
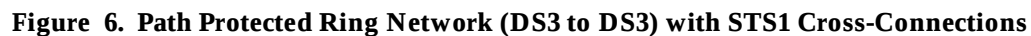


Figure 5. Path Protected Ring Network (DS3 to DS3) with STS1 Cross-Connections



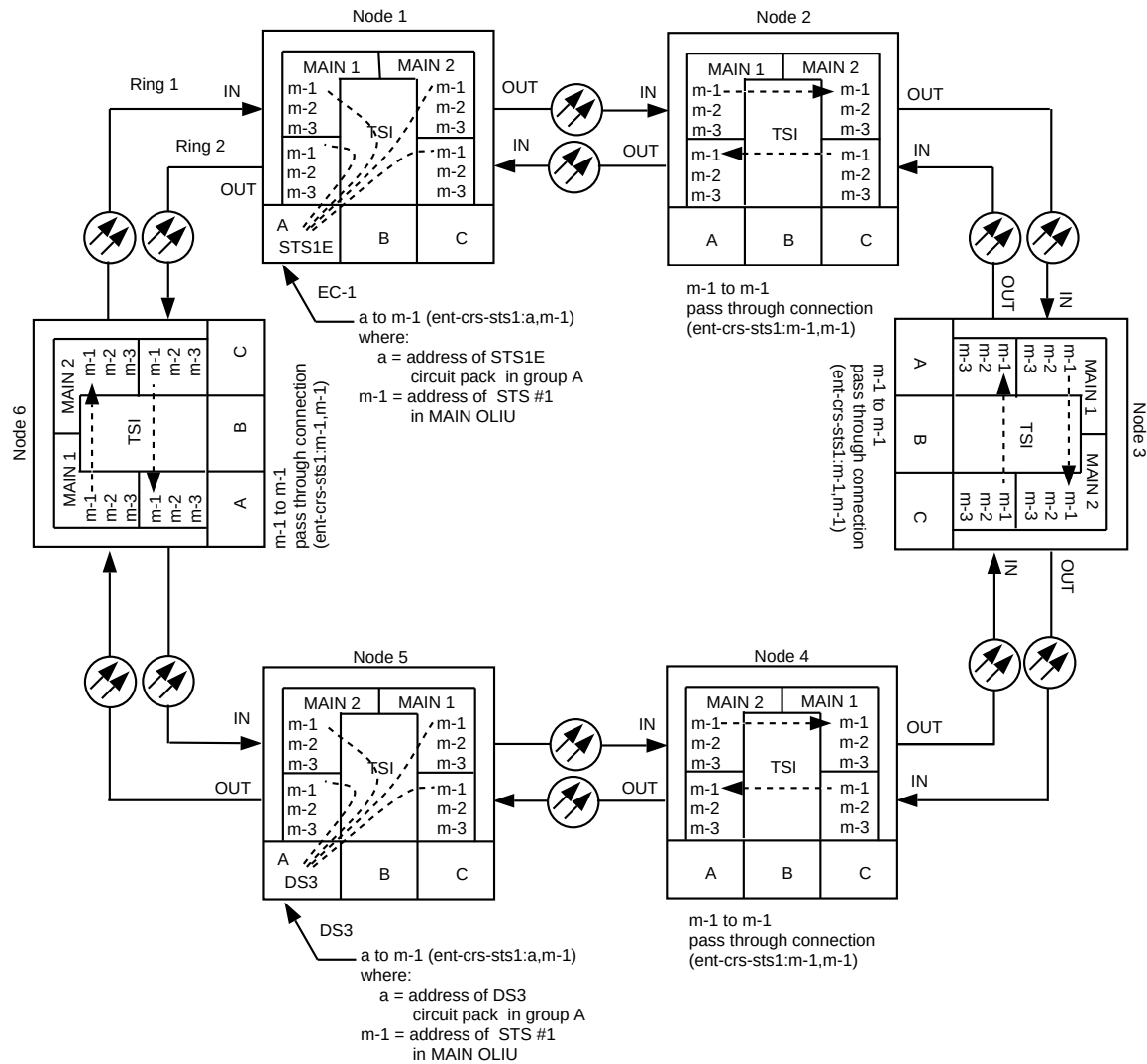


Figure 7. Path Protected Ring Network (DS3 to EC-1) with STS1 Cross-Connections

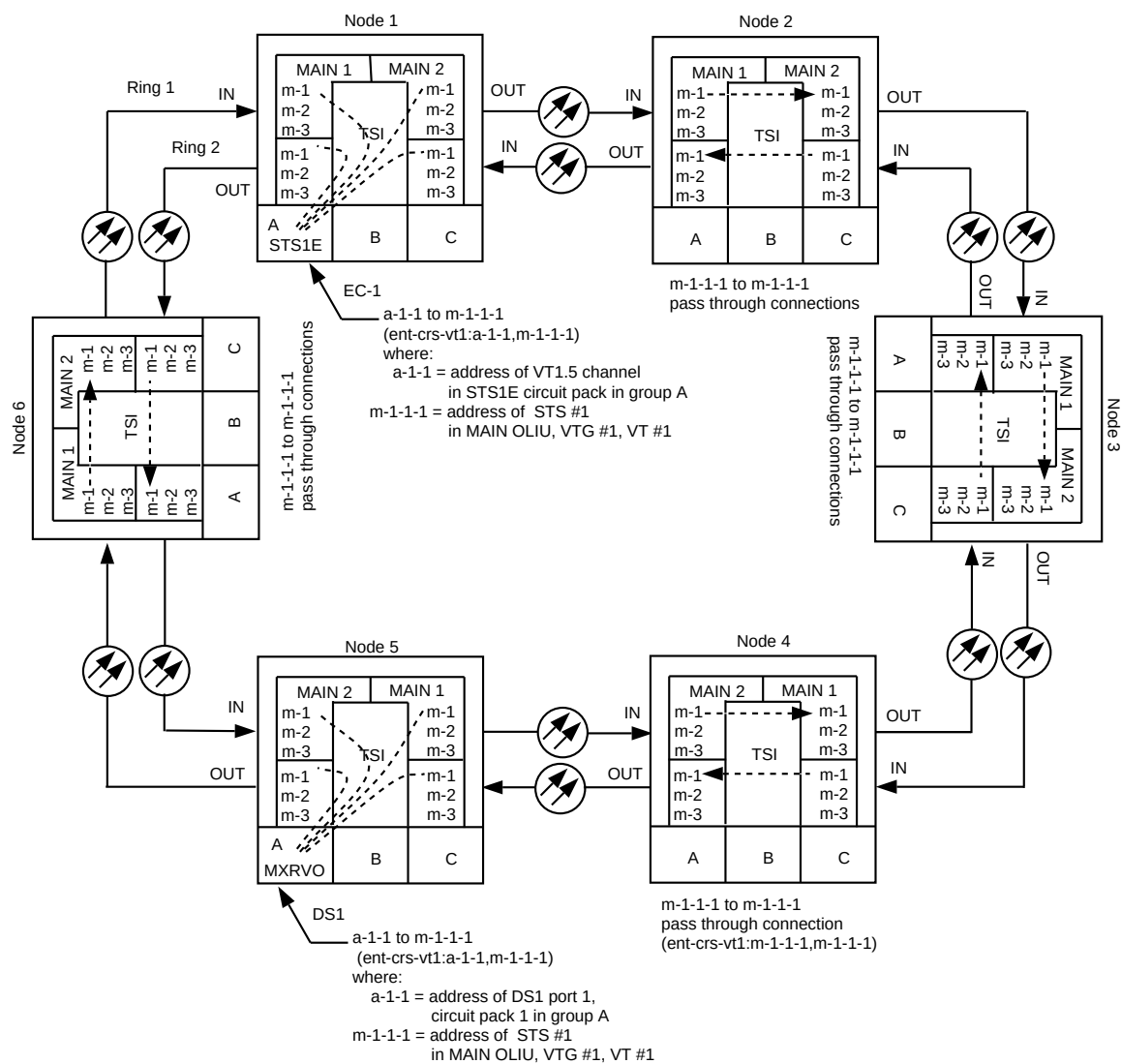


Figure 8. Path Protected Ring Network (one DS1 to EC-1) with VT1.5 Cross-Connections

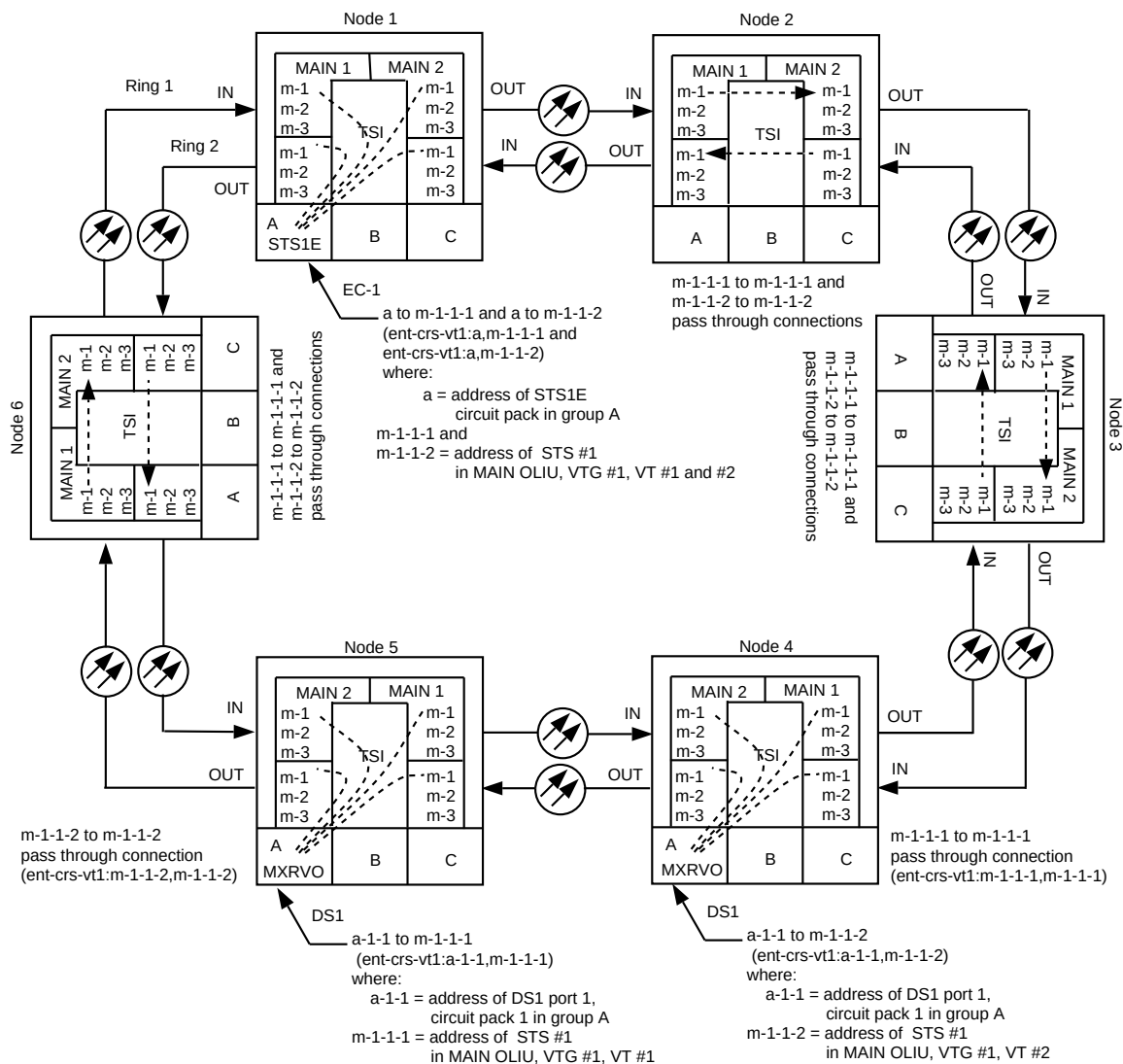
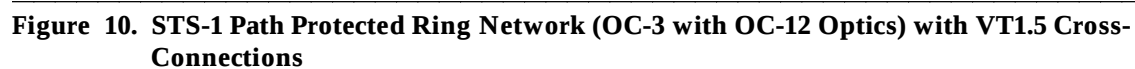


Figure 9. Path Protected Ring Network (two DS1s to EC-1) with VT1.5 Cross-Connections



DDM-2000 Receiver Sensitivity Test

1.  **WARNING:**
Unterminated optical connectors may emit invisible laser radiation. Avoid direct exposure to the beam. Do not view beam with optical instruments. Use of controls or adjustments or performance of procedures other than those specified herein may result in hazardous radiation exposure.
-  **CAUTION 1:**
Take care to avoid damaging light emitting diodes (LEDs) that protrude through opening in faceplate of optical line interface unit (OLIU).
-  **CAUTION 2:**
Avoid excessive bending of optical jumper and cables.
-  **CAUTION 3:**
All optical fiber connectors, couplings, and buildouts should be properly cleaned [DLP-527]. Signal performance may be degraded if connectors, couplings, or buildouts are not cleaned properly.
-  **NOTE 1:**
It may take from 15 seconds to 3 minutes and 25 seconds for **FAULT** LEDs to stop flashing, depending on setting of signal degrade threshold (–5 to –9).
-  **NOTE 2:**
This test may be accomplished with one shelf by simply using an optical loopback after the optical splitter.

Configure the DDM-2000 shelf and test equipment as shown in Figure 1.

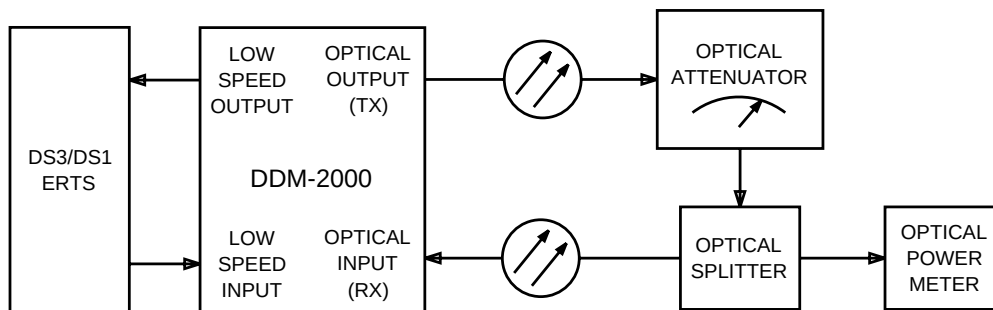


Figure 1. DDM-2000 Receiver Sensitivity Test Configuration

2. Set variable optical attenuator to obtain power level reading on optical power meter as required from Table A.

Table A. OC-3 OLIU Optical Power Levels

OC-3 OLIU	Power Level (dBm)
21D, 21D-U, 22D-U	-33.8(Cont. Env.) -31.8(Uncont. Env.)
22F, 22F-U, 22F2-U	-34.0
21G, 21G-U, 21G2-U	-34.0
22G-U, 22G2-U, 22G3-U	-34.0
26G2-U, 27G-U, 27G2-U	-30.8
24G-U	-30.0

3. Monitor the DS1/DS3 received signal with the DS1/DS3 Error Rate Test Set (ERTS) for 30 minutes and insure a bit error rate (BER) result of 10^{-10} or better.
4. Did **OLI** pass BER test?
 - If **YES**, then **STOP. YOU HAVE COMPLETED THIS PROCEDURE.**
 - If **NO**, then continue with **Step 5.**
5. Clean optical attenuators and connectors and repeat test. If test fails again, replace **OLI**.

Replace Defective Fan Pack

1.  **CAUTION:**
Exercise care in removing the fiber tray or fiber support bracket, if required, to prevent damage to the optical fibers.

-  **NOTE 1:**
Fan packs are numbered from left to right as viewed from front of fan shelf.

-  **NOTE 2:**
This procedure is the same for both front and rear access arrangements.

-  **NOTE 3:**
Fan pack removal does not require the removal of the fan shelf.

-  **NOTE 4:**
To remove the front cover of a fan shelf located between two OC-3 shelves it may be necessary to remove either the fiber tray from the top OC-3 shelf, if it is a G1 shelf, or the fiber support bracket, if the shelf is a G3 or G4 shelf.

Remove fan shelf front cover by turning front latch assemblies according to the markings on the front cover.

2. Disconnect the fan pack cable and unscrew the two mounting screws holding the fan pack in place. See Figure 1.

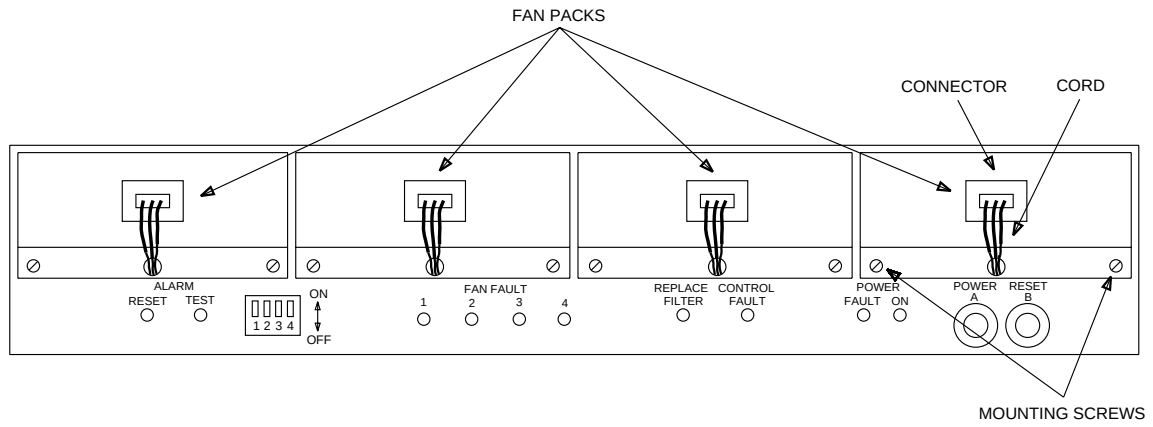


Figure 1. DDM-2000 Fan Shelf — Front Cover Removed

3. Slide out defective fan pack and install new fan pack (ED-8C733-30, G6).
4. Reinstall fan pack screws and reconnect the fan cable.
5. Remount fan shelf front cover and tighten latch assemblies.
6. **STOP. YOU HAVE COMPLETED THIS PROCEDURE.**

Install BBG8/BBG8B SYSCTL New Shelf Only BBG9 OHCTL Installed

1. **NOTE:**
This procedure is used for installing the **SYSCTL** in a new shelf for the first time (initial shelf turnup, only **OHCTL** installed at this time). For procedures to replace an in-service **SYSCTL**, refer to **DLP-501**.

Set **SYSCTL** switch **S1** sections **S1-1**, **S1-2**, and **S1-3** to **OFF**, **OFF**, **OFF**, respectively, to set the product (shelf) type. See Figure 1.

2. Set TBOS termination switch **S2-1** per Table A.

**Table A. SYSCTL Switch 2
TBOS Link Terminator**

Shelf Position	Switch S2-1
Last	ON
Not Last	OFF

3. Set all remaining **SYSCTL** switch **S2** sections **S2-2**, **S2-3**, **S2-4**, **S2-5**, **S2-6**, **S2-7**, and **S2-8** to **OFF**.

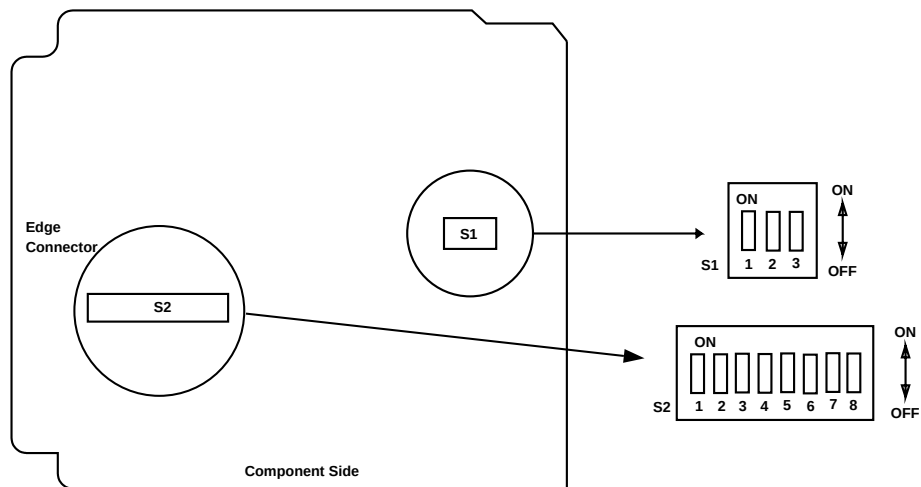


Figure 1. SYSCTL Option Settings

4.  **NOTE:**
Both the **BBG8/BBG8B SYSCTL** and **BBG9 OHCTL** must be installed for the controllers to function.

Ensure the **BBG9 OHCTL** is installed.

Reference: **DLP-500**

5.  **NOTE:**
Steps 6 and 7 must be performed without unnecessary delays. Familiarize yourself with these steps before continuing with the procedure.

Read Steps 6 and 7 before proceeding.

6.  **CAUTION:**
*Take care to avoid damaging the LEDs that protrude through the opening in the faceplate of the **SYSCTL**.*

 **NOTE 1:**
The **UPD/INIT** pushbutton on the **SYSCTL** is recessed to prevent its accidental operation. You will need a small pointed object such as a ballpoint pen to operate it.

 **NOTE 2:**
Ignore the **MJ**, **MN**, and **NE ACTY** LEDs on the User Panel.

Read the remainder of this step and Step 7 before installing the SYSCTL, then seat the SYSCTL.

If the following responses do not occur, proceed to **Step 8**.

Response: **FAULT** LED on **BBG8/BBG8B SYSCTL** lights and **ABN** LED on the User Panel lights after approximately 5 seconds. **MJ** and **NE** LEDs may light or flash briefly. **FAULT** LED on the **SYSCTL** goes off after approximately 5 seconds. **ABN** LED goes off after approximately 15 seconds. Approximately 1 minute and 30 seconds after the **ABN** LED goes off, the **FAULT** LED on the **OHCTL** goes off and the **CR** LED on the User Panel begins to flash.

7. Momentarily depress the **UPD/INIT** button on the **SYSCTL** while the **CR** LED is flashing (**you have 10 SECONDS to do this**).

If the following responses do not occur, continue with **Step 8**.

Response: **CR** LED on the User Panel stops flashing when the **UPD/INIT** button is pressed.

FAULT LED on **BBG9 OHCTL** and **ABN** LED on the User Panel are lighted after approximately 15 seconds. **ABN** LED goes off after approximately 30 seconds. Approximately 1 minute and 45 seconds after the **ABN** LED goes off, the **CR** LED on the User Panel flashes again. **DO NOT** depress **UPD/INIT** pushbutton again when the **CR** alarm LED flashes.

Initialization may take 2-3 minutes.

8. Observe one of the following indications in the **FE ID** display. Note the indication and follow suggested procedure:

- A. Nothing displayed in the **FE ID** display indicates that compatible software is installed in the **OHCTL** and **SYSCTL**.

Proceed to **Step 11**.

- 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 that a previous download attempt has failed and a new software download will have to be attempted either locally or remotely using the **ins-prog:tid** or **cpy-prog:tid** command. If there is no period (**P**) the software can only be downloaded locally.

Continue with **Step 9**.

- C. 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.

Continue with **Step 9**.

- D. The letter **U** displayed in the **FE ID** display indicates that **SYSCTL** Switch **S1** is not set properly for type of shelf being equipped.

Remove **SYSCTL** and repeat this procedure from **Step 1**.

- E. The letter **E** displayed in the **FE ID** display indicates that the **SYSCTL** must be replaced.

Get replacement **SYSCTL** and repeat this procedure from **Step 1**.

- F. The letter **F** displayed in the **FE ID** display indicates that the **SYSCTL** faceplate latch is not fully latched.

Unplug the **SYSCTL** and repeat this procedure from **Step 5**. Ensure you properly seat the faceplate latch when you seat the **SYSCTL**.

- G. A flashing letter **L** displayed in the **FE ID** display indicates a low voltage condition (brownout) on the shelf.

Use **TAP-121** to clear brownout condition.

9. Find circuit packs with compatible software and repeat this procedure, or install new software using the procedures of **DLP-561**.
10. **STOP. YOU HAVE COMPLETED THIS PROCEDURE.**
11. Retrieve generic software version ID by depressing the **ACO** button longer than 2 seconds and observing version code on the **FE ID** display.
12. Is proper software version installed?
 If **YES**, then **STOP. YOU HAVE COMPLETED THIS PROCEDURE.**
 If **NO**, then continue with **Step 13**.
13. Find circuit packs with the correct software and repeat this procedure or install new software using the procedures of **DLP-561**.
14. **STOP. YOU HAVE COMPLETED THIS PROCEDURE.**

Make VT1.5 (DS1) or STS1 (DS3) Cross-Connections Using CIT Dual Ring Interworking Configuration Release 9 and Later

1. **⇒ NOTE 1:**
This procedure assumes that the "drop and continue" feature will be used to interconnect two rings at two locations to support service between nodes in each ring. The two rings interface through EC-1 or OC-3 connections at two interworking nodes.

- ⇒ NOTE 2:**
If you are not familiar with doing cross-connections using the CIT commands, it is strongly suggested that you read *Cross-Connection Provisioning* in the "Administration and Provisioning" section and read the description of the following commands in the "Commands and Reports" section of 363-206-280, *DDM-2000 OC-3 Multiplexer, Releases 8.0 through 11.1, User/Service Manual—Volume I*: **"ent-crs-sts1"**, **"ent-crs-vt1"**, **"rtrv-crs-sts1"**, **"rtrv-crs-vt1"**, **"dlt-crs-sts1"**, and **"dlt-crs-vt1"**.

- ⇒ NOTE 3:**
You will have to login to more than one node in each ring to get a complete map of the network using the **"rtrv-map-network"** and **"rtrv-map-neighbor"** command. If a drawing of the network is not provided with the work order, it is recommended that you draw a simple schematic of the network before making cross-connections. List the TID of each node and how they are connected to each other. Figure 1 shows an example of a simple schematic.

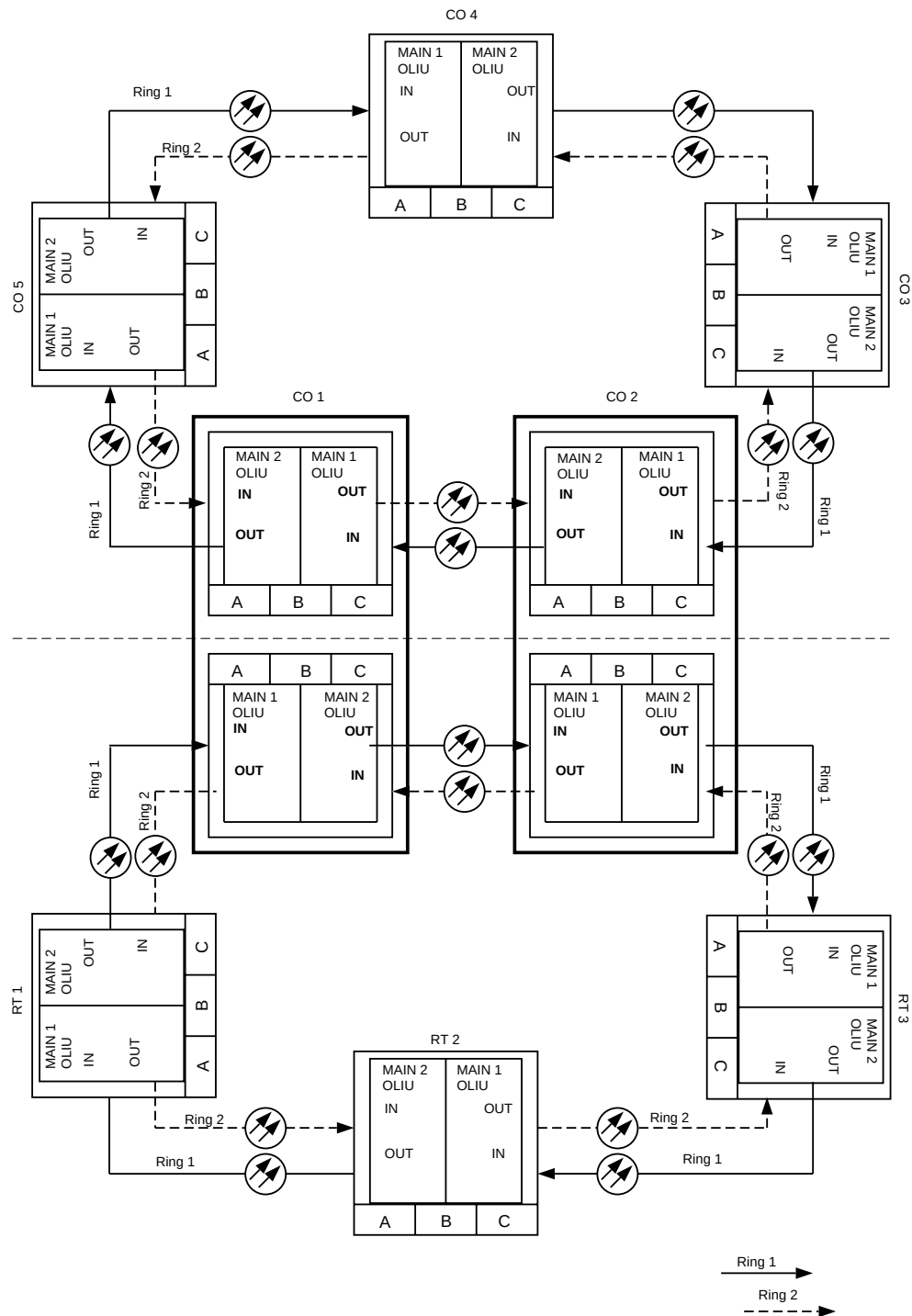


Figure 1. Sample Network Schematic

Log in to any node in each ring in the network and use the "**rtrv-map-network**" and "**rtrv-map-neighbor**" command to retrieve a map of the network which lists all the systems and how they are connected to each other.

Sample output reports are shown in Figures 2, and 3:

```
C01 98-05-27 13:09:53 DDM-2000 OC-3, R11.1.1
M  rtrv-map-network: COMPLD
/* Network Map for C01
```

System Name (TID)	Comm. Status	Product Type	NE Type	Alarm Group
C01		DDM-2000 OC-3	DSNE	3
C02		DDM-2000 OC-3		3
C03		DDM-2000 OC-3		3
C04		DDM-2000 OC-3		3
C05		DDM-2000 OC-3		3
C06		DDM-2000 OC-3		5
C07		DDM-2000 OC-3		5
RT1	Failed	DDM-2000 OC-3		5
RT1		DDM-2000 OC-3		5
RT1		DDM-2000 OC-3		5

```
*/
```

Figure 2. Sample Report From **rtrv-map-network** Command

```
C01 98-05-27 13:09:53 DDM-2000 OC-3, R11.1.1
M  rtrv-map-neighbor: COMPLD
/* Neighbor Map for C01
```

System Name (TID)	Connected Through	Link Comm. Status	Product Type
C01			DDM-2000 OC-3
C05	main-2		DDM-2000 OC-3
C06	fn-b	Failed	DDM-2000 OC-3

```
*/
```

Figure 3. Sample Report From **rtrv-map-neighbor** Command

2. Verify system configuration is same as specified on work order or circuit order.
3. From work order or circuit order, determine the terminating (drop) nodes for the service being established.

4. **⇒ NOTE 1:**

In dual ring configurations, cross-connections consist of "drop and continue" connections in addition to pass-through and terminating cross-connections. For example in Figure 4, drop and continue connections are made at the four nodes in CO 1 and CO 2 located between the two rings. Also, cross-connections must be made in all interconnected rings, including other DDM-2000 OC-3 rings, DDM-2000 OC-12 rings, and FT-2000 OC-48 rings, as required.

⇒ NOTE 2:

In ring configurations, you should use the following rules in establishing cross-connections in each ring:

1. All drop connections (including DRI, if present) from the same STS-1 timeslot must be provisioned the same, either all VT1.5 or STS-1.
2. If all 28 VT1.5s (DS1s) in an STS-1 are being passed through at a node in a VT1.5 path-switched ring, then the cross-connection may be provisioned as either a pass-through STS-1 or VT1.5. However, if you anticipate dropping VT1.5s from the pass-through node in the future, you should provision the pass-throughs as VT1.5 cross-connections. Also, provisioning now as a VT1.5 cross-connect will avoid a hit on traffic if the STS-1 cross-connect has to be converted ("**cnvt - crs**") to 28 VT1.5 cross-connections to drop DS1s at a later time.
3. On STS-1 path-switched rings, all nodes in the ring must be provisioned as STS-1 cross-connections.

From work order, circuit order, and the sketch made in Step 1, determine the pass-through nodes for the service being established.

5. Use the "**rtrv-eqpt:**" command at each node to verify that each shelf is properly equipped for the service being established. For example, is the group or slot being used for service at the terminating ends equipped with the proper **MXRVO** and/or **DS1/DS1PM** circuit packs if DS1 service is being established?
6.  **NOTE 1:**
Cross-connections supporting DS3 services are STS1 cross-connections. Cross-connections supporting DS1 services may be either STS1 or VT1.5 cross-connections. Use VT1.5 cross-connections for DS1 services if you expect to cross-connect only a portion of the VT1.5 signals in the STS-1 channel. If STS1 cross-connections are made at a shelf, there is a fixed mapping of all 28 VT1.5 cross-connections to a specific shelf group (see "**ent-crs-sts1**" command).
-  **NOTE 2:**
The following commands may be used to delete, enter, and retrieve cross-connections: "**dlt-crs-vt1**", "**ent-crs-sts1**", "**ent-crs-vt1**", "**ent-crs-sts1**", "**rtrv-crs-vt1**", and "**rtrv-crs-sts1**". See the "Commands and Reports" section of this manual for a description of commands.

From work order or circuit order, determine the cross-connections (STS-1 or VT1.5) to be made at each node associated with the kind of service being established.

7. Starting at one of the terminating nodes for the DS1/DS3 circuit being established, use the "**rtrv-crs-()**:" command at each node in the ring to verify that the cross-connections specified on the work order or circuit order may be made. For example, if the DS1 #3 low speed port in the **DS1** circuit pack in slot #2 of **LOW SPEED GROUP A** (a-2-3) is to be connected to timeslot m-1-2-3 and the "**rtrv-crs-vt1**" command shows that the cross-connection is already established, you should determine from office records if this port is already in-service before continuing with this procedure.

If cross-connections are already assigned or improperly assigned, refer trouble to the organization responsible for facility design. Improperly assigned cross-connections may have to be deleted using the "**dlt-crs-()**" commands.

8.  **NOTE:**
Channel state provisioning provides IS, AUTO, and NMON states for VT and STS channels similar to the port states for DS1 and DS3 ports. When a cross-connection is made to a point of termination the channel is in the AUTO state and alarming is disabled. The channel must receive a good signal from either ring to cause the channel to transition to in-service (IS).

At all nonterminating nodes in the network, use the "**ent-crs-vt1**:" or "**ent-crs-sts1**:" command to provision pass-through connections. [For example, to make the DS1 pass-through cross-connection for channel m-1-2-3, use the "**ent-crs-vt1:m-1-2-3,m-1-2-3:cct=twoway**" command. To make pass-through cross-connections for STS-1 #1, use the "**ent-crs-sts1:m-1,m-1:cct=twoway**" command.]

9. At the terminating (drop) nodes of the circuit being established, use the "ent-crs-vt1:" or "ent-crs-sts1:" command to make the terminating cross-connections (for example, "ent-crs-vt1:m-1-2-3,a-2-3:cct=twoway") or "ent-crs-sts1:m-1,b:cct=twoway")
10. From work order or circuit order, determine the dual ring interworking node sites where the two rings are being interconnected.
11. From work order or circuit order at each dual ring interworking node, determine the "drop and continue" cross-connections to be made at each node.
12. At the dual ring interworking node sites, make or verify proper backplane EC-1 cable connections [**J38-J39** (Group A), **J40-J41** (Group B), **J42-J43** (Group C)] between **FUNCTION UNITS** groups used for service being provided. See CO 1 and CO 2 in Figure 4.
13. ➤ **NOTE:**
Ring 1 is the ring being received on the **MAIN 1 OLIU**. Ring 2 is the ring being received on the **MAIN 2(P) OLIU**. The *ring* parameter of the "ent-crs" commands is used to identify which ring rotation will be continued as well as dropped at a node. For example, if Ring 2 continues to the next node, then *ring=m2*

At the dual ring interworking node sites, determine the ring (Ring 1 or Ring 2) rotation that will be continued to each node. For example, in Figure 4, note that at CO 1 in the top ring configuration, Ring 2 is continued to CO 2. In the bottom ring configuration, Ring 1 is continued from CO 1 to CO 2.

14.  **NOTE:**
If VT1.5 cross-connections in the same STS-1 are made at a dual ring interworking node site, all VT1.5 "drop and continue" cross-connections at that node must be made in the same direction.

At the dual ring interworking node sites, make proper "drop and continue" cross-connections. For example, at the top node at CO 1 if STS-1 #1 in **MAIN OLIU** (m-1) is to be cross-connected to **FUNCTION UNITS** group **B** (b) then the command "**ent-crs-sts1:m-1,b:cct=dc,ring=m2**" would be used to make the cross-connection. This command makes both the drop cross-connection as well as the continue cross-connection. If FT-2000 is a part of the DRI configuration, use 365-575-102, *FT-2000 OC-48 Lightwave System, User/Service Manual*, to make DRI cross-connections.

15. Use the "**rtrv-crs-vt1:**" or "**rtrv-crs-sts1:**" command to verify that the proper connection has been made. If an improper cross-connection is made, use the "**dlt-crs-vt1:**" or "**dlt-crs-sts1:**" command to delete the improper cross-connection and reenter the cross-connection.
16. At terminating nodes equipped with **BBG4B DS3** circuit packs, use the "**set-trace-sts1**" command to verify the proper cross-connect path of a STS-1 cross-connected STS-1 signal.
17. After all cross-connections are made, use the "**rtrv-alm:**" command to verify no alarms are present.
18. If DS3 cross-connections have been established and the terminating nodes are equipped with **BBG4B DS3** circuit packs, use "**set-trace-sts1**" command to check integrity of cross-connect path.

Reference: **DLP-563**

19. If "ne-acty", "inc. VT AIS", "inc. STS1 AIS", "inc. VT unequipped", or "inc. STS1 unequipped" alarms are present, look for missing or improperly made cross-connections. Use **TAP-120** to locate missing cross-connections, if required.



Replace DDM-2000 OC-3 Shelf User Panel Out of Service

1.  **CAUTION:**
For an in-service shelf, it will be necessary to remove service prior to performing this procedure.

 **NOTE 1:**
The **ED-8C724-31, G1** User Panel in the **ED-8C724-30, G1** DDM-2000 OC-3 Shelf can **not** be replaced in the field.

 **NOTE 2:**
This procedure provides instructions for replacement of the User Panel in an **ED-8C724-30, G3** or **G4** DDM-2000 OC-3 Shelf.

Tools, Accessories, and Material

The following is required:

Table A. Tools, Accessories, and Material

Quantity	Description
1	ED-8C724-31, G2 or G3 User Panel
1	Screwdriver
1	Pliers
1	Wrist Strap*

* A grounded wrist strap must be worn when handling circuit packs.

Preparation

2. If the shelf is in service, verify that the shelf is free of alarms and that no protection switches are active. Remove service from the shelf.

Modification Procedure

3. Remove the **OHCTL** and **SYSCTL** circuit packs from the shelf.
4. Disconnect the shelf power lead connectors **P1** and **P2** from the bay power riser connectors **J1** and **J2**. The green **PWR ON** LED on the front of the user panel should gradually extinguish.
5. Unseat the remaining circuit packs in the shelf.
6. Remove the screw at the top of the User Panel faceplate.
7. Unscrew the **ESD** jack at the bottom of the User Panel faceplate.
8. Slide out the User Panel and disconnect the three cable plugs from the connectors on the User Panel printed wiring board.
9. Install the new User Panel, reconnecting the three cable plugs. (Cable plug **J4** connects to the top connector, **J5** to the middle connector, and **J6** to the bottom connector.)
10. Reconnect shelf power lead connector **P1** to the bay power riser connector **J1** and verify that the **PWR ON** LED on the User Panel lights.

Verification and Completion

11. Disconnect shelf power lead connector **P1**. Reconnect shelf power lead connector **P2** to bay power riser connector **J2** and verify that the **PWR ON** LED on the User Panel lights.
12. Reconnect power lead connector **P1** to bay power riser connector **J1**.
13. Install the **OHCTL** circuit pack and then the **SYSCTL** circuit packs in the shelf.
14. Reseat the remaining circuit packs in the following order: **TGS**, **OLIU**, **MXRVO**, **DS3**, **TMUX**, **STS1E**, **HDSL**, and **DS1/DS1PM**.

15. After about 10 minutes the shelf should be free of alarm indications.
16. Depress the **ACO/TST** pushbutton on the User Panel and verify that all LEDs on the User Panel light. Continue to depress the **ACO/TST** pushbutton and the release number of the software installed in the shelf should be displayed in the **SYSCTL** window.
17. Use CIT and verify that you can log into the shelf. If you cannot establish a session, check cable connections.

Reference: **DLP-521**

18. Service may now be restored to the shelf.
19. **STOP. YOU HAVE COMPLETED THIS PROCEDURE.**

Install/Remove Lightguide Buildout

1.  **WARNING:**
Unterminated optical connectors may emit invisible laser radiation. Avoid direct exposure to the beam. Do not view beam with optical instruments. Use of controls or adjustments or performance of procedures other than those specified herein may result in hazardous radiation exposure.

-  **CAUTION:**
Use static ground wrist strap whenever handling circuit packs or working on DDM-2000 terminal to prevent electrostatic discharge damage to sensitive components.

Is buildout being installed or removed?

If **Installing**, then continue with Step 2.

If **Removing**, then continue with Step 5.

2. Remove protector caps and plugs (if equipped) from buildout and buildout block.
3. Align lightguide buildout locking tab with slot in buildout block (unlocked position), push in, and rotate clockwise until locked into position. Refer to the appropriate figure for the specific buildout type.

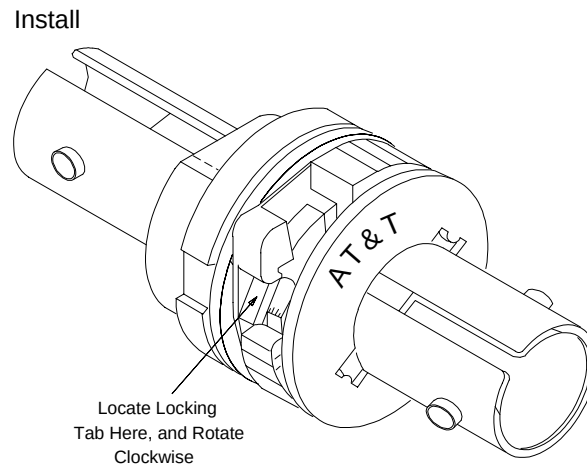


Figure 1. *ST*[®]-Type Buildout (Old Version)

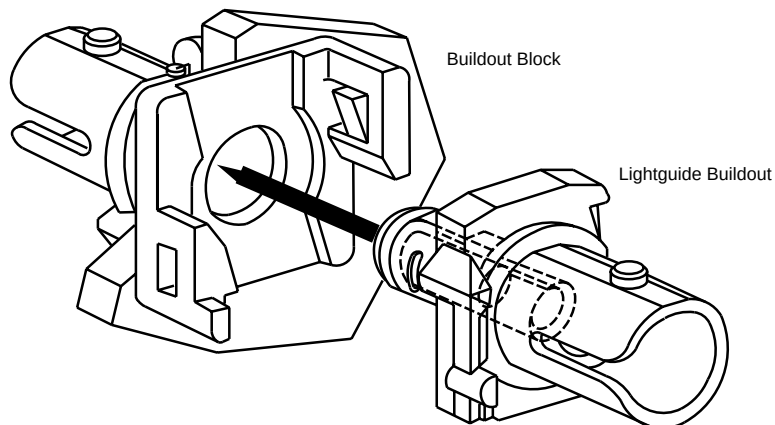


Figure 2. *ST*-Type Universal Buildout

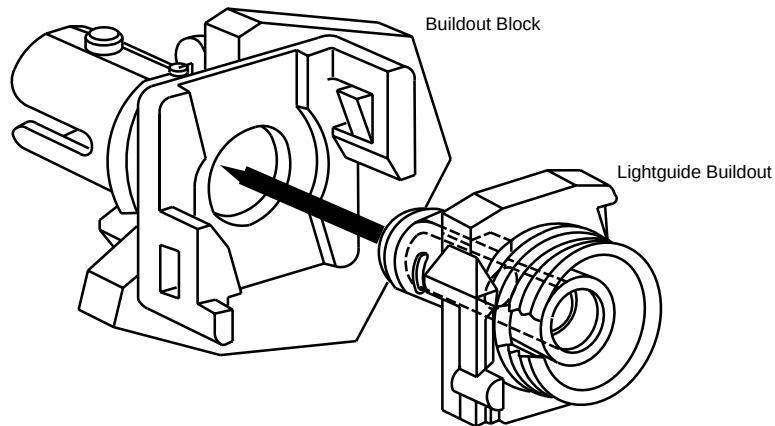


Figure 3. FC/PC-Type Universal Buildout

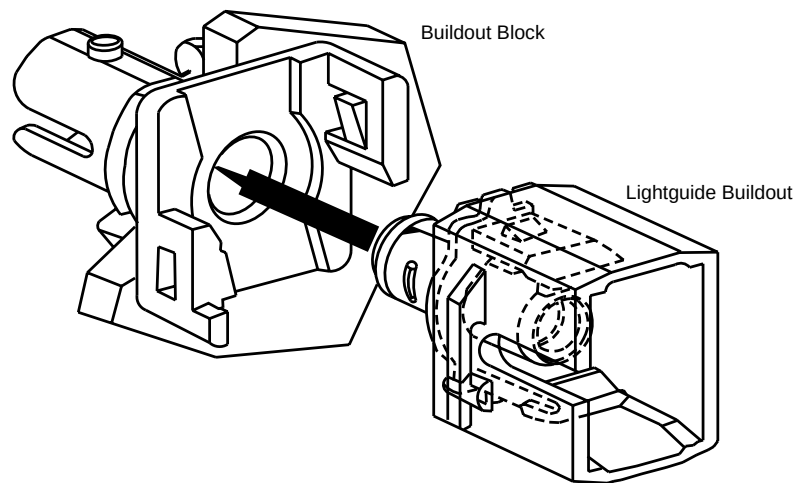


Figure 4. SC-Type Universal Buildout

4. **STOP! YOU HAVE COMPLETED THIS PROCEDURE.**

5. Depress locking tab on the buildout until locking tab is free from the locked position, rotate the buildout counterclockwise to the stop position, and separate the buildout block by pulling it toward you. Only the old version of the *ST*-type buildout is shown. Refer to the appropriate figure in Step 3 for the specific buildout type.
-

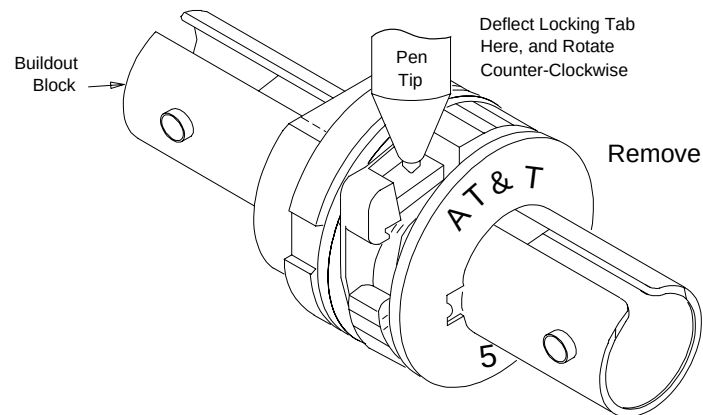


Figure 5. *ST*-Type Buildout (Old Version)

6. **STOP. YOU HAVE COMPLETED THIS PROCEDURE.**

Perform DS3 Transmission Test Dual Ring Interconnection

Overview: This procedure is performed on one or more out-of-service circuits to test the dual ring interconnections (DRI) from a DDM-2000 ring network to another DDM-2000 ring network or to an FT-2000 ring network. Numerous configurations are possible when interconnecting DDM-2000 networks. Therefore, this procedure provides you with typical examples and explanations of some of the possible configurations and instructs you on the procedures used in testing these configurations.

1. **⇒ NOTE 1:**

This procedure may be used to perform DS3 transmission tests for a Dual Ring Interconnection (DRI) between DDM-2000 networks and FT-2000 ring networks. When this procedure is being used to perform end-to-end DS3 tests, it is assumed that the complete end-to-end systems have already been tested and that only a particular DS3 channel is being tested at this time.

⇒ NOTE 2:

A CIT is required for this test to make/verify cross-connections and to switch paths of the DS3 being tested. The transmission test can be performed either with a CIT and the automated test command **test - trmsn - t3** or with a DS3 test set.

⇒ NOTE 3:

The DS3 circuit being tested is assumed to originate at equipment external to the DDM-2000 source node and is carried around the DDM-2000 ring to the dual ring interconnection nodes where it is connected to the corresponding DDM-2000 DRI nodes or to the primary and secondary FT-2000 DRI nodes. The DS3 is then carried around the next ring network to the final destination node where it is terminated on external equipment. If more than two rings are interconnected, the DS3 signal may be passed through another set of DRI nodes.

⇒ **NOTE 4:**

Proper cross-connections must be made at each shelf to establish the complete end-to-end path for the DS3 circuit being tested. Release 9 and later has no default cross-connections and supports only manual VT1.5 and STS-1 cross-connections. See the description of the following commands in the "Commands and Reports" section of 363-206-280, *DDM-2000 OC-3 Multiplexer, Releases 8.0 through 11.1, User/Service Manual—Volume I*: **cnvt-crs**, **dlt-crs-sts1**, **dlt-crs-vt1**, **ent-crs-sts1**, **ent-crs-vt1**, **rtrv-crs-sts1**, **rtrv-crs-vt1**, **cnvt-crs-sts1**, **set-ne**, and **rtrv-ne**. See *Cross-Connection Provisioning* in the "Administration and Provisioning" section of this manual for more information on cross-connection provisioning.

⇒ **NOTE 5:**

If one terminating end is equipped with **STS1E** circuit packs to provide EC-1 service and the other terminating end is equipped with **DS3** circuit packs, the DS3 transmission test is performed from the DS3 terminating end. If the CIT and **test-trmsn-t3:** command is being used to perform the test and you are at the EC-1 terminating end, the **rlgn** command may be used to log into the DS3 end to perform the test using the **test-trmsn-t3:** command.

⇒ **NOTE 6:**

When both terminating ends are equipped with **STS1E** circuit packs, DS3 transmission tests may be performed. For DS3 tests, one end may be temporarily equipped with **DS3** circuit packs to perform the transmission tests. To perform transmission tests for this configuration, remove the **STS1E** at the near end, perform an update (**upd**), and install the **DS3** circuit pack(s). After the tests are completed, remove the temporary circuit packs, perform an update, and reinstall the **STS1E** circuit packs.

At the near-end **DDM-2000**, connect the CIT to the **CIT** jack on the User Panel, if required.

Reference: **DLP-521**

2. **⇒ NOTE:**

Work orders, office records, or CIT **ent-crs-sts1** or **rtrv-crs** commands may be used to make or verify STS-1 cross-connections.

At each shelf in the network, make/verify that proper pass-through, terminating, and "drop and continue" STS-1 cross-connections have been made for each DS3 channel being tested.

3. Do one of the following:

(a) **⇒ NOTE:**

When an end-to-end DS3 test is run in the mux direction and an **external** loopback is established at the far end, provision the far end DS3 for CC mode with no AIS (**set - t3:address:mode=cc,ais=no**). Otherwise, if the VMR mode is used, then only errors in the receive direction will be monitored and the system may not recognize that a loopback is up.

Connect a patch cord from the **OUT** jack to the **IN** jack at the far-end DSX-3 or STSX cross-connect point associated with the DS3 channel to be tested.

- (b) Log into the far-end DDM-2000 terminal, either locally or by using the **rlgn** command, if possible, and use the **opr - lpbk - t3:address** or **opr - lpbk - ec1:address** command to loop back the DS3 or EC-1 port(s) at the far end. Use **logout** or **toggle** (ctrl t) command to return control of CIT to near end.

4.  **CAUTION:**
Execution of switch commands may affect service. Check local procedures before performing switch commands.

 **NOTE 1:**
If this transmission test is to be performed for each path in the end-to-end network, the **switch-path-sts1** command must be used at some of the DDM-2000 nodes to switch paths for each test. If FT-2000 is part of the network, the **FAULT-Switch-Path-STS3** command must be used at the FT-2000 Primary DRI node(s) if the FT-2000 secondary path and the DDM-2000 DRI connections to the FT-2000 secondary node are to be tested. Up to four tests may have to be performed for each DS3 circuit if all protection paths are required to be tested. See Figures 3 through 14.

 **NOTE 2:**
For configurations not shown in the examples, local procedures should be developed to test the DS3 circuits being equipped. A sketch of the network may need to be made and the paths to be tested should be determined as shown in the examples in this procedure.

Use the necessary switch commands to set up the DS3 path being tested. [For example, if the configuration looks like Figure 3, use the **switch-path-sts1** command for test 1 to make Ring 1 active at both terminating nodes and all DDM-2000 DRI nodes. Other DS3 path tests for the same configuration would be set up as follows (Figures 4 through 6)]:

Test	Terminating Nodes	DRI Nodes	Figure
Test 1	Ring 1 active	Ring 1 active	Figure 3
Test 2	Ring 2 active	Ring 1 active	Figure 4
Test 3	Ring 2 active	Ring 2 active	Figure 5
Test 4	Ring 1 active	Ring 2 active	Figure 6

5. Are you using CIT and **test-trmsn-t3** command to perform this test?
If **YES**, then continue with **Step 6**.
If **NO**, then proceed to **Step 23**.

6. Are you doing this test in the mux or demux direction?

If **MUX** direction, then continue with **Step 7**.

If **DEMUX** direction, then proceed to **Step 9**.

7. At the near end DDM-2000, use the following command to perform a test of the DS3 loop in the fiber direction:

test-trmsn-t3:address:dirn=mux:dur=();

Where *address* = address identifier of the DS3 signal.

dirn = direction of the test. If **dirn=mux**, direction is toward fiber.

dur = duration of the test in minutes (1-120), default is 1.

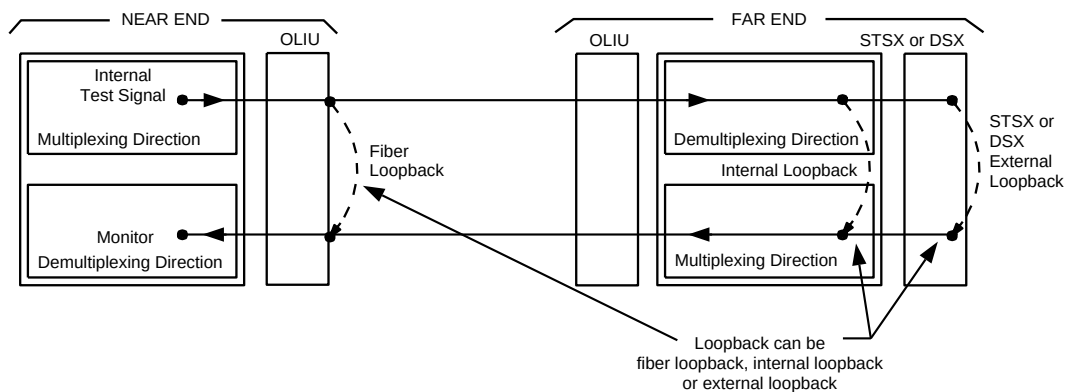


Figure 1. Transmission Test of DS3 Signal in MUX Direction

8. Was the test successful (error free)?

If **YES**, then continue with **Step 12**.

If **NO**, then proceed to **Step 37**.

9. See Figure 2. At the near-end DSX-3 cross-connection associated with the DDM-2000 being tested, connect a patch cord from the **OUT** jack to the **IN** jack for the DS3 channel to be tested.
 10. Use the following command to perform a DS3 transmission test in the demux direction to test the DS3 loop in the DSX direction:
test-trmsn-t3:address:dirn=demux:dur=();
Where *address* = address identifier of the DS3 signal.
dirn = direction of the test. If **dirn=demux**, direction is toward DSX.
dur = duration of the test in minutes (1-120), default is 1.
 11. Was the test successful (error free)?
If **YES**, then continue with **Step 12**.
If **NO**, then proceed to **Step 37**.
-

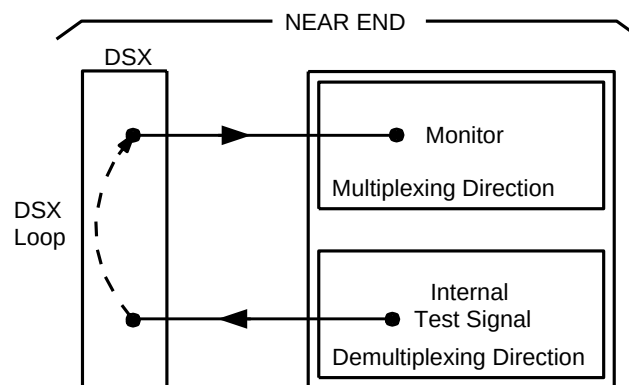


Figure 2. Transmission Test of DS3 Signal in DEMUX Direction

12. Is this the first service being placed on the group and is a protection circuit pack installed?

If **YES**, then continue with **Step 13**.

If **NO**, then proceed to **Step 17**.

13. Use the following command to switch from service to protection circuit pack:

switch-fn:address:pri=manual;

Response: The green **ACTIVE** LED lights on the protection circuit pack.

14. Repeat the transmission test in the mux (or demux) direction using the following command:

test-trmsn-t3:address:dirn=mux (or demux):dur=();

15. Was the test successful (error free)?

If **YES**, then continue with **Step 16**.

If **NO**, then proceed to **Step 37**.

16. Use the following command to clear active switch requests on the protection circuit pack:

switch-fn:address:pri=reset;

17. The **DS3** circuit path under test has passed the DS3 transmission test. Have all required paths been tested?

If **NO**, then continue with **Step 18**.

If **YES**, then proceed to **Step 19**.

18. Repeat this procedure from Step 4 for the next path to be tested.

19. Remove the looping patch cords from the cross-connect point. Use the **rls-lpbk-t3** command to release loopback(s) at the far end, if required.

20. At the near-end (and the far-end) DDM-2000, momentarily depress the **UPD/INIT** button (or use the **upd** command) on the **SYSCTL** to update the **SYSCTL**.

21. If violation monitor removal mode was set differently from the original mode in Step 3, reprovision the mode to the original or required setting using the **set-t3** command. Repeat this procedure from Step 2 for any additional DS3 circuits to be tested.

22. **STOP. YOU HAVE COMPLETED THIS PROCEDURE.**

23. At the cross-connection associated with the near-end DDM-2000, connect the DS3 test set to the **IN** and **OUT** jacks associated with the circuit under test.
24. Use the DS3 test set to test for error-free transmission.
25. Was the test successful (error free)?
 - If **YES**, then continue with **Step 26**.
 - If **NO**, then proceed to **Step 37**.
26. Is this the first service being placed on the group and is protection circuit pack installed?
 - If **YES**, then continue with **Step 27**.
 - If **NO**, then proceed to **Step 31**.
27. Unseat the service **DS3** circuit pack associated with the circuit under test.
28. Repeat the DS3 transmission test with the DS3 test set.
29. Was the test successful (error free)?
 - If **YES**, then continue with **Step 30**.
 - If **NO**, then proceed to **Step 37**.
30. Reseat the **DS3** circuit pack associated with the circuit under test.
31. The **DS3** circuit path under test has passed the DS3 transmission test. Have all required paths been tested?
 - If **NO**, then continue with **Step 32**.
 - If **YES**, then proceed to **Step 33**.
32. Repeat this procedure from Step 4 for the next path to be tested.
33. Remove the looping patch cords from the cross-connections.
34. At the near-end (and the far-end) DDM-2000, momentarily depress the **UPD/INIT** button on the **SYSCTL** to update the **SYSCTL**.
35. Repeat this procedure from Step 2 for any additional DS3 circuits to be tested.
36. **STOP. YOU HAVE COMPLETED THIS PROCEDURE.**

37. Has the **DS3** circuit pack that failed been replaced?

If **YES**, then proceed to **Step 40**.

If **NO**, then continue with **Step 38**.

38. Replace the **DS3** circuit pack that failed the test.

Reference: **DLP-523**

39. Repeat this procedure for the **DS3** circuit pack that failed.

40. Trouble may be in the DSX cross-connect wiring, STS-1 cross-connections in the network (if ring configuration), or the shelf backplane. Use the **rtrv-crs-sts1** command to ensure proper STS-1 cross-connections have been made at each shelf in the ring for the DS3 being tested. If no trouble found, check DSX cross-connect wiring and backplane connections. If other alarms or trouble indications are present, refer to **Trouble Clearing: IXL-001** to isolate the trouble. If no alarms or indications are present and a CIT is available, use the RETRIEVE commands (for example, **rtrv-alm**, **rtrv-hsty**, etc.) to check for other trouble indications.

41. **STOP. YOU HAVE COMPLETED THIS PROCEDURE.**

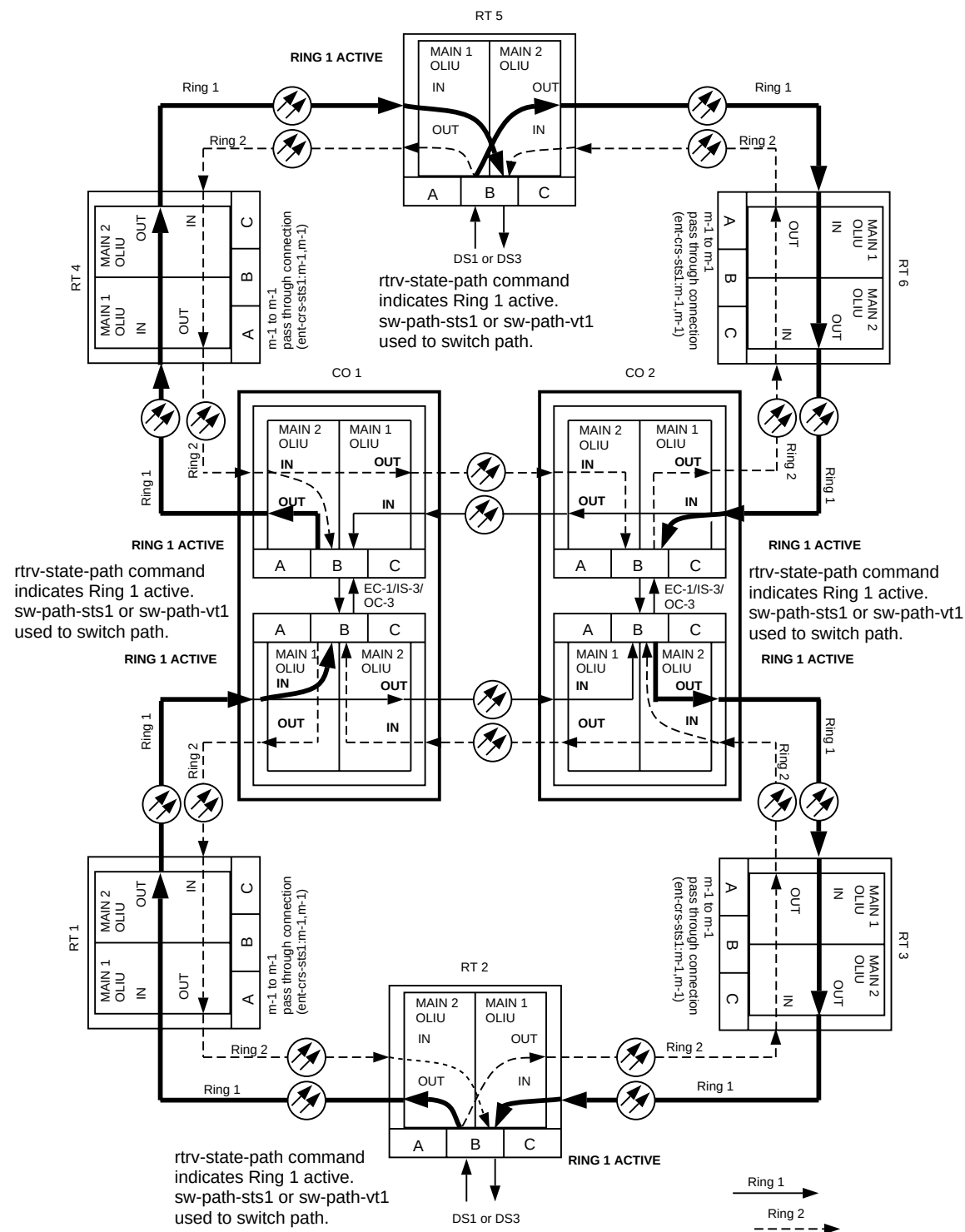


Figure 3. Example of DS3 Transmission Test in Dual Ring Interworking Network

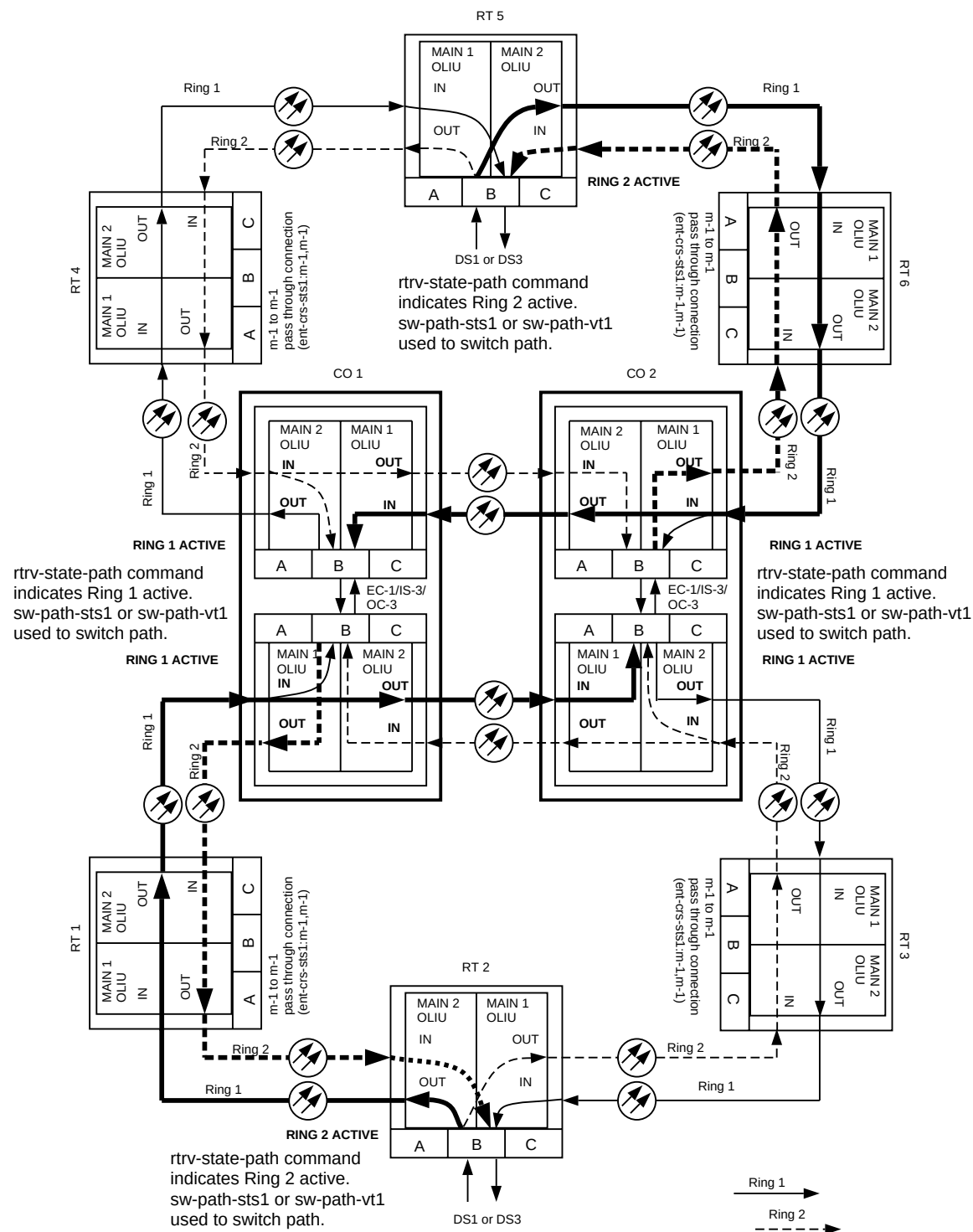
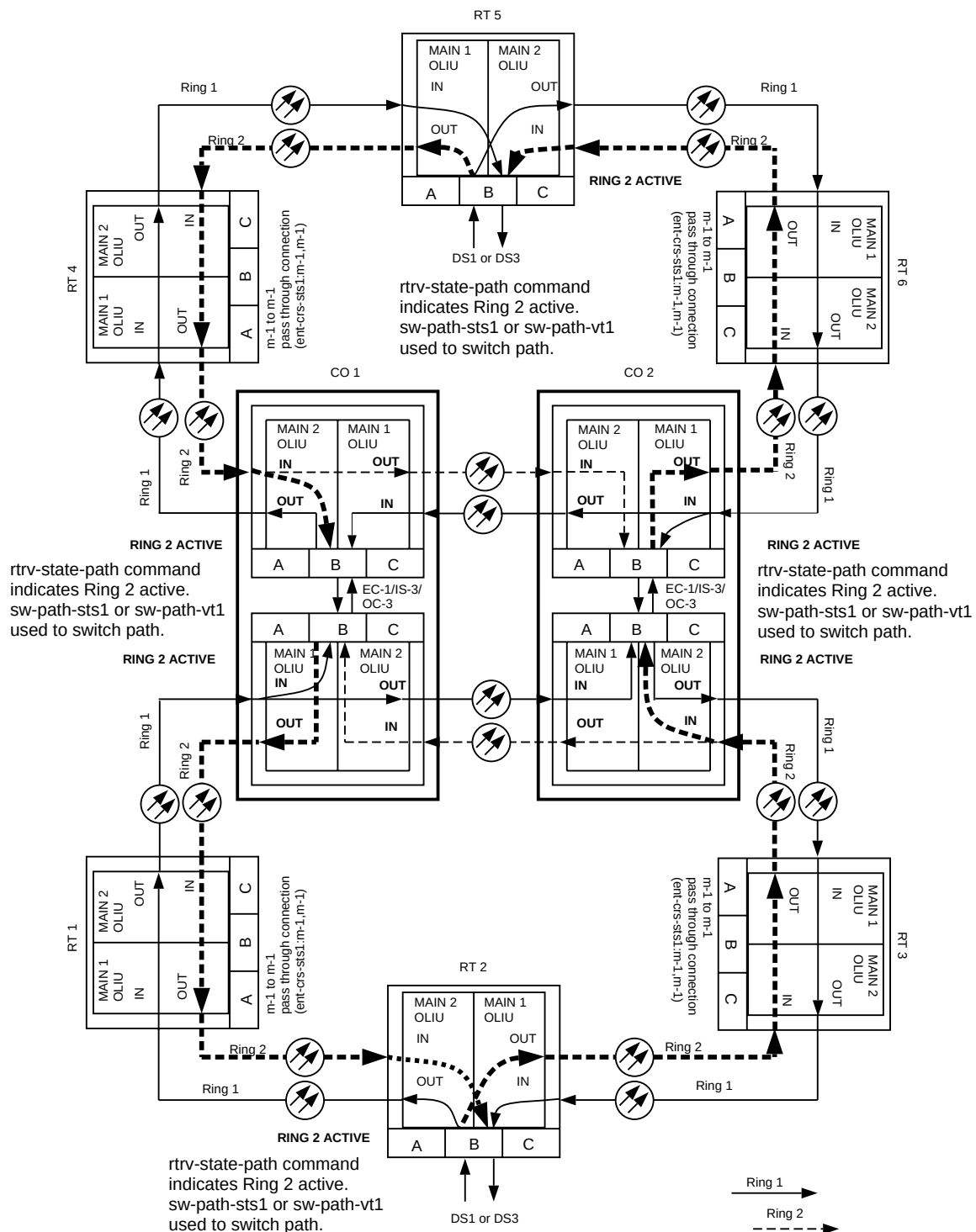


Figure 4. Example of DS3 Transmission Test in Dual Ring Interworking Network



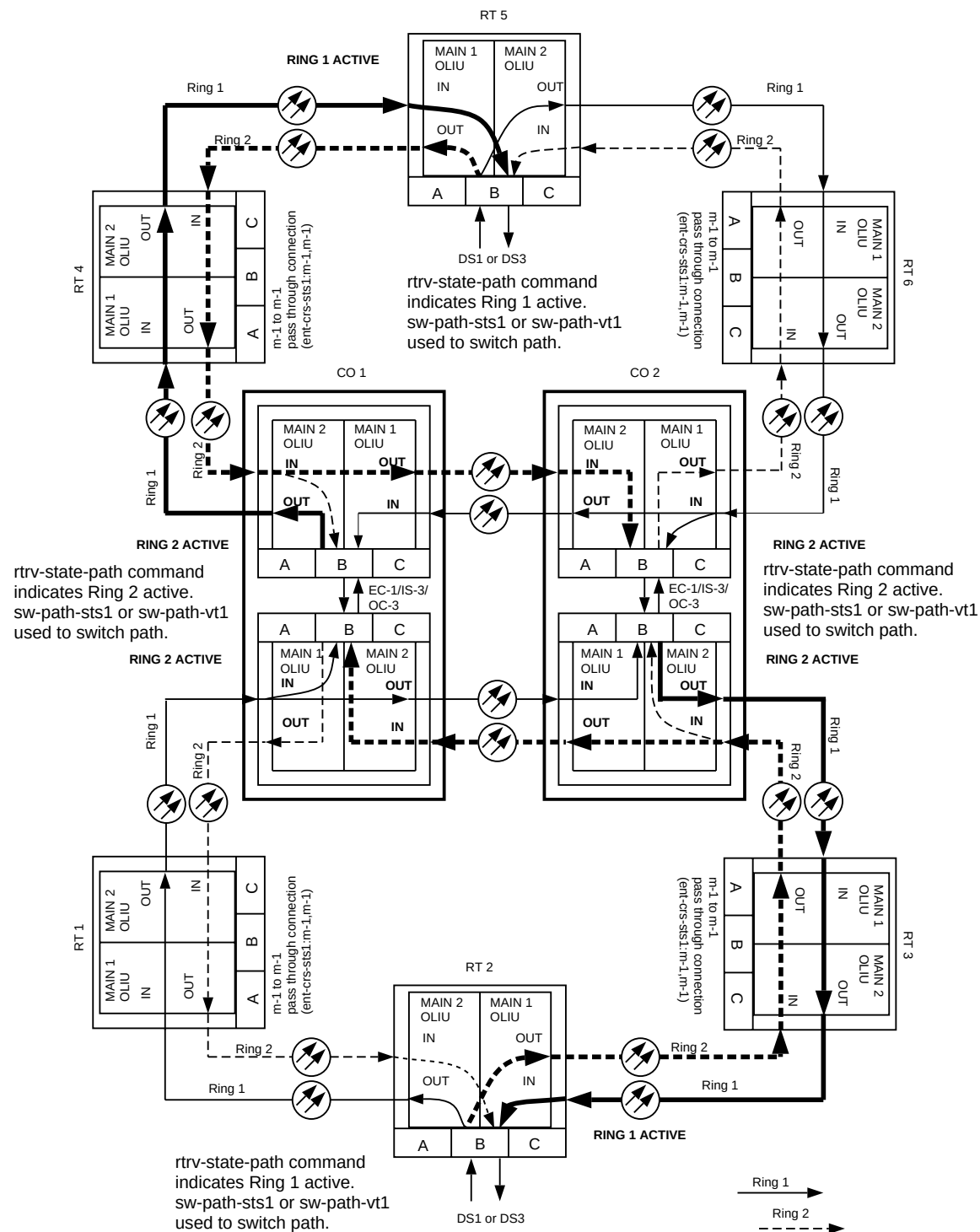


Figure 6. Example of DS3 Transmission Test in Dual Ring Interworking Network

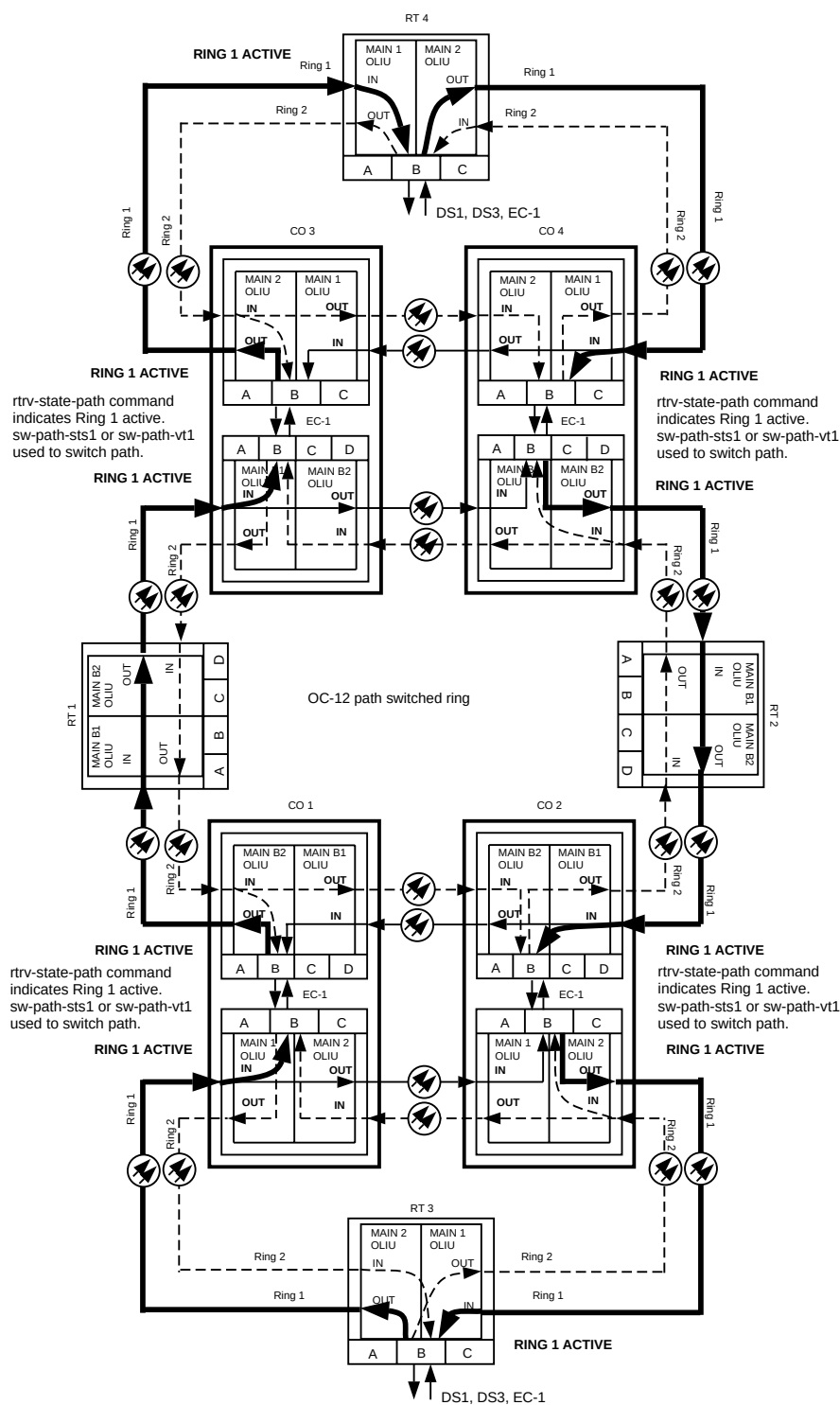


Figure 7. Example of DS3 Transmission Test in Dual Ring Interworking Network

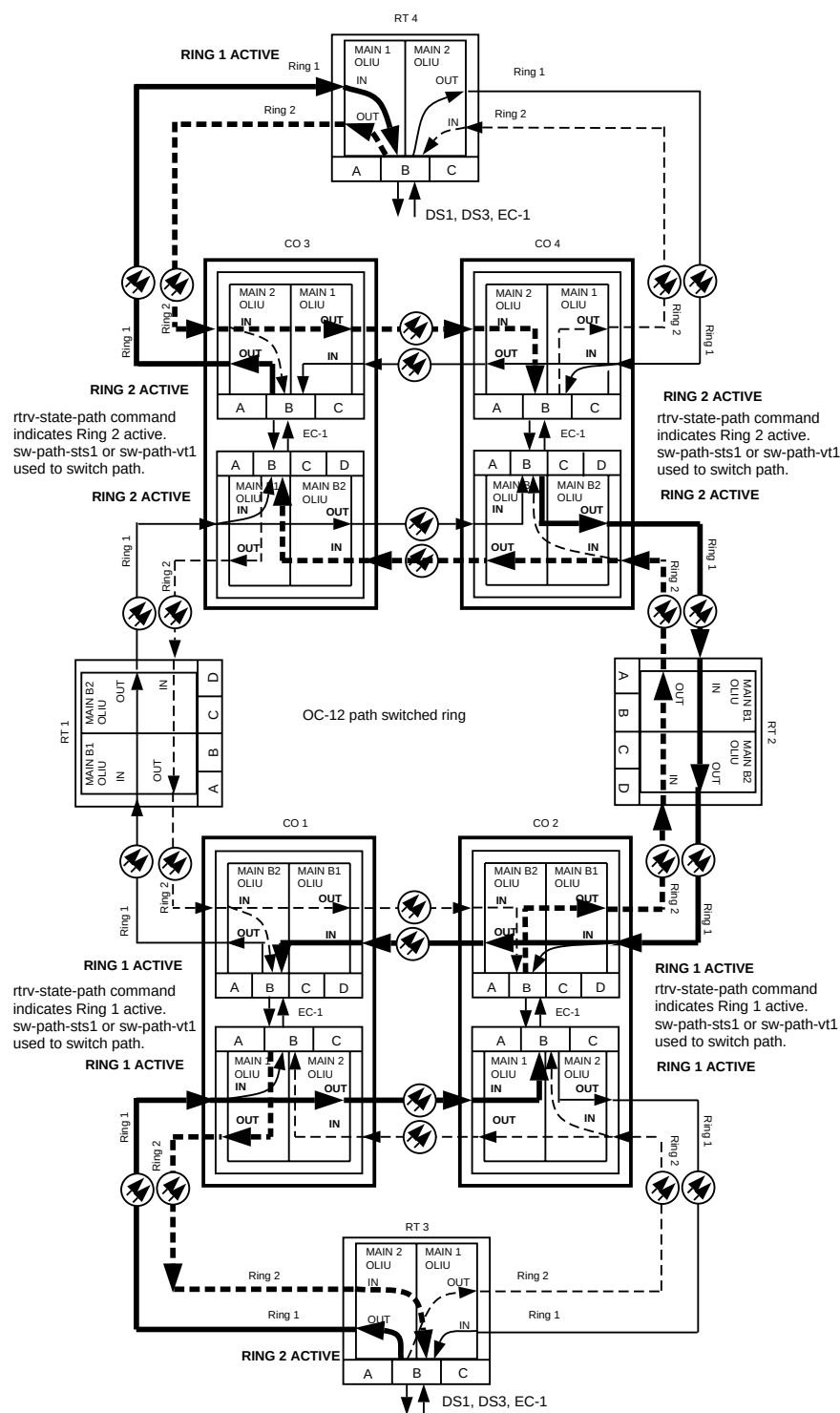


Figure 8. Example of DS3 Transmission Test in Dual Ring Interworking Network

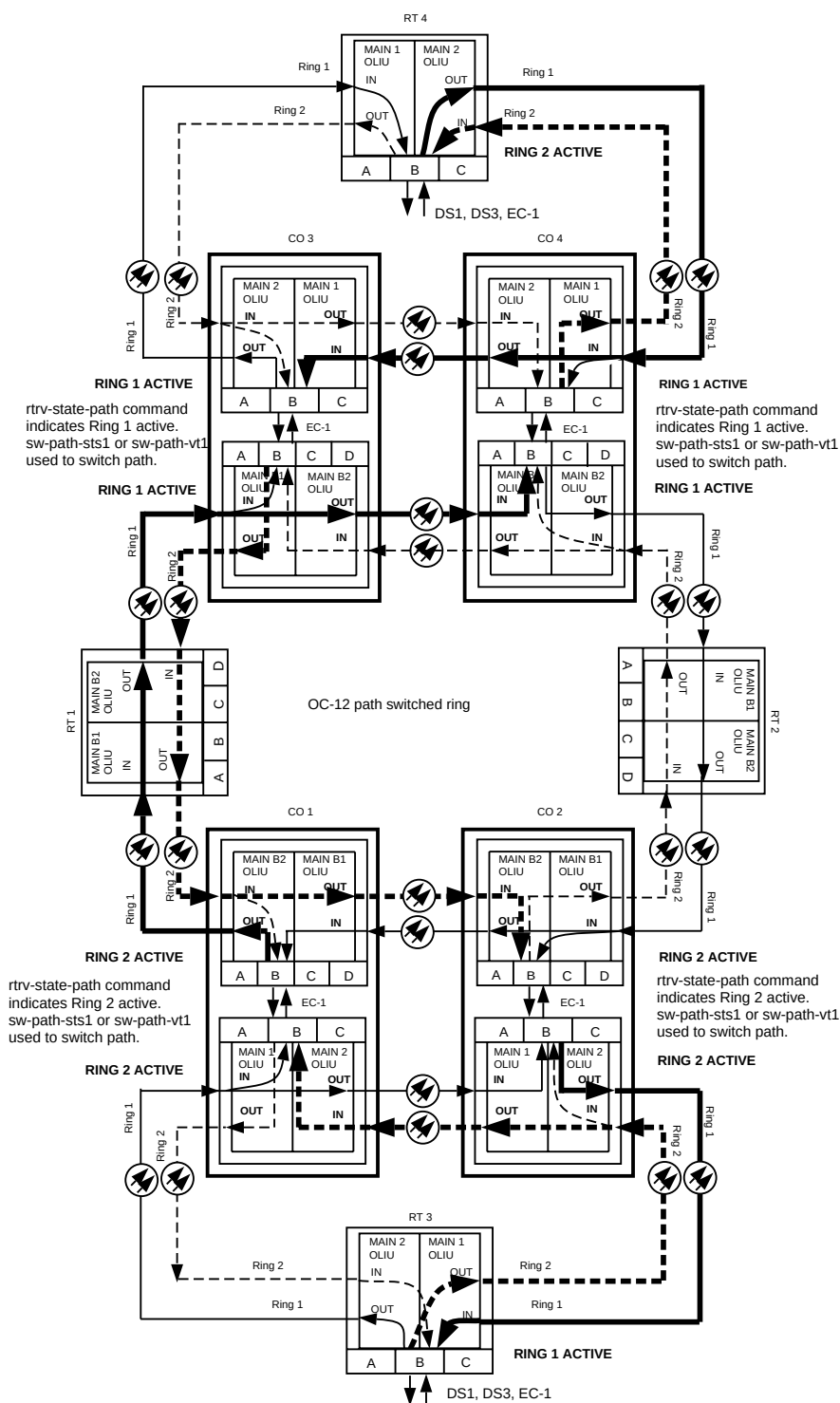


Figure 9. Example of DS3 Transmission Test in Dual Ring Interworking Network

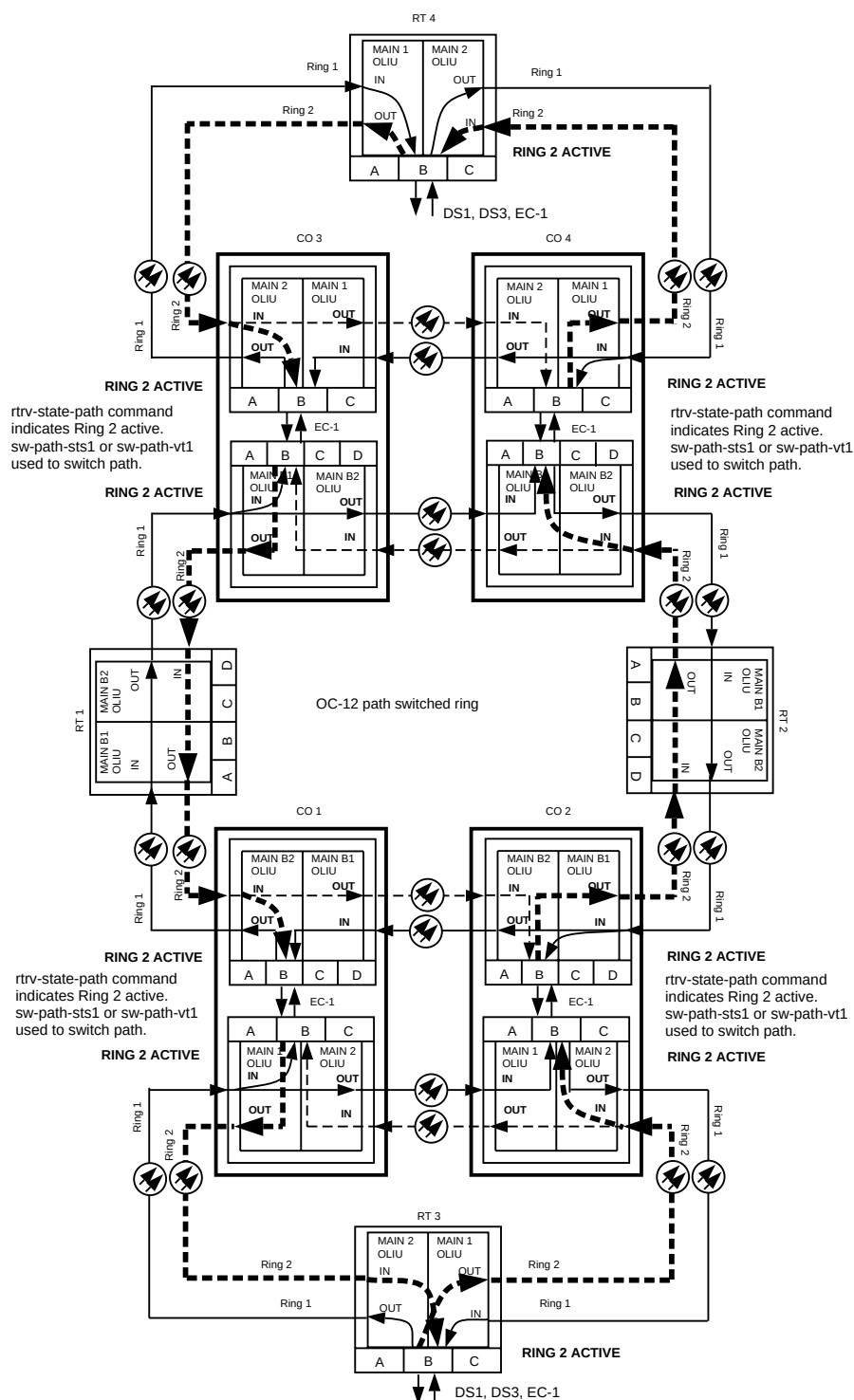


Figure 10. Example of DS3 Transmission Test in Dual Ring Interworking Network

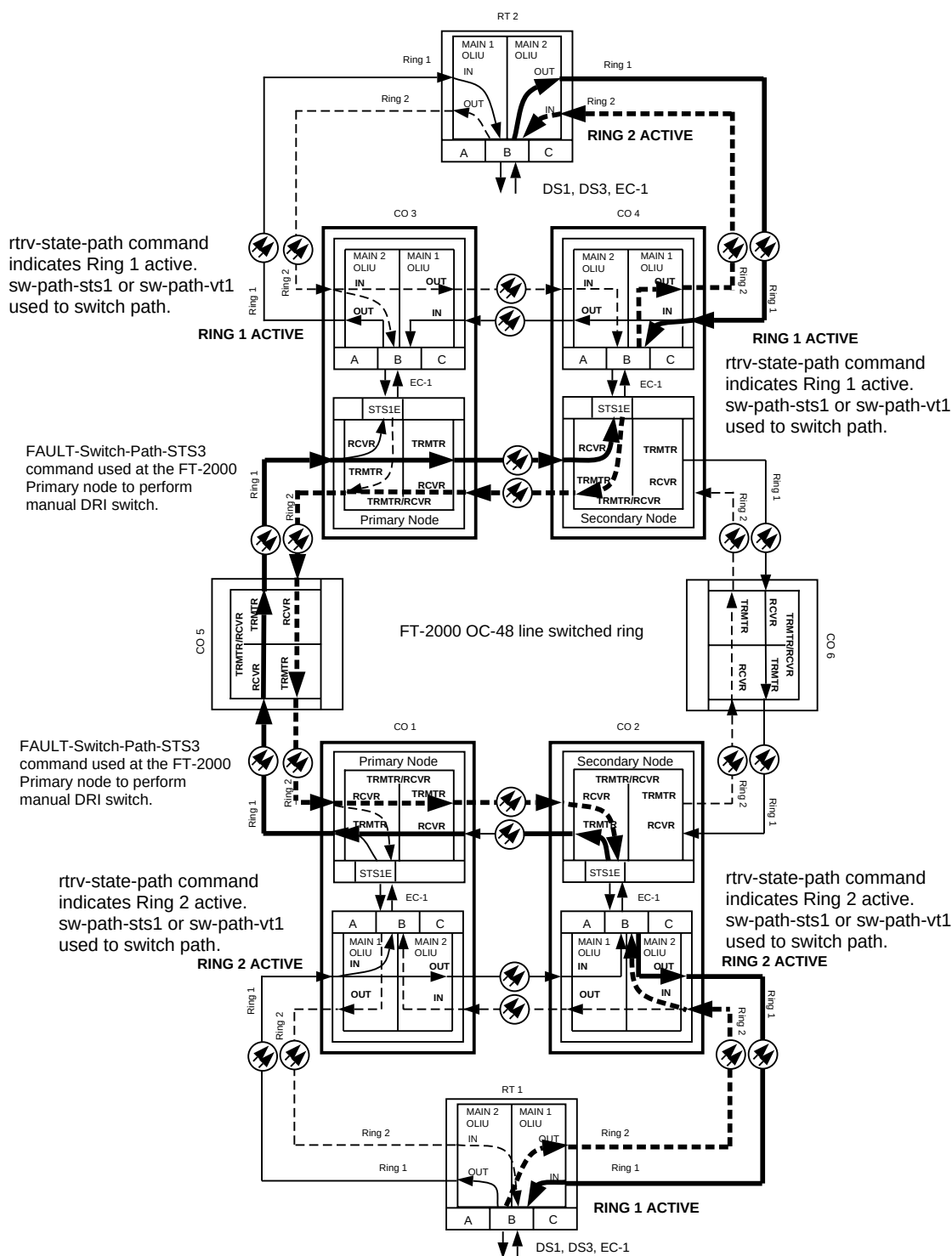


Figure 11. Example of DS3 Transmission Test in Dual Ring Interworking Network

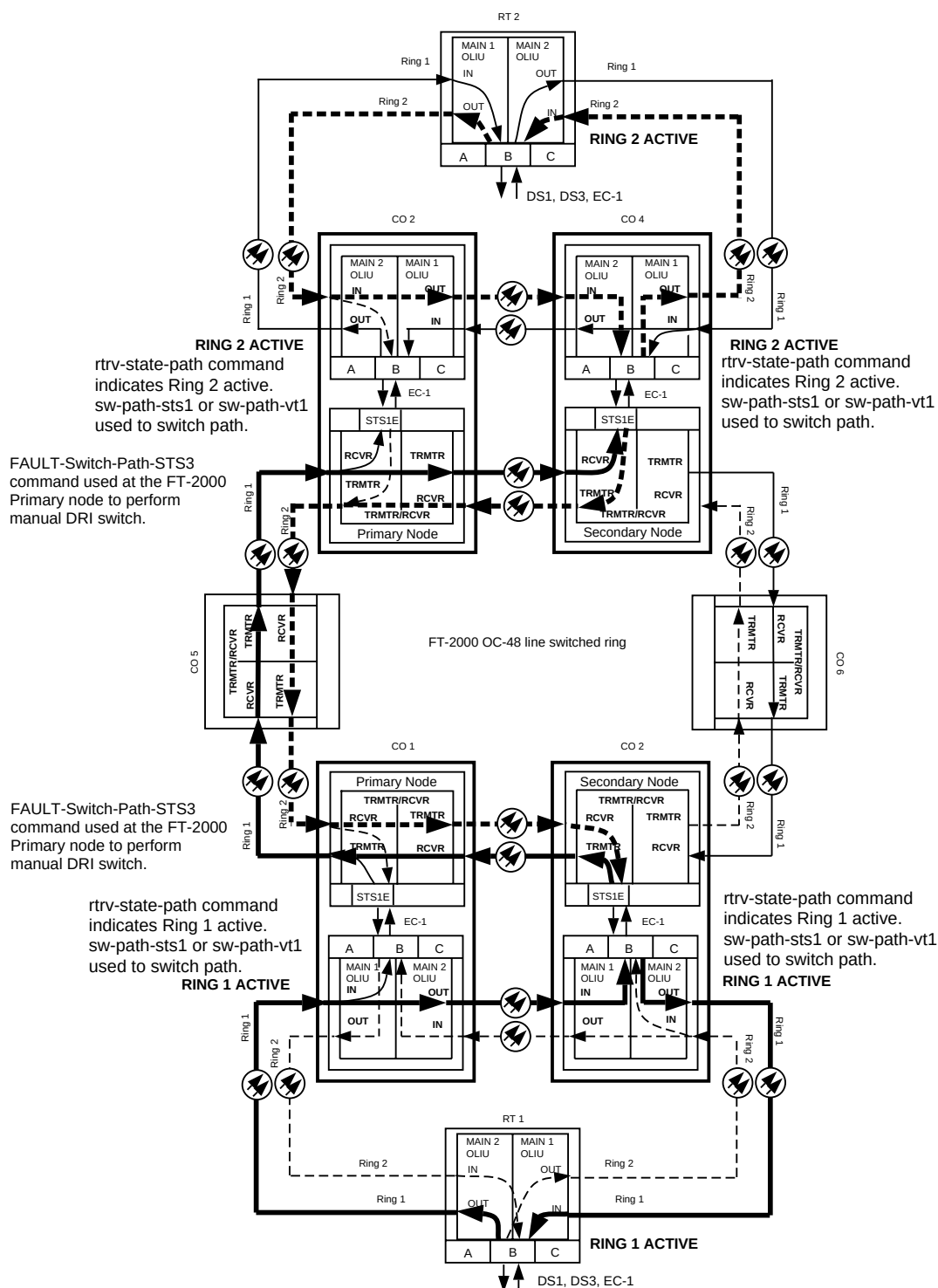


Figure 12. Example of DS3 Transmission Test in Dual Ring Interworking Network

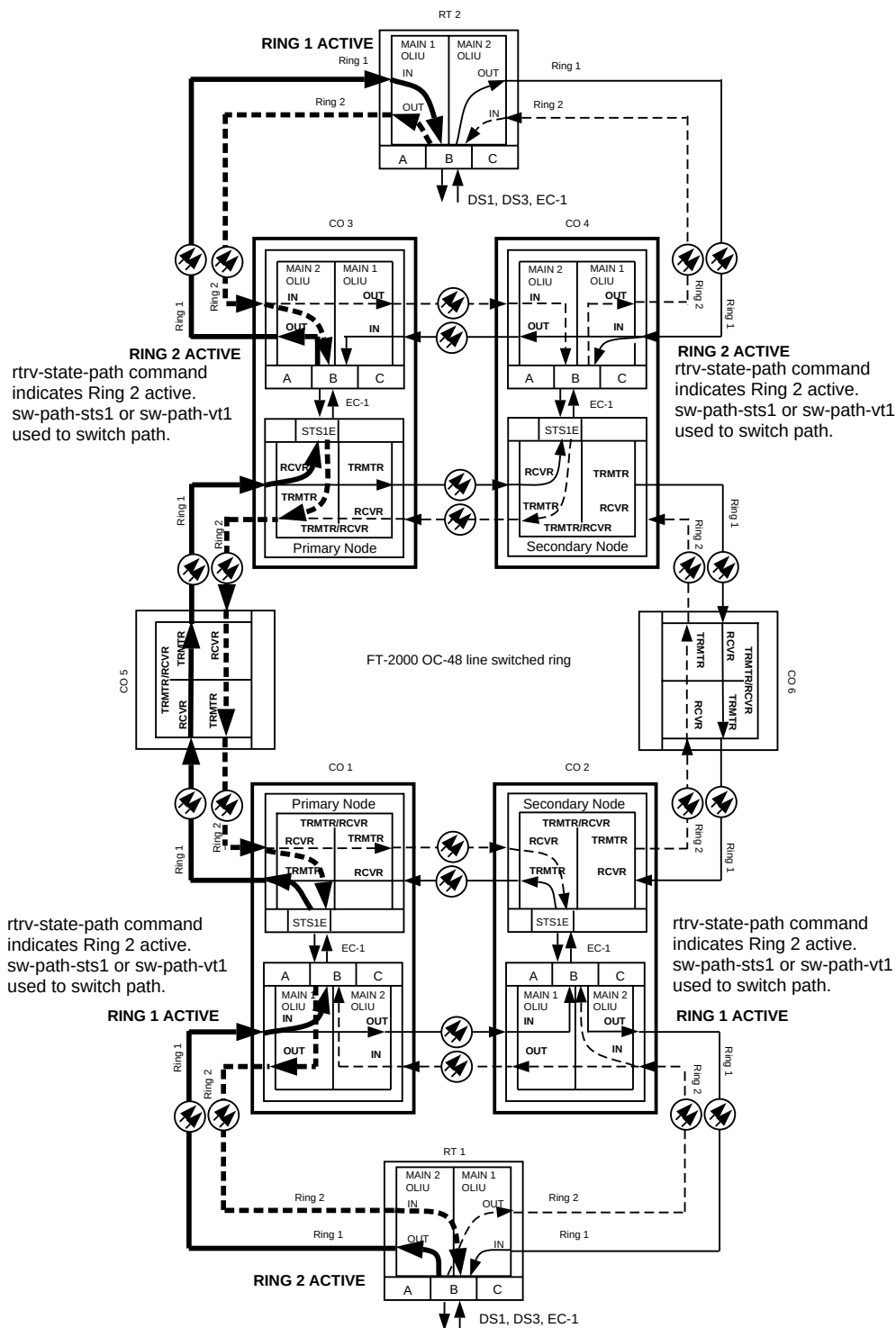


Figure 13. Example of DS3 Transmission Test in Dual Ring Interworking Network

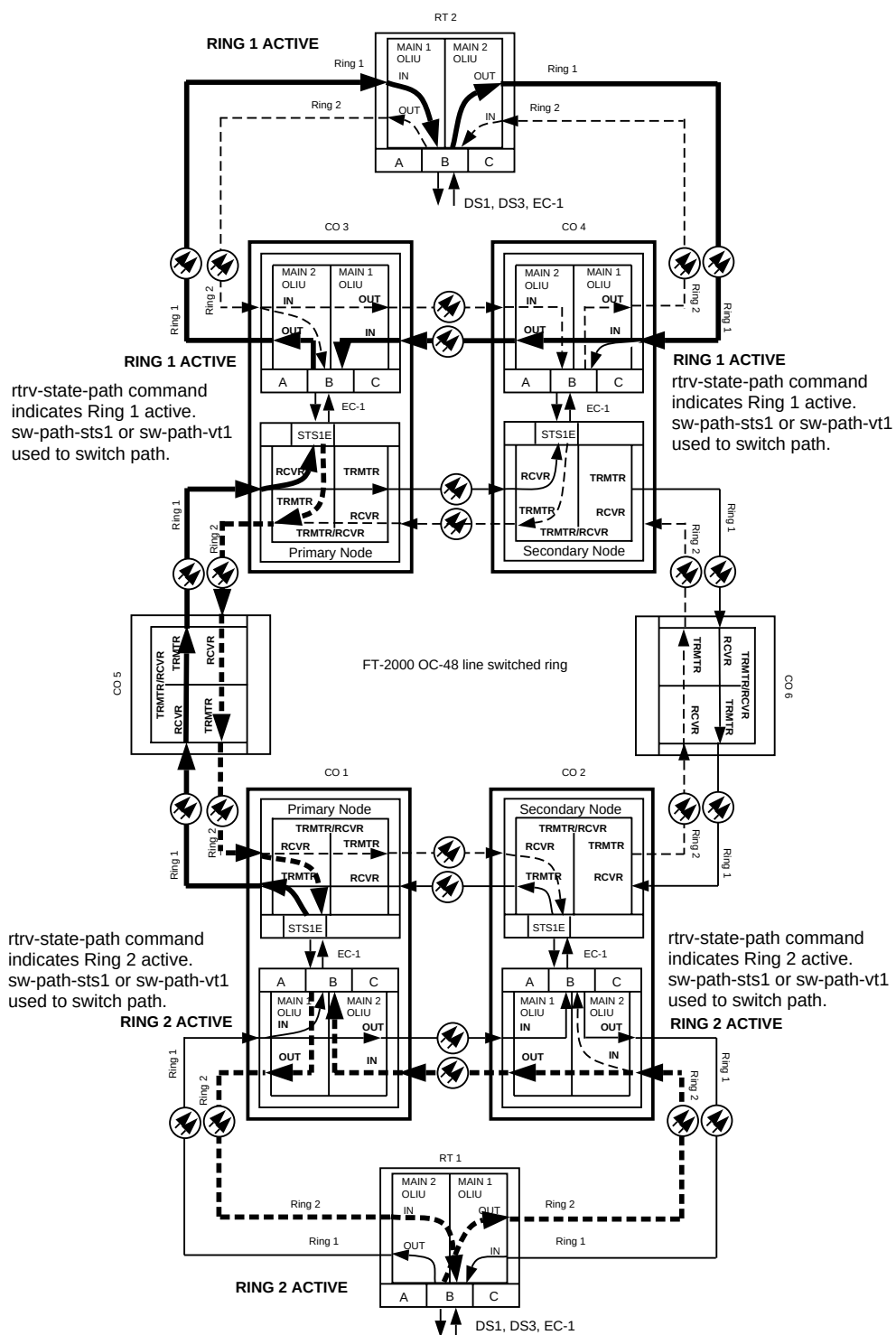


Figure 14. Example of DS3 Transmission Test in Dual Ring Interworking Network

Perform DS1 Transmission Test Dual Ring Interconnection

Overview: This procedure is performed on one or more out-of-service circuits to test the dual ring interconnections (DRI) from a DDM-2000 ring network to another DDM-2000 ring network or through an FT-2000 ring network. Numerous configurations are possible when interconnecting DDM-2000 networks. Therefore, this procedure provides you with typical examples and explanations of some of the possible configurations and instructs you on the procedures used in testing these configurations.

1. **⇒ NOTE 1:**

This procedure may be used to perform DS1 transmission tests for a Dual Ring Interconnection (DRI) between DDM-2000 networks and FT-2000 ring networks. When this procedure is being used to perform end-to-end DS1 tests, it is assumed that the complete end-to-end systems have already been tested and that only a particular DS1 channel is being tested at this time.

⇒ NOTE 2:

A CIT is required for this test to make/verify cross-connections and to switch paths of the DS1 being tested. The transmission test can be performed either with a CIT and the automated test command **test - trmsn - t1** or with a DS1 test set.

⇒ NOTE 3:

The DS1 circuit being tested is assumed to originate at equipment external to the DDM-2000 source node and is carried around the DDM-2000 ring to the dual ring interconnection nodes where it is connected to the corresponding DDM-2000 DRI nodes or to the primary and secondary FT-2000 DRI nodes. The DS1 is then carried around the next ring network to the final destination node where it is terminated on external equipment. If more than two rings are interconnected, the DS1 signal may be passed through another set of DRI nodes.

⇒ **NOTE 4:**

Proper cross-connections must be made at each shelf to establish the complete end-to-end path for the DS1 circuit being tested. Release 9 and later has no default cross-connections and supports only manual VT1.5 and STS-1 cross-connections. See the description of the following commands in the "Commands and Reports" section of this manual: **cnvt-crs**, **dlt-crs-sts1**, **dlt-crs-vt1**, **ent-crs-sts1**, **ent-crs-vt1**, **rtrv-crs-sts1**, **rtrv-crs-vt1**, **cnvt-crs-sts1**, **set-ne**, and **rtrv-ne**. See *Cross-Connection Provisioning* in the "Administration and Provisioning" section of this manual for more information on cross-connection provisioning.

⇒ **NOTE 5:**

If one terminating end is equipped with **STS1E** circuit packs to provide EC-1 service and the other terminating end is equipped with **DS1/DS1PM** circuit packs, the DS1 transmission test is performed from the DS1 terminating end. If the CIT and **test-trmsn-t1:** command is being used to perform the test and you are at the EC-1 terminating end, you may be able to use the **rlgn** command to log into the DS1 end to perform the test using the **test-trmsn-t1:** command.

⇒ **NOTE 6:**

When both terminating ends are equipped with **STS1E** circuit packs, one end may be temporarily equipped with **DS1/DS1PM** and **MXRVO** circuit packs to perform the transmission tests. To perform transmission tests for this configuration, remove the **STS1E** at the near end, perform an update (**upd**), and install the **DS1/DS1PM** and **MXRVO** circuit pack(s). After the tests are completed, remove the temporary circuit packs, perform an update, and reinstall the **STS1E** circuit packs.

At the near-end **DDM-2000**, connect the CIT to the **CIT** jack on the User Panel, if required.

Reference: **DLP-521**

2.  **NOTE:**
Work orders, office records, or CIT **ent-crs-sts1**, **ent-crs-vt1**,
or **rtrv-crs** commands may be used to make or verify STS-1
cross-connections.

At each shelf in the network, make/verify that proper pass-through,
terminating, and "drop and continue" STS-1 cross-connections have been
made for each DS1 channel being tested.

3.  **NOTE:**
Local tests cannot be performed in the DEMUX direction for **STS1E**
circuit packs.

See Figures 1 and 2. If local tests are being performed, the fiber
loopbacks at the near-end **OLIUs** must be in place. If end-to-end tests are
being performed, do ONE of the following:

- (a) Connect a patch cord from the **OUT** jack to the **IN** jack at the far-end
DSX-1 or STSX cross-connection associated with the DS1 channel to
be tested.
- (b) Log into the far-end terminal and use the **opr-lpbk-t1:address**
or **opr-lpbk-ec1:address** command to loop back the DS1 or
EC-1 port(s) at the far end. Use **logout** or **toggle** (ctrl t)
command to return control of CIT to near end.

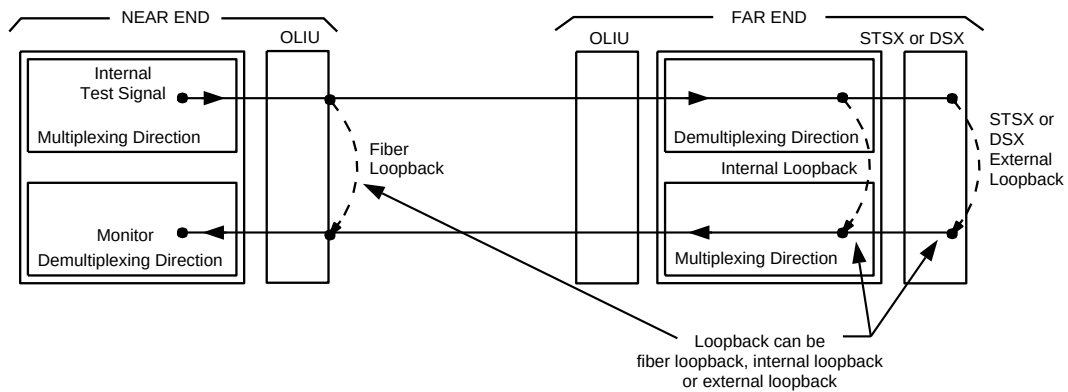


Figure 1. Transmission Test of DS1 Signal in MUX Direction

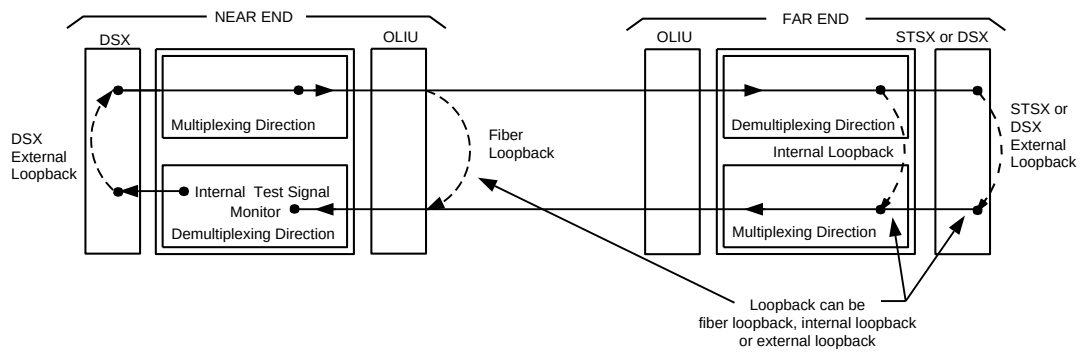


Figure 2. Transmission Test of DS1 Signal in DEMUX Direction

4.  **CAUTION:**
Execution of switch commands may affect service. Check local procedures before performing switch commands.

 **NOTE 1:**
If this transmission test is to be performed for each path in the end-to-end network, the **switch-path-sts1** or **switch-path-vt1** command must be used at some of the DDM-2000 nodes to switch paths for each test. If FT-2000 is part of the network, the **FAULT-Switch-Path-STS3** command must be used at the FT-2000 Primary DRI node(s) if the FT-2000 secondary path and the DDM-2000 DRI connections to the FT-2000 secondary node are to be tested. Up to four tests may have to be performed for each DS1 circuit if all protection paths are required to be tested. See Figures 3 through 14.

 **NOTE 2:**
For configurations not shown in the examples, local procedures should be developed to test the DS1 circuits being equipped. A sketch of the network may need to be made and the paths to be tested should be determined as shown in the examples in this procedure.

Use the necessary switch commands to set up the DS1 path being tested. [For example, if the configuration looks like Figure 3, use the **switch-path-sts1** command for test 1 to make Ring 1 active at both terminating nodes and all DDM-2000 DRI nodes. Other DS1 path tests for the same configuration would be set up as follows (Figures 4 through 6)]:

Test	Terminating Nodes	DRI Nodes	Figure
Test 1	Ring 1 active	Ring 1 active	Figure 3
Test 2	Ring 2 active	Ring 1 active	Figure 4
Test 3	Ring 2 active	Ring 2 active	Figure 5
Test 4	Ring 1 active	Ring 2 active	Figure 6

5. Are you using CIT and **test-trmsn-t1** command to perform this test?
If **YES**, then continue with **Step 6**.
If **NO**, then proceed to **Step 23**.
6. Are you doing this test in the mux or demux direction?
If **MUX** direction, then continue with **Step 7**.
If **DEMUX** direction, then proceed to **Step 9**.
7. At the near end DDM-2000, use the following command to perform a test of the DS1 loop in the fiber direction:
test-trmsn-t1:address:dirn=mux:dur=();
Where *address* = address identifier of the DS1 signal.
dirn = direction of the test. If **dirn=mux**, direction is toward fiber.
dur = duration of the test in minutes (1-120), default is 1.
8. Was the test successful (error free)?
If **YES**, then continue with **Step 12**.
If **NO**, then proceed to **Step 37**.
9. See Figure 2. At the near-end DSX-1 cross-connection associated with the DDM-2000 being tested, connect a patch cord from the **OUT** jack to the **IN** jack for the DS1 channel to be tested.
10. Use the following command to perform a DS1 transmission test in the demux direction to test the DS1 loop in the DSX direction:
test-trmsn-t1:address:dirn=demux:dur=();
Where *address* = address identifier of the DS1 signal.
dirn = direction of the test. If **dirn=demux**, direction is toward DSX.
dur = duration of the test in minutes (1-120), default is 1.
11. Was the test successful (error free)?
If **YES**, then continue with **Step 12**.
If **NO**, then proceed to **Step 37**.

12. Is this the first service being placed on the group and is a protection circuit pack installed?

If **YES**, then continue with **Step 13**.

If **NO**, then proceed to **Step 17**.

13. Use the following command to switch from service to protection circuit pack:

switch-ls:address:pri=manual;

Response: The green **ACTIVE** LED lights on the protection circuit pack.

14. Repeat the transmission test in the mux (or demux) direction using the following command:

test-trmsn-t1:address:dirn=mux (or demux):dur=();

15. Was the test successful (error free)?

If **YES**, then continue with **Step 16**.

If **NO**, then proceed to **Step 37**.

16. Use the following command to clear active switch requests on the protection circuit pack:

switch-ls:address:pri=reset;

17. The **DS1** circuit path under test has passed the DS1 transmission test. Have all required paths been tested?

If **NO**, then continue with **Step 18**.

If **YES**, then proceed to **Step 19**.

18. Repeat this procedure from Step 4 for the next path to be tested.

19. Remove the looping patch cords from the cross-connect point. Use the **r1s-lpbk-t1** command to release loopback(s) at the far end, if required.

20. At the near-end (and the far-end) DDM-2000, momentarily depress the **UPD/INIT** button (or use the **upd** command) on the **SYSCTL** to update the **SYSCTL**.

21. Repeat this procedure from Step 2 for any additional DS1 circuits to be tested.

22. **STOP. YOU HAVE COMPLETED THIS PROCEDURE.**

23. At the cross-connection associated with the near-end DDM-2000, connect the DS1 test set to the **IN** and **OUT** jacks associated with the circuit under test.
24. Use the DS1 test set to test for error-free transmission.
25. Was the test successful (error free)?
 - If **YES**, then continue with **Step 26**.
 - If **NO**, then proceed to **Step 37**.
26. Is this the first service being placed on the group and is protection circuit pack installed?
 - If **YES**, then continue with **Step 27**.
 - If **NO**, then proceed to **Step 31**.
27. Unseat the service **DS1/DS1PM** circuit pack associated with the circuit under test.
28. Repeat the DS1 transmission test with the DS1 test set.
29. Was the test successful (error free)?
 - If **YES**, then continue with **Step 30**.
 - If **NO**, then proceed to **Step 37**.
30. Reseat the **DS1/DS1PM** circuit pack associated with the circuit under test.
31. The **DS1** circuit path under test has passed the DS1 transmission test. Have all required paths been tested?
 - If **NO**, then continue with **Step 32**.
 - If **YES**, then proceed to **Step 33**.
32. Repeat this procedure from Step 4 for the next path to be tested.
33. Remove the looping patch cords from the cross-connections.
34. At the near-end (and the far-end) DDM-2000, momentarily depress the **UPD/INIT** button (or use the **upd** command) on the **SYSCTL** to update the **SYSCTL**.
35. Repeat this procedure from Step 2 for any additional DS1 circuits to be tested.
36. **STOP. YOU HAVE COMPLETED THIS PROCEDURE.**

37. Check for line code (AMI/B8ZS) mismatch at near end and far end. If mismatch is found, set line code [DLP-513] to correct value and repeat this test. If no trouble is found, continue with the next step.
38. In some releases, if **dlc=yes** as set by the **set -t1** command, loopbacks are not recognized (loopback not recognized) in this test. Use **rtrv-t1** command to check if **dlc=yes**.
39. Is dlc set to yes?
 If **YES**, then continue with **Step 40**.
 If **NO**, then proceed to **Step 41**.
40. Use **set -t1** command to temporarily set **dlc=no** and repeat this test. If the test fails again, continue with the next step.
41. Has the **DS1/DS1PM** circuit pack that failed the test been replaced?
 If **YES**, then proceed to **Step 44**.
 If **NO**, then continue with **Step 42**.
42. Replace the **DS1/DS1PM** circuit pack that failed the test.

Reference: **DLP-523**

43. Repeat this procedure for the **DS1/DS1PM** circuit pack that failed.
44. Trouble may be in the DSX cross-connect wiring, VT1/STS-1 cross-connections in the network (if ring configuration), or the shelf backplane. Use the **rtrv-crs-()** command to ensure proper VT1/STS-1 cross-connections have been made at each shelf in the ring for the DS1 being tested. If no trouble found, check DSX cross-connect wiring and backplane connections. If other alarms or trouble indications are present, refer to **Trouble Clearing: IXL-001** to isolate the trouble. If no alarms or indications are present and a CIT is available, use the RETRIEVE commands (for example, **rtrv-alm**, **rtrv-hsty**, etc.) to check for other trouble indications.
45. **STOP. YOU HAVE COMPLETED THIS PROCEDURE.**

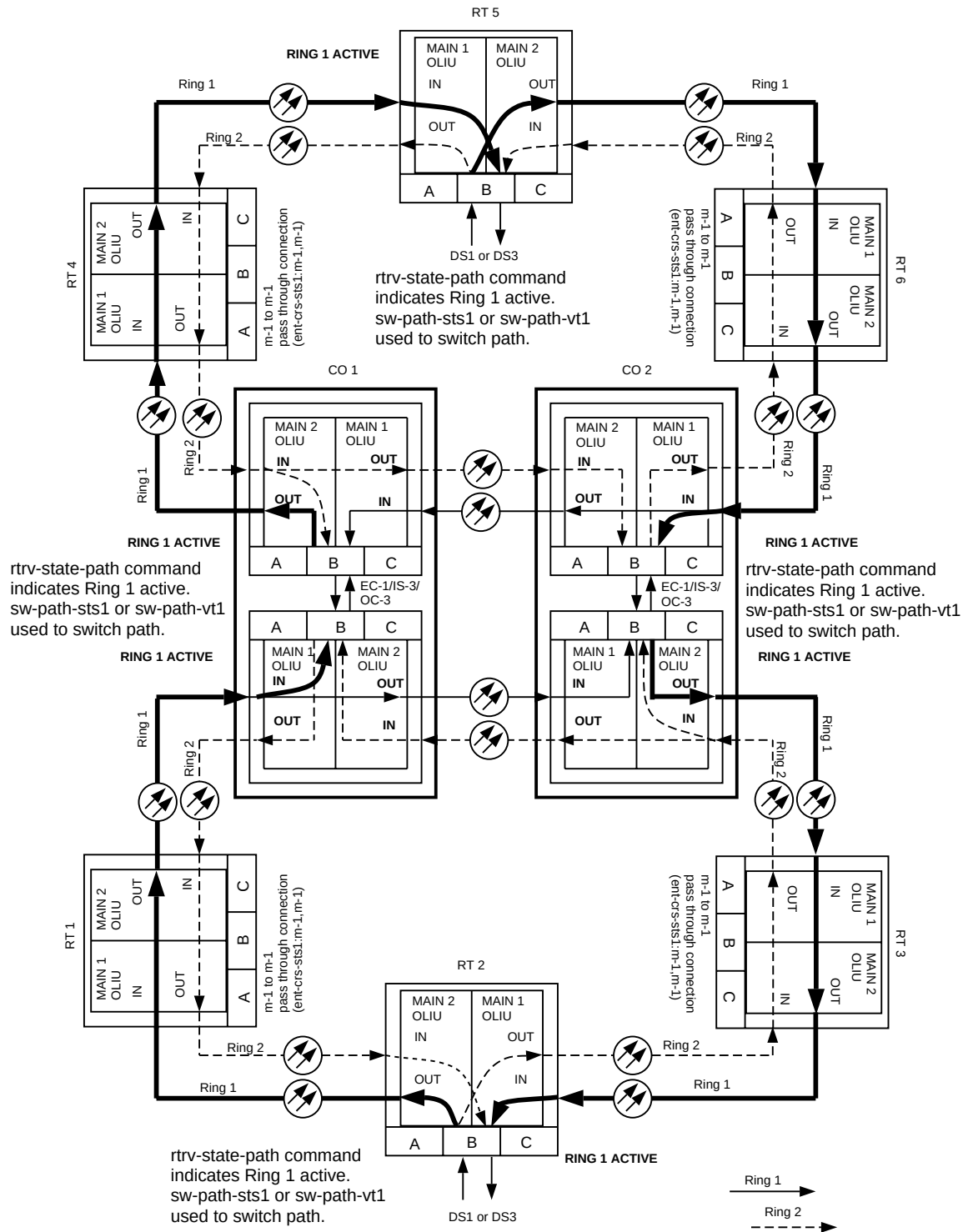


Figure 3. Example of DS1 Transmission Test in Dual Ring Interworking Network

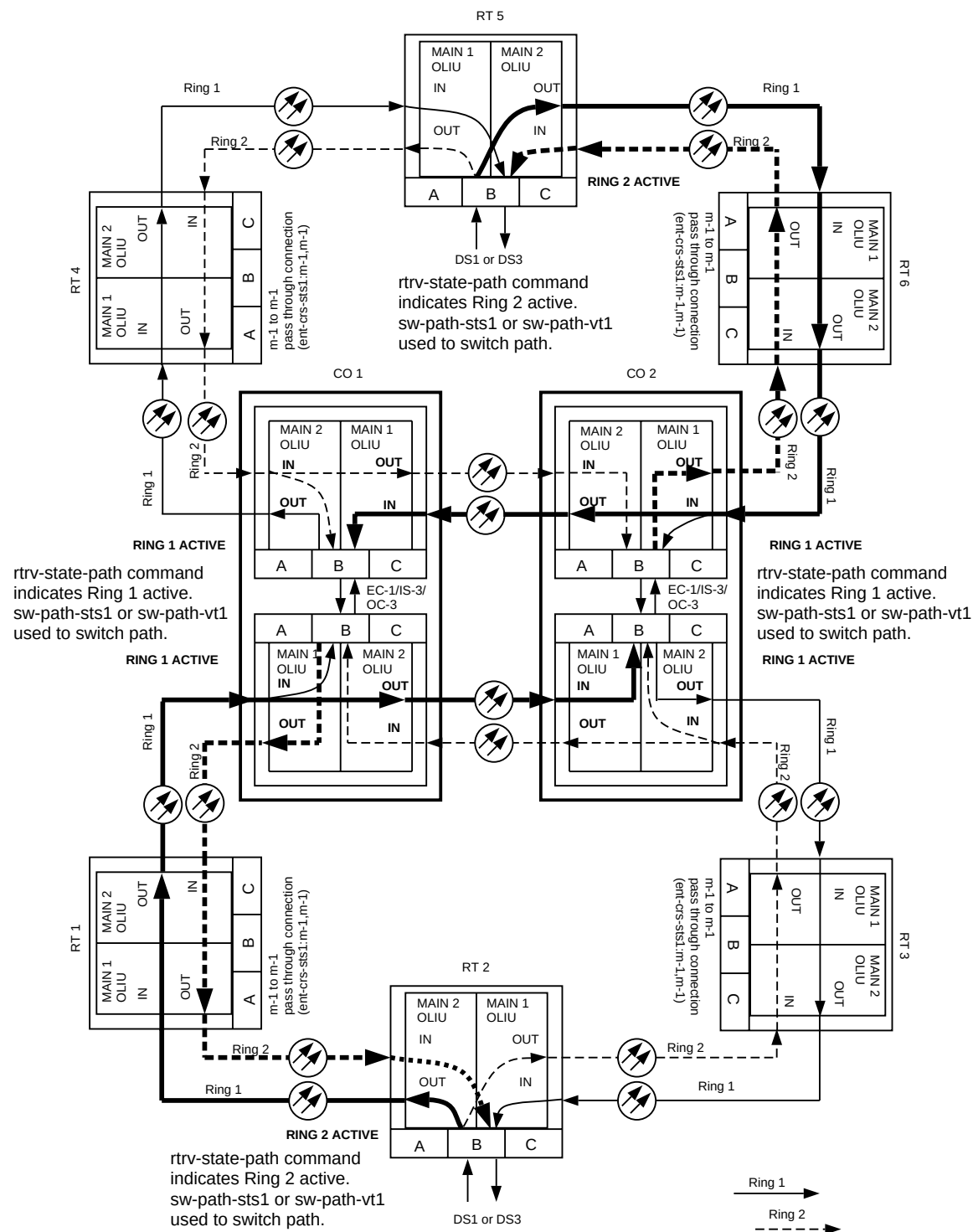
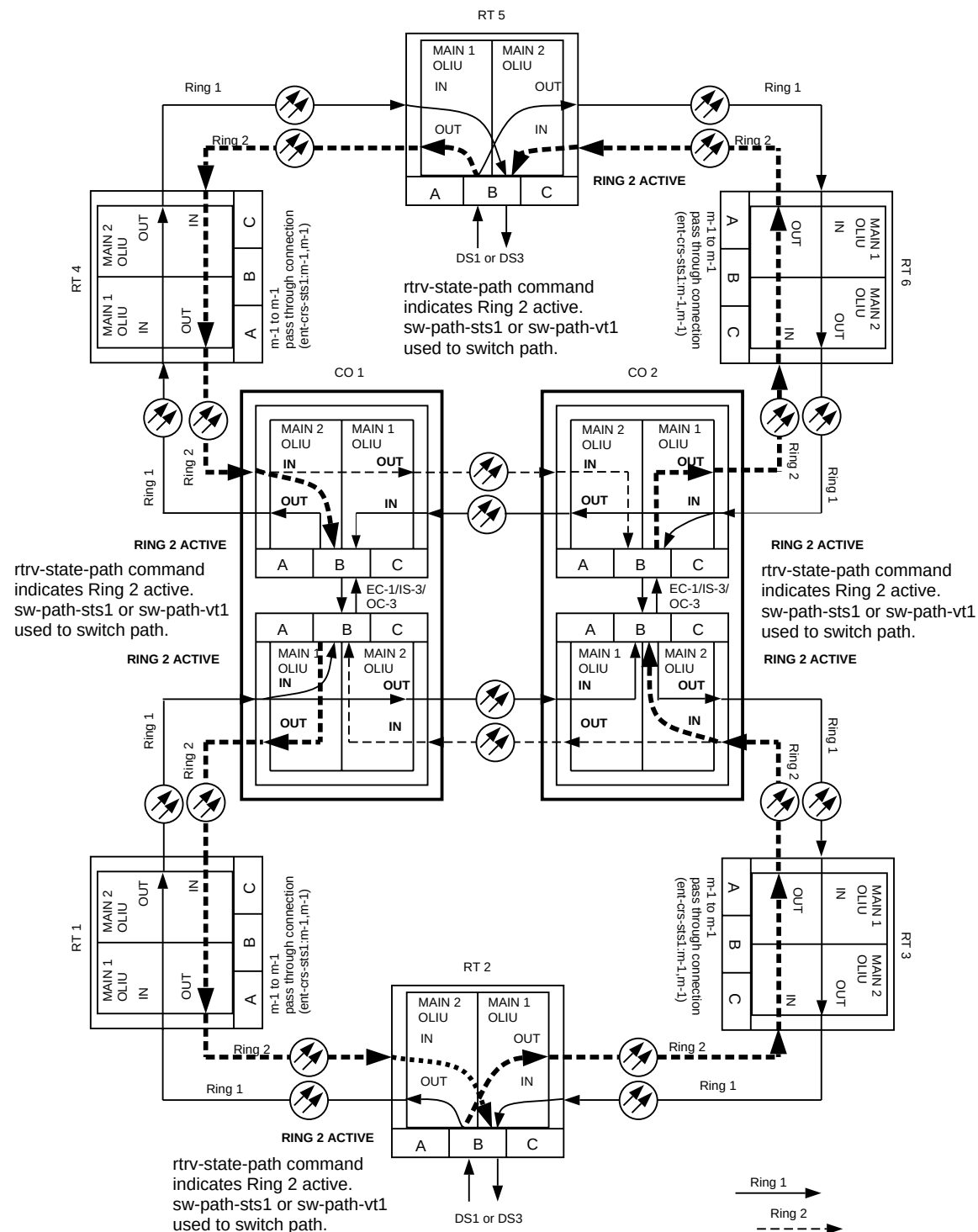


Figure 4. Example of DS1 Transmission Test in Dual Ring Interworking Network



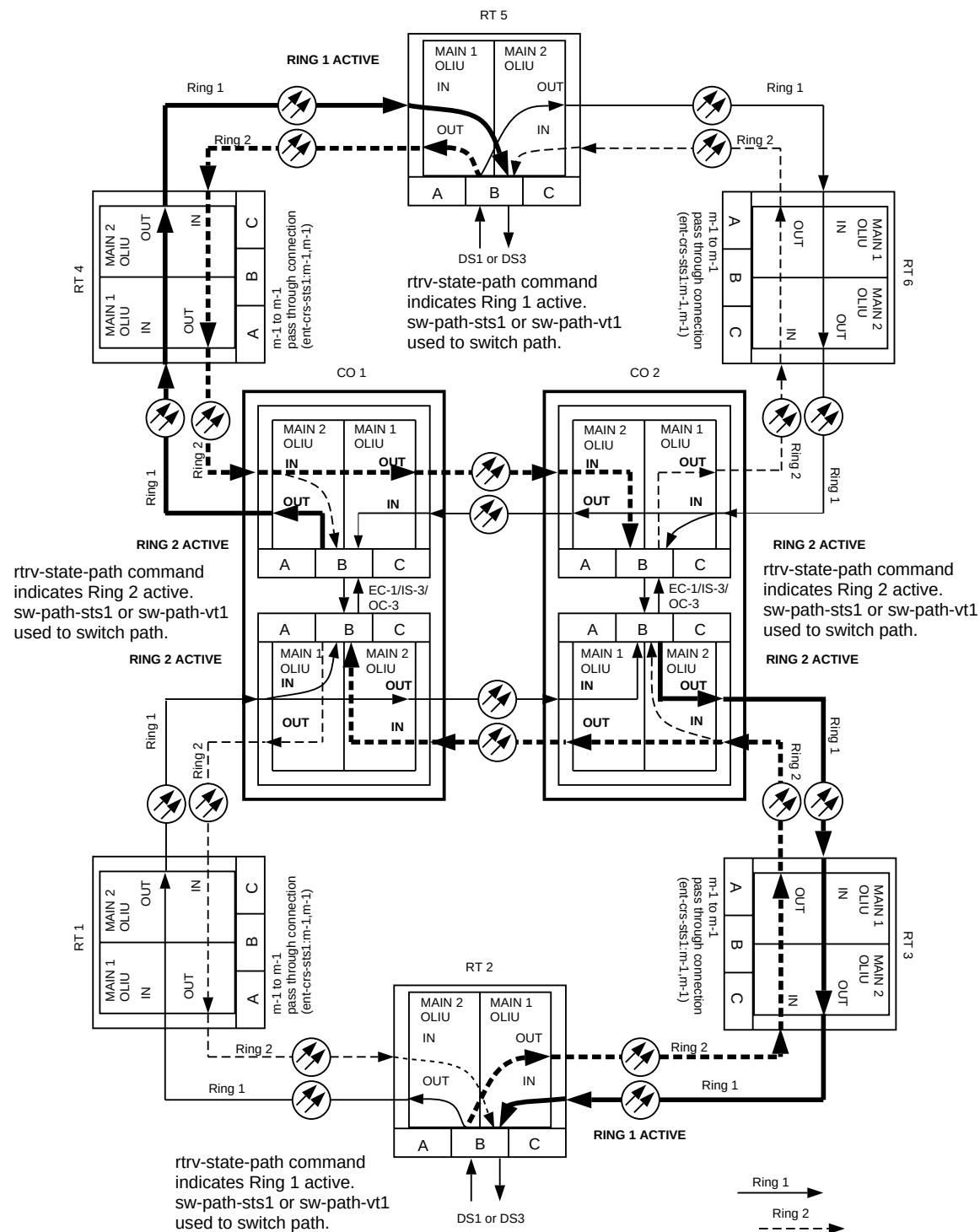


Figure 6. Example of DS1 Transmission Test in Dual Ring Interworking Network

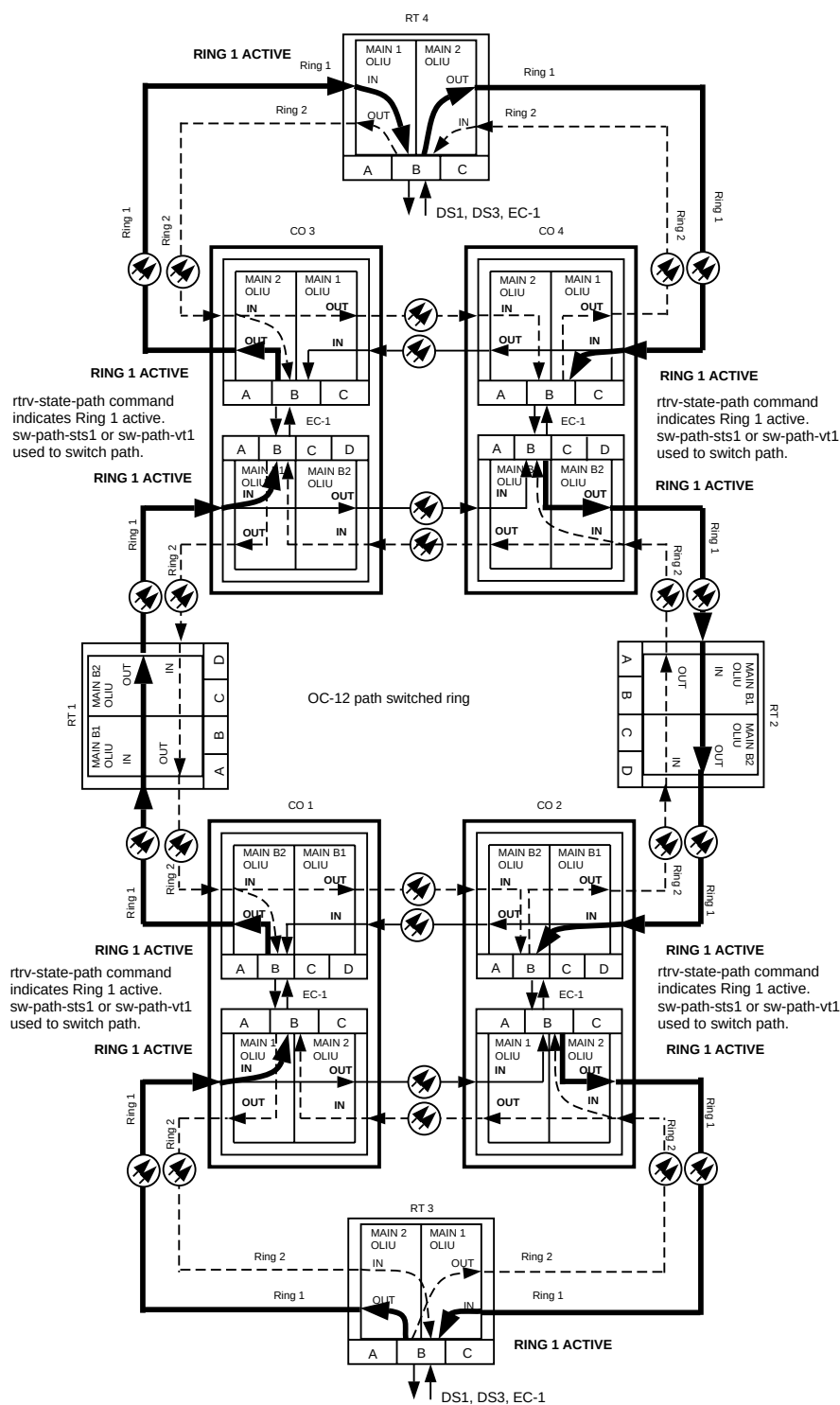


Figure 7. Example of DS1 Transmission Test in Dual Ring Interworking Network

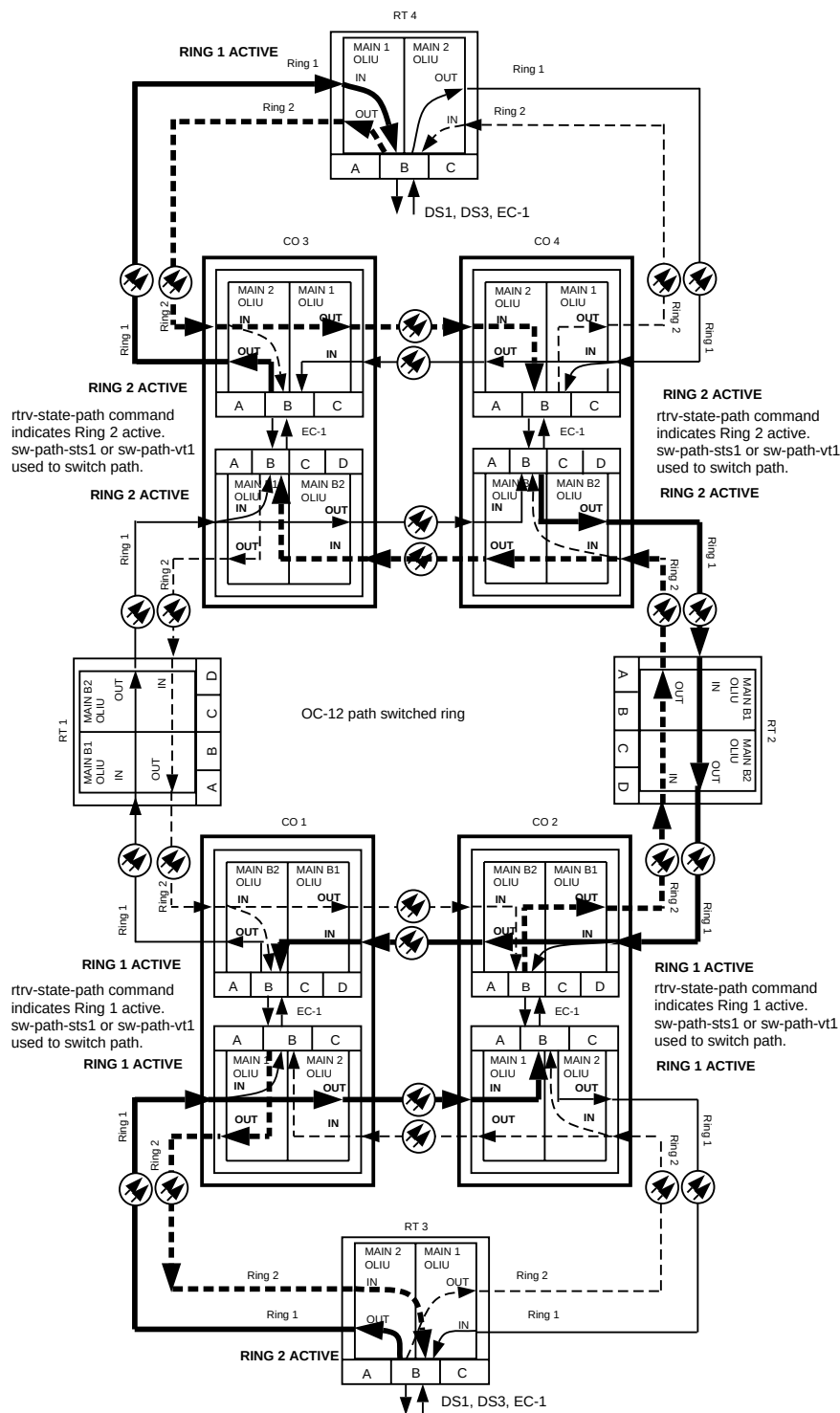


Figure 8. Example of DS1 Transmission Test in Dual Ring Interworking Network

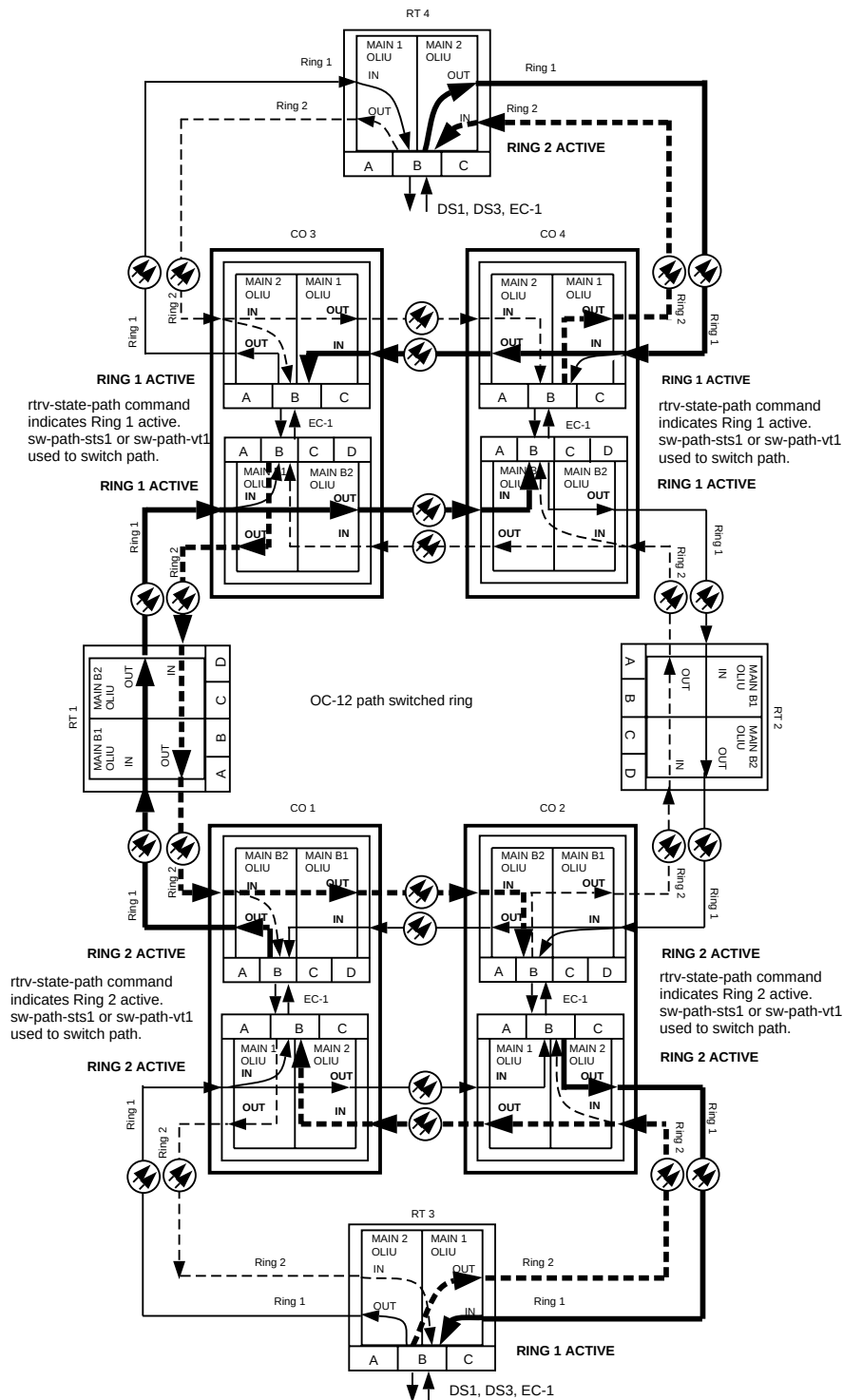


Figure 9. Example of DS1 Transmission Test in Dual Ring Interworking Network

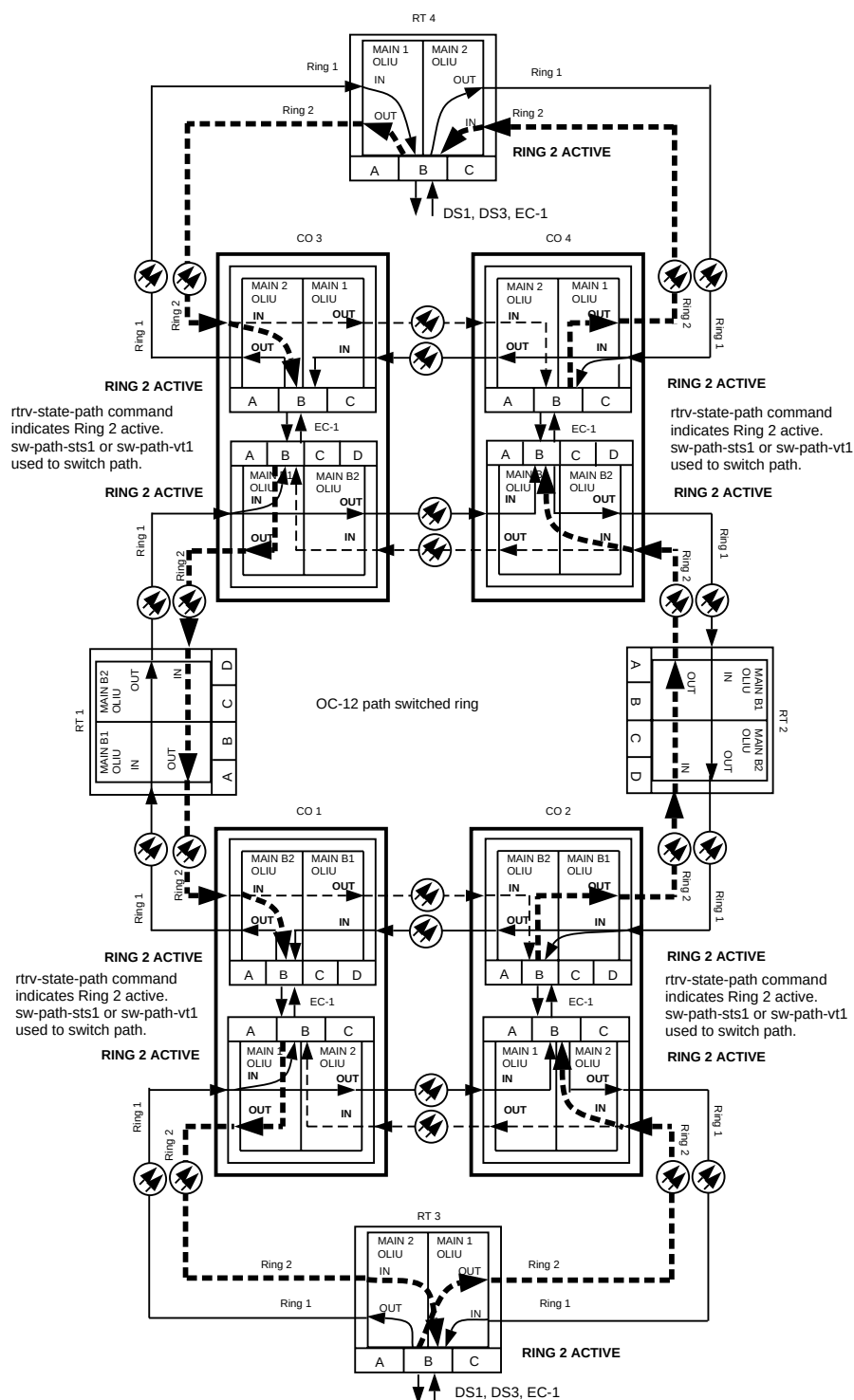


Figure 10. Example of DS1 Transmission Test in Dual Ring Interworking Network

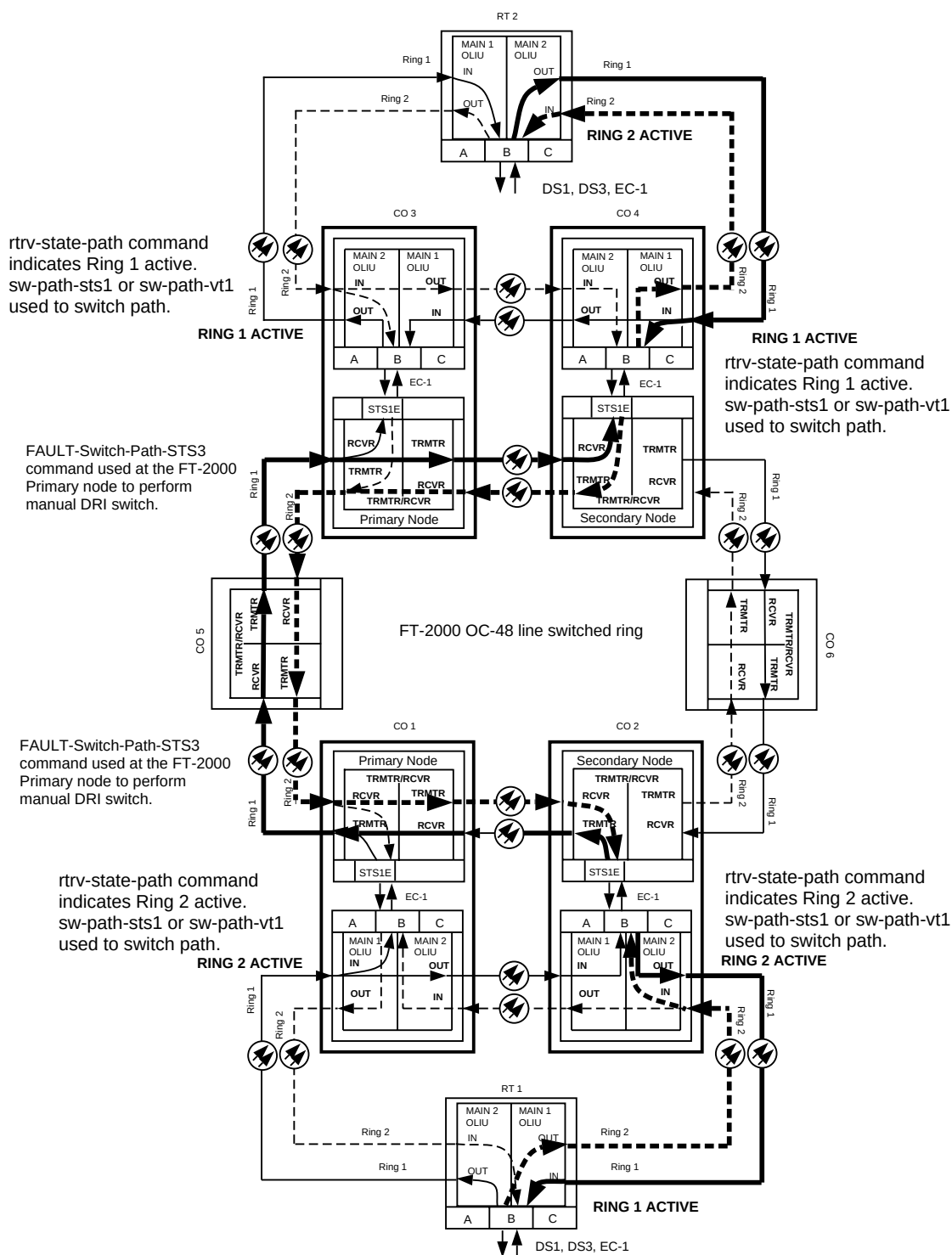


Figure 11. Example of DS1 Transmission Test in Dual Ring Interworking Network

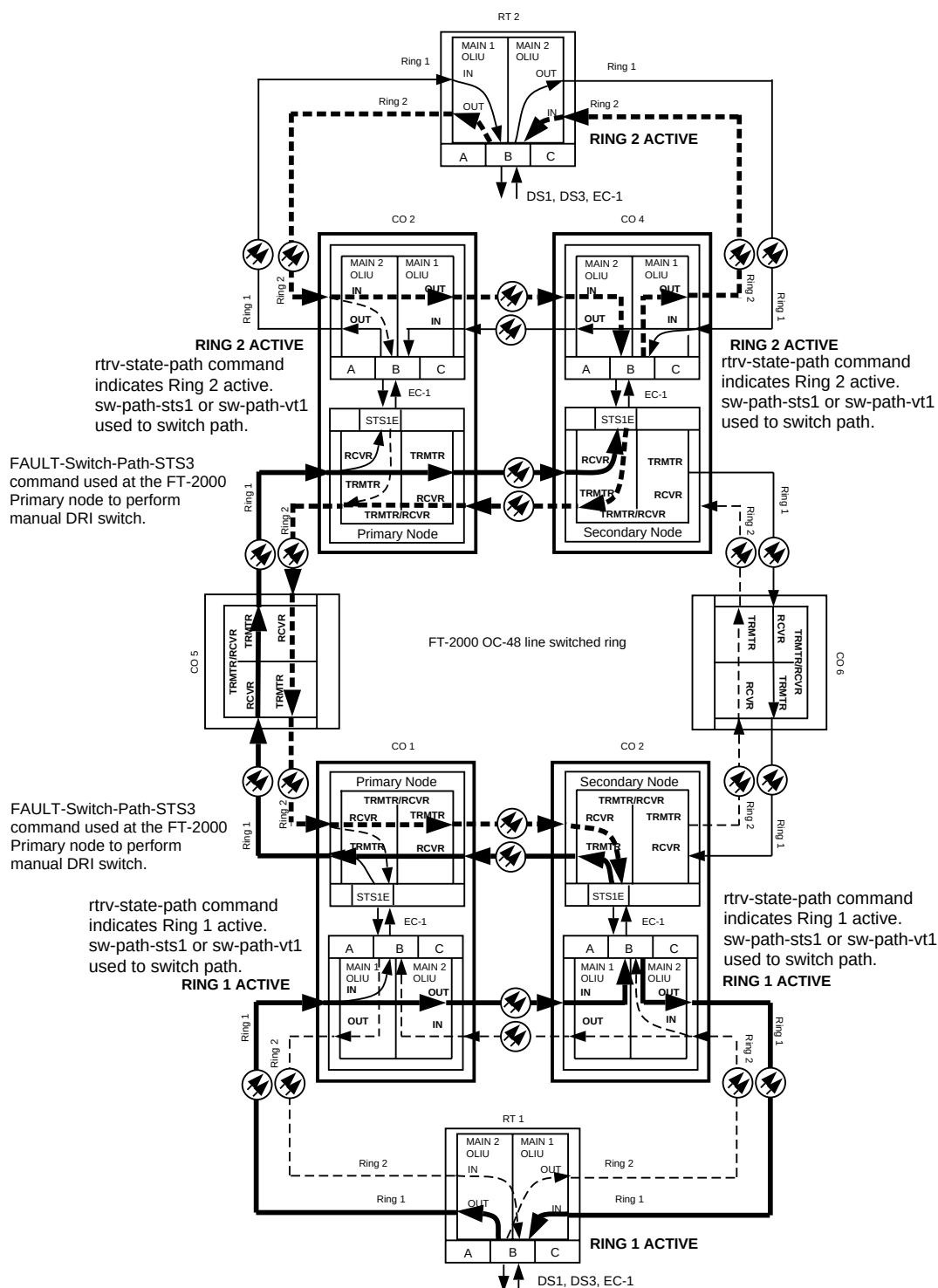


Figure 12. Example of DS1 Transmission Test in Dual Ring Interworking Network

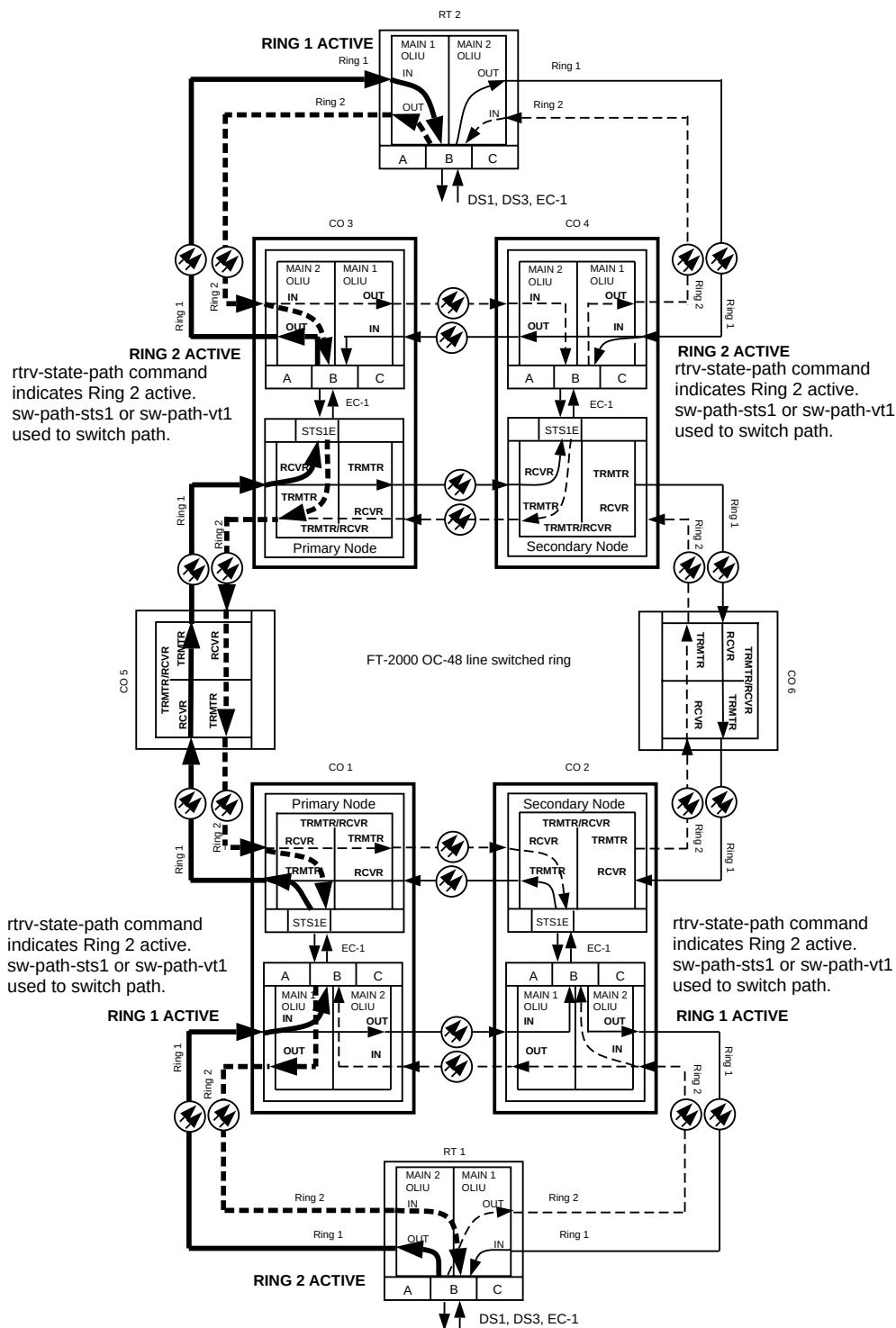


Figure 13. Example of DS1 Transmission Test in Dual Ring Interworking Network

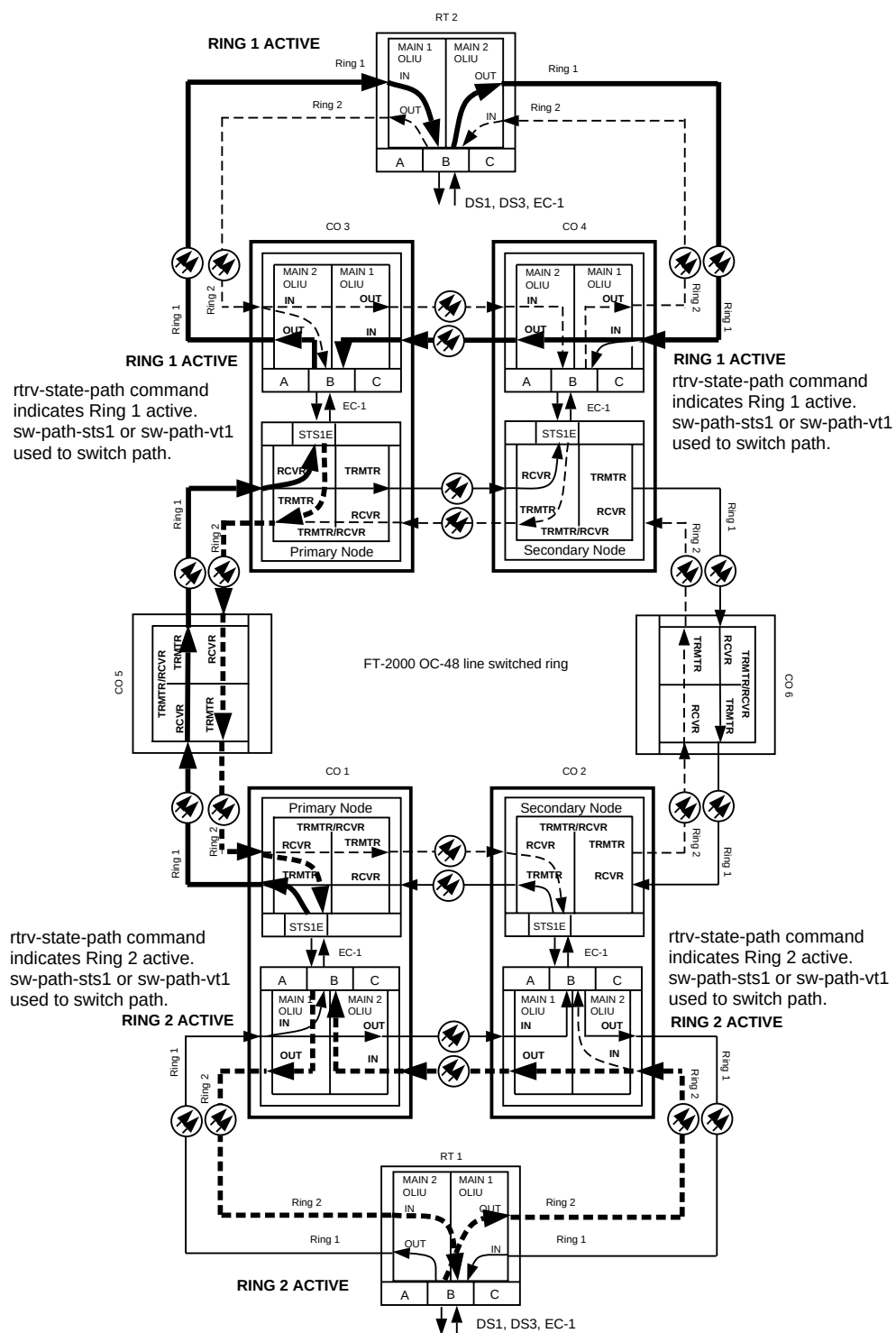


Figure 14. Example of DS1 Transmission Test in Dual Ring Interworking Network

Remove –48 V DC User Panel Fuse

1. Obtain multimeter capable of measuring DC voltage in the 40 to 60 volt range.

2.  **WARNING:**
–48 V DC is present in the fuse holders and the P1 and P2 power connections at rear of User Panel.

 **CAUTION:**
If system is in service, service interruption will occur if both fuses are removed or both power feeders are disconnected. Do not remove any User Panel fuse that does not indicate blown without first verifying that –48 V is present on the other incoming power feeder.

Does fuse indicator indicate blown fuse?

If **YES**, then continue with **Step 3**.

If **NO**, then proceed to **Step 7**.

3. Replace –48 V blown fuse.
4. Did fuse blow again?
If **YES**, then continue with **Step 5**.
If **NO**, then proceed to **Step 7**.
5. Trouble in User Panel 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 User Panel needs to be replaced, see **DLP-551**.
6. **STOP. YOU HAVE COMPLETED THIS PROCEDURE.**

7.  **CAUTION:**
Before removing a fuse that does not have a failure indicator activated, you must first verify that –48 V is available to the shelf through the fuse that is not going to be removed.

Momentarily depress the **ACO/TST** pushbutton on the User Panel and the **FE SEL** pushbutton 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, remove the **SYSCTL**, then the **OHCTL**.

8. Refer to Figures 1, 2, and 3. Is your shelf an ED-8C724-30, G1 shelf (Figure 1) or an ED-8C724-30, G3 or G4 shelf (Figure 2 or 3)?
 If **ED-8C724-30, G1**, then continue with **Step 9**.
 If **ED-8C724-30, G3** or **G4**, then proceed to **Step 14**.
9. See Figure 1.
 If fuse **FA** is being removed, verify that –48 V DC is present between pin **8** of Filter A6257 (positive lead) and terminal **E1** of terminal board **TB1** (negative lead).

 If fuse **FB** is being removed, verify that –48 V DC is present between pin **6** of Filter A6257 (positive lead) and terminal **E2** of terminal board **TB1** (negative lead).

 Requirement: Voltage must be between –41.75 V and –60.0 V DC
10. Was requirement met?
 If **YES**, then continue with **Step 11**.
 If **NO**, then proceed to **Step 19**.
11. Reinstall **SYSCTL** and **OHCTL**.
12. You can safely remove one fuse as required, if power is maintained to the shelf through the other fuse.
13. **STOP. YOU HAVE COMPLETED THIS PROCEDURE.**

14. See Figure 2 or 3.
If fuse **FA** is being removed, verify that –48 V DC is present between pin **3** (positive lead) and pin **4** (negative lead) of **P2**.

If fuse **FB** is being removed, verify that –48 V DC is present between pin **2** (positive lead) and pin **1** (negative lead) of **P2**.

Requirement: Voltage must be between –41.75 V and –60.0 V DC

15. Was requirement met?
If **YES**, then continue with **Step 16**.
If **NO**, then proceed to **Step 19**.
16. Reinstall **SYSCTL** and **OHCTL**.
17. You can safely remove one fuse as required, if power is maintained to the shelf through the other fuse.
18. **STOP. YOU HAVE COMPLETED THIS PROCEDURE.**
19. Trouble in User Panel, power feeder(s), or office battery distribution. If you need assistance, notify your supervisor, your local technical support organization, or call Lucent Technologies RTAC, per local operating instructions. If User Panel needs to be replaced, see **DLP-551**.
20. **STOP. YOU HAVE COMPLETED THIS PROCEDURE.**

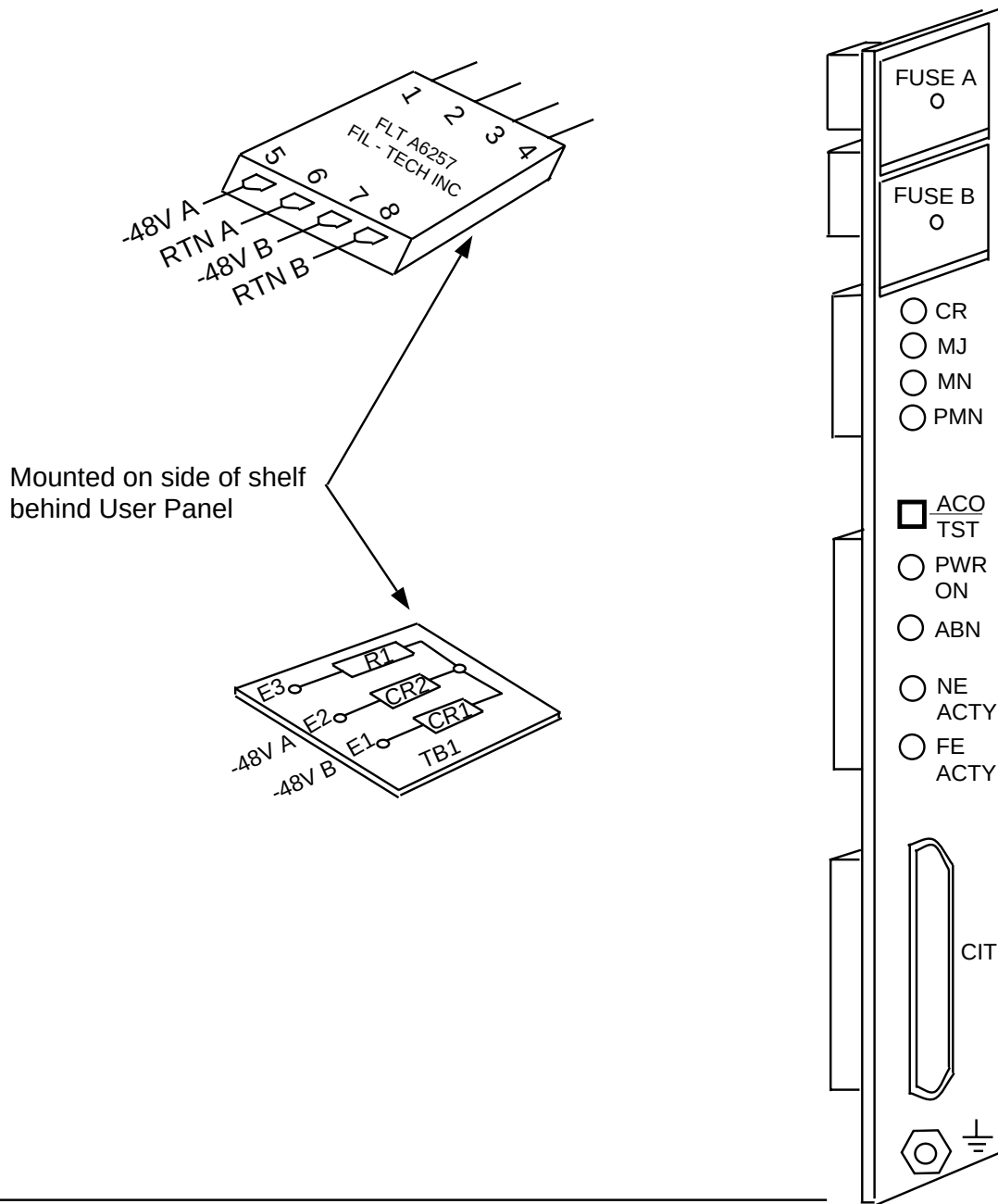


Figure 1. ED-8C724-31, G1 User Panel for ED-8C724-30, G1 DDM-2000 OC-3 Shelf

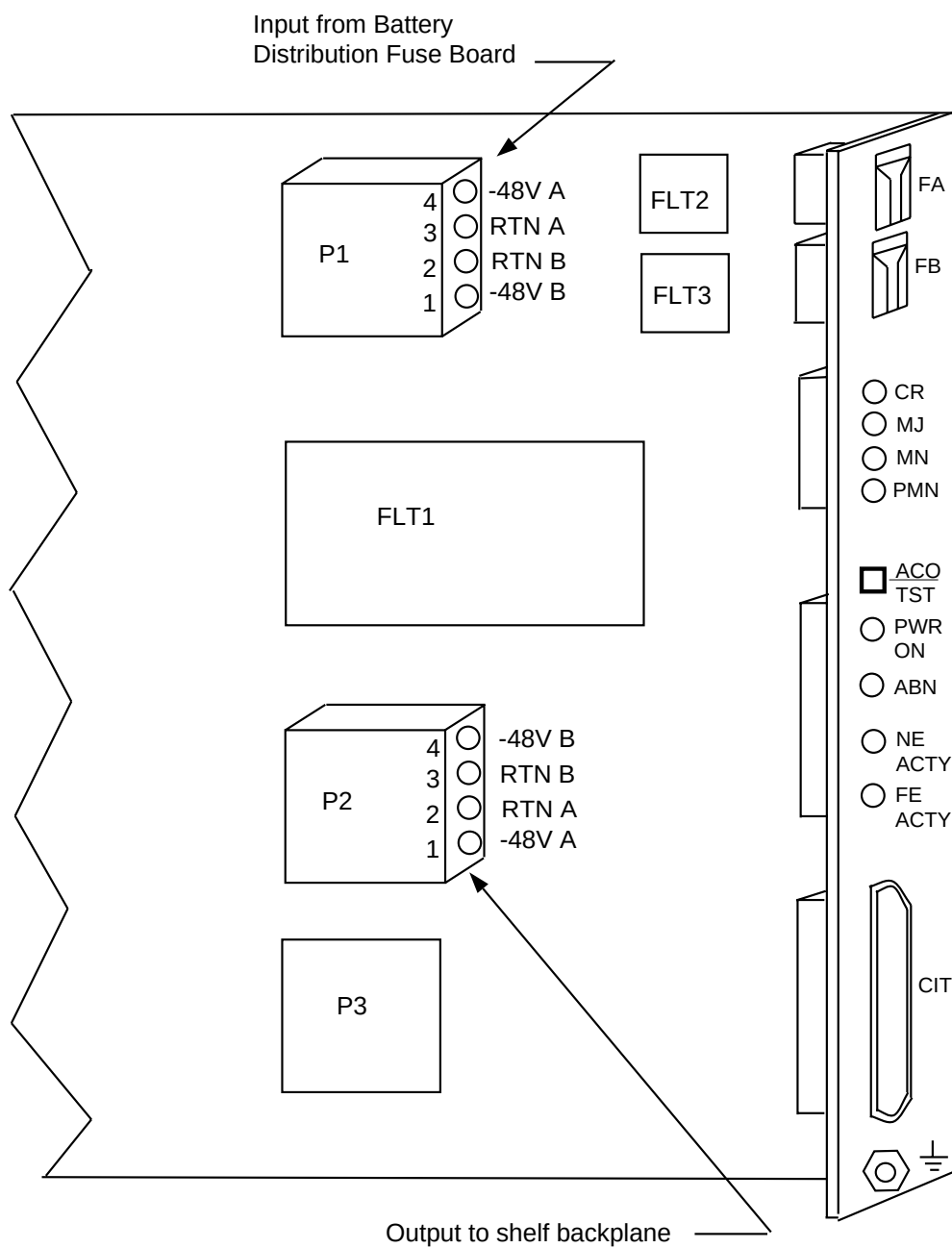


Figure 2. ED-8C724-31, G2 User Panel for ED-8C724-30, G3 DDM-2000 OC-3 Shelf

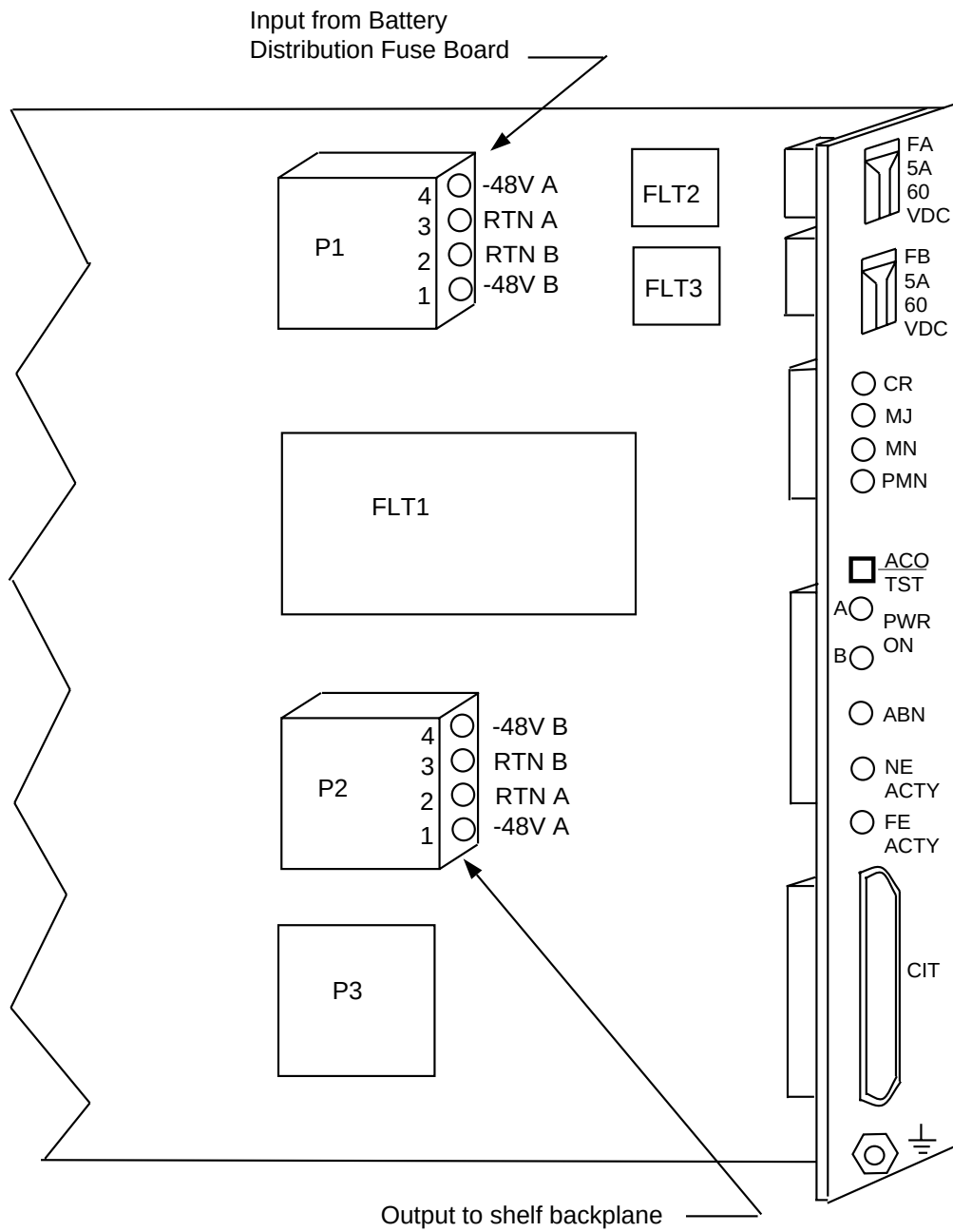


Figure 3. ED-8C724-31, G3 User Panel for ED-8C724-30, G4 DDM-2000 OC-3 Shelf

Perform End-to-End OC-1 Optical Line Test

1.  **WARNING:**
Unterminated optical connectors may emit invisible laser radiation. Avoid direct exposure to the beam. Do not view beam with optical instruments. Use of controls or adjustments or performance of procedures other than those specified herein may result in hazardous radiation exposure.

 **NOTE 1:**
This test is used in ring Release 9 and later to verify the integrity of the OC-1 fiber lines between the DDM-2000 OC-3 and DDM-2000 FiberReach shelves and may be performed with the DDM-2000 OC-3 and DDM-2000 FiberReach in service or out of service.

 **NOTE 2:**
It is assumed that each DDM-2000 OC-3 and DDM-2000 FiberReach have passed the local (looped) transmission tests and a CIT is available. If these tests have not been completed, refer to the appropriate procedure and perform the tests.

 **NOTE 3:**
This test must be performed locally at each shelf location associated with the optical span(s) being tested. See Figure 1.

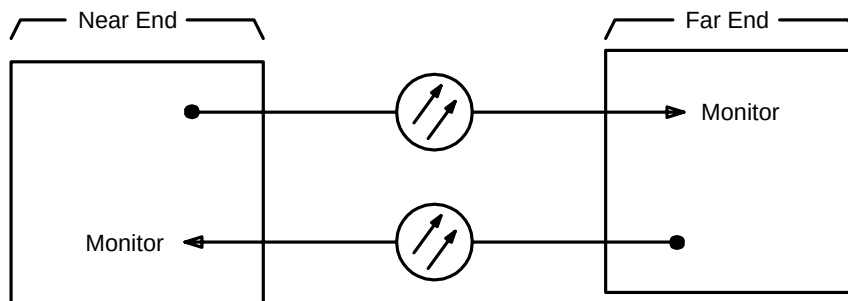


Figure 1. End-to-End Optical Line Test Monitoring

2. At test location, connect CIT to User Panel **CIT** connector and establish session.

Reference: **DLP-521**

3. **CAUTION:**
*The **init-pm:reg=all** command initializes (clears) all current day and/or all current quarter-hour performance-monitoring storage registers.*

NOTE:
If local procedures prohibit you from doing the **init-pm:reg=all** command, you may perform the following in Steps 5 and 6. Use the **rtrv-pm-line** command to obtain the line performance monitoring status report, note the readings on the Today line in the report, wait 20 seconds and then obtain another report. There should be no change in readings from the first report.

Enter the command **init-pm:reg=all**, if allowed.

4. Wait 20 seconds.

5. Enter one of the following commands:

- **rtrv-pm-line:fn-{a or b or c}-1-1** if service line is being tested.
- **rtrv-pm-line:fn-{a or b or c}-1-2** if service line is being tested.
- **rtrv-pm-line:fn-{a or b or c}-2-1** if protection line is being tested.
- **rtrv-pm-line:fn-{a or b or c}-2-2** if protection line is being tested.
- **rtrv-pm-line:fn-{a or b or c}-all** if both lines are being tested.

Response: The following CIT report will indicate the status of the equipment. The Today line should indicate that there are no errors. Other Time lines may exist with numbers greater than zero. (The "Commands and Reports" section of this manual under **RTRV-PM-LINE** describes this report.)

For OC-3 Release 9.1 and earlier, the output report appears as follows:

```
/* Line Performance Monitoring Status Report
   Last initialized: day registers at yy-mm-dd hh:mm:ss
                   quarter hour registers at yy-mm-dd hh:mm:ss
=====
Address      Start  B2 CV  B2 ES  B2 ES  B2 ES  B2 SES  B2 UAS  PSC-L
              Time
=====
address      time    nn..   nn..   nn..   nn..   nn..   nn..   nn..
.            .       .       .       .       .       .       .       .
.            .       .       .       .       .       .       .       .
.            .       .       .       .       .       .       .       .
-----
address      time    nn..   nn..   nn..   nn..   nn..   nn..   nn..
.            .       .       .       .       .       .       .       .
.            .       .       .       .       .       .       .       .
.            .       .       .       .       .       .       .       .
*/
```

For OC-3 Release 11.0 and later, the output report appears as follows:

```

/* Line Performance Monitoring Status Report
   Last initialized: day registers at yy-mm-dd hh:mm:ss
                   quarter hour registers at yy-mm-dd hh:mm:ss
=====
Address      Start   B2 CV   B2 ES   B2 ESA  B2 UAS  PSC-L  PJC
              Time
              B2 SES B2 ESB
=====
address      time    nn..   nn..   nn..   nn..   nn..   nn..
.            .       .       .       .       .       .       .
.            .       .       .       .       .       .       .
.            .       .       .       .       .       .       .
-----
address      time    nn..   nn..   nn..   nn..   nn..   nn..
.            .       .       .       .       .       .       .
.            .       .       .       .       .       .       .
.            .       .       .       .       .       .       .
*/

```

6. Has performance-monitoring report been obtained from all shelf locations associated with optical span(s) being tested?
 If **NO**, then continue with **Step 7**.
 If **YES**, then proceed to **Step 8**.
7. Repeat this procedure from Step 3 at other locations.
8. Did report indicate errors?
 If **YES**, then continue with **Step 9**.
 If **NO**, then **STOP. YOU HAVE COMPLETED THIS PROCEDURE**.
9. Trouble may be in optical fiber and/or connections. Trouble may also be in **OLIUs**. If the report indicated trouble when the report was obtained from the near end of the span, trouble may be in the receive direction (see Figure 1). If the report indicated trouble when the report was obtained from the far end of the span, trouble may be in the transmit direction. Check optical fiber and connections. Clean optical fiber connections [**DLP-527**]. If no trouble found in the optical fibers, replace **OLIU(s)** [**DLP-523**] associated with the address indicated in the report.
10. **STOP. YOU HAVE COMPLETED THIS PROCEDURE.**

Make VT1.5 (DS1) or STS1 Cross-Connections Using CIT Single/Dual Homing OC3/OC1 Ring Configuration

1. **⇒ NOTE 1:**

This procedure may also be found in the 363-206-301, *DDM-2000 FiberReach Multiplexer, Wideband/Narrowband Shelf, User/Service Manual*.

⇒ NOTE 2:

If you are not familiar with doing cross-connections using the CIT commands, it is strongly suggested that you read *Cross-Connection Provisioning* in the "Administration and Provisioning" section and read the description of the following commands in the "Commands and Reports" section in 363-206-280, *DDM-2000 OC-3 Multiplexer, Releases 8.0 through 11.1, User/Service Manual—Volume I* and 363-206-301, *DDM-2000 FiberReach Multiplexer, Wideband/Narrowband Shelf, User/Service Manual*: "**ent-crs-sts1**" (OC-3 only), "**ent-crs-vt1**", "**rtrv-crs-sts1**" (OC-3 only), "**rtrv-crs-vt1**", "**dlt-crs-sts1**" (OC-3 only), and "**dlt-crs-vt1**".

⇒ NOTE 3:

You will have to log in to more than one node in each ring to get a complete map of the network using the "**rtrv-map-network**" and "**rtrv-map-neighbor**" command. If a drawing of the network is not provided with the work order, it is recommended that you draw a simple schematic of the network before making cross-connections.

Make a simple drawing of the network and list the TID of each node and how they are connected to each other. Figure 1 shows an example of a simple schematic.

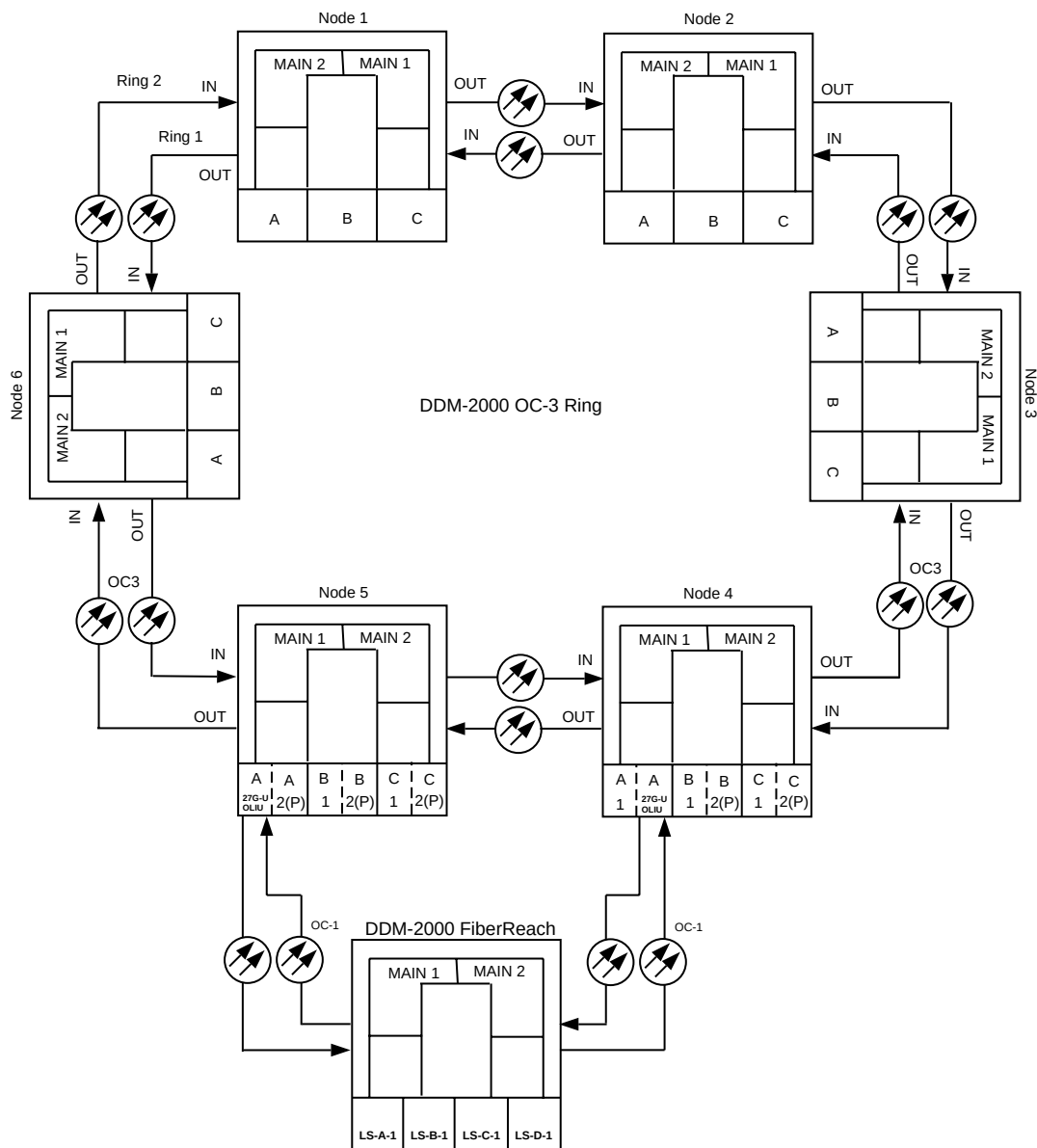


Figure 1. Sample Network Schematic

Log in to any node in each ring in the network and use the "**rtrv-map-network**" and/or "**rtrv-map-neighbor**" command to retrieve a map of the network which lists all the systems and how they are connected to each other.

Sample output reports are shown in Figures 2 and 3:

```
Node5 98-05-27 13:09:53 DDM-2000 OC-3, R11.1.1
M rtrv-map-network: COMPLD
/* Network Map for Node5
```

System Name (TID)	Comm. Status	Product Type	NE Type	Alarm Group
Node5		DDM-2000 OC-3	DSNE	3
Node4		DDM-2000 OC-3		3
Node3		DDM-2000 OC-3		3
Node2		DDM-2000 OC-3		3
Node1		DDM-2000 OC-3		3
Node6		DDM-2000 OC-3		3
Node7		FiberReach		3

```
*/
```

Figure 2. Sample Report From rtrv-map-network Command

```
Node7 98-05-27 13:09:53 FiberReach, R2.2.1
M rtrv-map-neighbor: COMPLD
/* Neighbor Map for Node7
```

System Name (TID)	Connected Through	Link Comm. Status	Product Type
Node7			FiberReach
Node5	main-1		DDM-2000 OC-3
Node4	main-2		DDM-2000 OC-3

```
*/
```

Figure 3. Sample Report From rtrv-map-neighbor Command

2. Verify system configuration is same as specified on work order or circuit order. For example, see Figures 4 through 13.
3.  **NOTE:**
Cross-connections consist of drop and pass-through connections. For example in Figure 4, drop connections are made at Nodes 1, 4, 5, and the FiberReach node. Pass-through cross-connections are made at Nodes 2, 3, and 6. Also, cross-connections must be made in all interconnected rings, including other DDM-2000 OC-3 rings, DDM-2000 OC-12 rings, and FT-2000 OC-48 rings, as required.

From work order or circuit order, determine the terminating (drop) nodes for the service being established.

4. From work order, circuit order, and the sketch made in Step 1, determine the pass-through nodes for the service being established.
5. From work order or circuit order, determine the host OC-3 node(s) that connects to the OC-1 FiberReach ring(s).

6.  **NOTE:**
The **cct** parameter of the "**ent-crs-vt1**" command specifies the cross-connect type. The valid values are **two-way**, **dc**, and **locked**. Two-way applies to add/drop, hairpin, OX1 ring, and pass-through connections. The **dc** parameter applies to dual ring interconnection (DRI) applications. The **locked** parameter supports non-path-switched DS1 applications where a DS1 is cross-connected to a specified channel in a specified direction of the ring interface (Figure 13). Provisioned AIS or unequipped signal is transmitted in the other direction around the ring, but is not alarmed at any pass-through nodes or the other terminating node with locked cross-connections present for the same channel. Any signal received in the same channel from the other ring interface is ignored.

Determine the cross-connect type (**cct**) to be made at each node for the service being established.

7. **NOTE 1:**

In dual homing configurations (Figures 4-7), **OLIU** circuit packs must be installed in the correct slots in the host OC-3 nodes to support the direction of traffic required. For example in Figure 4, for traffic to be routed between Node 1 and the FiberReach system, **27G-U/27G2-U OLIUs** must be installed in **FUNCTION UNITS** group **A, B, or C**, slot **1** of Node 5 and **FUNCTION UNITS** group **A, B, or C**, slot **2(P)** of Node 4. This is required because traffic entering Node 5, slot **FUNCTION UNITS A 1** from the FiberReach shelf is automatically connected to the **MAIN-1 OLIU** when cross-connections are made. Traffic entering slot **FUNCTION UNITS A 2(P)** is automatically connected to the **MAIN-2 OLIU**.

In single homing configurations (Figures 6-12), **27G-U/27G2-U OLIUs** in **FUNCTION UNITS** group **A, B, or C**, slot **1** of the OC-3 shelf must be connected to the **MAIN-1 OLIU** in the FiberReach shelf. The **27G-U/27G2-U OLIUs** in **FUNCTION UNITS** group **A, B, or C**, slot **2(P)** of the OC-3 shelf must be connected to the **MAIN-2 OLIU** in the FiberReach shelf.

 NOTE 2:

When only one OC-1 single-homed or dual-homed ring will be required, the **26G2-U OLIU** may be substituted for the **27G-U/27G2-U OLIU** in the OC-3 shelf **FUNCTION UNITS** slots.

Use the "**rtrv-eqpt:**" command at each node in the network to verify that each shelf is properly equipped for the service being established. Ensure that **OLIU** circuit packs are installed in the correct slots in the host OC-3 nodes.

8. **⇒ NOTE 1:**

Cross-connections supporting DS1 services may be either STS1 or VT1.5 cross-connections in DDM-2000 OC-3. Only VT1.5 cross-connections are allowed in DDM-2000 FiberReach. In an OC-3 shelf, use VT1.5 cross-connections for DS1 services if you expect to cross-connect only a portion of the VT1.5 signals in the STS-1 channel. If STS1 cross-connections are made at an OC-3 shelf, there is a fixed mapping of all 28 VT1.5 cross-connections to a specific shelf group [see "**ent-crs-sts1**" command (OC-3 only)].

⇒ NOTE 2:

The following commands may be used to delete, enter, and retrieve cross-connections: "**dlt-crs-vt1**", "**dlt-crs-sts1**" (OC-3 only), "**ent-crs-vt1**", "**ent-crs-sts1**" (OC-3 only), "**rtrv-crs-vt1**", and "**rtrv-crs-sts1**" (OC-3 only). See the "Commands and Reports" section of each system manual for a description of commands.

⇒ NOTE 3:

In ring configurations, you should use the following rules in establishing cross-connections in each ring:

1. All terminating drop connections (including DRI drop and continue, if present) from the same STS-1 timeslot must be provisioned the same, either all VT1.5 or STS-1.
2. If all 28 VT1.5s (DS1s) in an STS-1 are being passed through at a node in a VT1.5 path-switched ring, then the cross-connection may be provisioned as either a pass-through STS-1 or VT1.5. However, if you anticipate dropping VT1.5s from the pass-through node in the future, you should provision the pass-throughs as VT1.5 cross-connections. Provisioning now as a VT1.5 cross-connect will avoid a hit on traffic if the STS-1 cross-connect has to be converted to 28 VT1.5 cross-connects to drop DS1s at a later time.
3. On STS-1 path-switched rings, all nodes in the ring must be provisioned as STS-1 cross-connections.

From work order or circuit order, determine the cross-connections [STS-1 (OC-3 only) or VT1.5] to be made at each node [pass-through, terminating (drop), and host OC-3 node(s)] associated with the kind of service being established.

9. Starting at one of the terminating nodes for the DS1 circuit being established, use the "**rtrv-crs-()**:" command at each node in the ring to verify that the cross-connections specified on the work order or circuit order may be made. For example, if the DS1 #1 low speed port in the **DS1** circuit pack in slot #1 of **LOW SPEED GROUP A** (a-1-1) is to be connected to timeslot m-1-1-1 and the "**rtrv-crs-vt1**" command shows that the cross-connection is already established, you should determine from office records if this port is already in-service before continuing with this procedure.

If cross-connections are already assigned or improperly assigned, refer trouble to the organization responsible for facility design. Improperly assigned cross-connections may have to be deleted using the "**dlt-crs-()**" commands.

10.  **NOTE:**
Channel state provisioning provides IS, AUTO, and NMON states for VT channels similar to the port states for DS1 ports. When a cross-connection is made to a point of termination the channel is in the AUTO state and alarming is disabled. The channel must receive a good signal from either ring to cause the channel to transition to in-service (IS).

At all nonterminating pass-through nodes in the network, use the "**ent-crs-vt1**:" or "**ent-crs-sts1**:" (OC-3 only) command to provision pass-through connections. [For example, to make the DS1 pass-through cross-connection for channel m-1-1-1, use the "**ent-crs-vt1:m-1-1-1,m-1-1-1:cct=twoway**" command. To make pass-through cross-connections for STS-1 #1 in an OC-3 shelf, use the "**ent-crs-sts1:m-1,m-1:cct=twoway**" command.]

11. At both terminating (drop) nodes of the circuit being established, use the "**ent-crs-vt1:**" command to make the terminating cross-connections (for example, Node 1 and FiberReach node in Figure 4, "**ent-crs-vt1:m-1-1-1,a-1-1:cct=twoway**")
12. At the host OC-3 ring node sites, make proper cross-connections. For example in Figure 4, at Node 5, if VT1.5 channel #1, VTG #1, STS #1 from the MAIN 1 OLIU is to be cross-connected to **FUNCTION UNITS** group **A**, OC-1 line #1, then the command "**ent-crs-vt1:m-1-1-1,a-1-1-1:cct=twoway**" would be used to make the cross-connection.
13. Use the "**rtrv-crs-vt1:**" or "**rtrv-crs-sts1:**" (OC-3 only) command to verify that the proper connections have been made. If an improper cross-connection is made, use the "**dlt-crs-vt1:**" or "**dlt-crs-sts1:**" (OC-3 only) command to delete the improper cross-connection and reenter the cross-connection.
14. After all cross-connections are made, use the "**rtrv-alm:**" command to verify no alarms are present.
15. If "ne-acty", "inc. VT AIS", "inc. STS1 AIS", "inc. VT unequipped", or "inc. STS1 unequipped" alarms are present, look for missing or improperly made cross-connections. Use **TAP-118** to locate missing cross-connections, if required.

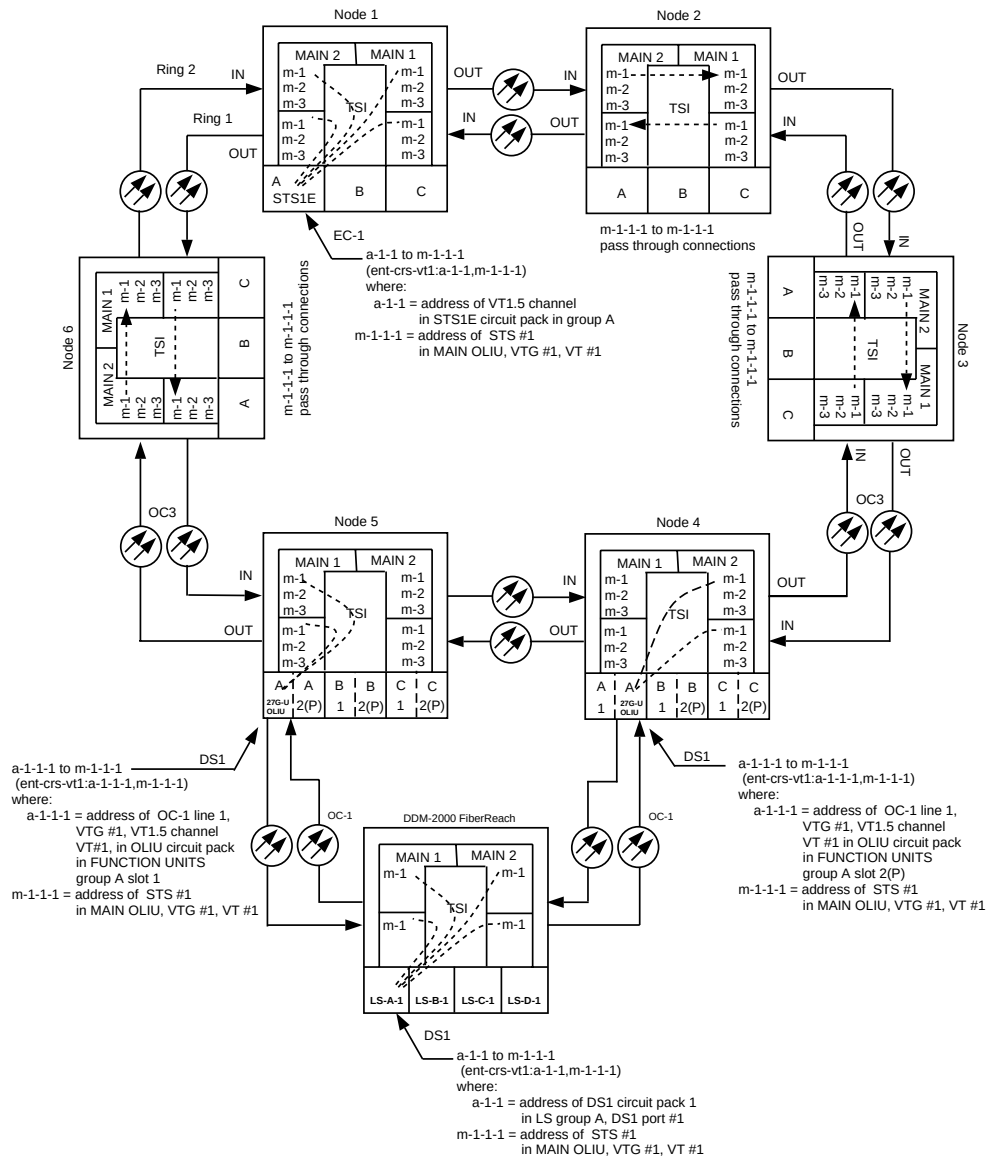


Figure 4. Example of Dual Homing OC-3/OC-1 Cross-connections

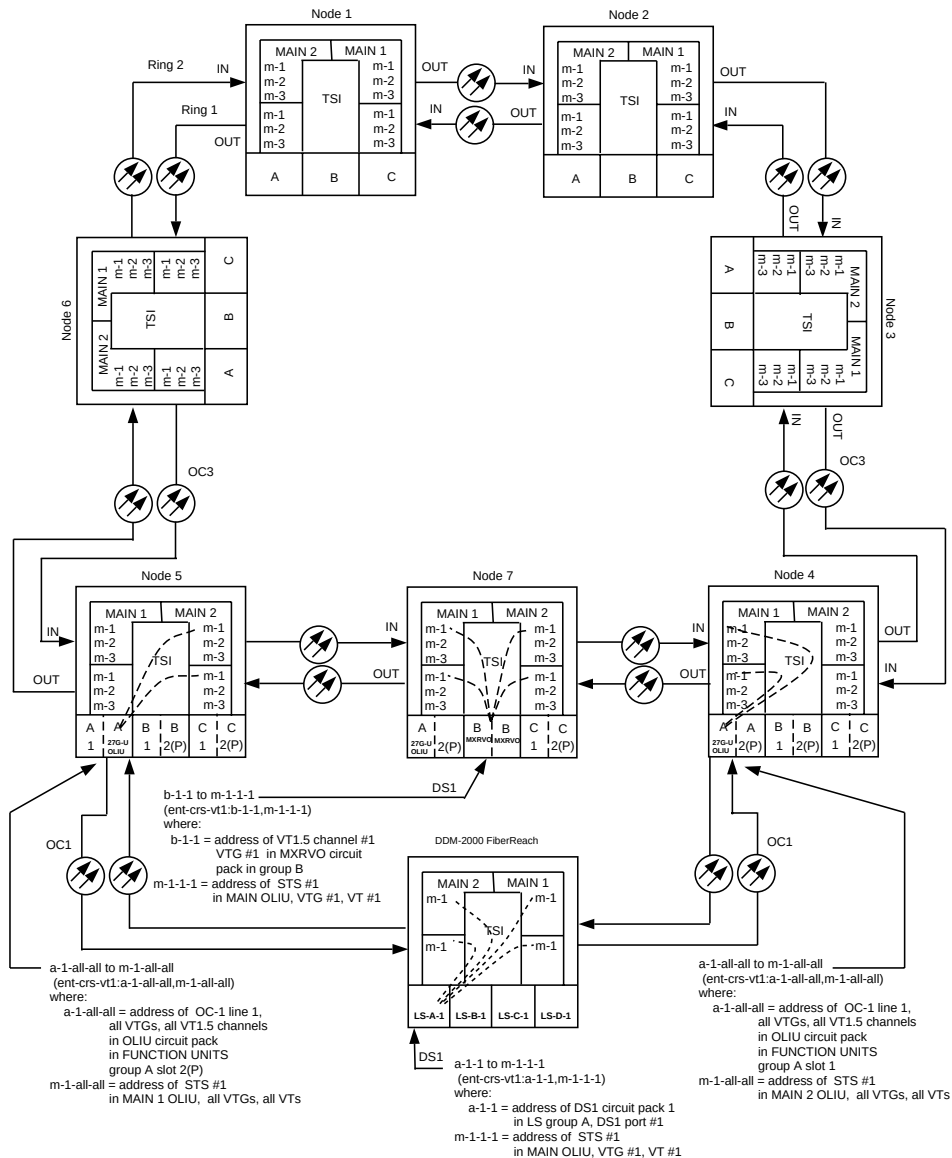


Figure 5. Example of Dual Homing OC-3/OC-1 Cross-connections

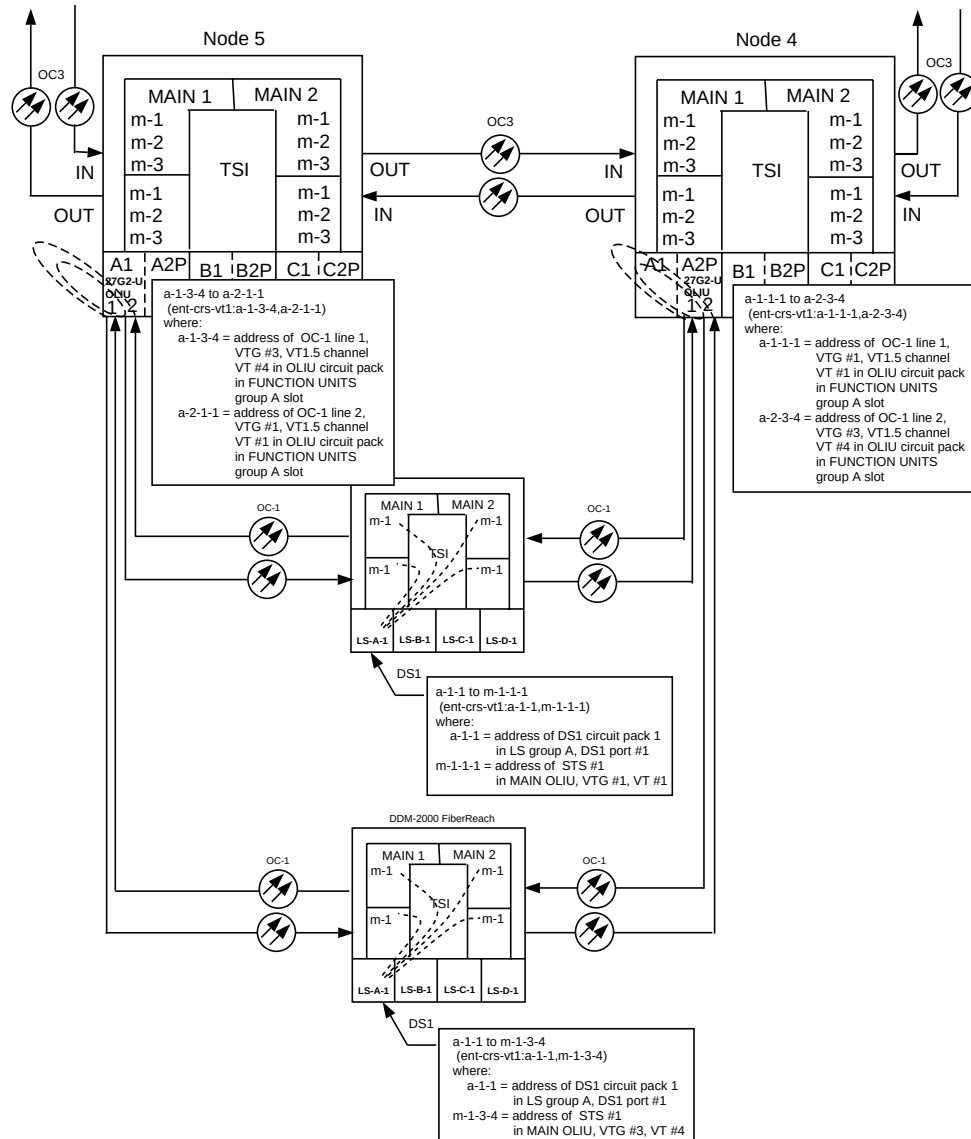


Figure 6. Example of Dual Homing Intra-Function Unit OC-3/OC-1 Cross-connections

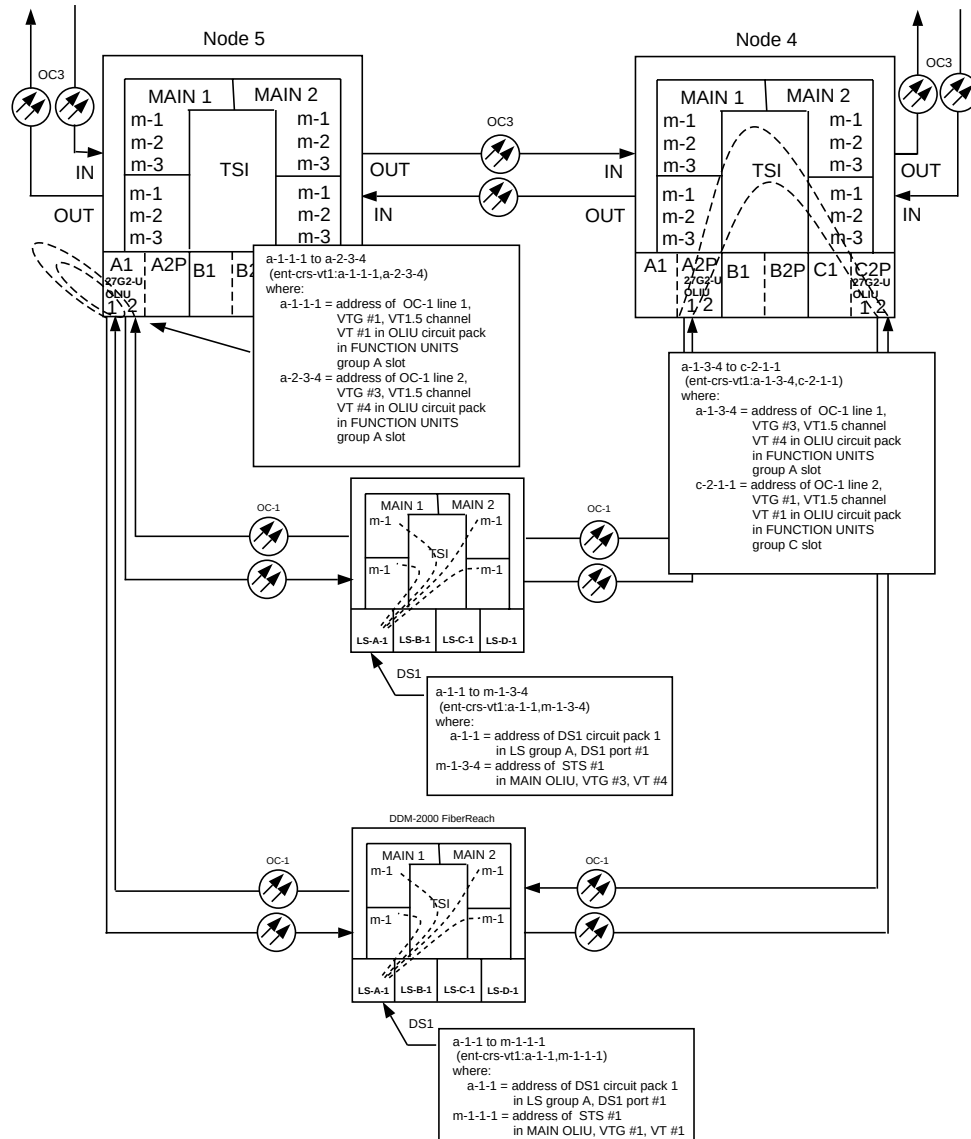


Figure 7. Example of Dual Homing Intra- and Inter-Function Unit OC-3/OC-1 Cross-connections



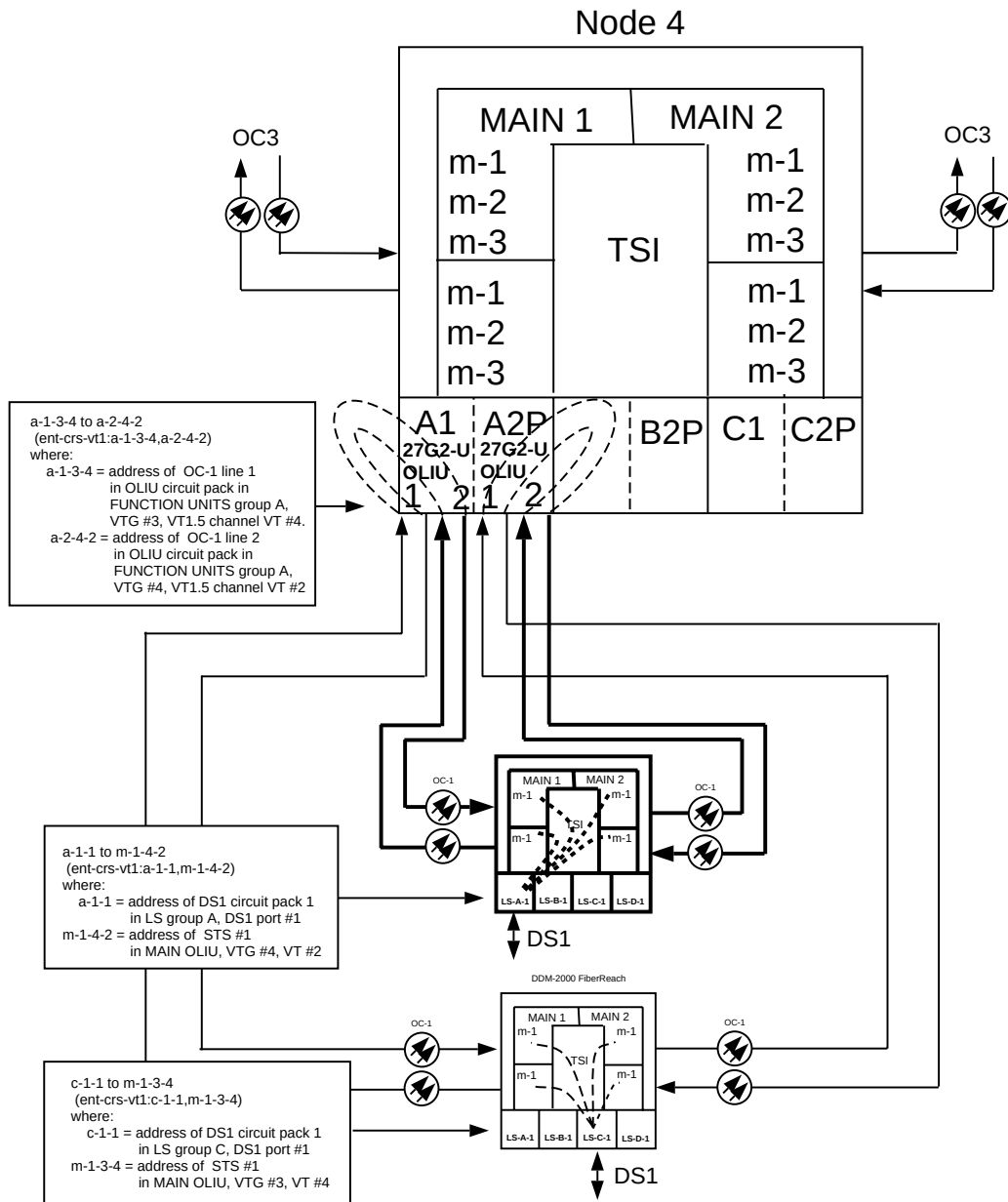


Figure 9. Example of Single Homing Intra-Function Unit OC-3/OC-1 Cross-connections



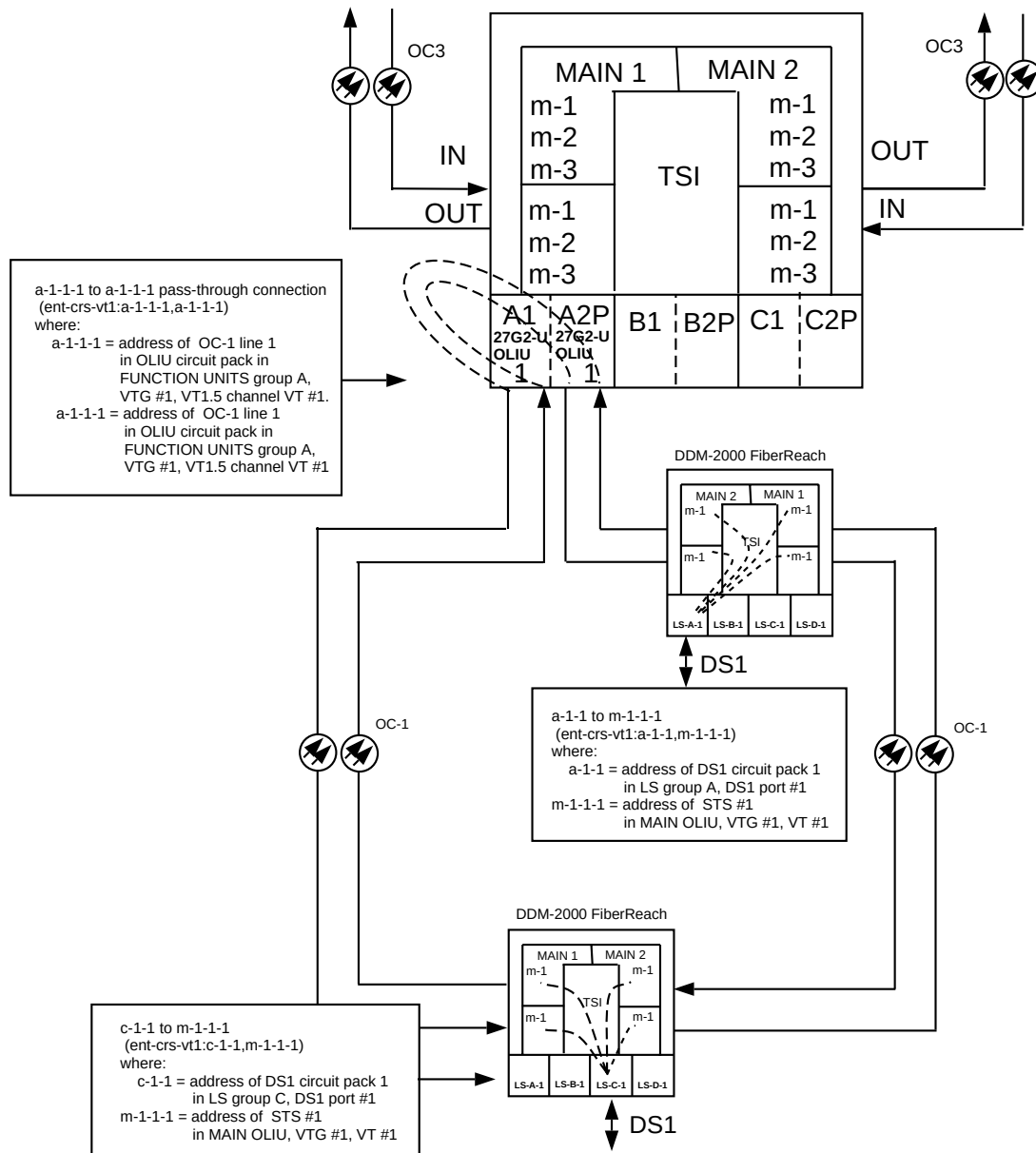


Figure 11. Example of Single Homing Intra-Ring Hairpin OC-3/OC-1 Cross-connections

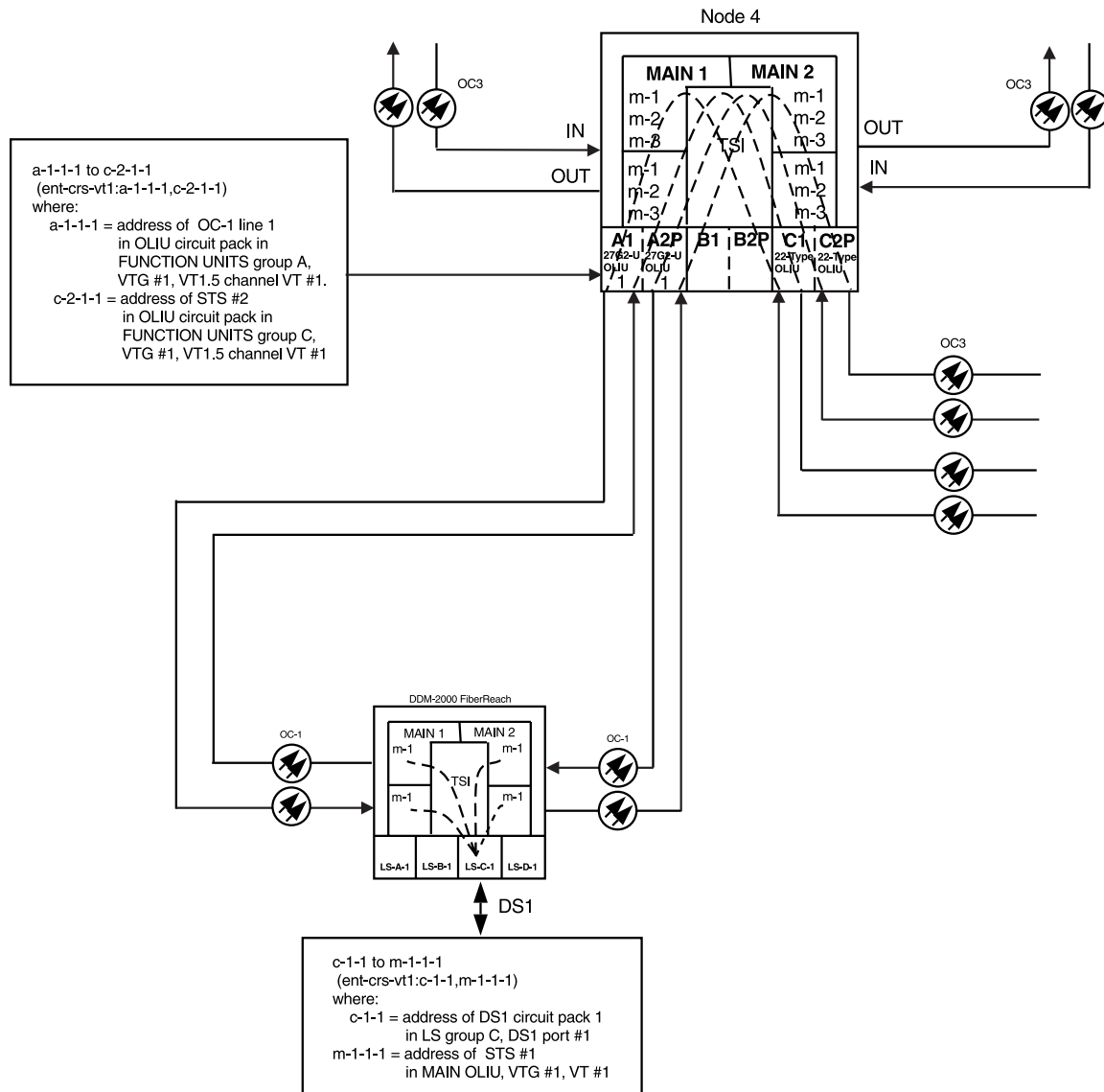


Figure 12. Example of Single Homing Function Unit Local Drop Hairpin Cross-connections

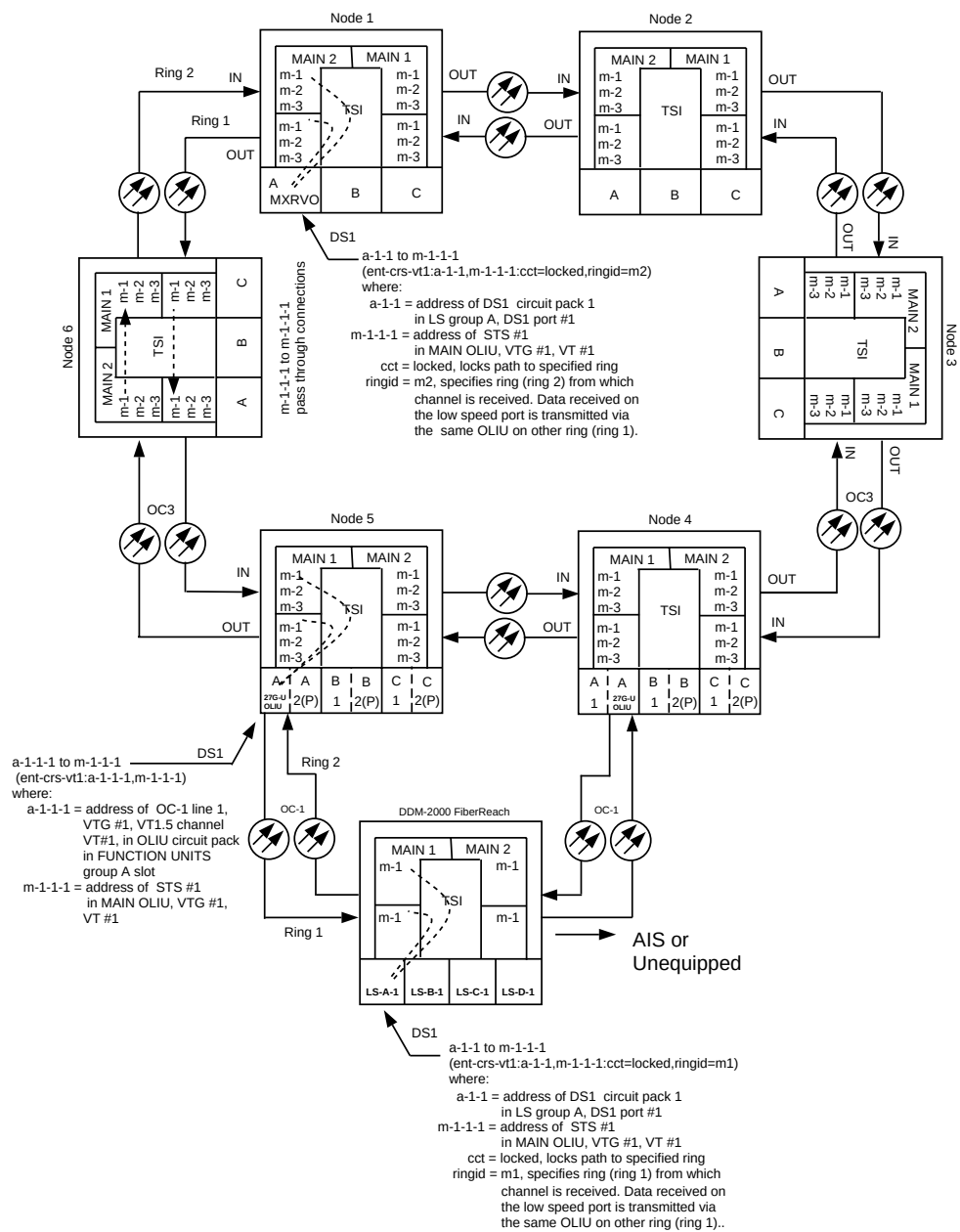


Figure 13. Example of Locked Cross-connections

Make VT1.5 (DS1) or STS1 Cross-Connections Using CIT Stand Alone OC3/OC1 Ring Configuration

1. **⇒ NOTE 1:**

This procedure may also be found in the 363-206-301, *DDM-2000 FiberReach Multiplexer, Wideband/Narrowband Shelf, User/Service Manual*.

⇒ NOTE 2:

If you are not familiar with doing cross-connections using the CIT commands, it is strongly suggested that you read *Cross-Connection Provisioning* in the "Administration and Provisioning" section and read the description of the following commands in the "Commands and Reports" section in 363-206-280, *DDM-2000 OC-3 Multiplexer, Releases 8.0 through 11.1, User/Service Manual—Volume I* and 363-206-301, *DDM-2000 FiberReach Multiplexer, Wideband/Narrowband Shelf, User/Service Manual*: **ent-crs-vt1**, **rtrv-crs-vt1**, and **dlt-crs-vt1**.

⇒ NOTE 3:

You will have to login to more than one node in each ring to get a complete map of the network using the **rtrv-map-network** and **rtrv-map-neighbor** command. If a drawing of the network is not provided with the work order, it is recommended that you draw a simple schematic of the network before making cross-connections.

Make a simple drawing of the network and list the TID of each node and how they are connected to each other. Figure 1 shows an example of a simple schematic.

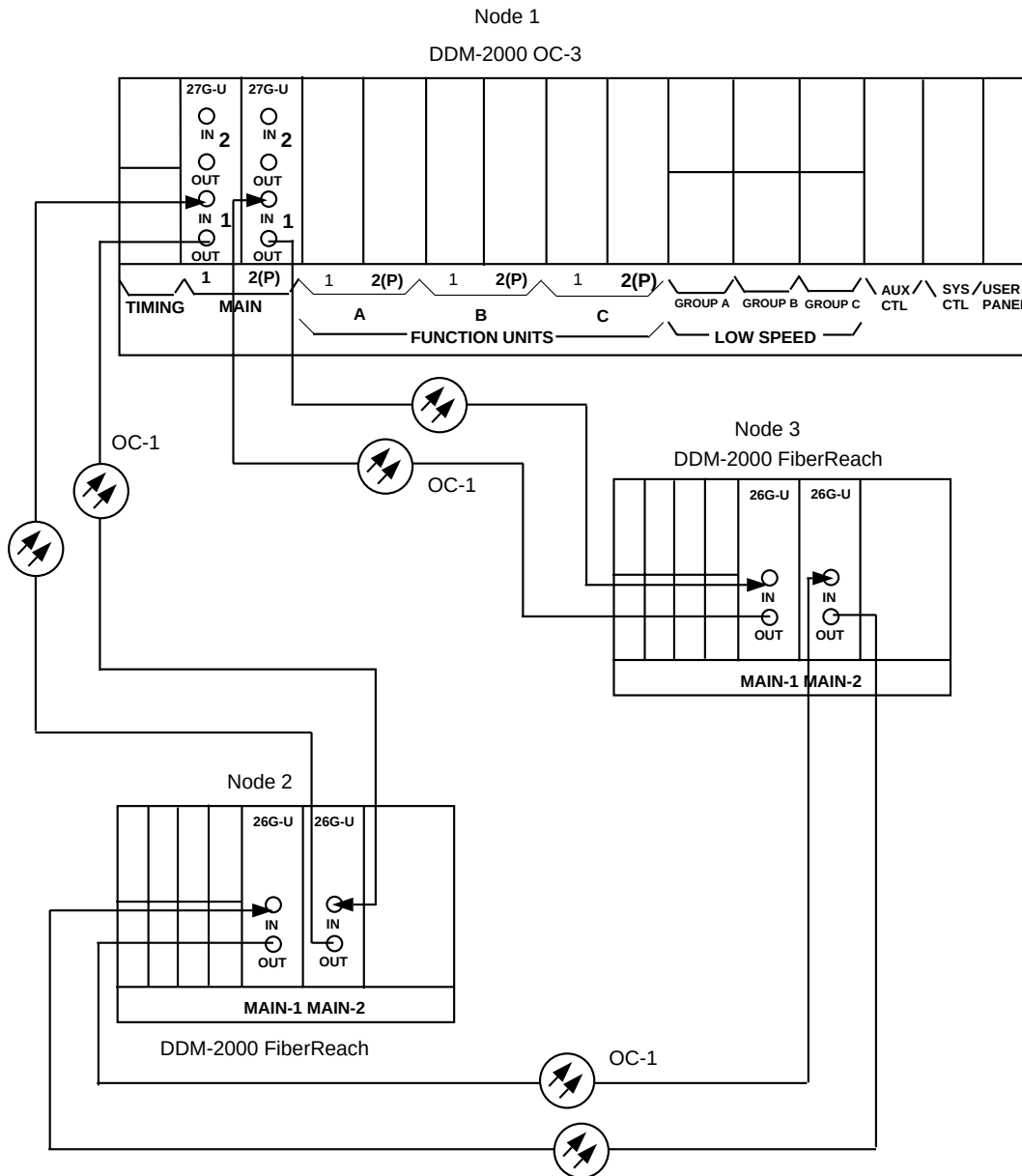


Figure 1. Sample Network Schematic

Log in to any node in the ring and use the **rtrv-map-network** and/or **rtrv-map-neighbor** command to retrieve a map of the network which lists all the systems and how they are connected to each other.

Sample output reports are shown in Figures 2 and 3:

```
Node1 98-05-27 13:09:53 DDM-2000 OC-3, R11.1.1
M rtrv-map-network: COMPLD
/* Network Map for Node1
=====
System Name      Comm.  Product      NE      Alarm
(TID)            Status Type         Type     Group
=====
Node1              DDM-2000 OC-3  DSNE      3
Node2              FiberReach      3
Node3              FiberReach      3
*/
```

Figure 2. Sample Report From rtrv-map-network Command

```
Node1 98-05-27 13:09:53 DDM-2000 OC-3, R11.1.1
M rtrv-map-neighbor: COMPLD
/* Neighbor Map for Node1
=====
System Name      Connected  Link      Product
(TID)            Through   Comm.     Type
Status
=====
Node1              DDM-2000 OC-3
Node2              main-1    FiberReach
Node3              main-2    FiberReach
*/
```

Figure 3. Sample Report From rtrv-map-neighbor Command

2. Verify system configuration is same as specified on work order or circuit order.
3. From work order or circuit order, determine the terminating (drop) nodes for the service being established.

4. **⇒ NOTE 1:**

Cross-connections consist of drop and pass-through connections. For example in Figure 4, drop connections are made at Nodes 1 and 2. Pass-through cross-connections are made at Node 3. In Figure 5, pass-through cross-connections are made at Node 1.

⇒ NOTE 2:

If all 28 VT1.5s (DS1s) in the STS-1 are being passed through at the OC-3 host node, then the cross-connection may be provisioned as either a pass-through STS-1 or VT1.5. However, if you anticipate dropping VT1.5s from the OC-3 node in the future, you should provision the OC-3 as VT1.5 cross-connections. Provisioning now as a VT1.5 cross-connect will avoid a hit on traffic if the STS-1 cross-connect has to be converted to 28 VT1.5 cross-connects to drop DS1s at a later time.

From work order, circuit order, and the sketch made in Step 1, determine the pass-through nodes for the service being established.

5. Use the **rtrv-eqpt:** command at each node to verify that each shelf is properly equipped for the service being established.

6. **⇒ NOTE:**

The following commands may be used to delete, enter, and retrieve cross-connections: **dlt-crs-vt1**, **ent-crs-vt1**, and **rtrv-crs-vt1**. See the "Commands and Reports" section of this manual for a description of commands.

From work order or circuit order, determine the cross-connections to be made at each node associated with the DS1 service being established.

7. Starting at one of the terminating nodes for the DS1 circuit being established, use the **rtrv-crs-vt1:** command at each node in the ring to verify that the cross-connections specified on the work order or circuit order may be made. For example, if the DS1 #1 low speed port in the **DS1** circuit pack in slot #1 of **LOW SPEED GROUP A** (a-1-1) is to be connected to timeslot m-2-1-1 and the **rtrv-crs-vt1** command shows that the cross-connection is already established, you should determine from office records if this port is already in-service before continuing with this procedure.

If cross-connections are already assigned or improperly assigned, refer trouble to the organization responsible for facility design. Improperly assigned cross-connections may have to be deleted using the **dlt-crs-vt1** commands.

8.  **NOTE:**
Channel state provisioning provides IS, AUTO, and NMON states for VT channels similar to the port states for DS1 ports. When a cross-connection is made to a point of termination the channel is in the AUTO state and alarming is disabled. The channel must receive a good signal from either ring to cause the channel to transition to in-service (IS).

At all nonterminating nodes in the network, use the **ent-crs-vt1:** command to provision pass-through connections. [For example, in Figure 4, node 3, to make the DS1 pass-through cross-connection for channel m-1-1-1, use the **ent-crs-vt1:m-1-1-1,m-1-1-1:cct=twoway** command.

9. At the terminating (drop) nodes of the circuit being established, use the **ent-crs-vt1:** command to make the terminating cross-connections. For example in Figure 4, at Node 1, if DS1 port #1, circuit pack #1 in **FUNCTION UNITS** group **A** is cross-connected to VT1.5 channel #1, VTG #1, STS #1, OC1 line 2, then the command **ent-crs-vt1:a-1-1,m-2-1-1:cct=twoway** would be used to make the cross-connection. At Node 2 in Figure 4, the command **ent-crs-vt1:m-1-1-1,a-1-1:cct=twoway** would be used to make the cross-connection.
10. Use the **rtrv-crs-vt1:** command to verify that the proper connection has been made. If an improper cross-connection is made, use the **dlt-crs-vt1:** command to delete the improper cross-connection and reenter the cross-connection.
11. After all cross-connections are made, use the **rtrv-alm:** command to verify no alarms are present.
12. If "ne-acty", "inc. VT AIS", "inc. STS1 AIS", "inc. VT unequipped", or "inc. VT unequipped" alarms are present, look for missing or improperly made cross-connections. Use **TAP-118** to locate missing cross-connections, if required.

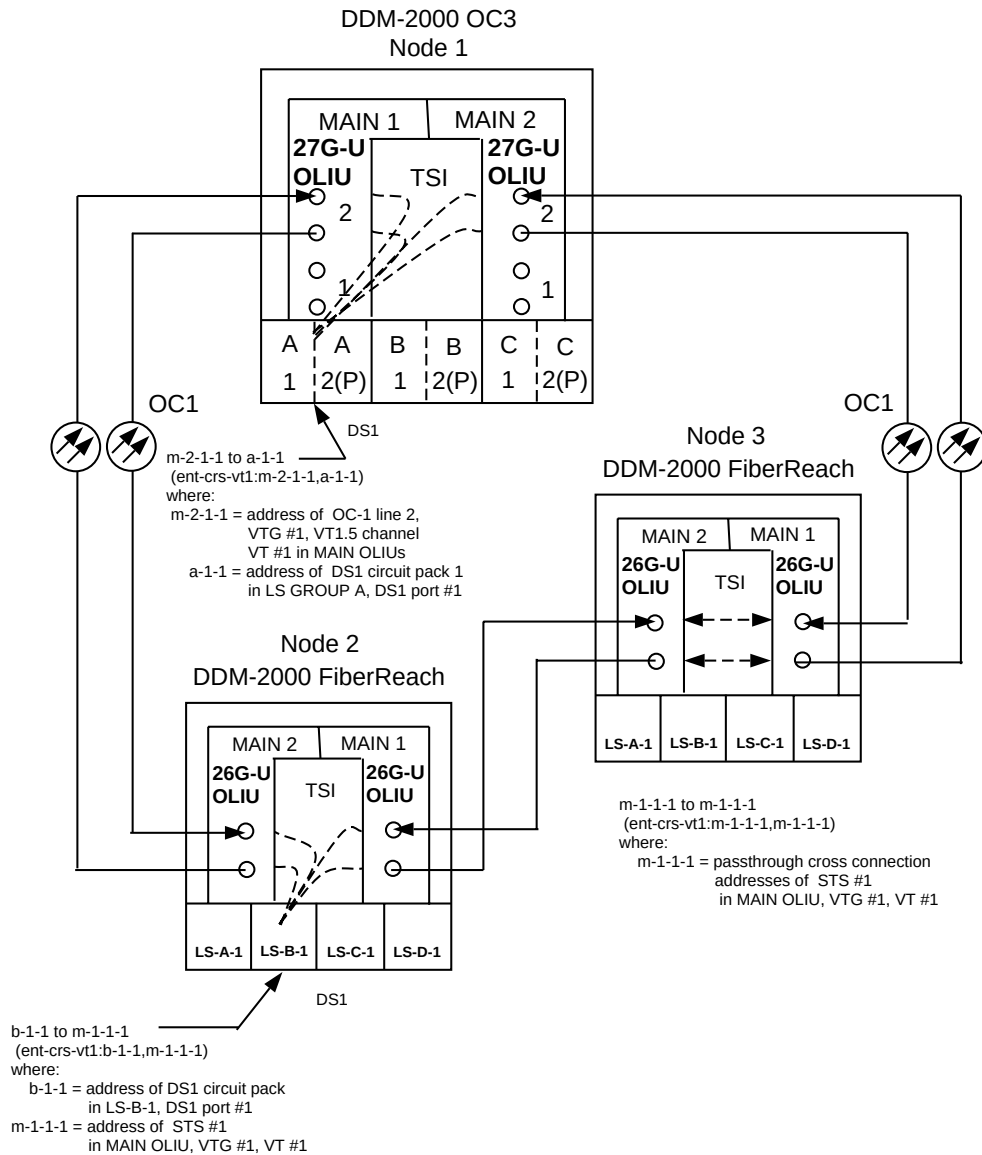


Figure 4. Example of Stand Alone OC-3/OC-1 Cross-connections

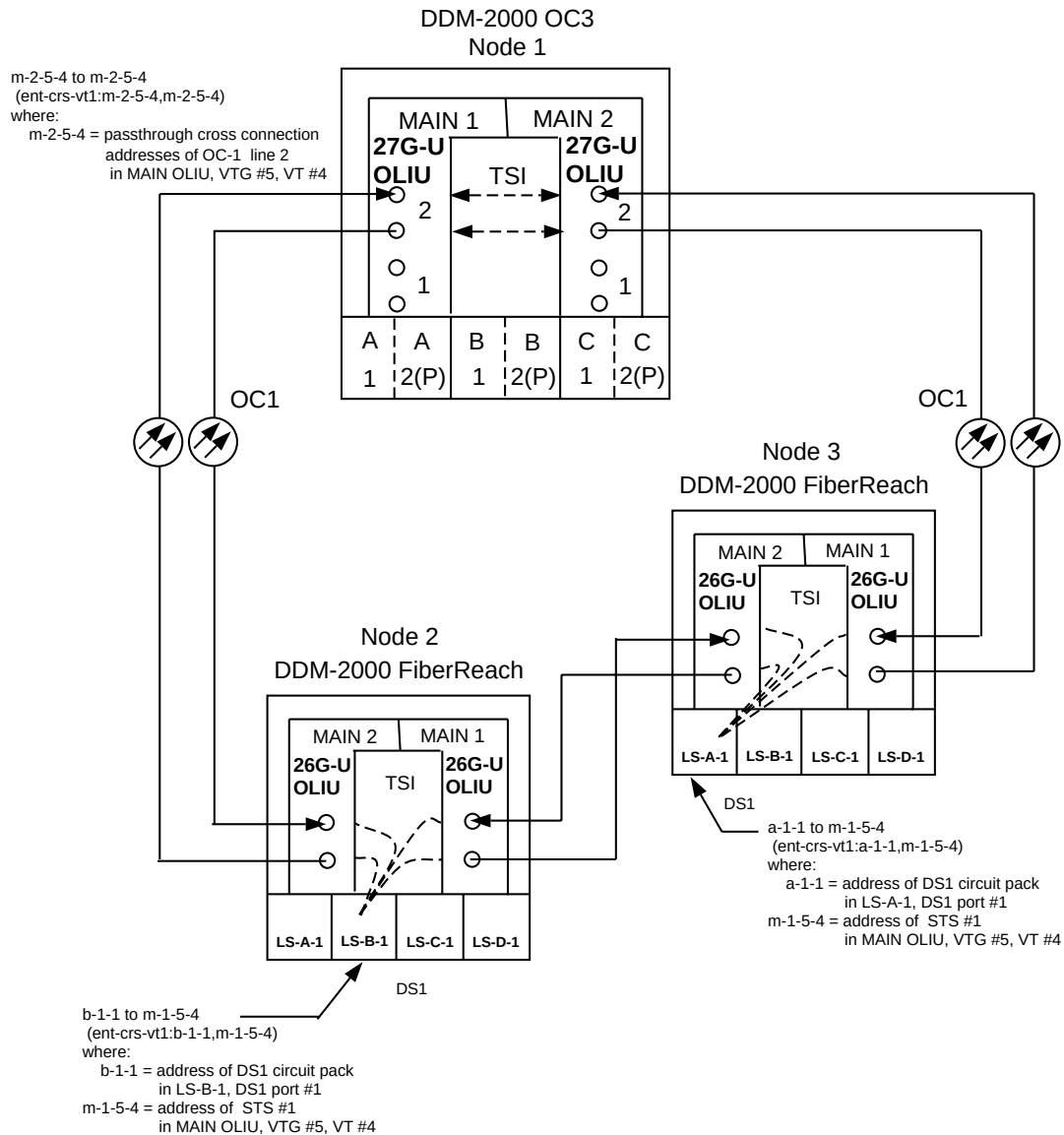


Figure 5. Example of Stand Alone OC-3/OC-1 Cross-connections

Make Cross-Connections Using CIT Single/Dual Homing and OC-3 Extensions OC-48/OC-3 Configuration

1. **NOTE 1:**

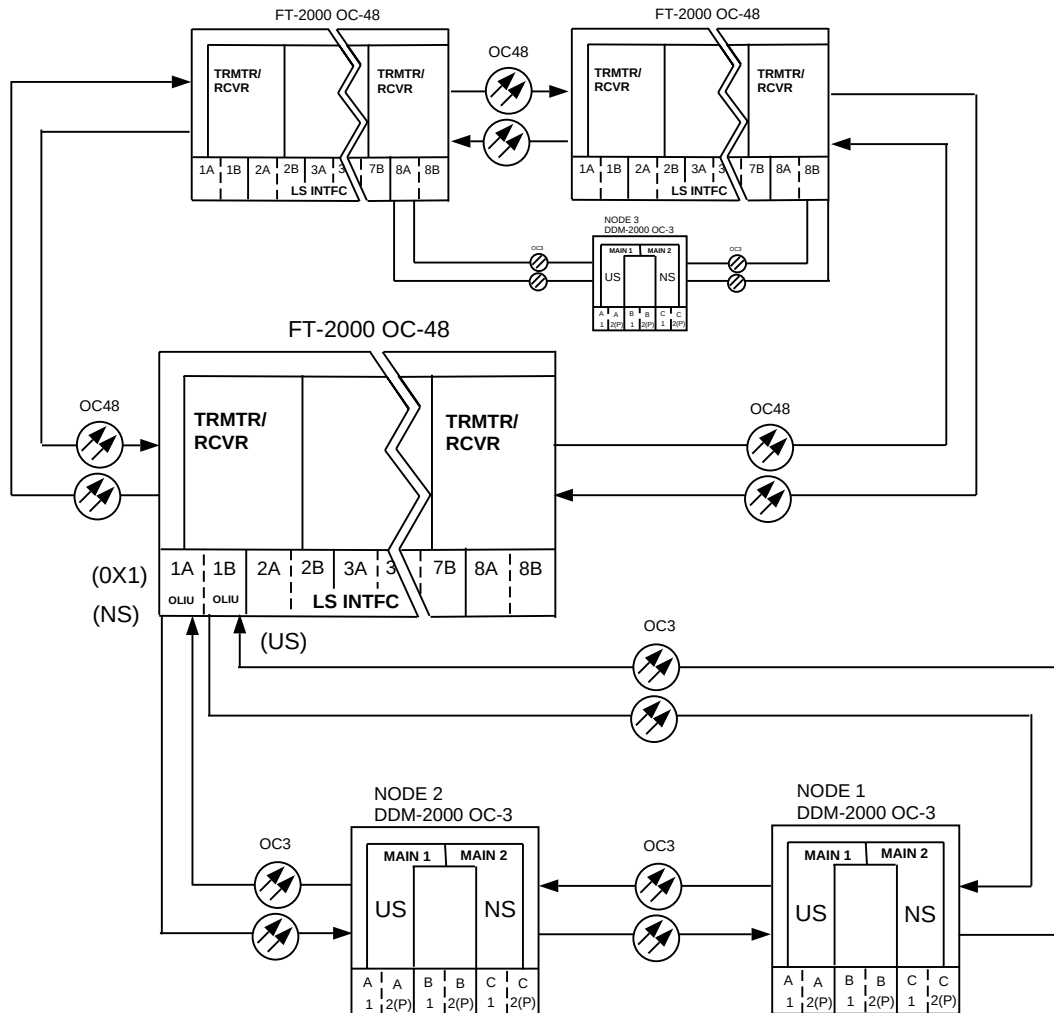
If you are not familiar with doing cross-connections using the CIT commands, it is strongly suggested that you read *Cross-Connection Provisioning* in the "Administration and Provisioning" section in 363-206-280, *DDM-2000 OC-3 Multiplexer, Releases 8.0 through 11.1, User/Service Manual—Volume I* and the appropriate documentation in 365-575-102, *FT-2000 OC-48 Lightwave System, User/Service Manual*. Also, read the description of the following commands in the "Commands and Reports" section of 363-206-280, *DDM-2000 OC-3 Multiplexer, Releases 8.0 through 11.1, User/Service Manual—Volume I* and the appropriate documentation in 365-575-102, *FT-2000 OC-48 Lightwave System, User/Service Manual*: **ent-crs-sts1**, **ent-crs-vt1** (OC-3 only), **rtrv-crs-sts1**, **rtrv-crs-vt1** (OC-3 only), **dlt-crs-sts1**, and **dlt-crs-vt1** (OC-3 only).

 NOTE 2:

You will have to log in to more than one node in each ring to get a complete map of the network using the **rtrv-map-network** and **rtrv-map-neighbor** command. If a drawing of the network is not provided with the work order, it is recommended that you draw a simple schematic of the network before making cross-connections.

Make a simple drawing of the network and list the TID of each node and how they are connected to each other. Figures 1, 2, 3, and 4 show examples of simple schematics.

2. Log in to any node in each ring in the network and use the **rtrv-map-network** and/or **rtrv-map-neighbor** command to retrieve a map of the network which lists all the systems and how they are connected to each other.



DDM-2000 OC-3 DCC Network Side (NS)/User Side (US) Defaults (set-fecom:nsus=ns/us)					
22-Type OLIUs (0X1 Rings application)	MAIN 1 dcc-m1	MAIN 2 dcc-m2	FN-A dcc-a	FN-B dcc-b	FN-C dcc-c
	US	NS	NS	NS	NS

Figure 1. Sample Single Homed Network Schematic

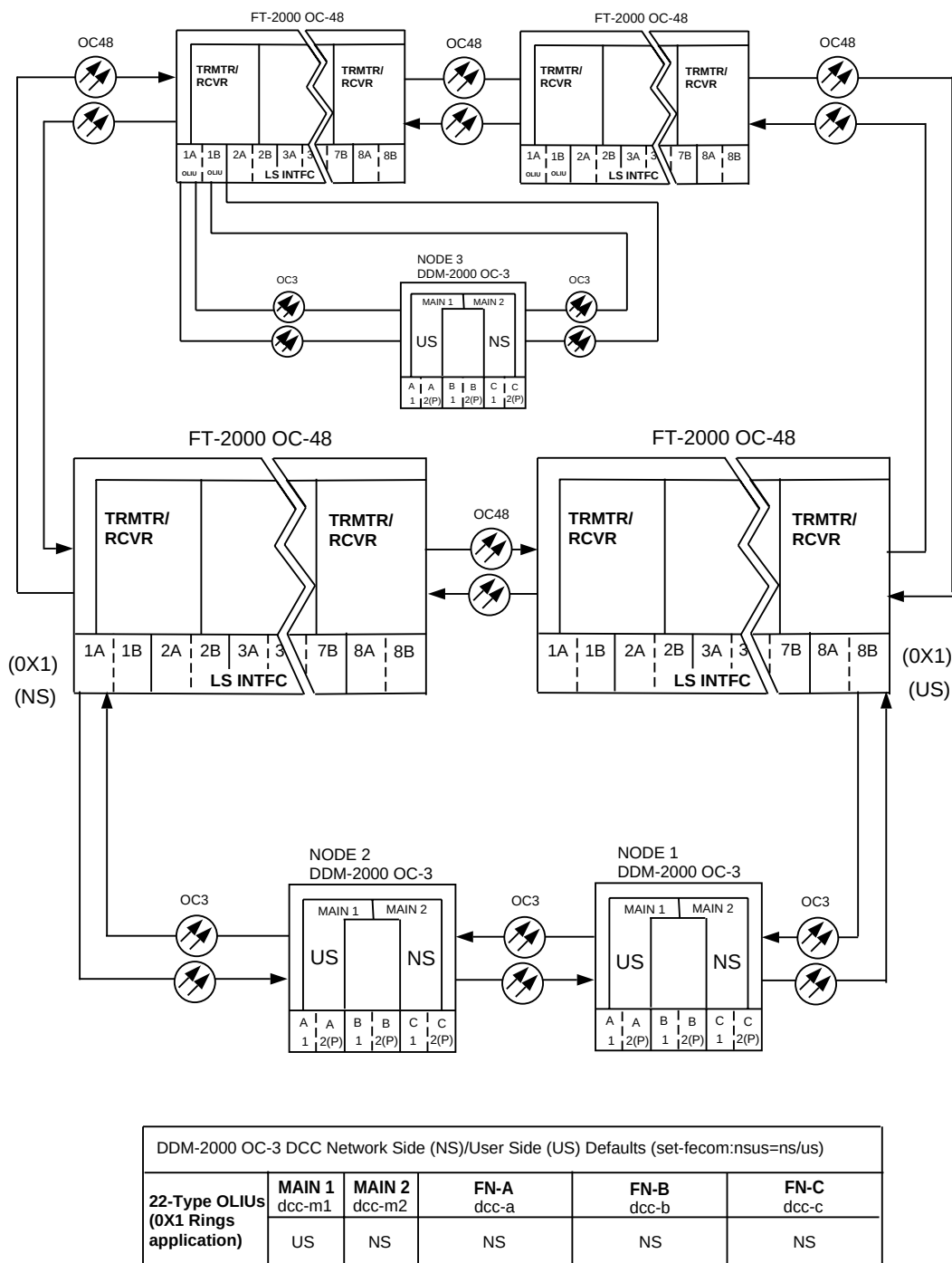


Figure 2. Sample Dual Homed Network Schematic

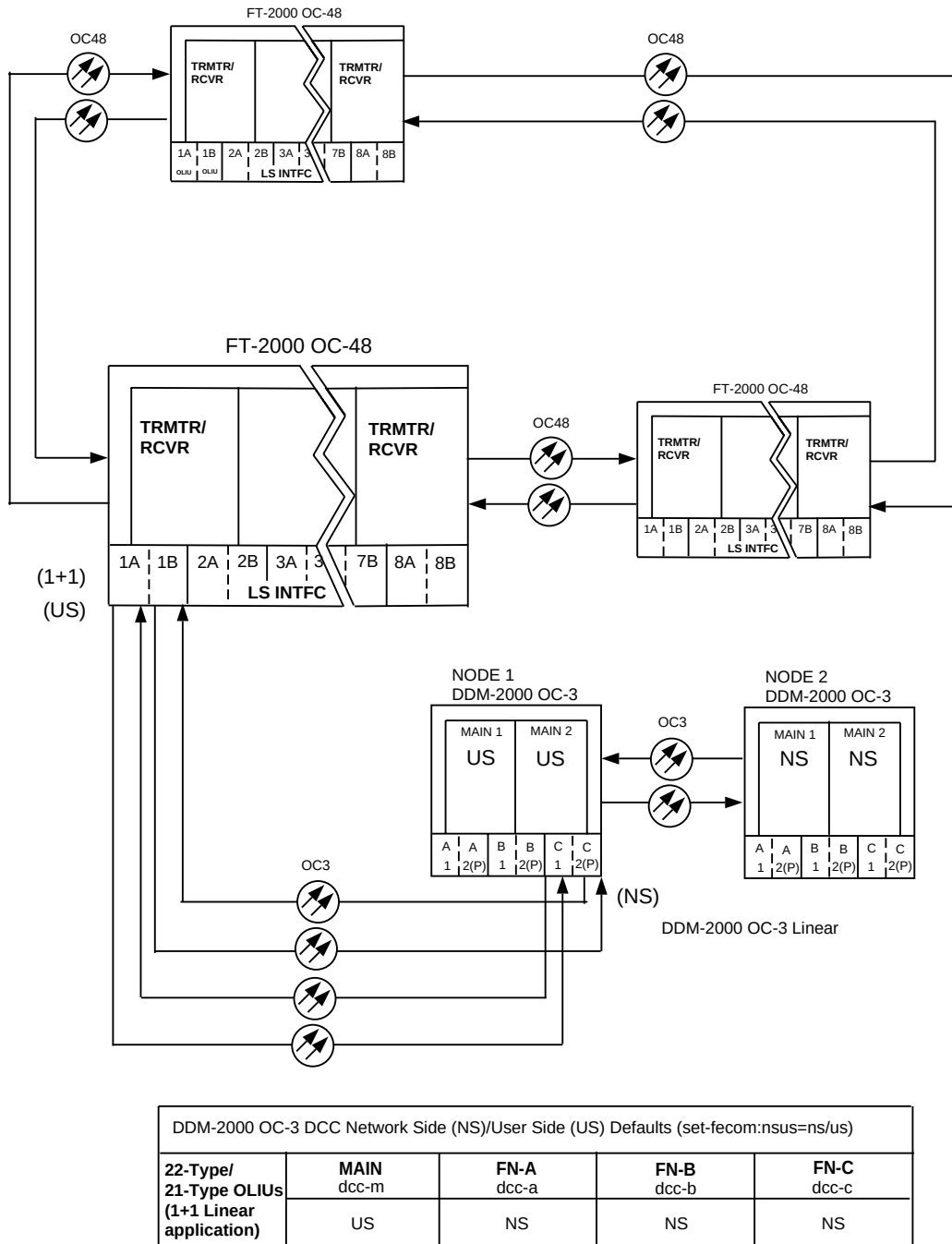


Figure 3. Sample OC-3 Linear Extension Network Schematic

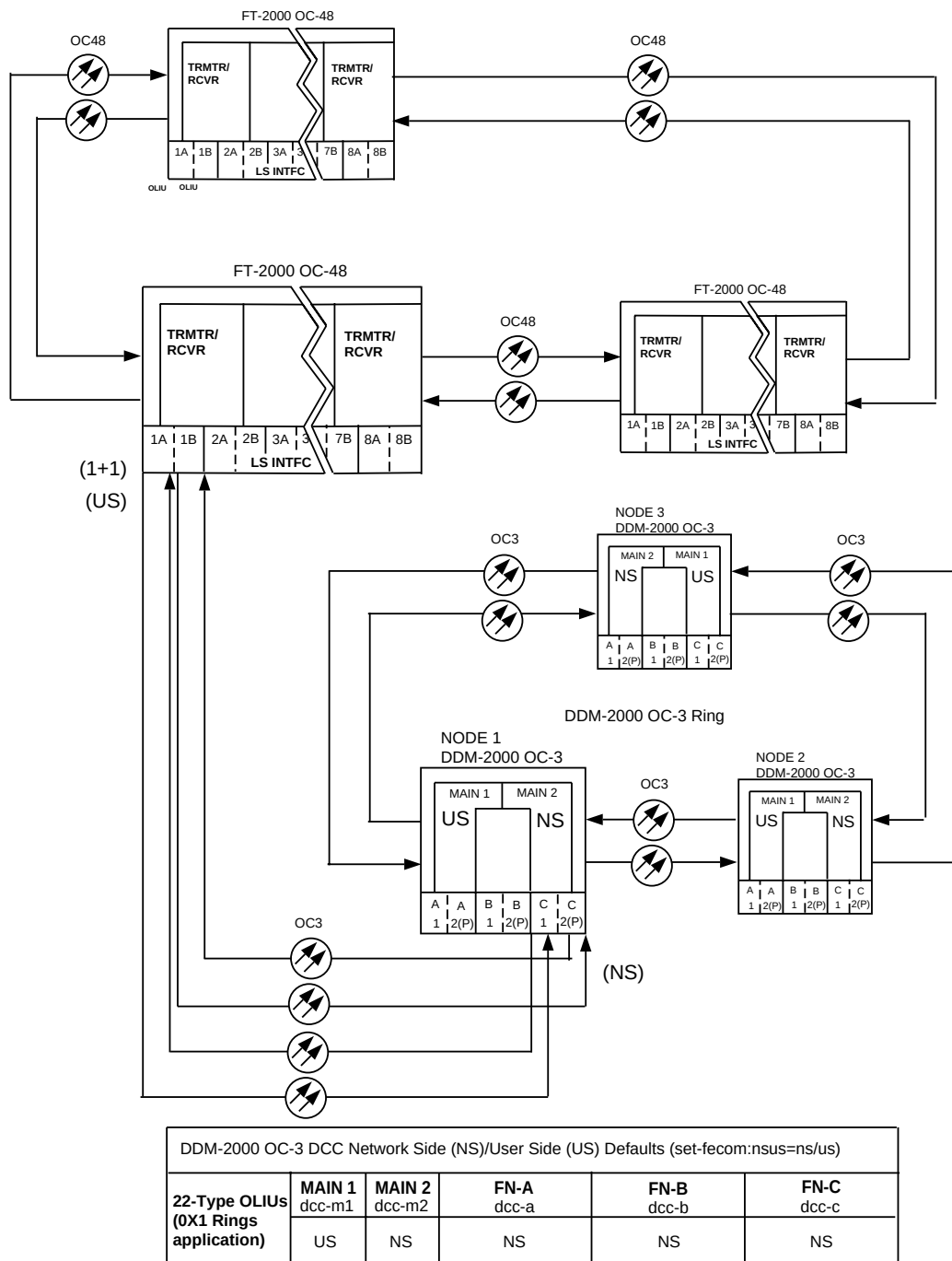


Figure 4. Sample OC-3 Linear Extension Network Schematic

3. Verify system configuration is same as specified on work order or circuit order.
4.  **NOTE:**
Cross-connections consist of drop and pass-through connections. For example in Figure 5, drop connections are made at OC-3 Nodes 1 and 3. Pass-through cross-connections are made at Node 2 in the network. Also, cross-connections must be made in all interconnected rings, including other DDM-2000 OC-3 rings, DDM-2000 OC-12 rings, and the FT-2000 OC-48 rings, as required. See **ent-crs-()** command in the "Commands and Reports" section of Volume 1 of this manual.

From work order or circuit order, determine the terminating (drop) nodes for the service being established.

5. From work order, circuit order, and the sketch made in Step 1, determine the pass-through nodes for the service being established.
6. From work order or circuit order, determine the host OC-48 node(s) that connects to the OC-3 ring(s) or extensions.
7. Use the **rtrv-eqpt:** command at each node in the network to verify that each shelf is properly equipped for the service being established. Ensure that **OLI** circuit packs are installed in the correct slots in the host OC-48 nodes.
8.  **NOTE 1:**
Cross-connections supporting DS1 services may be either STS1 or VT1.5 cross-connections in DDM-2000 OC-3. Only STS-1 cross-connections are allowed in FT-2000 OC-48. In an OC-3 shelf, use VT1.5 cross-connections for DS1 services if you expect to cross-connect only a portion of the VT1.5 signals in the STS-1 channel. If STS1 cross-connections are made at an OC-3 shelf, there is a fixed mapping of all 28 VT1.5 cross-connections to a specific shelf group [see **ent-crs-sts1** command].

⇒ **NOTE 2:**

The following commands may be used to delete, enter, and retrieve cross-connections: **dlt-crs-vt1** (OC-3 only), **dlt-crs-sts1**, **ent-crs-vt1** (OC-3 only), **ent-crs-sts1**, **rtrv-crs-vt1** (OC-3 only), and **rtrv-crs-sts1**. See the "Commands and Reports" section of each system manual for a description of commands.

⇒ **NOTE 3:**

In ring configurations, you should use the following rules in establishing cross-connections in each ring:

1. All terminating drop connections (including DRI, if present) from the same STS-1 timeslot must be provisioned the same, either all VT1.5 or STS-1.
2. If all 28 VT1.5s (DS1s) in an STS-1 are being passed through at a node in a VT1.5 path-switched ring, then the cross-connection may be provisioned as either a pass-through STS-1 or VT1.5. However, if you anticipate dropping VT1.5s from the pass-through node in the future, you should provision the pass-throughs as VT1.5 cross-connections. Provisioning now as a VT1.5 cross-connect will avoid a hit on traffic if the STS-1 cross-connect has to be converted to 28 VT1.5 cross-connects to drop DS1s at a later time.
3. On STS-1 path-switched rings, all nodes in the ring must be provisioned as STS-1 cross-connections.

From work order or circuit order, determine the cross-connections [STS-1 or VT1.5] to be made at each node [pass-through, terminating (drop), and host OC-48 node(s)] associated with the kind of service being established.

9. Starting at one of the terminating nodes for the DS1/STS-1 circuit being established, use the **rtrv-crs-()**: command at each node in the ring to verify that the cross-connections specified on the work order or circuit order may be made. For example, if the DS1 #1 low speed port in the **DS1** circuit pack in slot #2 of **LOW SPEED GROUP B** (b-2-1) is to be connected to timeslot m-1-2-1 and the **rtrv-crs-vt1** command shows that the cross-connection is already established, you should determine from office records if this port is already in-service before continuing with this procedure. If cross-connections are already assigned or improperly assigned, refer trouble to the organization responsible for facility design. Improperly assigned cross-connections may have to be deleted using the **dlt-crs-()** commands.
10. **⇒ NOTE:**
Channel state provisioning provides IS, AUTO, and NMON states for VT/STS1 channels similar to the port states for DS1 ports. When a cross-connection is made to a point of termination the channel is in the AUTO state and alarming is disabled. The channel must receive a good signal from either ring to cause the channel to transition to in-service (IS).

At all nonterminating pass-through nodes in the network, use the **ent-crs-vt1**: or **ent-crs-sts1**:) command to provision pass-through connections. [For example, to make the DS1 pass-through cross-connection for channel m-1-2-1 in other OC-3 shelves, use the **ent-crs-vt1:m-1-2-1,m-1-2-1:cct=twoway** command.]

11. At both terminating (drop) nodes of the circuit being established, use the **ent-crs-()**: command to make the terminating cross-connections at OC-3 nodes (for example at the OC-3 Node 3 in Figure 5, **ent-crs-vt1:m-1-2-1,b-2-1:cct=twoway**)

12. At the host FT-2000 OC-48 ring node sites, make proper cross-connections.
13. Use the **rtrv-crs-vt1:** or **rtrv-crs-sts1:** command to verify that the proper connections have been made. If an improper cross-connection is made, use the **dlt-crs-vt1:** or **dlt-crs-sts1:** command to delete the improper cross-connection and reenter the cross-connection.
14. At OC-3 terminating nodes equipped with **BBG4B DS3** circuit packs, use the **set-trace-sts1** command to verify the proper cross-connect path of a STS-1 cross-connected STS-1 signal.
15. After all cross-connections are made, use the **rtrv-alm:** command to verify no alarms are present.
16. If DS3 cross-connections have been established and the terminating nodes are equipped with **BBG4B DS3** circuit packs, use **set-trace-sts1** command to check integrity of cross-connect path.

Reference: **DLP-563**

17. If "ne-acty", "inc. VT AIS", "inc. STS1 AIS", "inc. VT unequipped", or "inc. STS1 unequipped" alarms are present, look for missing or improperly made cross-connections. Use **TAP-120** to locate missing cross-connections, if required.

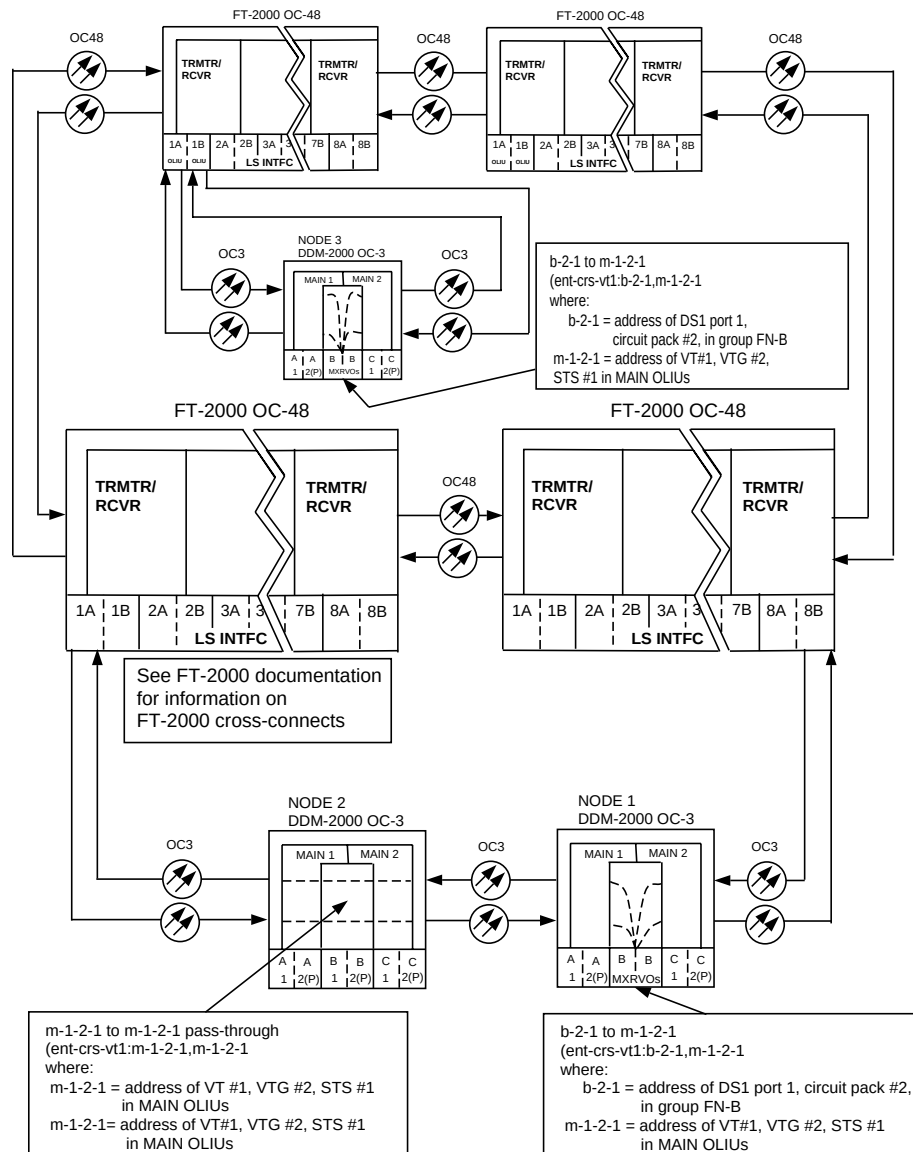


Figure 5. Example of Single/Dual Homing OC-48/OC-3 Cross-connections

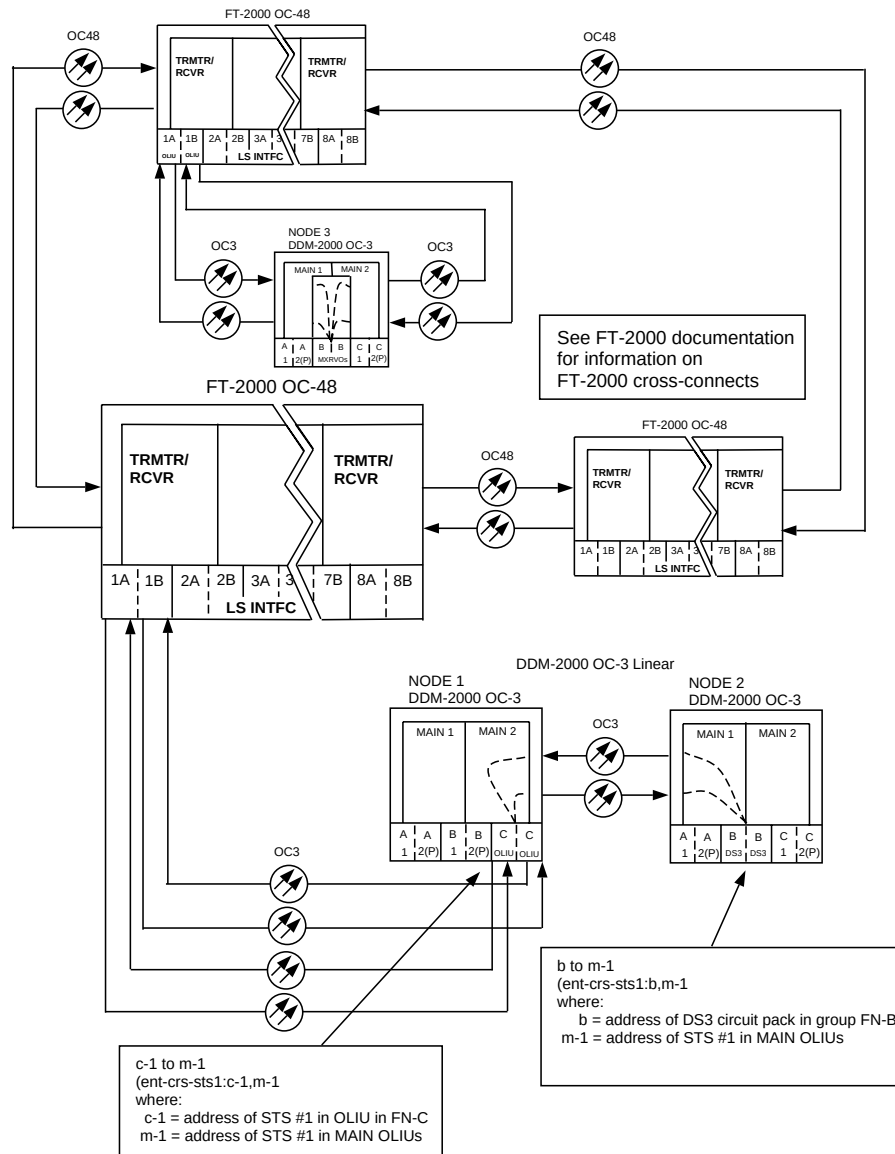


Figure 6. Example of FT-2000 with OC-3 Extensions Cross-connections



Make Cross-Connections Using CIT Single/Dual Homing OC-12/OC-3 Ring Configuration

1. **⇒ NOTE 1:**

If you are not familiar with doing cross-connections using the CIT commands, it is strongly suggested that you read *Cross-Connection Provisioning* in the "Administration and Provisioning" section and read the description of the following commands in the "Commands and Reports" section in 363-206-280, *DDM-2000 OC-3 Multiplexer, Releases 8.0 through 11.1, User/Service Manual—Volume I* and 363-206-290, *DDM-2000 OC-12 Multiplexer, Release 5 and Higher, User/Service Manual—Volume I*: "**ent-crs-sts1**", "**ent-crs-vt1**" (OC-3 only), "**rtrv-crs-sts1**", "**rtrv-crs-vt1**" (OC-3 only), "**dlt-crs-sts1**", and "**dlt-crs-vt1**" (OC-3 only).

⇒ NOTE 2:

You will have to login to more than one node in each ring to get a complete map of the network using the "**rtrv-map-network**" and "**rtrv-map-neighbor**" command. If a drawing of the network is not provided with the work order, it is recommended that you draw a simple schematic of the network before making cross-connections.

Make a simple drawing of the network and list the TID of each node and how they are connected to each other. Figures 1 and 2 show examples of simple schematics.

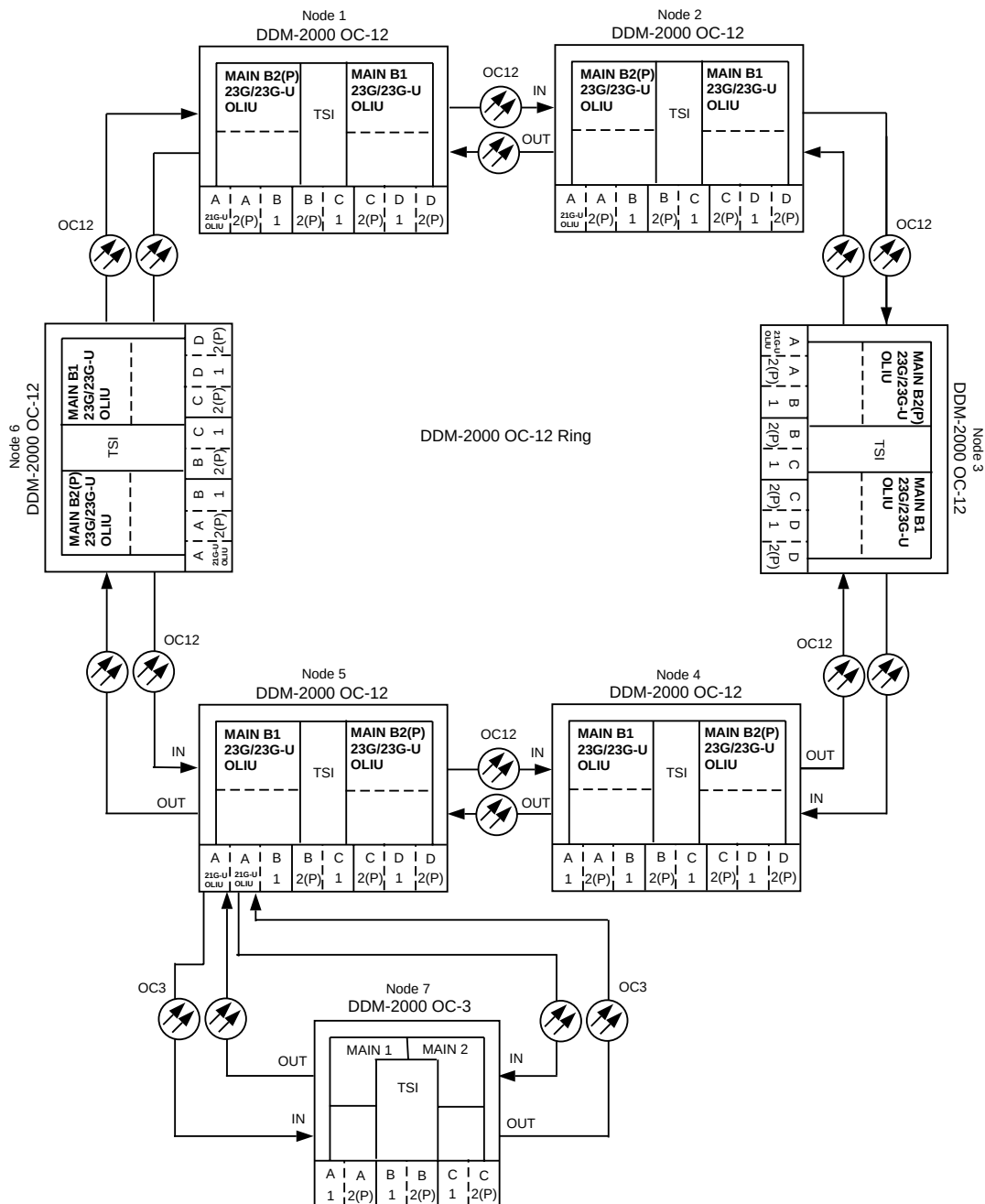


Figure 1. Sample Single Homed Network Schematic

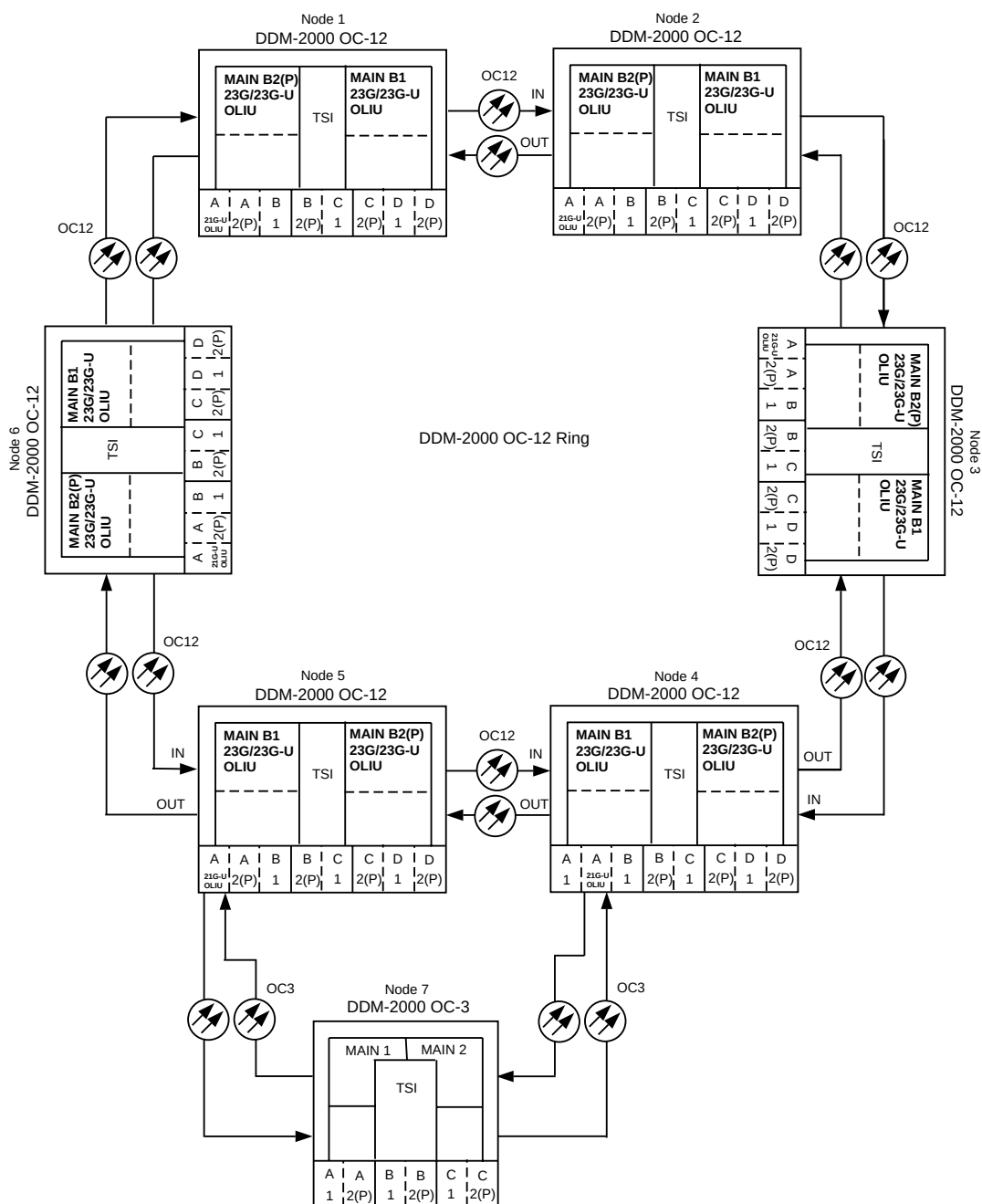


Figure 2. Sample Dual Homed Network Schematic

Log in to any node in each ring in the network and use the "**rtrv-map-network**" and/or "**rtrv-map-neighbor**" command to retrieve a map of the network which lists all the systems and how they are connected to each other.

Sample output reports are shown in Figures 2 and 3:

```
Node5 98-05-27 13:09:53 DDM-2000 OC-12, R5.1.1
M  rtrv-map-network: COMPLD
/* Network Map for Node5
```

System Name (TID)	Comm. Status	Product Type	NE Type	Alarm Group
Node5		DDM-2000 OC-12	DSNE	3
Node4		DDM-2000 OC-12		3
Node3		DDM-2000 OC-12		3
Node2		DDM-2000 OC-12		3
Node1		DDM-2000 OC-12		3
Node6		DDM-2000 OC-12		3
Node7		DDM-2000 OC-3		3

```
*/
```

Figure 3. Sample Report From rtrv-map-network Command

```
Node7 98-05-27 13:09:53 DDM-2000 OC-3, R11.1.1
M  rtrv-map-neighbor: COMPLD
/* Neighbor Map for Node7
```

System Name (TID)	Connected Through	Link Comm. Status	Product Type
Node7			DDM-2000 OC-3
Node5	main-1		DDM-2000 OC-12
Node4	main-2		DDM-2000 OC-12

```
*/
```

Figure 4. Sample Report From rtrv-map-neighbor Command

2. Verify system configuration is same as specified on work order or circuit order. For example, see Figures 5, 6, and 7.
3.  **NOTE:**
Cross-connections consist of drop and pass-through connections. For example in Figure 5, drop connections are made at Nodes 1, 4, and 5. Pass-through cross-connections are made at other nodes in the network (Figure 2). Also, cross-connections must be made in all interconnected rings, including other DDM-2000 OC-3 rings, DDM-2000 OC-12 rings, and FT-2000 OC-48 rings, as required. See "**ent-crs- ()**" command in the "Commands and Reports" section of Volume 1 of this manual.

From work order or circuit order, determine the terminating (drop) nodes for the service being established.

4. From work order, circuit order, and the sketch made in Step 1, determine the pass-through nodes for the service being established.
5. From work order or circuit order, determine the host OC-12 node(s) that connects to the OC-3 ring(s).
6.  **NOTE:**
In dual homing configurations (Figures 5 and 6), **OLIU** circuit packs must be installed in the correct slots in the host OC-12 nodes to support the direction of traffic required. For example in Figure 5, for traffic to be routed between Node 1 (See Figure 2) and the OC-3 system, the **21-Type OLIU** must be installed in **FUNCTION UNITS** group **A, B, C, or D**, slot **1** of Node 5 and **FUNCTION UNITS** group **A, B, C, or D**, slot **2(P)** of Node 4. This is required because traffic entering Node 5, slot **FUNCTION UNITS A 1** from the OC-3 shelf is automatically connected to the **MAIN B 1 OLIU** when cross-connections are made. Traffic entering slot **FUNCTION UNITS A 2(P)** is automatically connected to the **MAIN B 2(P) OLIU**.

In single homing configurations (Figure 7), the **21-Type OLIU** in **FUNCTION UNITS** group **A, B, C, or D**, slot **1** of the OC-12 shelf must be connected to the **MAIN 1 OLIU** in the OC-3 shelf. The **21-Type OLIU** in **FUNCTION UNITS** group **A, B, C, or D**, slot **2(P)** of the OC-12 shelf must be connected to the **MAIN 2(P) OLIU** in the OC-3 shelf.

Use the "**rtrv-eqpt**:" command at each node in the network to verify that each shelf is properly equipped for the service being established. Ensure that **OLIU** circuit packs are installed in the correct slots in the host OC-12 nodes.

7.  **NOTE 1:**
Cross-connections supporting DS1 services may be either STS1 or VT1.5 cross-connections in DDM-2000 OC-3. Only STS-1 cross-connections are allowed in DDM-2000 OC-12. In an OC-3 shelf, use VT1.5 cross-connections for DS1 services if you expect to cross-connect only a portion of the VT1.5 signals in the STS-1 channel. If STS1 cross-connections are made at an OC-3 shelf, there is a fixed mapping of all 28 VT1.5 cross-connections to a specific shelf group [see "**ent-crs-sts1**" command].

-  **NOTE 2:**
The following commands may be used to delete, enter, and retrieve cross-connections: "**dlt-crs-vt1**" (OC-3 only), "**dlt-crs-sts1**", "**ent-crs-vt1**" (OC-3 only), "**ent-crs-sts1**", "**rtrv-crs-vt1**" (OC-3 only), and "**rtrv-crs-sts1**". See the "Commands and Reports" section of each system manual for a description of commands.

⇒ **NOTE 3:**

In ring configurations, you should use the following rules in establishing cross-connections in each ring:

1. All terminating drop connections (including DRI, if present) from the same STS-1 timeslot must be provisioned the same, either all VT1.5 or STS-1.
2. If all 28 VT1.5s (DS1s) in an STS-1 are being passed through at a node in a VT1.5 path-switched ring, then the cross-connection may be provisioned as either a pass-through STS-1 or VT1.5. However, if you anticipate dropping VT1.5s from the pass-through node in the future, you should provision the pass-throughs as VT1.5 cross-connections. Provisioning now as a VT1.5 cross-connect will avoid a hit on traffic if the STS-1 cross-connect has to be converted to 28 VT1.5 cross-connects to drop DS1s at a later time.
3. On STS-1 path-switched rings, all nodes in the ring must be provisioned as STS-1 cross-connections.

From work order or circuit order, determine the cross-connections [STS-1 or VT1.5] to be made at each node [pass-through, terminating (drop), and host OC-12 node(s)] associated with the kind of service being established.

8. Starting at one of the terminating nodes for the DS1/STS1 circuit being established, use the "**rtrv-crs-()**:" command at each node in the ring to verify that the cross-connections specified on the work order or circuit order may be made. For example, if the DS1 #1 low speed port in the **DS1** circuit pack in slot #2 of **LOW SPEED GROUP B** (b-2-1) is to be connected to timeslot m-1-2-1 and the "**rtrv-crs-vt1**" command shows that the cross-connection is already established, you should determine from office records if this port is already in-service before continuing with this procedure.

If cross-connections are already assigned or improperly assigned, refer trouble to the organization responsible for facility design. Improperly assigned cross-connections may have to be deleted using the **"dlt-crs-()"** commands.

9. **⇒ NOTE:**

Channel state provisioning provides IS, AUTO, and NMON states for VT/STS1 channels similar to the port states for DS1 ports. When a cross-connection is made to a point of termination the channel is in the AUTO state and alarming is disabled. The channel must receive a good signal from either ring to cause the channel to transition to in-service (IS).

At all nonterminating pass-through nodes in the network, use the **"ent-crs-vt1:"** or **"ent-crs-sts1:"** command to provision pass-through connections. [For example, to make the DS1 pass-through cross-connection for channel m-1-2-1 in other OC-3 shelves, use the **"ent-crs-vt1:m-1-2-1,m-1-2-1:cct=twoway"** command. To make pass-through cross-connections for STS-1 #1 in an OC-12 shelf, use the **"ent-crs-sts1:m-1,m-1:cct=twoway"** command.]

10. At both terminating (drop) nodes of the circuit being established, use the **"ent-crs-():"** command to make the terminating cross-connections (for example at the OC-3 node in Figure 5, **"ent-crs-vt1:m-1-2-1,b-2-1:cct=twoway"**)
11. At the host OC-12 ring node sites, make proper cross-connections. For example, in Figure 5 at Node 5, if STS-1 channel #1 from the OC-3 **MAIN 1 OLIU** is to be cross-connected to STS#1 in the OC-12 **MAIN B 1 OLIU** then the command **"ent-crs-sts1:mb-1,a-1:cct=twoway"** would be used to make the cross-connection.

12. Use the "**rtrv-crs-vt1:**" or "**rtrv-crs-sts1:**" command to verify that the proper connections have been made. If an improper cross-connection is made, use the "**dlt-crs-vt1:**" or "**dlt-crs-sts1:**" command to delete the improper cross-connection and reenter the cross-connection.
13. At terminating nodes equipped with **BBG4B DS3/BBG11B 3DS3** circuit packs, use the "**set-trace-sts1**" command to verify the proper cross-connect path of a STS-1 cross-connected STS-1 signal.
14. After all cross-connections are made, use the "**rtrv-alm:**" command to verify no alarms are present.
15. If DS3 cross-connections have been established and the terminating nodes are equipped with **BBG4B DS3/BBG11B 3DS3** circuit packs, use "**set-trace-sts1**" command to check integrity of cross-connect path.

Reference: **DLP-563**

16. If "ne-acty", "inc. VT AIS", "inc. STS1 AIS", "inc. VT unequipped", or "inc. STS1 unequipped" alarms are present, look for missing or improperly made cross-connections. Use **TAP-120** to locate missing cross-connections, if required.

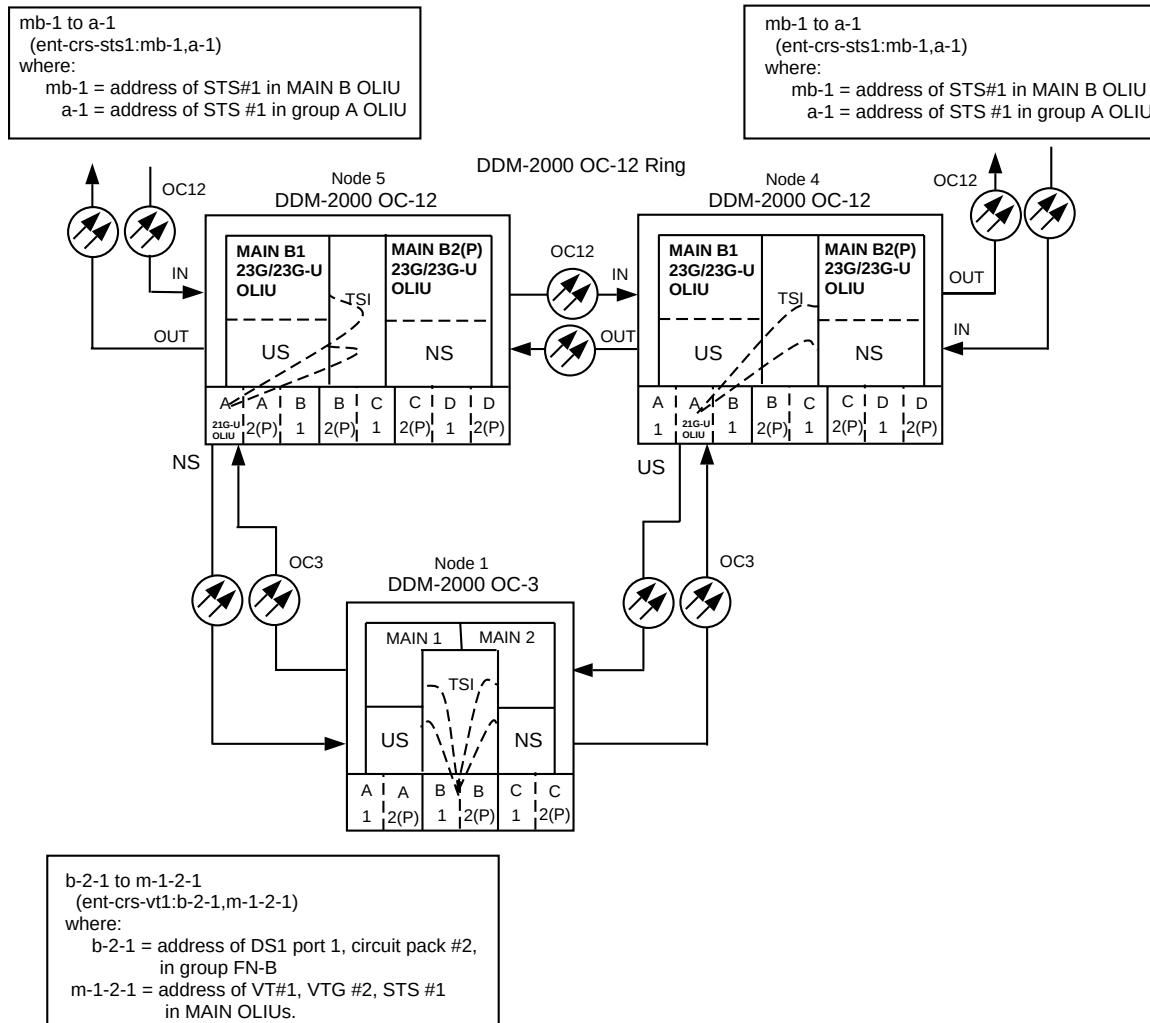


Figure 5. Example of Dual Homing OC-12/OC-3 Cross-connections

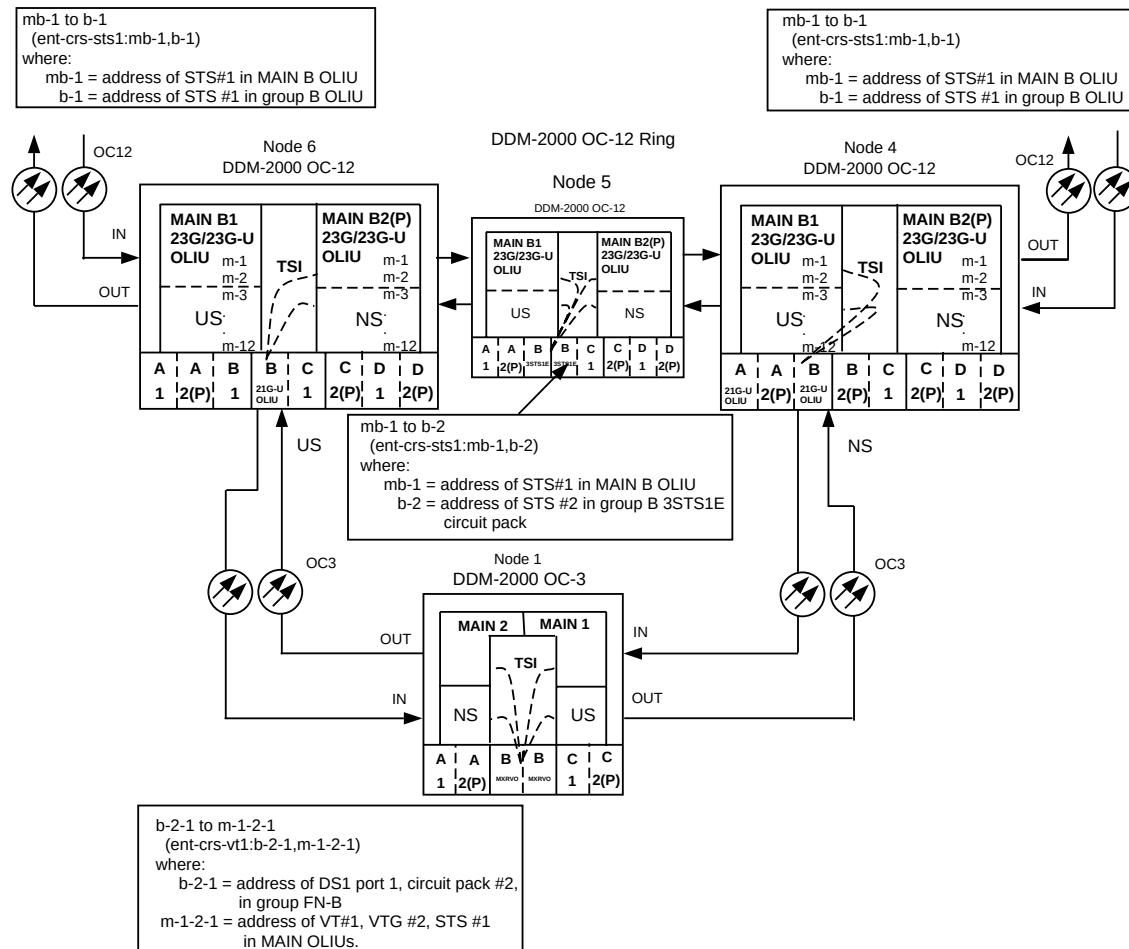


Figure 6. Example of Dual Homing OC-12/OC-3 Cross-connections

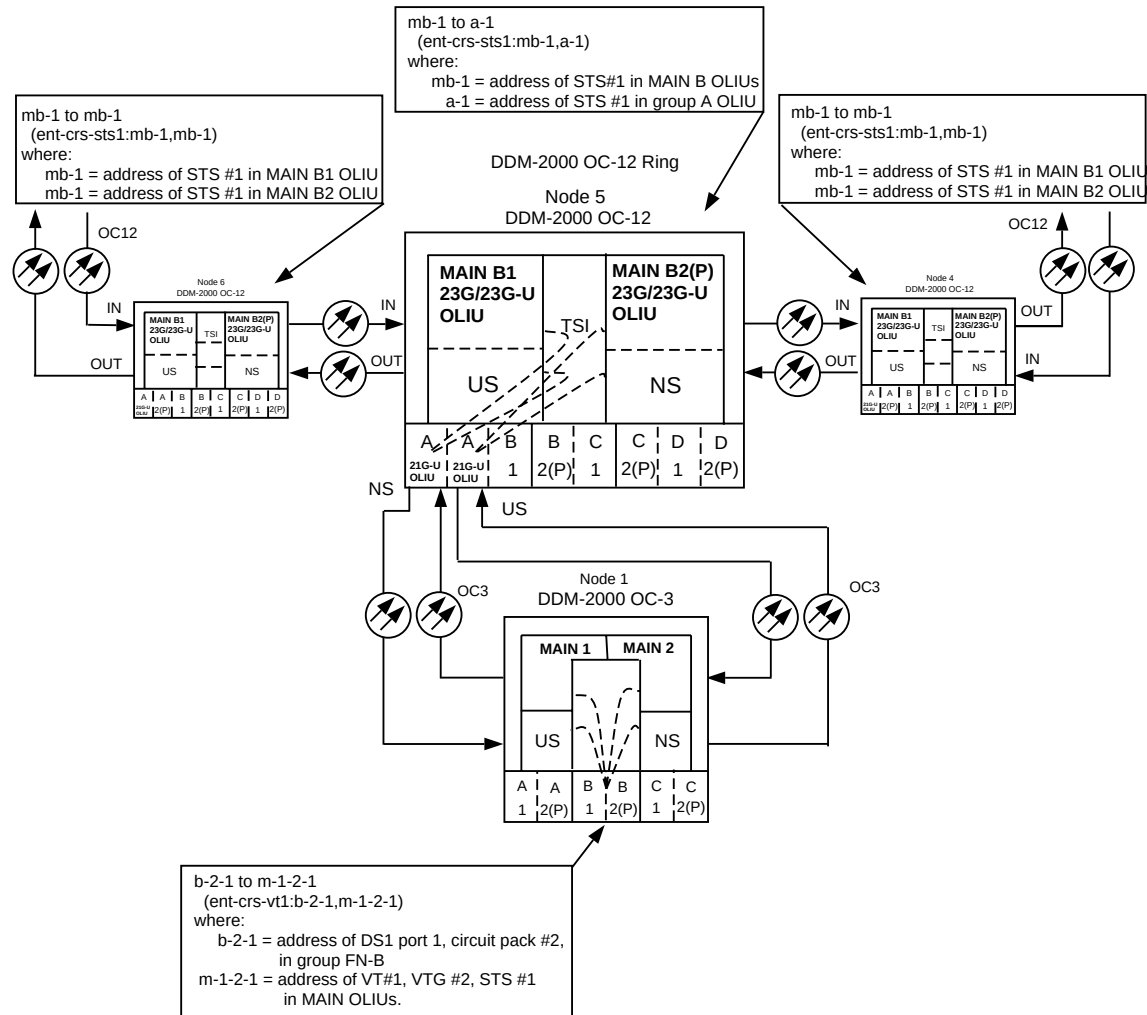


Figure 7. Example of Single Homing OC-12/OC-3 Cross-connections

Install Software Generic Program - New Shelf Installation Only BBG8/BBG8B SYSCTL and BBG9 OHCTL Installed

1.  **NOTE 1:**
This procedure is used to install a software program in a new DDM-2000 OC-3 shelf equipped only with the **BBG8/BBG8B SYSCTL** and **BBG9 OHCTL** controller circuit packs. The circuit packs may be new from the factory or circuit packs used previously that may be loaded with software. For procedures to download software locally to a fully equipped in-service shelf, see **DLP-532**. For procedures to download software remotely to a fully equipped in-service shelf, see **DLP-562**.

 **NOTE 2:**
It is assumed that the **BBG9 OHCTL** and **BBG8/BBG8B SYSCTL** circuit packs have been installed per **DLP-500** and **DLP-549**.

 **NOTE 3:**
If you are using a PC operating in a *Windows*^{*} environment, you must **exit Windows** and restart your PC in *MS-DOS*^{*} mode before performing these download procedures. For example, if your PC is running *Windows 95* you must exit *Windows* by clicking on the **Start** button, then **Shut Down**, then **Restart the computer in MS-DOS mode**.

Obtain equipment, check software, and connect PC for download.

Reference: **DLP-566**

* Registered trademark of Microsoft Corporation.

2. Observe one of the following indications on the **FE ID** display. Note the indication and follow the suggested procedure.

A. **Letter "P" in FE ID Display**

Indicates no software installed in **SYSCTL**. Software must be downloaded locally using these procedures.

Continue with **Step 3**.

B. **Letter "P." in FE ID Display**

Letter "**P**" followed by a period (**P.**) indicates a previous download attempt has failed. New software must be downloaded locally using these procedures.

Proceed to **Step 6**.

C. **FE ID Display Blank:**

Indicates compatible software is installed in **OHCTL** and **SYSCTL**. This procedure assumes the installed software version is not the correct version. (Version is displayed on the **FE ID** display when the **ACO** button is depressed for longer than 2 seconds.)

Proceed to **Step 6**.

D. **Letter "d" in FE ID Display:**

Indicates **OHCTL** has no software or that software in **OHCTL** and **SYSCTL** is incompatible.

Proceed to **Step 6**.

E. Letter "U" in FE ID Display:

Indicates **SYCTL** Switch **S1** is not set properly for type of shelf being equipped.

Remove **SYCTL**. Repeat procedures of **DLP-549** to correct switch settings and to install **SYCTL**.

F. Letter "E" in FE ID Display:

Indicates **SYCTL** must be replaced.

Get replacement **SYCTL** and repeat procedures of **DLP-549**.

G. Letter "F" in FE ID Display:

Indicates **SYCTL** faceplate latch is not fully latched.

Unplug **SYCTL** and repeat procedures of **DLP-549**. Ensure you properly latch the faceplate when installing **SYCTL**.

H. Flashing Letter "L" in FE ID Display:

Indicates a low voltage condition (brownout) on the shelf.

Clear trouble using **Trouble Clearing: TAP-121**.

Letter "P" in FE ID Display

3. Ensure PC is connected to the front CIT (CIT-1) connector of shelf receiving software. 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.

4. **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 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 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 a.b.c is installed */
```

The **SYSCTL** resets and the terminal is logged off the system.

5. Was response correct?

If **YES**, then **STOP. YOU HAVE COMPLETED THIS PROCEDURE.**

If **NO**, then proceed to **Step 10.**

Letter "d" or "P." in FE ID Display or Display Blank

6. Ensure PC is connected to the front CIT (CIT-1) connector of shelf receiving software. 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.
7. 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. If after starting the terminal emulator you see the message "Can't find script <init>", disregard it.

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.

8. 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 (approximately 15 seconds). Software download 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 a.b.c is installed */
```

The **SYSCTL** resets and the terminal is logged off the system. After approximately three minutes, you can log into the system.

9. Was response correct?

If **YES**, then **STOP. YOU HAVE COMPLETED THIS PROCEDURE.**

If **NO**, then continue with **Step 10.**

10. Did the download start as indicated by the In progress message and rows of dots?

If **NO**, then continue with **Step 11**.

If **YES**, then proceed to **Step 18**.

11. Check that the DDM-2000 is connected to the PC through the **COM** port. If it is not, reconnect the PC to DDM-2000 using the **COM** port and repeat the procedure.

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 CTRM baud rate as follows and repeat this procedure: if the baud rate is currently set to 9600, change it to 4800 or if the baud rate is currently set to 4800, change it to 9600. The baud rate is changed by:

1. Momentarily depress 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 depress the "Escape/Esc" key to activate the new baud rate.
12. Ensure first (number 1) disk of program being installed is inserted, if using floppies.
 13. Ensure diskette is inserted in correct drive.
 14. Ensure the proper command was used to go to the drive with the diskette or to the proper directory containing the software.
 15. Check for invalid COM port. Exit TERM (Alt-F2), then restart TERM using **term COM1** or **term COM2**.
 16. If the download still does not start, refer to **Trouble Clearing: TAP-116**.
 17. **STOP. YOU HAVE COMPLETED THIS PROCEDURE.**

18. If the download *starts and fails* during its progress, exit TERM (Alt-F2), unplug and 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 (approximately 15 seconds). Repeat this procedure from **Step 3**.

If the download still does not complete, refer to
Trouble Clearing: TAP-116.

19. **STOP. YOU HAVE COMPLETED THIS PROCEDURE.**

Install New Software Generic Program In-Service System Remote Shelf Download

1. Before beginning the software installation, refer to the "Software Installation and Upgrade Procedure" section of the Software Release Description. This section contains a description of any special considerations required when installing this version of software.

2.  **NOTE 1:**

This procedure uses the "**cpy-prog**", "**ins-prog**", or "**apply**" command to install a new executing or dormant software program in a remote in-service DDM-2000 OC-3 shelf. It is assumed that the local shelf has already been upgraded and the software is executing normally or has been installed as a dormant copy. For procedures to download software in a new shelf (initial installation), see **DLP-561**. For procedures to download software to a local in-service shelf, see **DLP-532**.

Verify that no DCC failures or transmission failures (OC-3 LOS, flashing **OLIUFault** LEDs, etc.) are present on the network element or system receiving the program.

3. Use "**rtrv-fecom/set-fecom**" command to verify/enable far-end communications (fecom).
4.  **CAUTION:**
***TIMING** slot 2 should always be equipped with a **TGS** circuit pack and be active prior to software download. To clear a "**C**" condition from the **SYSCTL FE ID** display, procedures will require removal of the **TGS** circuit pack from **TIMING** slot 1 to force the system to run the new software. See Table A.*

Table A. DDM-2000 OC-3 In-Service Upgrade Compatibility

Current Release in Shelf (OLD)	Software Release To Be Installed (NEW)						
	Linear		Ring				
	8.0	8.1.n	7.2.n	9.0.n	9.1.n	11.0.n	11.1.n
7.1.n or earlier	NA	NA	C	C	C	C	C
7.2.n (Ring)	NA	NA	X	C	C	C	C
8.0.n (Linear)	X	X	C	C	C	C	C
8.1.n (Linear)	NA	X	NA	C	C	C	C
9.0.n (Ring)	NA	NA	NA	X	X	X	X
9.1.n (Ring)	NA	NA	NA	NA	X	X	X
11.0.n (Ring)	NA	NA	NA	NA	NA	X	X
11.1.n (Ring)	NA	NA	NA	NA	NA	NA	X

C - Indicates software incompatibility. Upon completion of the software download, a "C" will be displayed in the **SYSCTL FE ID** display. This is a caution indicating that the newly installed software has major changes from the previous release. Transmission will not be affected but shelf access, protection switching, alarm reporting, and control functions will be disabled while the "C" is displayed. You must verify that the correct software version has been downloaded and that a "C" was expected as a result of the download (See Table above). After verifying that the correct software download occurred, the system may be forced to run the new software by following the steps provided in this procedure.

NA - Not Applicable. If an NA conversion is required, contact your local technical support organization.

X - Indicates software compatibility. Download procedures will not require the system to be forced to run the software installed. No "C" should appear in the **SYSCTL FE ID** display. Other equipment/fiber changes and/or software/equipment provisioning may be required before and/or after the upgrade. See **System Turnup: IXL-001** for particular upgrade procedures and the Software Release Description for the software release being installed.

⇒ **NOTE 1:**

If a linear shelf is in the STS3c mode (**concat** mode enabled by the "**set-oc3**" command) and a different software generic that does not have the STS3c feature is loaded, the **OLIUs** will stay in the **concat** mode until they are removed and reseated.

⇒ **NOTE 2:**

When the "**ins-prog**" or "**cpy-prog**" command is used for software upgrades from Release 9.1 to Release 11, or later, the software is loaded as a dormant copy in the **SYSC** receiving the software. At the end of the download, the "**rtrv-alm**" report will show a status message of "*dormant/exec code mismatch*". The "**apply**" command must be used to overwrite the original executing copy of software with the new dormant software version. See the "Commands and Reports" section in 363-206-280, *DDM-2000 OC-3 Multiplexer, Releases 8.0 through 11.1, User/Service Manual—Volume I*, for a description of the "**apply**" command.

Before performing this procedure, ensure that both **TGS** circuit packs are installed in the shelf receiving the program, then use the "**switch-sync:s=circuitpack,pri>manual**" command to switch to the protection **TGS** circuit pack in **TIMING** slot 2, if not already **ACTIVE**. Use "**rtrv-sync:**" command to verify that the **TGS** circuit pack in **TIMING** slot 2 is **ACTIVE**.

5. ⇒ **NOTE 1:**

If you want to load new software to a remote shelf (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. For OC-3 Release 9.0 and earlier, only one "**ins-prog:**" per **term** session is permitted. After using the "**ins-prog:tid**" command to download software to one shelf, you must exit **term** (Alt F2) and re-execute **term** before starting a second "**ins-prog:**" command. If **term** is not exited, it will stop running if a second "**ins-prog:**" is started within the same **term** session. The PC will not respond or return any message and the "**ins-prog:**" will not progress.

⇒ **NOTE 2:**

If remote software downloading is allowed and you want to load new software to a remote site via 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 *tid* = the tid 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 3:**

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.

⇒ **NOTE 4:**

When upgrading from releases without synchronization messaging to releases with this feature, it is suggested to upgrade first the shelves which are provisioned for "external timed" or "external mult" timed. This is to prevent timing "holdover" conditions at nodes that derive timing from the OC-3 line.

Are you using "**cpy-prog**", "**ins-prog**", or "**apply**" command to download software to far-end shelf?

If **CPY-PROG**, then continue with **Step 6**.

If **INS-PROG**, then proceed to **Step 13**.

If **APPLY**, then proceed to **Step 34**.

6.  **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 and establish session with local shelf being used as a source for the new remote program download.

Reference: **DLP-521**

7. Enter the command "**cpy-prog: tid**"
Where tid = the target identifier (shelf name) for the remote DDM-2000 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 =.

8. Was response correct?
If **YES**, then continue with **Step 9**.
If **NO**, then do **Trouble Clearing: TAP-116**.

9. 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 far-end shelf receiving the program (for uncompressed executing copy download, not if dormant copy is being loaded). At DDM-2000 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 User Panel. 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 a.b.c is installed */
```

The LEDs go off on the User Panel and **SYSCTL**.

10. Was response correct?
If **YES**, then proceed to **Step 27**.
If **NO**, then continue with **Step 11**.
11. Wait approximately 10 minutes for network to stabilize then repeat this procedure from Step 7. If the second attempt to download software fails, then do **Trouble Clearing: TAP-116**. You may have to go to the remote site.
12. **STOP. YOU HAVE COMPLETED THIS PROCEDURE.**

13.  **NOTE:**
If you are using a PC operating in a *Windows*^{*} environment, you must **exit** *Windows* and restart your PC in *MS-DOS*^{*} mode before performing these download procedures. For example, if your PC is running *Windows 95* you must exit *Windows* by clicking on the **Start** button, then **Shut Down**, then **Restart the computer in MS-DOS mode**.

Obtain equipment, check software, and connect PC for download.

Reference: **DLP-566**

14.  **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-532**.
 - 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 front CIT (CIT-1). 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.

* Registered trademark of Microsoft Corporation.

15. 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. If after starting the terminal emulator you see the message "Can't find script <init>", disregard it.

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.

16. **⇒ 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] =

17. Was response correct?

If **YES**, then proceed to **Step 19**.

If **NO**, then continue with **Step 18**.

18. Check PC to **CIT** port connections. Make sure the cable is connected between the PC **COM()** port and the **CIT** connector on the DDM-2000. If the rear **CIT** connector is being used on the DDM-2000, make sure a null modem is installed on the port. Check term setup and make sure the **com** port selected matches the port (**COM()**) on the PC that is connected to the **CIT** port on the shelf. If CIT bay mult cabling is connected to this shelf verify that it is terminated.

Exit term (Alt-F2) and repeat this procedure from Step 14.

19. Enter the shelf number for the local shelf being used for new program download.

Response: PC responds with:

```
login<
password<

/*****
*
*
*      Lucent Technologies
*      DDM-2000 OC-3 Multiplexer
*
*      Release a.b.c
*
*****/

      .
      .
      .

TID date time
M  rtrv-alm: all COMPLD
/* Active Alarms and Status Report
```

20.  **NOTE:**

After the system prompt (<), the system will respond normally to commands entered. The "Commands and Reports" section of this manual gives a description of the commands.

Use "**rtrv-map-network**" command to retrieve the name (*tid*) of the remote shelf having new program installed.

21. Enter the command "**ins-prog: tid**"

Where tid = the target identifier (shelf name) for the far-end DDM-2000 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 =.

22. Was response correct?

If **YES**, then continue with **Step 23**.

If **NO**, then do **Trouble Clearing: TAP-116**.

23. 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 User Panel. 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 a.b.c is installed */
```

The **SYSCTL** resets, and the terminal is logged off the system. The LEDs go off on the User Panel and **SYSCTL**.

24. Was response correct?

If **YES**, then proceed to **Step 27**.

If **NO**, then continue with **Step 25**.

25. Wait approximately 10 minutes for the network to stabilize, exit **term**, then repeat this procedure from **Step 14**. If the second attempt to download software fails, do **Trouble Clearing: TAP-116**. You may have to go to the remote site.

26. **STOP. YOU HAVE COMPLETED THIS PROCEDURE.**

27. 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.
28. Is communication status good between local and remote shelf?
 If **YES**, then proceed to **Step 31**.
 If **NO**, then continue with **Step 29**.
29. Dispatch technician to remote site and perform local software download procedures.

Reference: **DLP-532**

30. **STOP. YOU HAVE COMPLETED THIS PROCEDURE.**
31. Use "**rlgn:tid**" command to remotely login to far-end shelf.

Reference: **DLP-522**

32.  **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*".

33. Does alarm report indicate "*dormant/exec code mismatch*"?
 If **YES**, then continue with **Step 34**.
 If **NO**, then **STOP. YOU HAVE COMPLETED THIS PROCEDURE.**

34. **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, 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.

See the "Commands and Reports" section in 363-206-280, *DDM-2000 OC-3 Multiplexer, Releases 8.0 through 11.1, User/Service Manual—Volume I*, 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 load the dormant version of software to replace the current executing software?

If **YES**, then continue with **Step 35**.

If **NO**, then **STOP. YOU HAVE COMPLETED THIS PROCEDURE.**

35. Use the "**rlgn:tid**" command to login to the remote shelf, then use the "**rtrv-ne:**" command to verify the *Dormant_Version* release.
36. Is the *Dormant_Version* release number listed and correct?
If **YES**, then continue with **Step 37**.
If **NO**, then proceed to **Step 39**.
37. 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.
LEDs and **FE ID** display go off on **SYSCTL** and User Panel.
The remote login session is terminated.
After approximately 10 minutes, you can remote login again to the remote shelf.
38. Was response correct?
If **YES**, then **STOP. YOU HAVE COMPLETED THIS PROCEDURE**.
If **NO**, then proceed to **Step 40**.
39. If the *Dormant_Version* release number is not listed, the dormant software is missing or corrupted. You will have to load new software.
40. Repeat this procedure to load new software using the "**cpy-prog**" or "**ins-prog**" command. If software installation fails again, you may have to dispatch a technician to the remote site to perform trouble clearing procedures, replace the **SYSCTL**, and/or install software locally using the procedures of **DLP-532**.
41. **STOP. YOU HAVE COMPLETED THIS PROCEDURE.**

Provision STS-1 Path Trace

OVERVIEW: This procedure is used to provision the transmit and receive path trace fields of an STS cross-connected STS-1 signal. Path trace is only applicable to STS paths terminating to a **BBG4B DS3** circuit pack because it is an STS-1 terminating device. This procedure can be performed from any network element in a DDM-2000 OC-3 network. See the "Commands and Reports" section in 363-206-280, *DDM-2000 OC-3 Multiplexer, Releases 8.0 through 11.1, User/Service Manual—Volume I*, for additional information on the **set-trace-sts1** and **rtrv-trace-sts1** commands.

1. If required, condition the CIT and connect it to the local DDM-2000 network element.

Reference: **DLP-521**

2. From office records, determine which DDM-2000 OC-3 network elements are the source and destination terminating network elements for the STS-1 path(s) to be traced.

3.  **NOTE:**

When performing this test, one DDM-2000 terminating shelf will be referred to as the near end and the other terminating shelf as the far end. These designations are arbitrary; either shelf can be the near-end or the far-end shelf.

Establish a login to the near-end terminating shelf.

4. Use the command **rtrv-crs-sts1** to determine the address of the STS-1 drop at each terminating location.

5. **⇒ NOTE 1:**

The path trace string may be up to 62 character long. The transmit (*trc*) and receive (*exptrc*) strings should be different within the same location; however, the *exptrc* from one location must identically match the *trc* at the other location.

⇒ NOTE 2:

Trace strings are case sensitive. Be sure to match capitals and lower case entries in the trace (*trc*) message at the near-end with the expected trace (*exptrc*) message at the far-end.

From office records, determine the path trace character string for each STS-1 path to be traced (path is between the source and destination network elements).

6. Use **set-trace-sts1:**

address:exptrc=ExpectedIncomingPathTrace, trc=OutgoingPathTrace command to provision the near-end Expected Incoming Path Trace (*exptrc*) string and near-end Outgoing Path Trace (*trc*) string.

7. Establish remote login to the far-end STS-1 terminating network element.

Reference: **DLP-522**

8. Use **set-trace-sts1:**

address:exptrc=ExpectedIncomingPathTrace, trc=OutgoingPathTrace command at the far-end to provision the Expected Incoming Path Trace (*exptrc*) string the same as you did for the *trc* string at the near-end terminating element. Provision the Outgoing Path Trace (*trc*) string the same as you did for the *exptrc* string at the near-end terminating element.

9. Use **rtrv-trace-sts1:address** command to retrieve the provisioned transmit and receive path trace strings for the STS-1 channel being tested.

10. Did the STS-1 Path Trace Report indicate Status: GOOD?
If **YES**, then proceed to **Step 14**.
If **NO**, then continue with **Step 11**.
11. Did the STS-1 Path Trace Report indicate Status: MISMATCH?
If **YES**, then proceed to **Step 13**.
If **NO**, then continue with **Step 12**.
12. Indications are that there is no incoming path trace message (Status: UNAVAILABLE). Verify that both terminating nodes are using **BBG4B DS3** circuit packs. Verify cross-connections and terminating addresses at all nodes. Repeat this test from Step 9.
13. Indications are that the Incoming Path Trace string message (INCTRC) does not match the Expected Path Trace string message (EXPTRC) — (Status: MISMATCH). Verify that the path string entered as the Expected Incoming Path Trace (EXPTRC) at this node matches exactly the Outgoing Path Trace string (TRC) entered at the other terminating node. circuit packs. Verify cross-connections and terminating addresses at all nodes. Repeat this test from Step 9.
14. Has the **rtrv-trace-sts1:address** command been performed at both terminating ends?
If **YES**, then **STOP. YOU HAVE COMPLETED THIS PROCEDURE**.
If **NO**, then continue with **Step 15**.
15. Log out of remote location. Repeat this test from Step 9. for the other terminating end.

Establish New Alarm Group System In-Service

OVERVIEW: This procedure establishes a new alarm group in an in-service system. It requires that a new AGNE be designated and new alarm group numbers be assigned to associated network elements. See the "Commands and Reports" section in 363-206-280, *DDM-2000 OC-3 Multiplexer, Releases 8.0 through 11.1, User/Service Manual—Volume I*, for additional information on the **set -ne** command.

1. If required, condition CIT and connect it to the local DDM-2000 network element.

Reference: **DLP-521**

2. Use the **rtrv-map-network** command to display all network elements that are a part of this network (associated with the same DSNE). Note the various *Alarm Group* numbers associated with each network element.
3. One at a time, log into a shelf in each alarm group that exists now and use the **rtrv-alm** command to verify that no alarms exist in any alarm group. If any alarms exist, they must be cleared before establishing a new alarm group.
4.  **NOTE:**
All network elements in the same alarm group must have the same alarm group number (**almgrp=1** through **255**).

From office records or work order, determine which DDM-2000 network element will be the new AGNE for the new alarm group. Determine new alarm group number (1-255) for the new AGNE and each associated network element.

5. From office records or work order, determine which DDM-2000 network elements will be in the same alarm group (*almgrp*) with the new AGNE.

6. Use **set-ne:tid=tid, agne=yes, almgrp=(1 through 255)** command to designate the new AGNE and its alarm group number.
7.  **NOTE:**
Other network elements of the same alarm group may be provisioned as backup AGNEs if required.

At each network element in the new alarm group, use **set-ne:tid=tid, agne=yes or no, almgrp=(1 through 255)** command to assign the new alarm group number.

8. Wait a few minutes, then verify that alarms are clear. Use the **rtrv-map-network** command to verify that all required network elements have been changed to the new alarm group.
9. **STOP. YOU HAVE COMPLETED THIS PROCEDURE.**

Sync Messaging Change Kbyte to Sbyte

1. **⇒ NOTE:**
This procedure may be used to change Kbyte sync messaging to Sbyte sync messaging.

Use **rtrv-alm** command to verify that there are no alarms or protection switches present on the system.

2. **⇒ NOTE 1:**
To minimize the amount of time that DDM-2000 shelves are in holdover mode when upgrading a ring network from Kbyte to Sbyte messages, it is recommended that you first upgrade the node(s) farthest away from the external timing source, then proceed to nodes closer to the timing source. For example, if all the line timed nodes in the network shown in Figure 1 had their *Sync Source (src)* set to *main1*, the farthest node from the external timing source would be Node D.

⇒ NOTE 2:
Note that in Figure 2, if Node B is changed to Sbyte first, then Node C will go into holdover. Note that in Figure 3, if Node D is changed to Sbyte first, then Node C and Node B, none of the nodes will go into holdover.

Use the **rtrv-sync/set-sync** command at each node in the network to display/set the synchronization source.

3. Use **rtrv-oc3/set-oc3:** command to verify/enable sync messaging (kbyte) at each node.
4. Determine the farthest node from the external timing source.

5. Use **set-oc3:syncmsg=Sbyte** command to enable Sbyte sync messaging at each node, starting from the node furthest from the external timing source.
6. Use the **rtrv-sync** command to display the provisioning and operational information of the synchronization interface.
7. **STOP. YOU HAVE COMPLETED THIS PROCEDURE.**

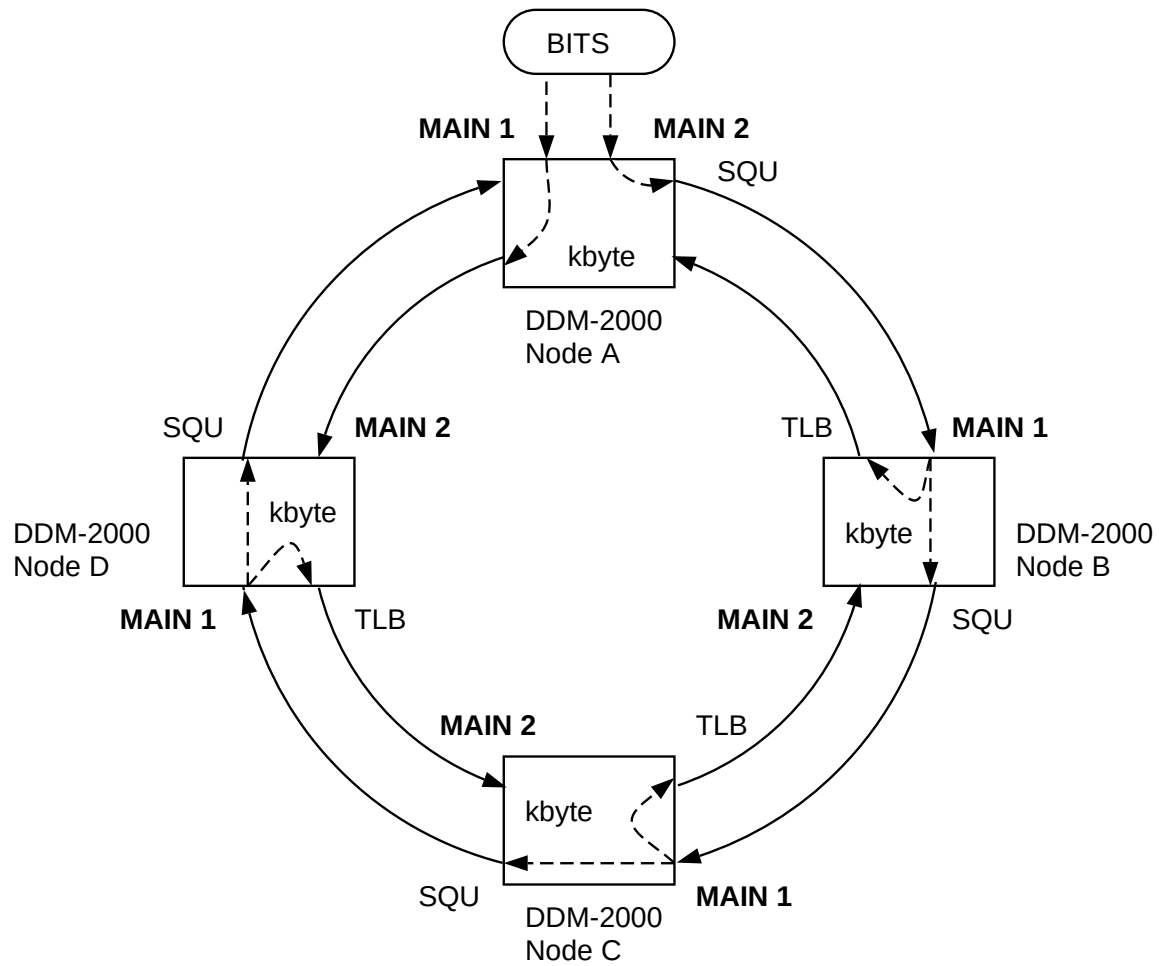


Figure 1. Normal OC-3 Ring Using Kbyte Messaging

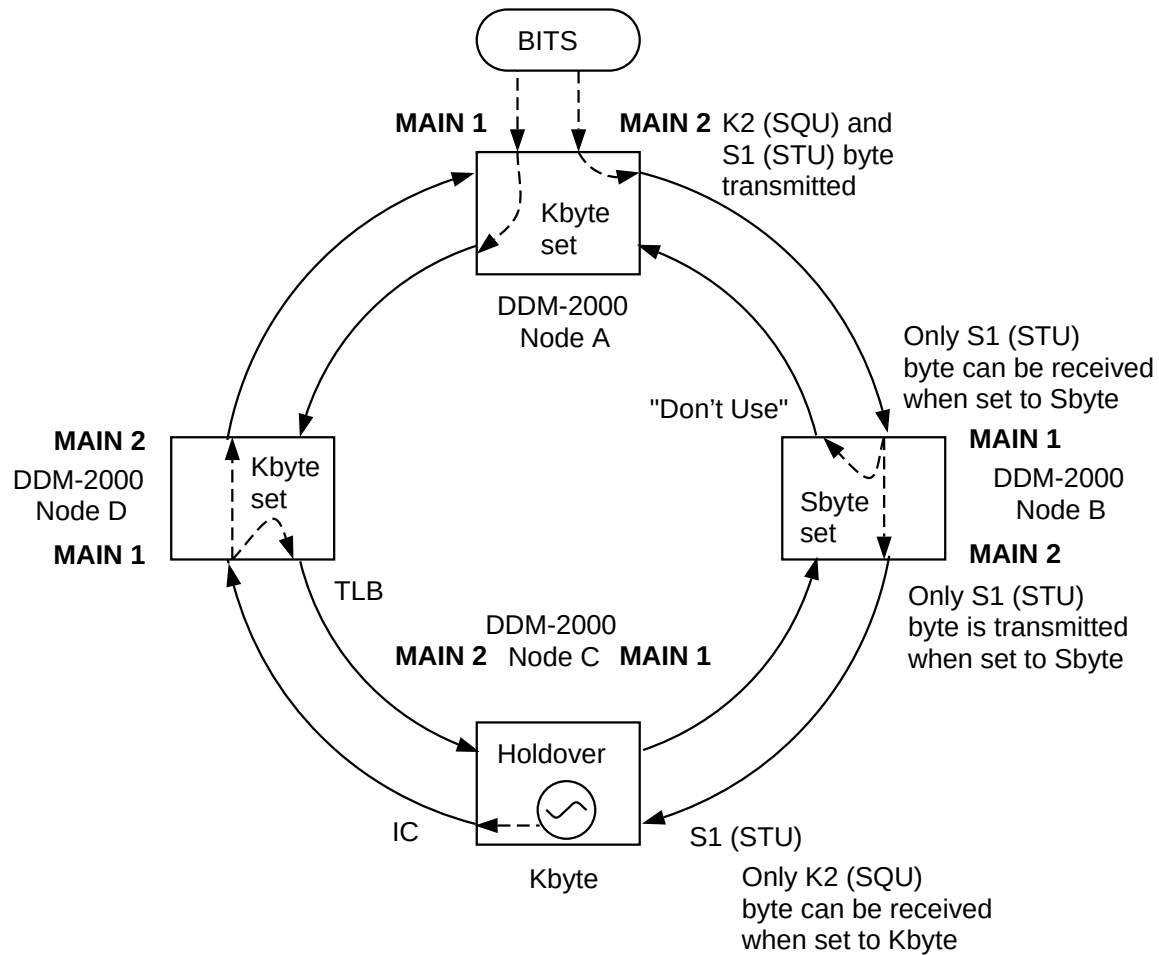


Figure 2. Abnormal Sequence of Changing Kbyte to Sbyte - One Node in Holdover

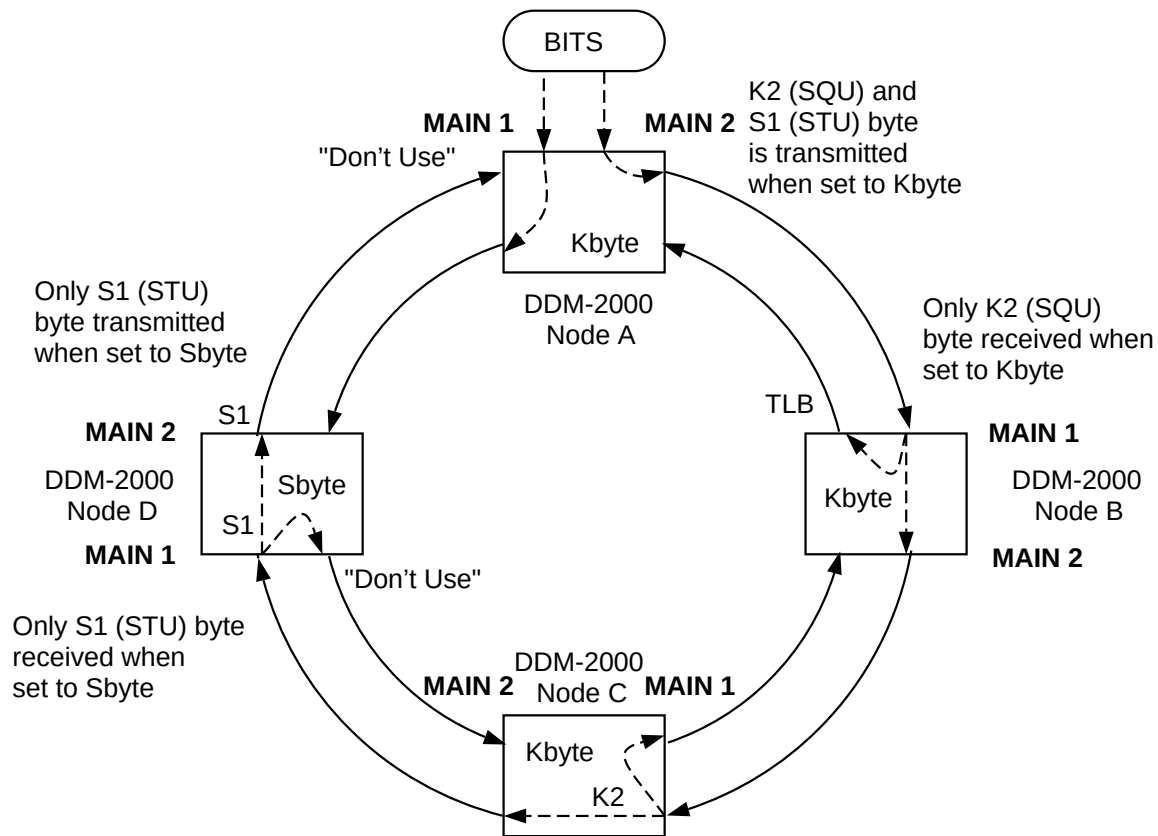


Figure 3. Normal Sequence of Changing Kbyte to Sbyte

Obtain Equipment, Check Software, Prepare and Connect Personal Computer (PC) for Software Download

1. Obtain the following equipment:

- (1) *IBM*^{*} compatible PC running an *MS-DOS*[†] computer program operating system, Release 2.1 or later.
- (2) RS-232 cable to connect PC **COM** port to User panel craft interface terminal (**CIT**) port.

⇒ **NOTE:**

The PC may be connected to either the front or rear CIT port, or remotely through a dial-up modem. If connected to the rear **CIT** port, a null modem is required between the RS-232 cable and the rear **CIT** port.

- (3) Working copies of the new system generic program diskette(s).
- (4) Software Release Description for software being installed.

* Registered trademark of International Business Machines Corporation.

† Registered trademark of Microsoft Corporation.

2. Before beginning the software installation procedure, the following is strongly suggested:
 - a. Become familiar with the characteristics and operating procedures of your PC and the *MS-DOS* operating system.

Reference: **DLP-533**

- b. Operate laptop PCs on AC power during download procedures.
 - c. Follow proper procedures in handling the diskette(s) (floppies).

Reference: **DLP-533**

- d. Make working copies and backup copies of the original new generic program diskettes.

Reference: **DLP-534**

- e. **Read the Software Release Description for software being installed.**
3. Before beginning the 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.

4. **⇒ NOTE:**

If you are using a PC operating in a *Windows*[‡] environment, you must **exit** *Windows* and restart your PC in *MS-DOS* mode before performing these download procedures. For example, if your PC is running *Windows 95* you must exit *Windows* by clicking on the **Start** button, then **Shut Down**, then **Restart the computer in MS-DOS mode**.

Start *MS-DOS* operating system on the PC [**DLP-534**].

Response: PC displays the prompt (for example, C>, C:\DOS>) determined by the PC.

[‡] Registered trademark of Microsoft Corporation.

5. If you are going to use the PC hard disk to load software to the shelf, **copy** all files on the source diskettes(s) (floppies) to a directory on the hard disk (for example, GEN_1111 for generic version 11.1.1).
6. If you are going to load the software from the hard disk, use the **cd** command to change to the appropriate hard drive directory containing the software.

If you are going to load the software from the floppies, use the appropriate *MS-DOS* command (for example, **a:** or **b:**) to go to the drive where the floppy disk will be installed.

Response: PC displays the appropriate prompt (A>, B>, C>, C:\DOS>, etc.) determined by the PC.

Comment: If you are using floppies and get a disk error message, verify the drive latch is locked and that you have the proper diskette installed in the drive.

7.  **NOTE:**
The new generic program may be on many floppy disks. If you are using the floppy disks, the PC will prompt you to insert disks as needed after the first disk is installed.

If you are using the floppy disks, insert the first (number 1) floppy disk into the PC drive.

8. **⇒ NOTE:**

The **checkpgm** command may take up to 25 minutes to complete.

Execute the command **checkpgm** to check the version number of the program you are installing. If using floppy disks, insert each diskette when prompted.

approx. 15 min. if using hard drive
approx. 25 min. if using floppy drive

Response: PC has DDM-2000 program version a.b.c

9. **⇒ NOTE 1:**

The shelf rear access CIT port is configured for a modem. A null modem is required to use this port with the PC.

⇒ NOTE 2:

The cable from the **CIT** port on the DDM-2000 must be connected to the **COM (COM1 or COM2)** RS-232 port of the PC. If a "**P**" or "**d**" is displayed in the **FE ID** display, the PC must be connected to the front **CIT** port.

Connect PC to **CIT** port by connecting one end of an RS-232 cable to the **COM()** port of the PC and the other end of the cable to the front or rear DDM-2000 **CIT** port.

10. **STOP. YOU HAVE COMPLETED THIS PROCEDURE.**

Install BBF8 HDSL Circuit Packs

1.  **CAUTION:**
*Take care to avoid damaging the light emitting diodes (LEDs) that protrude through the opening in the faceplate of the **BBF8 HDSL** (High Density Digital Subscriber Line) circuit pack.*

 **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.

Refer to Figure 1 and Table A and set option switches.

Table A. BBF8 HDSL Control Switch Settings

Control Settings	Switch S1 Settings			
	S1-1	S1-2	S1-3	S1-4
Master	—	OFF	—	OFF
Slave	—	ON	—	ON
Local	OFF	—	OFF	—
Remote	ON	—	ON	—

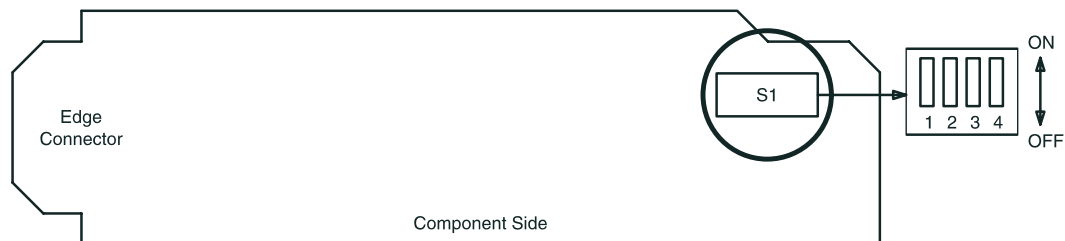


Figure 1. BBF8 HDSL Control Switch

2. **⇒ NOTE:**
A maximum of three **HDSL** circuit packs, including protection, can be installed with current **BBG2 MXRVO** circuit packs installed in the associated **LOW SPEED GROUP**.

Seat **HDSL** circuit pack in required slot of **LOW SPEED GROUP** being equipped.

Response: **FAULT** LED on **HDSL** circuit pack lights and may remain lighted for about 40 seconds and then goes off.

3. Repeat this procedure from Step 1 for each service **HDSL** circuit pack being installed.
4. **⇒ NOTE 1:**
One protection **HDSL** circuit pack may be installed in slot **8(P)** of each **LOW SPEED GROUP** being equipped.

If required, refer to Figure 1 and Table A and set option switches on protection **HDSL** circuit pack.

5. If required, install protection **HDSL** circuit pack into slot **8(P)** of **LOW SPEED GROUP** being equipped.

6. Install **177A** Retainer Cards into all unequipped service DS1 **LOW SPEED GROUP** slots.
7. **STOP. YOU HAVE COMPLETED THIS PROCEDURE.**

