Lucent Technologies
Bell Labs Innovations

DACS II
Release 8.0 PDS
Operation and Maintenance Manual

Volume I - Acceptance and Operation

365-353-121
Issue 1
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About This Document

Purpose

This document provides procedural information required to support the craft personnel activities involved in the daily operation and maintenance of the DACS II (Digital Access and Cross-Connect System II). It also includes an overview that describes the physical and functional attributes of the DACS II. This volume contains the procedures to isolate and clear troubles.

Intended Audiences

This document is for individuals who are responsible for the acceptance, provisioning, operation, and maintenance of the DACS II system, Release 8.0.

How to Use This Document

Before you attempt to use the procedures in this document you should become familiar with its contents. The contents are described below.

The document is divided into two volumes:

Volume I - Operation and Maintenance and Reference Information
Volume II - Trouble Clearing

With the exception of the reference information contained in Volume I, each of the volumes stands on its own. The reference information applies to both volumes.

There are three ways to access the information in this document:

- The index in the back of each volume
- The tabs and the table of contents in the front of each tab
- The overall table of contents in the front of each volume.

Before you use the procedures in this document, you should have completed the DACS II Operation and Maintenance course (TR3521). If you were not able to take the training course, you should carefully study the information in Chapter 1 and the *Command Denials* section (found in each volume).

The procedures are arranged to be performed in the sequence in which they are presented. If you perform a procedure out of sequence, you may have trouble performing that procedure and the subsequent procedures.

Always start the trouble-clearing process by performing the procedures in Chapter 1 *Trouble Identification* of Volume II. The sections in Volume II are functional groupings of troubles. It is not always obvious from the message or alarm which of the trouble sections provides the procedure or procedures for clearing the trouble. If you begin with Chapter 1, you will be directed from procedure to procedure until the trouble is cleared.

Contents

Volume I

- **Chapter 1 - Introduction**

  This chapter provides an overview of the DACS II. It describes the DACS II hardware arrangements, functional operation, and command and message set. This chapter contains reference information required to operate and maintain the DACS II.

- **Chapter 2 - Acceptance**

  This chapter contains all the procedures required to accept a DACS II frame after it has been installed.

- **Chapter 3 - Provisioning**

  This chapter provides the procedures to install circuit packs and to grow and enable the common equipment (frame, synchronizer, and cross-connect network) and Units (FTU, DS3U, HDS3U, and DSPU).

  Included are the procedures to install circuit packs and to grow and enable the NPCs (FTU with or without *SLC*® Carrier, DS3U, HDS3U, and DSPU, Subrate, or DMB).

  Also included are the procedures to make the DSX connections and perform tests to establish DS1 facilities with or without *SLC* Carrier, DS3 and Hybrid DS3 facilities, and Subrate channels.

- **Chapter 4 - Test Access**

  This chapter contains the procedures to establish the test ports, make the DS0 and Clear-DS1 test connections, and establish and test-subrate channels.

- **Chapter 5 - Remove and Degrow Equipment**

  This chapter contains the procedures to remove and degrow NPCs, units, and cross-connect networks.

- **Chapter 6 - Cross-Connections and Disconnections**

  This chapter contains the procedures to make DS0, Clear-DS1, Channelized-DS1, and Subrate cross-connections and to disconnect the cross-connections.

- **Chapter 7 - Administration**

  This chapter contains the procedures to log on or log off the DACS II; create, change, and delete alternate maps; and create, activate, and delete macros.

- **Chapter 8 - Maintenance**

  This chapter contains the procedures for routine PMEM and SMEM memory card maintenance, PMEM and SMEM card removal, and plug-in removal and replacement.

- **Chapter 9 - Performance Monitoring**

  The procedures in this chapter tell you how to schedule and retrieve reports that monitor various DS1 performance parameters.

- **Chapter 10 - Command Denials**

  This chapter lists the command denial codes and their meanings. This information is useful in determining problems with the DACS II. You should be familiar with the contents of this chapter before you attempt any of the other procedures.

Volume II

- **Chapter 1 - Trouble Identification**

  This chapter contains the procedures for interpreting the alarms and messages that identify troubles. ***All trouble clearing starts here. You are directed from here to a procedure in one of the following chapters. That procedure may direct you to a procedure in a chapter that follows it. The process continues until you isolate the fault***.

- **Chapter 2 - Power Failures**

  This chapter contains the procedures for isolating power troubles.

- **Chapter 3 - Facility Alarms**

  This chapter contains the procedures for isolating troubles in the facilities that connect to DACS II.

- **Chapter 4 - Hardware Failures**

  This chapter contains procedures for locating internal DACS II troubles. The messages associated with these troubles usually identify one or more possible faulty plug-ins.

- **Chapter 5 - Manual Diagnostic Failures**

  This chapter contains the procedures for clearing troubles identified when you run manual diagnostics.

- **Chapter 6 - Controller and Link Troubles**

  The procedures in this chapter are used to isolate troubles in the controller or the link connecting the controller to a terminal or operating system. These troubles are usually associated with a reset.

- **Chapter 7 - Data Base Troubles**

  The procedures in this chapter are used to isolate a conditional reset or back-up memory trouble.

- **Chapter 8 - Frame Audits**

  The procedures in this chapter are used to isolate faults detected when frame audits are run.

- **Chapter 9 - Software Error**

  The procedures in this chapter are used to isolate troubles indicated by a software trouble message.

- **Chapter 10 - Command Denials**

  This chapter lists the command denial codes and their meanings. This information is useful in determining problems with the DACS II.

Conventions Used

This manual uses special fonts in order for the user to differentiate computer input/output. The constant width font indicates message formats, keywords, letter representations of parameters, parameter values, and messages as they would appear on a DACS II terminal screen.

Related Documentation

The following documents support the DACS II system:

- DACS II Release 8.0 Installation Manual:
  - IPH903 (DACS II CEF)
  - IPH903I (DACS II ESBF)

  Audience: Customers planning to install the equipment

  Content: Customer installation instructions.

- DACS II Release 8.0 Product Description Manuals:
  - 365-353-120 (24 Channel)
  - 365-353-140 (30 Channel)

  Audience: Network planners, engineers, and others that need to know how the DACS II works and fits into the network

  Content: Features, applications, and description and other reference information.

- DACS II Release 8.0 Operation and Maintenance Manuals:
  - 365-353-121 (PDS)
  - 365-353-131 (MML)
  - 365-353-141 (PDS 2.048-Mb/s Interface)
  - 365-353-151 (MML 2.048-Mb/s Interface)

  Audience: End-user maintenance personnel

  Contents: Procedures to operate and maintain the DACS II.

- DACS II Release 8.0 Command and Message Manuals:
  - 365-353-122 (PDS)
  - 365-353-132 (MML)
  - 365-353-142 (PDS 2.048-Mb/s Interface)
  - 365-353-152 (MML 2.048-Mb/s Interface).

  Audience: End-user maintenance personnel

  Content: Description of each software input message and its response along with a description of each system output report.

- DACS II Release 8.0 Quick Reference Guides:
  - 365-353-123 (PDS)
  - 365-353-133 (MML)
  - 365-353-143 (PDS 2.048-Mb/s)
  - 365-353-153 (MML 2.048-Mb/s)

  Audience: End-user maintenance personnel

  Content: Abbreviated list of system commands and parameters.

- DACS II Release 8.0, Software Release Description:
  - Com. Code CC108164492

  Audience: End-user maintenance personnel

  Content: Upgrade procedures for the new software release, status of problems fixed in previous releases, and operating issues for the specified software release.

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Introduction

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Introduction

1

DACS II Overview

The DACS II is the current generation of equipment for access and cross-connection of DS0 (digital signal level 0) channels. DS0 channels are defined as 64-kb bandwidth channels produced by pulse code modulation (PCM). The DACS II is software-based equipment. The DACS II has both main and secondary controllers, centralized and distributed memory, and single-stage, nonblocking timeslot interchange circuitry. Small and large frame complexes and modular equipment design allow the DACS II to be economically deployed in both large and small installations.

The name Digital Access and Cross-Connect System describes the main function of DACS II. It accesses DS0 information channels in the digital signals connected to it. These digital signals can be 1.544-Mb/s DS1 signals or 44.736-Mb/s DS3 signals. This access allows cross-connecting of DS0 channels without decoding them to analog and allows channels to be brought outside the DACS II for testing. These cross-connect and test-access operations are initiated by commands entered on an administrative link.

DACS II uses a process called time slot interchange to electronically cross-connect single DS0 (64-kb/s) channels or any continuous range of up to 24 DS0 channels (1.544-Mb/s DS1 facility) within the DACS II cross-connect network. When three bays are equipped to terminate 640 DS1 facilities (original interface bays), it can connect all 15,360 DS0 channels in various cross-connect circuit configurations. If the capacity expansion frame (CEF) is equipped for 2,560 DS1 facilities, the DACS II can connect all 61,440 DS0 channels.

When equipped with the subrate feature, DACS II can cross-connect, access for testing, and multiplex subrate (2.4-kb/s, 4.8-kb/s, and 9.6-kb/s) and 56-kb/s digital data channels.

Up to four DS1 facility interfaces per frame can be reserved for DS0 test access. DACS II allows test access of any channel within a facility without interfering with any other channel. You can test with standard test equipment locally at the distributing frame or test from a remote location through the Remote Test System-5A (RTS-5A) or Remote Maintenance System-Digital 1 (RMS-D1) of Switched Access Remote Testing System (SARTS). If the frame is at the full capacity, the RMS-D1 system will have to be used because the RTS-5A is too small to handle the requirements at full capacity.

In addition, facility circuit packs can be software provisioned for clear-channel DS1 application and used for test access of other clear-channel DS1 facilities which terminate directly or terminate in DS3 signals. There is no restriction on the number of clear-DS1 network processing circuits (NPCs) that can be used for test access. There are ten possible test access configurations, including monitor and split modes with unidirectional and bidirectional connections.

DACS II also monitors the performance of connecting 1.544-Mb/s and DS3 facilities, checking for loss of signal and transmission errors. Additional facility parameters are monitored using different error-checking schemes on the DS1 signals (including those embedded in DS3). Facility performance is reported in a daily summary message and on demand by entering a command. If the errors or counted activities exceed prescribed thresholds, the DACS II initiates office and remote alarms and/or alarm messages over the administrative links.

The DACS II can be configured for gateway operation. When configured for gateway operation, the DACS II terminates both DSI (1.544 Ms/s) facilities and 2.048 Mb/s facilities. The DS0 channels in each of the facilities can be cross connected.

The DS3 feature lets the DACS II process domestic asynchronous DS3 signals. Up to six DS3 interfaces can terminate on a DS3 unit, and each DS3 interface can be grown as needed. With the modular DS3 unit equipment, the DS3 feature can be economically added for small-scale DS3 terminations, or with the flexible bay, most or all of the frame can be used to provide an alternative vehicle for substantial DS3 terminations. The cross-connections at the DACS II are done at the DS0 signal level so each incoming DS3 signal is demultiplexed to the constituent DS1s and the DS0 channels. The constituent DS1s are individually monitored for facility performance just like direct DS1 terminations. The DS0 channels can be packed or groomed into other DS1 facilities by cross-connections. A clear DS1 can also be supported on the DS3 unit, thereby providing the functionality of a true DS3/DS1/DS0 system.

The Hybrid DS3 feature expands DACS II system's DS3 capabilities to allow the processing of both Hybrid DS3 and regular DS3 signals. Any of the seven DS2 signals within a Hybrid DS3 signal may carry either three 2048 Mbit/s (E1) signals or four 1544 Mbit/s (T1) signals. However, the two signal types (T1 and E1) cannot be mixed within a DS2. The same modular flexibility of the DS3U has been incorporated into the HDS3U. The cross-connections are also performed at the DS0 level, so the demultiplexing and multiplexing of signals is similar to that of the DS3U.

Line loopback is supported for both the E1 and T1 signals within the Hybrid DS3 signal.

When a Hybrid DS3 signal fails, it will trigger the generation of a DS3 alarm message, but there will be no alarm messages for the individual T1 or E1 circuits. This will eliminate a flood of alarm messages. However, the circuits affected by the Hybrid DS3 signal failure will be placed in a CGA or BPA alarm state.

The *SLC*® carrier features provide a direct interface at DACS II for T1 lines from either *SLC* 96 carrier or *SLC* Series 5 carrier remote terminals. The channels from these remote terminal lines are then connected through DACS II to office equipment to provide the *SLC* carrier services. The DACS II provides *SLC* carrier alarm handling and facility protection switching so it can be placed in the route without altering the operation of the other equipment. For *SLC* 96 carrier, the direct interface supports both Modes I and III; for *SLC* Series 5 carrier, the interface supports Feature Package B (FPB) with specials (also referred to as Enhanced Feature Package B) and Feature Package C (FPC) for special services only.

For *SLC* 96 carrier Mode I, mixed services (POTS and specials) residing on the same T1 line are brought to DACS II. Special service channels are packed and routed to the network, and the POTS channels are passed through the DACS II to the local digital switch. This interface allows integration of the Mode I systems carrying any number of both POTS and specials. DACS II also supports Mode I systems carrying special services only. DACS II terminates the *SLC* 96 carrier data link, packs the specials onto either DS1 or DS3 facilities, and routes the services to their destination. For the Mode III, the DACS II acts as a replacement for back-to-back COTs (central office terminals) and D-channel banks. The Mode III facilities terminate directly on the DACS II, and the specials are routed to their destination in the network on either DS1 or DS3 facilities.

In the *SLC* Series 5 carrier FPC configuration, the DACS II connects nonlocally switched special service channels to network equipment in the office. Provisioning of the RT (remote terminal) channel units can be done over the facility data link with the Series 5 CIU (craft interface unit) connected at the DACS II. The DACS II continuously checks for discrepancies between the provisioning stored in it and the RT. The *SLC* Series 5 carrier FPB with specials interface supports the same functionality and feature set that the Mode I interface provides.

Physical Description

The paragraphs which follow describe the various frame, bay, unit, and circuit pack configurations offered by DACS II.

Frame Configurations

Figure 1-1 shows the DACS II frames covered in this manual and the software releases associated with each.

Table 1-1 lists the units that make up the frames. Table 1-2 lists the circuit packs in each unit.

With the exception of the single-bay frame, each frame is made up of one switch bay and one or more interface bays. The single-bay frame provides both switch and interface functions in a single frame. The switch bay contains the cross-connect network(s), synchronizer, main controller and backup memories. There are two types of interface bay. They are the original interface bay and the flexible interface bay. The original interface bay refers to interface bays that were provided before the flexible interface bay was available.

Single-Bay Frame

The single-bay frame, Figure 1-2, contains the units listed in Table 1-1. The single-bay frame contains many of the same circuit packs that are used in multibay frames. Differences in the capacity, the cross-connect network (CCN), and location of circuit packs are accounted for in the software by the information contained in the data base configuration file.

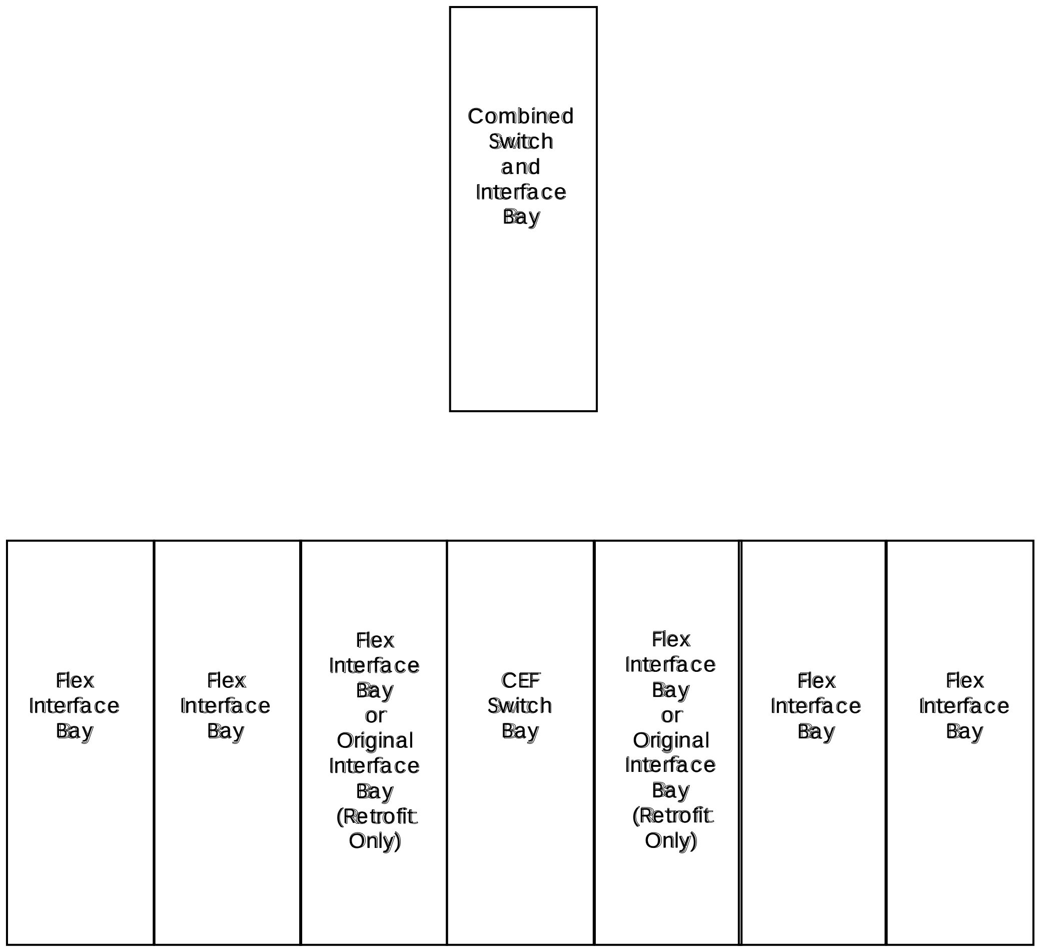


Figure 1-1. DACS II Frame Arrangements

Table 1-1. DACS II Frame/Bay/Unit Arrangements

FRAME TYPES

- Single-Bay Frame
- Capacity Expansion Frame (CEF)

BAY TYPES

- Switch Bays
- Interface Bays
- Single (Combination Switch and Interface Bay)

- SWITCH BAYS
  - Original (one in each double- and triple-bay frame)
  - CEF (one in each CEF frame)
- INTERFACE BAYS
  - Original (one in double-bay frames, two in triple-bay frames)
  - flexible (up to six in CEF frame)

SWITCH BAY UNITS

ORIGINAL SWITCH BAY	CEF SWITCH BAY
CCN (0 and 1)	ECCN (0 and 1)
Status Panel	Status Panel
Synchronizer	Synchronizer
MC (main controller)	MC (main controller)
CCN Power Unit (0 and 1)	
Fuse and Alarm	Fuse and Alarm

INTERFACE BAY UNITS

ORIGINAL INTERFACE BAY	FLEXIBLE INTERFACE BAY (FLEX BAY)
FTU (Maximum 2 per bay)	IFTU (Maximum 3 per bay)
FTM	FTM
Power and Control	
DSPU (Maximum 1 per bay)	DSPU (Maximum 3 per bay)
DS3U (Maximum 1 per bay)	DS3U (Maximum 3 per bay)
HDS3U (Maximum 1 per bay)	HDS3U (Maximum 3 per bay)

SINGLE-BAY UNITS

- Fuse and Alarm
- FTU
  - FTM
- CCN (0 and 1)
- Status Panel
- MC and Sync
- FTU Power and Control
- DSPU/DS3U/HDS3U

Table 1-2. DACS II Circuit Pack Equipment

FUNCTION NAME FULL	ABBREV	CKT PACK	USED IN/WITH	NUMBER REQUIRED PER FRAME OR UNIT (U)
ORIGINAL SWITCH BAY				
CCN (Cross-Connect Network)				2 sides (0 and 1)
Time Slot Interchange	TSI	TM660	CCN	Up to 36 per side
Cross-Connect Buffer	CCB	UM26B	CCN	Up to 6 per side
Cross-Connect Network Interface	CCNI	UM30	CCN	1 per side
Synchronizer				1
(Time Base Slots) TB can be installed in TLI 3				
Time Bases-Stratum 3	TBS3	TG60	SYNC	2 or 3
Time Base CEPT Local	TBCL	TG61		of 1 code
Time Base CEPT Toll	TBCT	TG62		
Stratum 2	TBS2	TG63		
(Timing Link Interface)	TLI		SYNC	Up to 8 Four 0 and 1 Pairs
Timing Extractor Function				Choose 2 of 1
Bipolar DS1	TXB1	TG64		or more codes.
Composite Clock 64 kb/s	TXCC	TG66		Selection based
Unipolar Clock	TXUC	TG67B		on the sync
BSRF	TXRF	TG68		configuration
CEPT 75-ohm Coax	TP75			
Timing Distributor Function				
Comp. Clock 64 kb/s out	TDCC	TG70		Choose 2 of 1 Code
Sine Wave 2.048 MHz out	TDS2	TG71B		as required
Digital Phase-Locked Loop	DPLL	TM590	SYNC	2 (0 and 1)
Synchronizer Power Unit	SPU	TG58 (5V)	SYNC	2 (0 and 1)

Continued on next page

Table 1-2. ***Continued***

FUNCTION NAME FULL	ABBREV	CKT PACK	USED IN/WITH	NUMBER REQUIRED PER FRAME OR UNIT (U)
Main Controller				1
Main Controller Power	MCP	SM565 (±12V)	MC	1 (U)
Central Processing Unit 2	CPU2	TM778*	MC	1
High speed Enhanced Communications Interface	HECI	TM762*	MC	1
Maintenance Circuit	MTC	UM24/UM24B	MC	1
Bus Extender	BX(2)	UM27/UM72*	MC	1
Power Unit	PU	411AA, (5V)	MC	1
CCN Power Unit				2 (0 and 1)
Power Unit	PU	485AB PWR UNIT (5V)	CCN Power	8
Fuse Board	DSR FUSE BD	ED-2C863-30 G3,ACCN	CCN Power	4
CEF SWITCH BAY				
ECCN (Cross-Connect Network)				2 (0 and 1)
Bus Terminator	BT	BBR1	ECCN	4 Two 0 and 1 Pairs
Clock Control Interface	CCI	BBS1	ECCN	2 One 0 and 1 Pairs
Expanded TSI	ETSI	BBS2	ECCN	Up to 32 Sixteen 0 and 1 Pairs

Continued on next page

Table 1-2. ***Continued***

FUNCTION NAME: FULL	FUNCTION NAME: ABBREV	CKT PACK	USED IN/WITH	NUMBER REQUIRED PER FRAME OR UNIT (U)
CEF SWITCH BAY (Contd)				
Synchronizer				
The synchronizer in the CEF switch bay uses the same circuit packs as the synchronizer in the original switch bay shown previously.				
Main Controller				
Main Controller Power	MCP	SM565 (±12V)	EMC	1
Central Processing Unit 2*	CPU2	TM778	EMC	1
High-Speed Enhanced Communications Interface	HECI	TM762	EMC	1
Maintenance Circuit*	EMTC	UM75	EMC	1
Bus Extender*	EBX	UM71	EMC	1
		(+12V), 411AA (+5V)	MC	1
Fuse Board				
Status Panel				
Status Circuit Pack	STATUS	ED-9C017-30	EMC	1 (F)

*New circuit pack CEF switch bay main controller.

Continued on next page

Table 1-2. *Continued*

FUNCTION NAME FULL	ABBREV	CKT PACK	USED IN/WITH	NUMBER REQUIRED PER FRAME OR UNIT (U)
INTERFACE BAYS				
Power and Control Unit				1
Central Processing Unit	CPU	TM657/TM657B	FTU	1
Unit Bus Extender	UBX	UM28	FTU	1
Power Unit	PU	411AA (5V)	FTU	3 per FTU
Fuse Board	DSR FUSE BD	ED-2C863-30 G1,A	FTU	2 (77-type)
Fuse Board	DSR FUSE BD	ED-2C863-30 G2,A	FTU	1
FTU				1 or 2 per bay
NPC				2 in each of the following circuit packs
Dual Digroup Circuit	DDC	TG80/TG80B	FTU	Up to 80
Enhanced Dual Digroup Circuit	EDDC	TG191	IFTU2	UP to 80
SLC 96 Carrier Direct Interface	S96D	TG183	FTU	Up to 80
SLC Series 5 Carrier Direct Interface	SS5D	TG184	FTU	Up to 80
Special Zero Code Suppression - ZBTSI	ZDC	TG186	FTU	Up to 80
Dual Primary Circuit (120-ohm termination)	DPC	TG182	FTU	Up to 64
Dual Primary Circuit (75-ohm termination)	DPC	TG185	FTU	Up to 64
Dual Primary Circuit (Minor BER) Circuit	DPC	TG187	FTU	Up to 64
Format Converter	FC	TG79	FTU	Up to 8 Four 0 and 1 Pairs
Facility Terminating Module Interface	FTMI	TG81	FTU	Up to 4
IFTU				Up to 3 per bay
IFTU uses the same circuit packs as the FTU (shown above) plus the following circuit packs.				
Central Processing Unit	CPU	TM657B	IFTU	1
Unit Bus Extender	UBX	UM28	IFTU	1
Fuse Board	DSR FUSE BD	ED-9C011-30	IFTU	16 (80-type)
Fuse Board	DSR FUSE BD	ED-9C012-30	IFTU	1 (80-type)
Power Unit	PU	411AA	FTU	3

Continued on next page

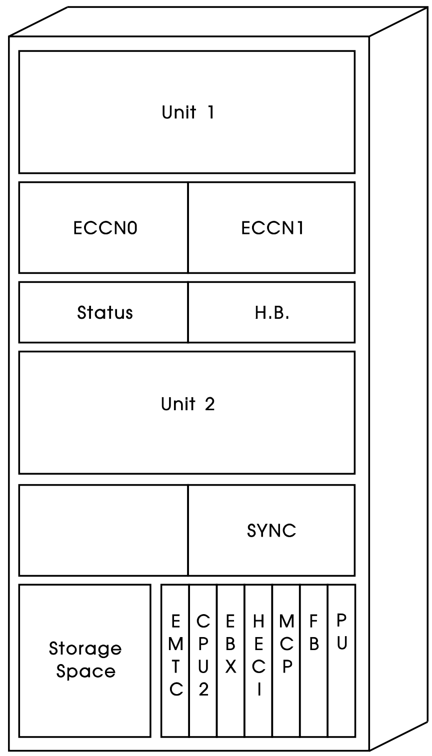
Table 1-2. *Continued*

FUNCTION NAME				
FULL	ABBREV	CKT PACK	USED IN/WITH	NUMBER REQUIRED PER FRAME OR UNIT (U)
INTERFACE BAYS (Contd)				
IFTU				Up to 3 per bay
IFTU2 uses the same circuit packs as the FTU (shown above) plus the following circuit packs.				
Central Processing Unit	CPU	TM657B	IFTU	1
Unit Bus Extender	UBX	UM28	IFTU	1
Fuse Board	DSR FUSE BD	ED-9C011-30	IFTU	16 (80-type)
Fuse Board	DSR FUSE BD	ED-9C012-30	IFTU	1 (80-type)
Power Unit	PU	484AA	FTU	3
DSPU				Up to 3 per bay
Subrate Multiplexer	SRM	TM739	DSPU	Up to 8 pairs 0 and 1
Multipoint Junction Unit	MJU	TM740	DSPU	Up to 8 pairs 0 and 1
Digital Multipoint Bridge	DMB	TM665	DSPU	Up to 8 pairs 0 and 1
Central Processing Unit	CPU	TM657 or TM657B	DSPU	1
DSP Controller Power	DCP	SM566	DSPU	1
DSP Interface	DSPI	UM29	DSPU	1
Power Unit	PU	411AA	DSPU	2
Fuse Board	DSR FUSE BD	ED-2C863-30 G3, ACCN	DSPU	1

Continued on next page

Table 1-2. *Continued*

FUNCTION NAME FULL	ABBREV	CKT PACK	USED IN/WITH	NUMBER REQUIRED PER FRAME OR UNIT (U)
INTERFACE BAYS (Contd)				
DS3U				Up to 3 per bay
DS3 Multiplexer	MXR	KCR1 or KCR5	DS3U	Up to 7
DS3 Facility Line Interface	FLI	KCR4	DS3U	2
Formatter	FMT	KER1	DS3U	2
Unit Controller	UC	KER2/KER6-2	DS3U	1
Power Unit	PU	563A PWR UNIT	DS3U	3
Fuse Board	DSR FUSE BD	ED-2C980-30	DS3U	1
HDS3U				Up to 3 per bay
HDS3 Multiplexer	MXR	KCR8	HDS3U	Up to 7
HDS3 Facility Line Interface	FLI	KCR4	HDS3U	2
Formatter	FMT	KER5	HDS3U	2
Unit Controller	UC	KER6-2	HDS3U	1
Power Unit	PU	563A PWR UNIT	HDS3U	3
Fuse Board	DSR FUSE BD	ED-2C980-30	HDS3U	1
Single Bay Frame				
CCN2 [Cross-Connect Network] Synchronizer Master Controller	Use same circuit packs as original switch bay units			
FTU FTU Power and Control DS3U	Use same circuit packs as original Interface Bay units			



Notes:

SYNC = Synchronizer
ECCN = Enhanced Cross-Connect Network
EMTC = Expanded Maintenance Circuit
CPU2 = Central Processing Unit 2
EBX = Enhanced Bus Extender
HECI = High Speed Enhanced Communications Interface
MCP = Main Controller Processor
FB = Fuse Board
PU = Power Unit

Figure 1-2. Single-Bay Frame Arrangement

Capacity Expansion Frame

The capacity expansion frame (CEF), Figure 1-3, consists of the CEF switch bay and up to six interface bays. The bays are always numbered as shown in Figure 1-3. The minimum starting configuration is the switch bay (bay 2) and one interface bay in the bay 1 position. It is not necessary to add the bays in numerical sequence. Bay 4 can be added before bay 3. There will never be more than 2 units (IFTU, DSPU, DS3U, or HDS3U) in bays 6 and 7. Only flexible interface bays are used in new installations. In retrofit configurations, bays 1 and 3 could be original interface bays.

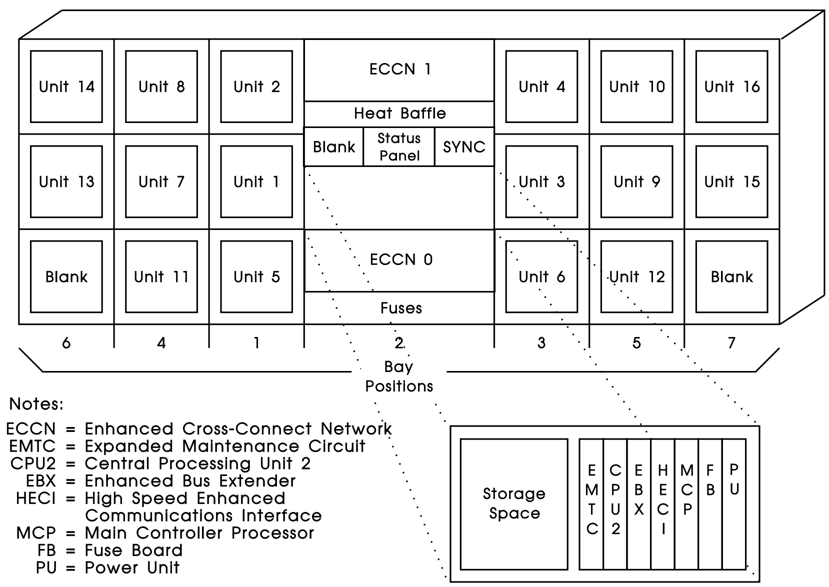


Figure 1-3. Capacity Expansion Frame

Switch Bay

The switch bay contains the following units:

- Cross-Connect Network (CCN) 0 and 1
- Synchronizer and Main Controller
- Status Panel
- Cross-Connect Network Power Unit
- Fuse and Alarm Panel.

The following paragraphs briefly describe each of these units.

Cross-Connect Network

The cross-connect network (CCN), Figure 1-4, is duplicated (sides 0 and 1) to protect against loss of service. Both sides must be equipped exactly alike. The CCN contains the following circuit packs: time slot interchange (TSI), cross-connect buffer (CCB), and cross-connect network interface (CCNI). The actual cross-connect function is performed in the TSI. Timing from the synchronizer and the control and status signals from the main controller are connected to the CCN through the CCNI. Six TSI 0 and 1 pairs are installed for each interface unit (FTU, DSPU, DS3, or HDS3) in a fully-equipped frame. One CCB 0 and 1 pair is installed for each interface unit.

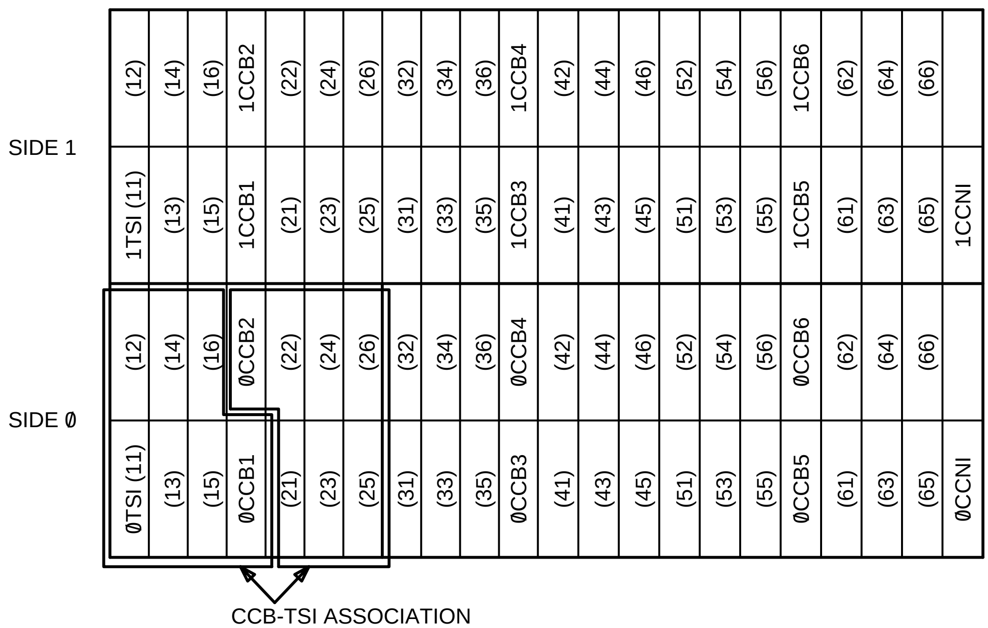


Figure 1-4. Locations of Cross-Connect Network Circuit Pack

Synchronizer and Main Controller

The synchronizer and main controller (Sync & MC) shelf, Figure 1-5, is mounted below the main controller. The sync circuit packs are located in the left of the shelf and the MC circuit packs are located in the right of the shelf as shown in Figure 1-5. The MC consists of the central processing unit 2 (CPU2), the communications interface (CI) which controls the communications between the internal and external links, the maintenance (MTC) circuit packs which control the interface between the MC and the alarm circuits and units, and the bus extender (BX). Power converters 411AA and MCP provide power for the MC. The sync contains duplicated circuits and is equipped to configure for the mode (master or slaved) and stratum of operation. Timing source signals coming to the sync for timing extraction connect through TLI (timing link interface) circuit packs. The redundant TLI (0 and 1) circuit packs provide the interface for up to four sources (8 TLI circuit packs). There are circuit pack slots for one redundant time base (TB). However, you may add two other redundant TB circuit pack pairs by using TLI3 (0 and 1) and TLI4 (0 and 1) slots. You can use the TLI slots because you will not need to interface to an external source if you use the internal TB source. The redundant synchronizer power units (SPU) provide power for the sync circuit packs. Timing from the TLI and TB circuit packs is connected to the CCN through digital phase-locked loop (DPLL) circuit packs.

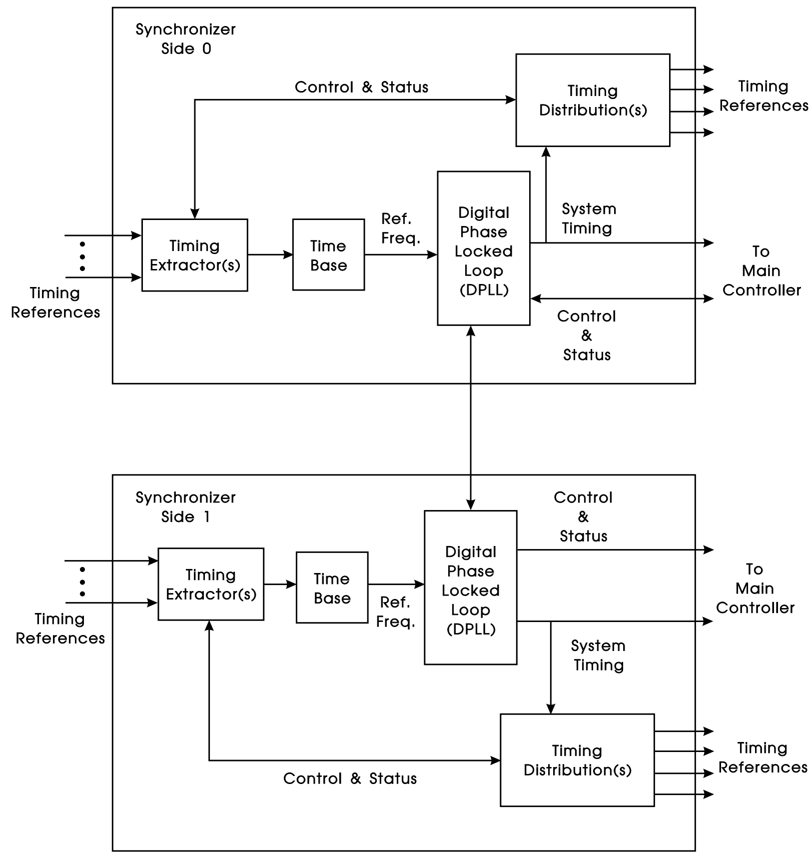


Figure 1-5. Original Switch Bay Synchronizer Circuit Pack Locations

Status Panel

The status panel contains alarm indicators (CRITICAL, MAJOR, and MINOR) which light when there is a failure in the DACS II or one of the facilities that connects to the DACS II. The ACO Button and ACO LED, main controller FAILURE indicator, RESET ENABLE switch, and RESET button are also mounted on the alarm panel. A plug on the front of the panel is used to connect a portable TTY to link 1. This plug is in parallel with a plug on the rear of the bay.

Cross-Connect Network Power Unit

The cross-connect network power unit (Figure 1-6) has eight +5volt power converters. Four provide the power for CCN0 and the other four provide the power for CCN1. Four fuse panel circuit packs provide protection for the power converter outputs to the CCNs.

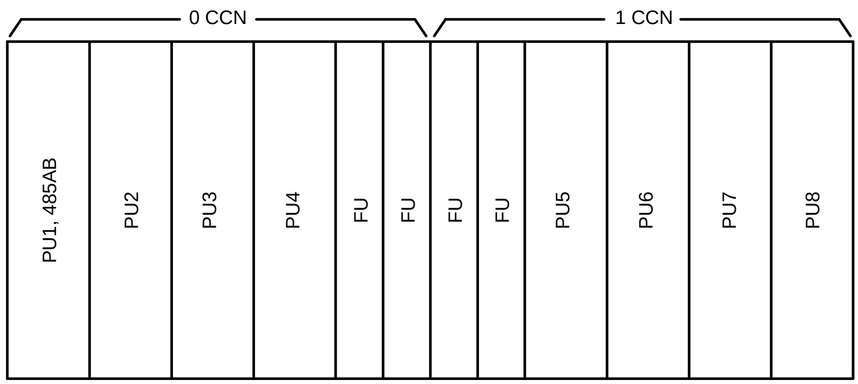


Figure 1-6. Original Switch Bay Cross-Connect Network Power Unit Circuit Pack Locations

Fuse and Alarm Panel

The 48-volt power is distributed to the switch bay units through the fuse and alarm panel, as shown in Figure 1-7. The 48-volt power is distributed through indicator fuses.

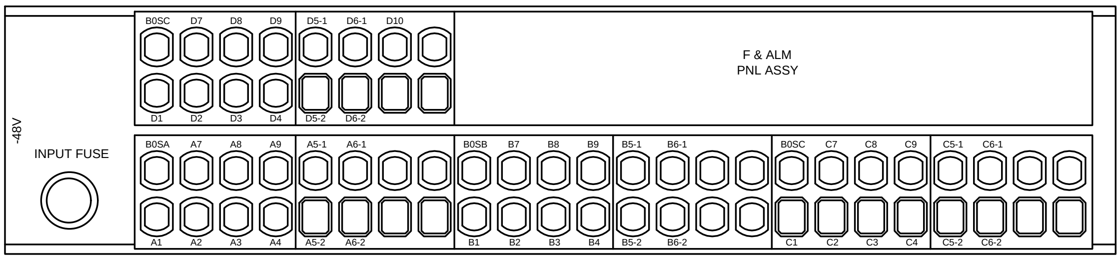


Figure 1-7. Original Switch Bay Fuse and Alarm Panel

CEF Switch Bay

The CEF switch bay, Figure 1-3, contains the following units:

- Extended Cross-Connect Network (ECCN)
- Extended Frame Controller
- Status Panel
- Synchronizer
- Main Controller (MC)
- Fuse and Alarm Panel

The following paragraphs briefly describe each of the units.

Extended Cross-Connect Network

The extended cross-connect network (ECCN), Figure 1-8, contains the expanded time slot interface (ETSI), clock control interface (CCI), and bus terminator (BT) circuit packs. The cross-connect function is performed in the ETSI. There are two ETSI (0 and 1) circuit packs provided for each unit (IFTU, DSPU, or DS3U). The CCI is the interface between the ECCN and synchronizer and main controller.

Extended Frame Controller

The extended frame controller (EFC) contains the status panel, synchronizer, and main controller. These units, which are mounted in a 2-shelf assembly, perform the same function as the comparable units in the original switch bay. Table 1-3 lists the codes for the main controller circuit packs that were updated in the CEF switch bay.

Synchronizer

The synchronizer, Figure 1-9, contains duplicated circuits for protection against failure. It is equipped to configure for the mode (master or slaved) and stratum of operation. Timing source signals supplied to the synchronizer for timing extraction connect through timing link interface (TLI) circuit packs. The redundant TLI (0 and 1) circuit packs provide for up to four sources. There are circuit pack slots for one redundant time base (TB). However, you may add two other redundant TB circuit pack pairs by using TLI3 (0 and 1) and TLI4 (0 and 1) slots. You can use the TLI slots because you do not need to interface the external source if you use the internal TB source. The redundant synchronizer power unit (SPU) provides power for the synchronizer circuit packs. The TLI and TB circuit packs are connected to the ECCN through the digital phase-locked loop (DPLL) circuit pack. The same synchronizer circuit packs are used in the original switch bay.

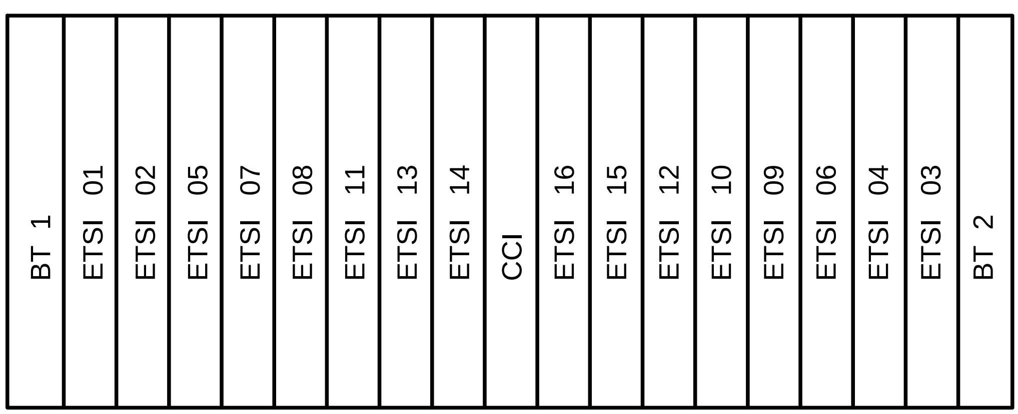


Figure 1-8. Location of Circuit Packs on ECCN Shelf

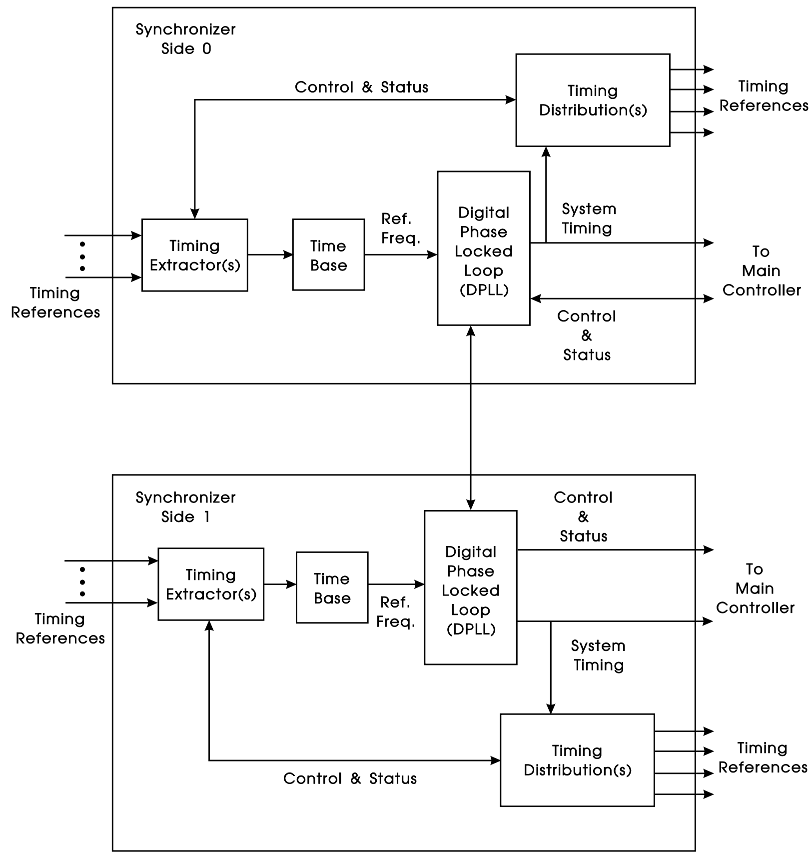


Figure 1-9. CEF Switch Bay Synchronizer Circuit Pack Locations

Table 1-3. Expanded MC Equipment

Circuit Pack	Equipment
CPU2	TM778
8-Mbyte EBX (Expanded Bus Extender)	UM71
EMTC (Expanded MTC)	UM75
8-Mbyte CI	TM658C
8-Mbyte ECI	TM736C
8-Mbyte HECI	TM762

Main Controller

The main controller contains the following units:

- Extended Maintenance (EMTC)
- Central Processor Unit 2 (CPU2)
- Extended Bus Extender (EBX)
- Communications Interface (HECI)
- Main Controller Power (MCP)
- Fuse Board (FB)
- Power converters

The EMTC controls the interface between the MC and the alarm circuits and units. The HECI manages the communications between the internal and external links. The EBX manages the communication between the MC and the ECCN. Two power converters and the MCP provide power for the MC.

Status Panel

The status panel, Figure 1-10, contains the frame alarm (CRITICAL, MAJOR, and MINOR) indicators, the ACO (alarm cutoff) switch and indicator, and the main controller FAILURE indicator, RESET ENABLE switch, and RESET indicator. A plug on the front of this unit can be used to connect a portable TTY to Link 1.

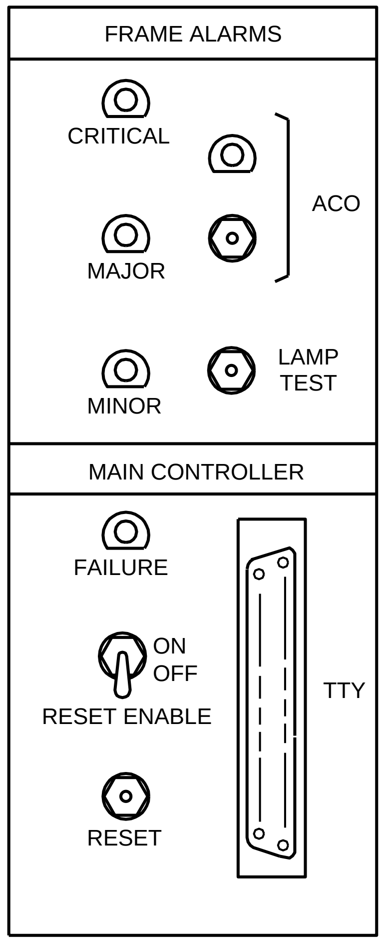


Figure 1-10. CEF Switch Bay Status Panel

Fuse and Alarm Panel

The 48-volt input power is distributed through indicator fuses in this panel, Figure 1-11, to the other assemblies in the CEF switch bay.

Interface Bays

As described previously, there are two types of interface bays — the original interface bay and the flexible interface bay.

In the original interface bays, unit positions 1, 2, 3, and 4 were always facility terminating units (FTUs) and Unit positions 5 and 6 were always DS3Us or DSPUs.

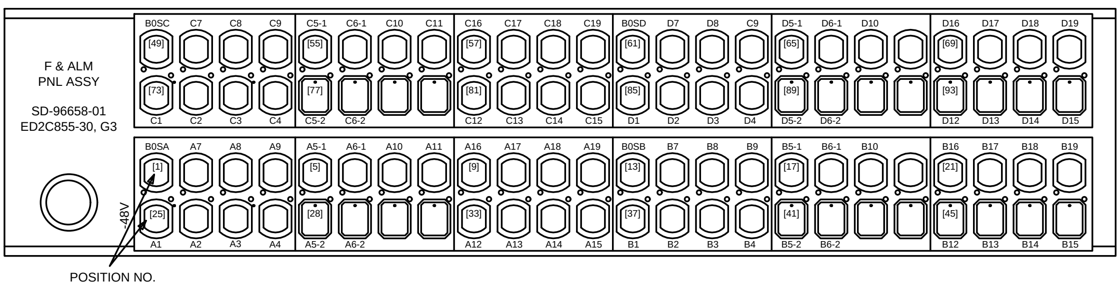


Figure 1-11. CEF Switch Bay Fuse and Alarm Panel

Power and Control Unit

The power and control unit is mounted in the original interface bays that use FTUs. The power and control unit contains power converters, fuse board circuit packs, central processing unit (CPU) circuit packs, and unit bus extender (UBX) circuit packs (see Figure 1-12). There is a power and control unit equipped for each equipped FTU.

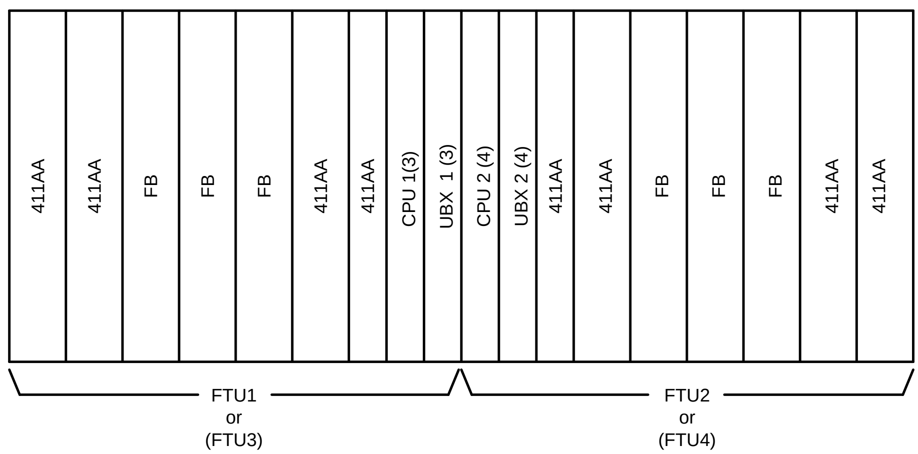


Figure 1-12. Original Interface Bay Power and Control Unit Circuit Pack Locations

Facility Terminating Unit and Integrated Facility Terminating Unit

The facility terminating unit (FTU) is the general name for the circuit block used to terminate digital line facilities; it is also the name for the facility hardware for the original interface bay. Within an FTU, the equipment is further divided into four FTMs (see Figures 1-13, 1-14 and 1-15). Each FTM occupies one shelf and contains one facility terminating module interface (FTMI), an format converter (FC) for each duplicated side, and up to 20 dual digroup circuit packs of the family of various network processing circuit (NPC) applications. Each dual circuit pack contains the circuitry for two NPC positions. Each NPC processes 24 DS0 channels. The common control circuit packs for the original FTU were mounted on the power and control unit described in the previous paragraph. These units are mounted on the FTM in the integrated facility terminating unit (IFTU). (See Figure 1-14.)

Up to four NPCs on each frame can be designated NPCTPs. Each NPCTP has 12 testports. Each testport has two channels. The NPCTPs processing 64-bit DS0 channels are called test access digroups. The NPCTPs processing DS1 clear channel signals are called facility access digroups (FAD).

Digital Signal Processing Unit

The digital signal processing unit (DSPU), Figure 1-16, occupies one DACS II shelf and is equipped as needed by the customer to provide digital channel processing functions such as channel bridging and subrate channel processing. This processing is done on internal channels; no facilities terminate on the DSPUs. Each DSPU consists of the common circuit packs, which are the digital signal processor interface (DSPI) and the unit controller, the specialized DSP circuit packs, and the power units for the DSPU. There are 8 DSP positions on the 0-side and 8 on the 1-side of the DSPU giving a total of 16 DSP positions. The DSP packs are duplicated on these two sides for redundancy to allow service switching in case a pack fails. The specialized DSP packs for the DSPU are: digital multipoint bridge (DMB) packs, and subrate multiplexer (SRM) packs, or multipoint junction unit (MJU) packs. Any combination of DMBs, SRMs, and MJUs can be used. The type (or combination of types) of signal processing depends on the customer’s applications and services.

DS3 Unit

The DS3U, Figure 1-17, is the designation for the shelf of equipment that is used to terminate DS3 facilities on the frame. The circuit packs for this unit are 12 inches high (which is taller than the packs for the FTU or DSPU), but the DS3U has a smaller heat ramp so that it will fit in the unit positions in the frames. Circuit packs in the unit provide the interfaces with the DS3 coaxial lines and the ECCN or CCN and MC on the DACS II side. Each multiplexer-MIU function group (MMFG) shown in the DS3U consists of mounting positions for the multiplexer (MXR) pack and the optional MIU pack. The power units and the fuse board for the DS3U are also included in the unit. Two multicoaxial cable connectors are provided behind the unit to connect to the transmit and receive coaxial cables for up to six DS3 facilities. Connections to each CCN side are through eight separate ribbon cables, and the connection with the MC is through twisted pair cables.

HDS3 Unit

The HDS3U, Figure 1-18, completely resembles the DS3U and operates similarly with some additional functionality. The HDS3U is used to terminate Hybrid DS3 facilities. The Hybrid DS3 signal contains seven DS2 signals, each DS2 signal containing either all 1544 Mbit/s signals or all 2048 Mbit/s signals. However, a single DS2 signal cannot carry a mixture of 1544 Mbit/s and 2048 Mbit/s signals. The MXR and FMT circuit packs have been upgraded (HMXR and HFMT, respectively) to handle Hybrid DS3 signal cross-connection. The HDS3U does not support the MIU circuit pack, used along with the MXR circuit pack to create a DS3U MMFG. The Hybrid MMFG consists of the HMXR circuit pack only; the slots which previously contained MIUs for the DS3U remain empty. The Hybrid DS3U UC has been redesigned to allow a capacity of 4 Mb of memory, instead of the DS3U’s 2 Mb of memory, to support the additional software needed for this feature.

FTM 4	NPC (121-140)	0FC (4)	FTMI (4)	1FC (4)	NPC (141-160)
FTM 3	NPC (081-100)	0FC (3)	FTMI (3)	1FC (3)	NPC (101-120)
FTM 2	NPC (041-060)	0FC (2)	FTMI (2)	1FC (2)	NPC (061-080)
FTM 1	NPC (001-020)	0FC (1)	FTMI (1)	1FC (1)	NPC (021-040)

Figure 1-13. FTU Circuit Pack Positions

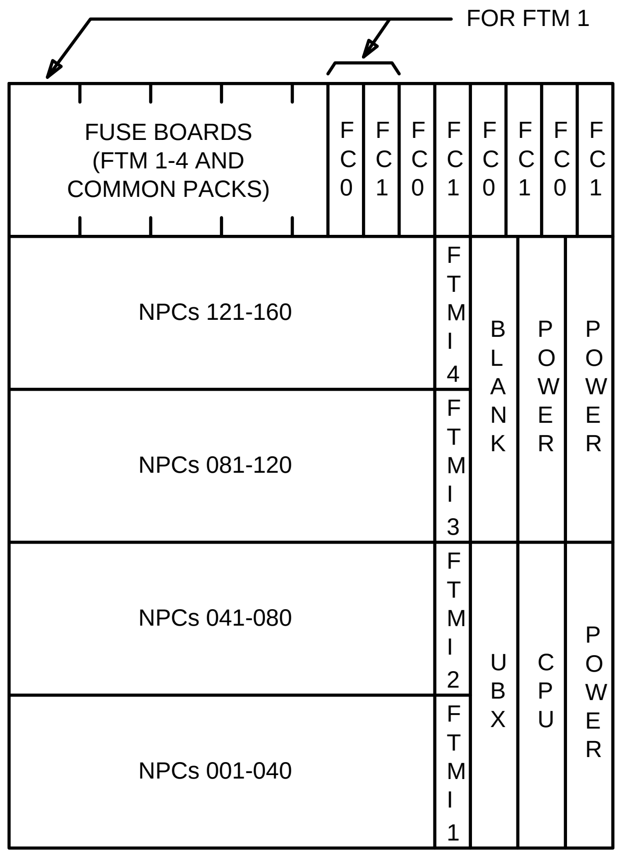


Figure 1-14. IFTU Circuit Pack Locations (Unit 1 Extended NPC Numbering Shown)

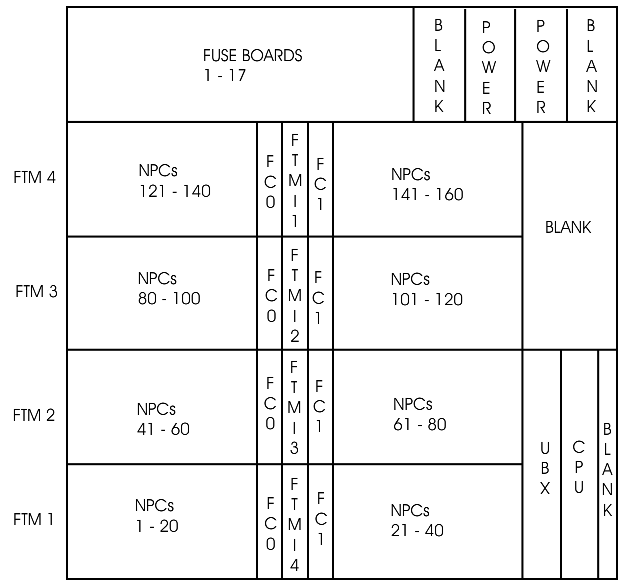


Figure 1-15. IFTU2 Circuit Pack Locations

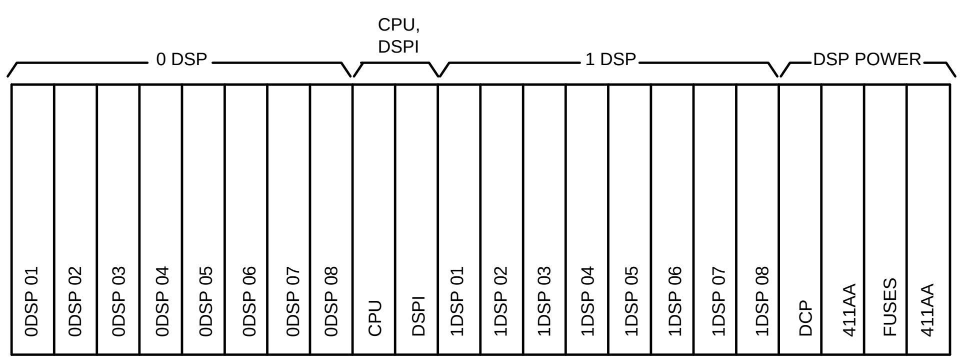


Figure 1-16. DSPU Circuit Pack Locations

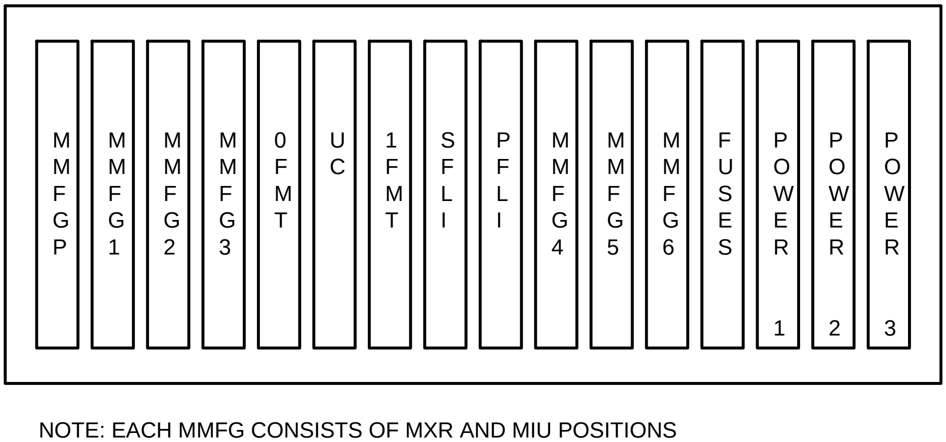


Figure 1-17. DS3U Circuit Pack Positions

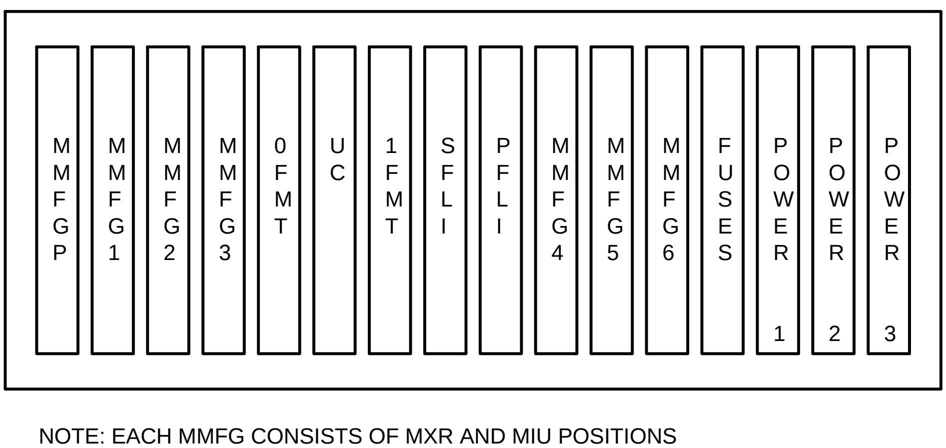


Figure 1-18. HDS3U Circuit Pack Positions

Single Bay

The single bay, Figure 1-2, combines one FTU, one optional DSPU (or conditionally one DS3U), power converters, control and synchronization circuitry, a cross-connect network. It has a special cross-connect network, Figure 1-19, which is slimmed down to serve only two units of NPC. The cross-connect network is designated CCN2. An operational peculiarity of the single-bay frame is that the numbering of the unit positions in it is units 1 and 5 to match the designations in the original interface bay. The status panel, MC and Sync Unit, Figure 1-5; the FTU, Figure, 1-13; DSPU, Figure 1-16; DS3U, Figure 1-17; and power and control unit, Figure 1-12, are the same as comparable units in the original switch and interface bays. The single-bay fuse and alarm panel is shown in Figure 1-20.

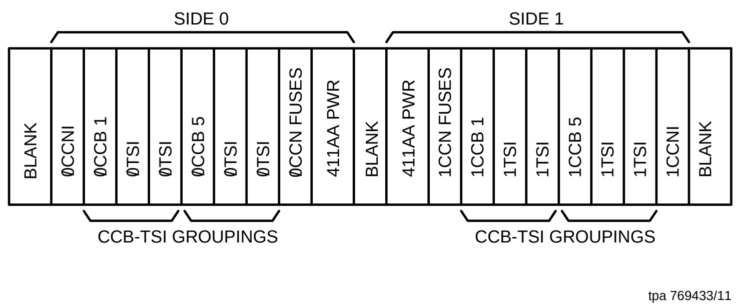


Figure 1-19. Single-Bay Cross-Connect Network 2 (CCN2) Circuit Pack Locations

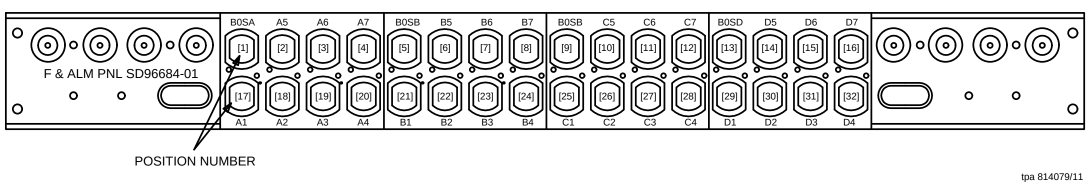


Figure 1-20. Single Bay Fuse and Alarm Panel

Functional Description

The following paragraphs are a functional description of the DACS II and are intended to provide the reader with a general knowledge of the circuit pack functions and interworkings.

Common Equipment Circuit Blocks

The basic function of DACS II is to provide access to incoming digital signal bit streams to interchange and interconnect (cross-connect) DS0 channels. This is done electronically within the circuitry without making any digital-to-analog conversions. Access to the channels for testing is also done by cross-connections. For test access, the time slots to be tested are cross-connected (mapped) to the time slots in the test access facility. Direct digital testing can be done by using the remote test system 5A (RTS-5A) or remote maintenance system-digital 1 (RMS-D1) test facility. When using RTS-5A, conversions to analog are required to allow testing voice channels. This conversion may be done externally to the DACS II in the channel bank equipment that terminates the test access facility.

The major circuit blocks of the DACS II are synchronization circuits that produce precise timing waveforms needed to maintain time slot alignment, the cross-connect network to accomplish the time slot connections, and microprocessors to manage internal and external operations. Since multiplexing the signal time slots to form higher capacity bit streams is inherent in the cross-connect process, circuit redundancy is needed to protect against the loss of service should a failure occur in a high-channel-capacity pack. Accordingly, all circuit packs carrying more than 120 DS0 channels are duplicated. Similarly, because of their importance, the synchronizers and power supplies are duplicated. The synchronizers also have the capability of temporarily operating in a stable, free-running mode. Nonvolatile memory is provided to protect against the loss of circuit memory if there is a power failure. Interface circuit packs are provided for communications within the DACS II, with administrative links to external systems, and with the office frame alarms system.

To support the increased capacity of the DACS II capacity expansion frame (CEF), expanded versions of two of these circuit blocks are needed. The two expanded circuit blocks include the expanded frame controller (EFC) and the expanded CCN (ECCN); the sync remains unchanged.

The DACS II circuit blocks are illustrated in the system architecture block diagram in Figure 1-21 which shows the CEF. At the center of this diagram is the main controller with its connections to the other controllers and circuitry in the frame. The units of facility terminating and digital signal processing circuit packs and the duplex cross-connect network (CCN), all of which carry the customer service, are shown across the top of the figure. Figure 1-21 shows the use of any type unit in the unit positions that require the fully flexible feature.

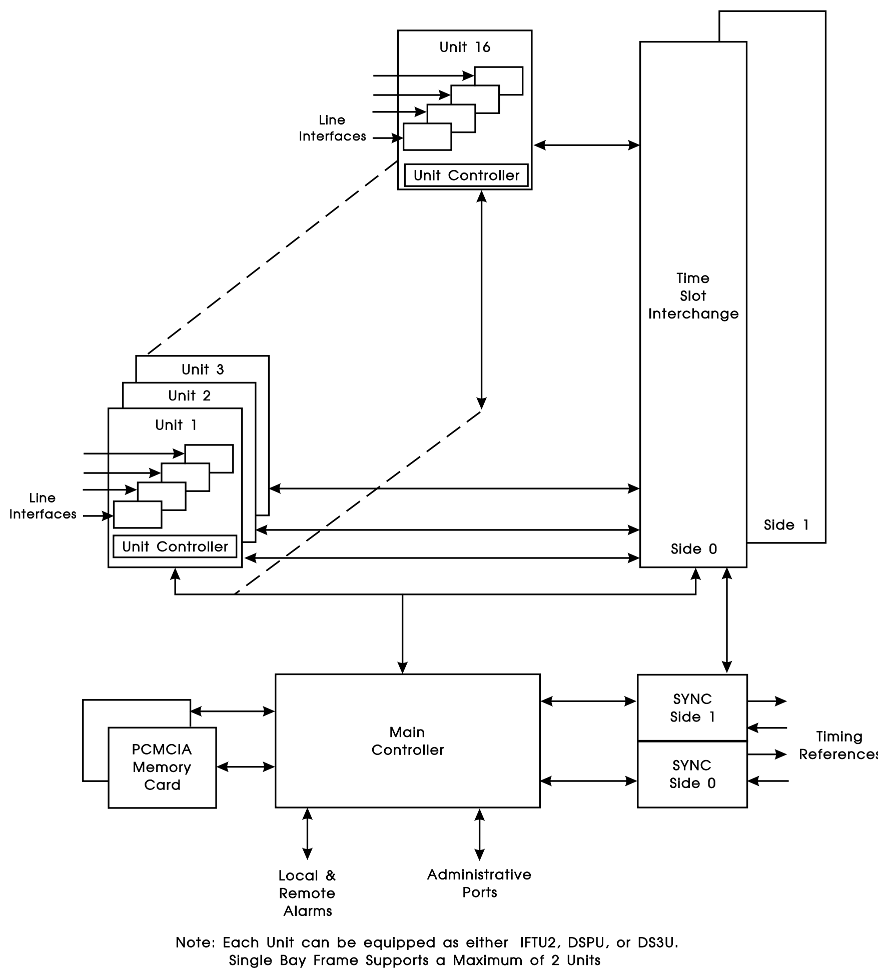


Figure 1-21. System Architecture Diagram

Communication between the unit controller (UC) for each unit and the maintenance circuit (MTC) of the main controller is by means of a local area network (LAN). Communication between the CCN or ECCN and the main controller is by means of a control bus. Connection of the syncs, nonvolatile memory devices, and the alarms and administrative ports to the main controller is as follows: the syncs and the PCMCIA Memory Cards connect to the main processor, the local terminal and outside links connect to the high-speed enhanced communications interface (HECI), and the alarm connections go to the maintenance pack. These major blocks are the topics of discussion in the following paragraphs.

Main and Secondary Controllers

The heart of the DACS II microprocessor control system is the main controller (MC). The MC maintains the DACS II operating system, processes input commands and internal interrupt operations, and detects and responds to internal errors and alarms. It communicates with the other controllers to execute the time slot cross-connections, and it monitors the health of the frame. One result of this monitoring is the selection of one duplicated sync to supply timing to the frame and the selection of the associated CCN to carry service. Other results are initiating recovery routines if an error is detected and reporting alarms if a failure has occurred.

The MC consists of the following circuit packs:

- central processing unit 2 (CPU2)
- high-speed enhanced communications interface (HECI)
- maintenance circuit pack (MTC or EMTC)
- bus extender (BX or EBX).

The CPU2 contains the microprocessor circuitry and the associated circuit memory along with the primary and secondary memory cards. The HECI is the interface between DACS II and external administrative ports as well as a local terminal. The EMTC or MTC pack is the hub for the LAN and serves mainly as the alarm control point. The BX or EBX provides the dual bus control interface to the duplicated cross-connect network.

The unit controllers, which are the secondary controllers, manage the service provisioning information in the local unit memories. They also process commands from the main controller and send replies or requested information over the LAN to the main controller.

In the IFTU2, the facility terminating module interface (FTMI) provides communication between the UC and the network processing circuits in the modules of the unit. The unit bus extender (UBX) serves as an interface between the UC and FTMIs. In digital signal processing units, the digital signal processing interface (DSPI) serves as the interface between the processing circuit and its UC. For the CEF frame, the clock and control interface (CCI) contains the main controller interface circuitry. HECI is the interface between DACS II and external administrative ports.

Nonvolatile Memories

The MC maintains redundant copies of the system software and database on non-volatile memory. This storage space is provided via two removable circuit pack PCMCIA Memory Cards (PCMCIA is an acronym for Personal Computer Memory Card International Association). The system maintains fully duplicated memory and software backups on both Memory Cards. The two Memory Cards supported are referred to as primary memory (PMEM) secondary memory (SMEM). To ensure database synchronization between working and backup memories, both Memory Cards are automatically updated when a backup is done from RAM to memory.

NOTE:
If PMEM is removed from service, the MC goes into MCOND, and the database is never booted from SMEM.

The Memory Cards are also used to download new software releases into the DACS II. This is accomplished by simply installing a Memory Card containing the new software and then executing the DACS II software upgrade procedure. The software upgrade procedure is non-service affecting.

Internal Synchronization

Figure 1-22 is a block diagram of the DACS II synchronizer. The synchronizer has duplicated sides (sync 0 and sync 1). Each sync contains the following circuit packs: up to four timing link interfaces (TLI), one or two time bases (TB), and one digital phase-locked loop (DPLL). The TLIs are used as timing extractors or timing distributors. The synchronizers operate in either the slaved or master timing mode. In the slaved mode, the TLIs are used as both timing extractors and timing distributors. In the master timing mode, they are used as timing distributors only. The TB is a source of stable timing for the DPLL. The DPLL is the source of the DACS II timing signals. Control of the DACS II synchronizer is accomplished through a pair of 2-way communications links to the main processor (MP). Syncs 0 and 1 are cross coupled so they run at the same frequency and phase during normal operation.

During normal operation, both sides are energized but only one side is in service (active). If the active side fails, service is automatically switched to the other sync. If both syncs fail, the synchronizer enters the "holdover" state. In the holdover state, the synchronizer retains the last good frequency. And the stability of the synchronizer is dependent on the stability of the output of the TB circuit pack. There are TB circuit packs that can match the following references:

- Domestic Stratum 2
- Domestic Stratum 3
- 2.048-Mb/s Interface Toll
- 2.048-Mb/s Interface Local.

In the slave timing mode, the timing extractor develops a timing reference from an incoming timing link signal. The timing extractor reference output in conjunction with the stable timing signal from the TB adjusts the output of the DPLL to match the incoming link signal. Each timing extractor can accept two incoming timing link signals. Each incoming timing link signal is applied to the same timing extractor input terminal in syncs 0 and 1. You can use up to four TLIs as timing extractors. Therefore, there is a possibility of connecting up to eight incoming timing link signals to the synchronizer. Only one of the inputs controls the synchronizer output. The signals are prioritized so that if a signal of higher priority fails, the synchronizer switches to the signal of next highest priority. In Gateway applications, sync timing can be extracted from 2.048 Mb/s line signals. Eight NPC positions in units 1 and 2 (four NPCs per unit) can be used for the source signals. When used as timing sources, the NPCs are identified in the commands to grow the TLI ports.

Different codes of TLIs are used as timing extractors depending on the nature of the incoming links. The timing extractor selected depends on the line rate and signal format of the incoming line signal of the external clock. The available timing extractors include circuit packs to accommodate the following incoming timing links:

- 1.544-Mb/s DS1 Transmission Lines
- 2.048-MHz basic synchronization reference frequency (BSRF)
- CCITT CEPT 2.048-Mb/s transmission lines
- CCITT 2.048-Mb/s transmission lines
- Sinusoidal/square waves of various frequencies
- 64-kb/s composite clock for the digital data system (DDS).

In the slave timing mode, each TLI slot that is not used as a timing extractor can be used as a TD. The TD output signals are derived from the DPLL output. The TD distributes timing signals to equipment outside the DACS II.

In the master timing mode, the DACS II is a timing island providing its own timing and timing for external equipment as required. In the master timing mode, a third TB is installed in sync 1 TLI slot 3. The third TB provides additional redundancy for reliability and maintenance purposes. In the master mode the TDs distribute timing signals to external equipment the same as they do in the slave mode.

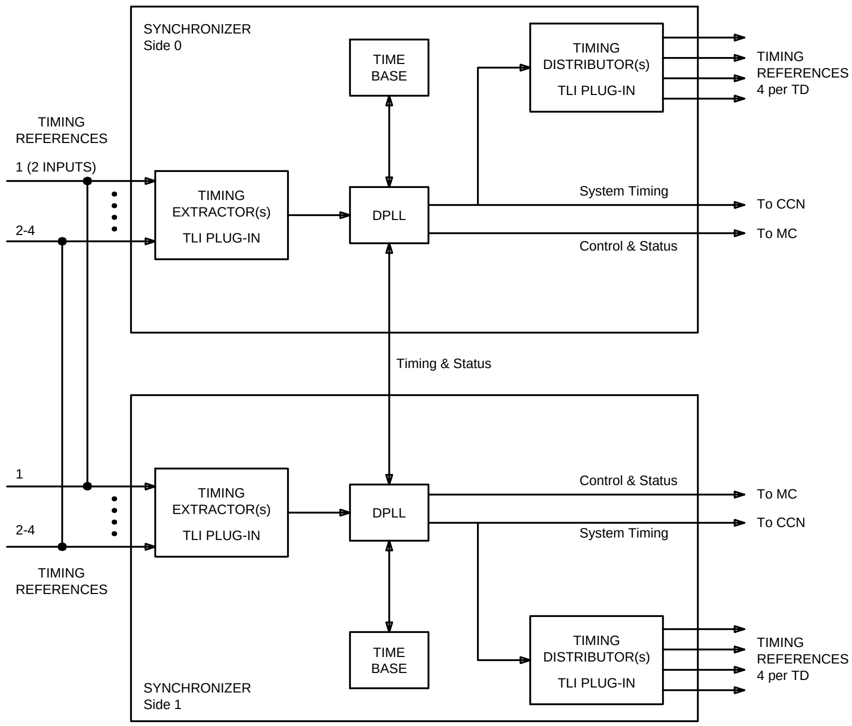


Figure 1-22. Synchronizer Block Diagram

DS1 Facility Terminating Units

The IFTU2 is the peripheral unit type that is grown and equipped to terminate DS1 lines. Common equipment in the FTU provide the control functions and signal processing for connection to the CCN or ECCN. The network processing circuits (NPCs) provide the line interface and signal processing. The family of NPC codes, each with its own array of software selectable line options, provides all the required line formats and zero code suppression modes for compatibility with other transmission equipment at the far end. The functions of the circuit packs in an FTU are described in the following paragraphs. A fully equipped FTU consists of four facility terminating modules (FTMs). Figure 1-23 shows the signal rates and conversions that take place in the FTM.

Communication and control circuitry for the FTU is contained in the unit controller (UC), the unit bus extender (UBX), and the FTM interface (FTMI). The UC connects to the DACS II main controller over the LAN. Within the FTU, the FTMI serves as the interface between the UC and the packs in the FTM, distributing information from the UC and sending replies from the FTM packs. Distributing information from the UC involves decoding the address data for the appropriate FTM. The UBX is needed with the UC to isolate and reclock the communications with the FTMI.

Timing and sync pulses from the synchronizer are delivered to the format converter (FC) packs in the FTM from the cross-connect buffer (CCB) or clock and control interface (CCI) packs of the cross-connect network. The FTMI is also timed from the FC packs.

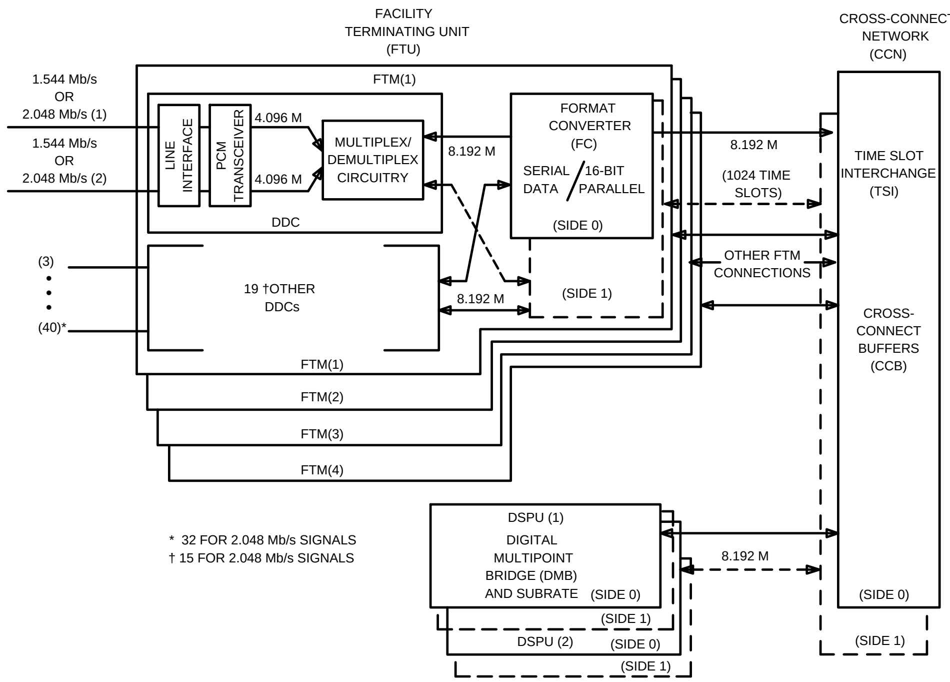


Figure 1-23. Unit and Cross-Connect Network Block Diagram

The line interface of the NPC terminates the incoming line signals and provides the compatible framing and signaling format. Among these formats (for DS1) are: superframe (Fs), extended superframe (Fe), DDS data, D4 channel bank, *SLC*® 96, and 1.544 Mb/s clear-channel lines. Circuitry for two NPC positions resides on a dual circuit circuit pack installed in the FTMs. The NPC also: (1) provides facility performance monitoring, (2) sends and receives facility alarms, and (3) sends carrier trunk conditioning to the other end.

In addition to the line interface circuitry, the DDC contains processing circuitry to change the signals to standard form for multiplexing into higher rate bit streams internal to the DACS II. Pulse code modulation (PCM) transceivers convert the two digroup signals to higher rate signals, and a multiplexer combines these into a single bit stream that is twice the rate of each input. The multiplexer also produces a duplicate output signal for protection if one output (side) fails. These outputs are applied along with the same outputs from the other DDCs in the module to the respective format converters (FCs) of the module. In the FC for each side, these signals are converted from serial to parallel data forms and read out on multiple leads to the respective CCN. The FC for a side goes to the like side of the duplicated CCN, and these same conversions and connections occur for the other (up to three) FTMs in the unit.

When the FTMI is grown in the software data base, the line interface equalizer is specified for the FTM shelf. For DS1 lines, the equalization for the left and right halves of the FTM shelf is specified; this equalization is applied to the outgoing (transmit side) path going to the DSX-1 bay.

Cross-Connect Networks

The overall function of the cross-connect network is to accomplish channel cross-connections by the time slot interchanging operations in the time slot interchange (TSI) packs. These packs are called expanded TSIs (ETSIs) in the ECCN for CEF frames. The TSI or ETSI operations are: connecting unit channel data to network buses, switching time slots out of the network data buses to the unit buses, and connecting the cross-connected data to the unit port. Each TSI or ETSI has access to the network data from all the peripheral units. The switching of time slots into the unit buses is enabled by buffers in the TSIs that store the data so that it can be written into the unit buses in the correct channel sequence. Each facility or digital processing unit connects to the CCN or ECCN over four network buses or ports. These ports have a 4096 time-slot capacity. Each port contains 1024 time-slot data buses, timing, status and error information.

Interconnection of information in the internal bit stream establishes a path through the DACS II that may be a 1- or 2-way cross-connection, a broadcast connection, or connections to the DSPUs for conference bridging. The type of connection is controlled by the input command. This path (or map) is determined by the main controller based on the record of used and available paths in the controller memory. The maps are autonomously transferred to the memory cards for backup protection. The CCN and ECCN are single-stage, nonblocking, time division switches.

The CCN or ECCN is duplicated so that cross-connections can be reproduced in the other network by the main controller without any loss of service should a failure occur on the active side. If the main controller is also out of service when a failure occurs in the CCN, ECCN, or duplicated peripheral unit pack, other packs in the unit will cause the switchover to the other side of the cross-connect network. The switchover can also be manually forced to allow maintenance on the inactive side.

Three CCNs are available for the different size DACS II frames: the CCN for the original multibay frames (with up to six units), the CCN for the single-bay frame (with two units), and the expanded CCN (ECCN) for the capacity expansion frame (with up to 16 units). These versions of the CCN are described in the following paragraphs.

CCNs for Non-CEF Frames

When fully equipped, the CCN for the original multibay frame is a 24,576 X 24,576 time-slot switch because it handles 6 times the 4096 time slots (per unit). Each side of the CCN mounts up to 36 TSIs, one CCNI, and one CCB for each peripheral unit. In a fully equipped frame, six TSIs are required per unit to interconnect each unit with itself and the five other units. The CCN interface (CCNI) communicates between the CCN and the MC and contains the error summary register for the CCN. The CCB produces the timing and sync pulses from the synchronizer circuit block. The TSI switches time slots from the network data buses from all the peripheral units to the CCB for conversion to the port going to the associated unit. Power for the duplicated network is obtained from power units in a separate shelf.

The CCN for the single-bay frame is a scaled down version of the above; it is an 8,192 X 8,192 time-slot switch because it serves up to two units. This network is distinguished in the software as the CCN2. Fully equipped, it contains four TSIs per side, one CCNI per side, and two CCBs per side. Power is obtained from power units in a separate shelf.

The ECCN for the CEF is a 65,536 X 65,536 time-slot switch because it handles 16 times the 4096 time slots (per unit). Each side of this duplicated network mounts one clock and control interface (CCI), one ETSI per unit (16 total), and two bus terminators (BT). The CCI regenerates sync clock and timing from the sync, communicates between the expanded MC and the ETSIs including master resets from the MC, and provides error detection for the ECCN. The ETSI converts the network data from the peripheral units to format required in the ECCN, connects time slots from the unit to the network receive data bus, switches time slots out of the network buses from all the ETSIs, and connects the time slots to the transmit data buses going to the associated unit. The BTs terminate both ends of the 16 network buses running between the ETSIs with a resistive termination. These packs also force desired states on these buses during inactive periods or when the CCI pack is disconnected. Figure 1-24 shows a simplified block diagram of the ECCN; this diagram is drawn with the BTs on the sides which nicely resembles the circuit pack mounting in the ECCN shelf.

The CCI contains the converter circuitry to produce 5-volt power for itself and the ETSIs on the same side of the network. Additional 3-volt power required by each ETSI is produced on the ETSI itself. There are no separate power units for the ECCN.

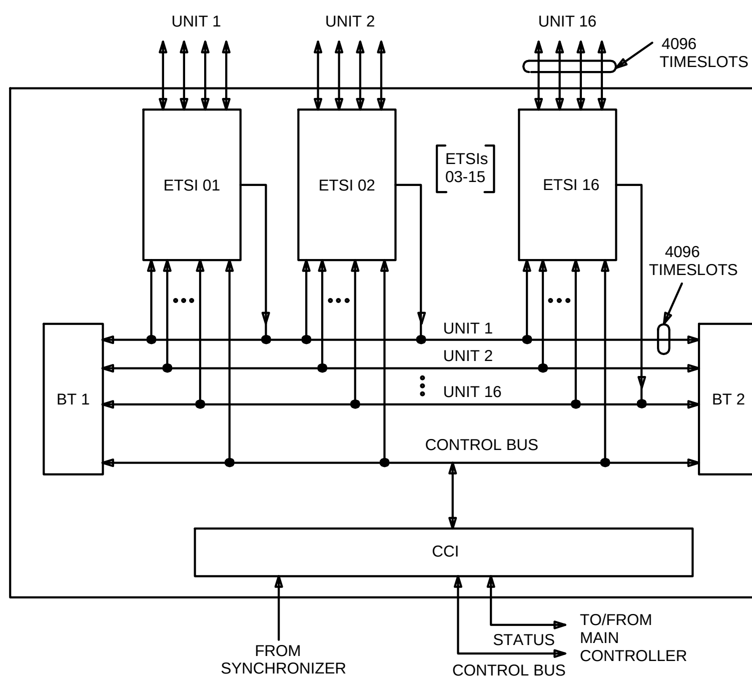


Figure 1-24. ECCN Block Diagram

Digital Signal Processing Units

These are equipped with the appropriate duplicated DSP circuit packs to produce further time slot interconnections and custom arrangements such as DS0 channel bridging or subrate data multiplexing. By being separate from the facility terminating units, the full time slot capacity of a unit is available at the DSPUs to allow almost any size or type connection without sacrificing any termination capacity in the facility units.

DS0 channel bridging is enabled by installing digital multipoint bridge (DMB) circuit packs in the DSPU. Each DMB consists of a single circuit pack that serves both the input and output functions. Channels to be bridged are cross-connected in the CCN, bridged in the DMB, and returned to the CCN to be added to the data stream. This bridging is done digitally without decoding the channel information. Each DMB contains two conferencing devices, with each conferencer supporting 256 channels. Thus, each DMB pack can support 12 channels or up to 170 separate 3-leg conferences. As additional DMB packs are added, additional conferences can be supported. Each DSPU can support up to eight duplicated DMB packs. Channel associated signaling bits are not transmitted across the DMB. The DMBs are duplicated for protection against service loss and connected to the respective sides of the CCN.

Among the bridge configurations that can be supported are the symmetrical, polling, and broadcast. The symmetrical configuration is a 2-way communications circuit between all bridge legs. The polling data network is a 2-way broadcast circuit where the broadcast direction is from the FTU NPCs through the CCN only. The return direction is summed and processed for gain, echo suppression, and noise guard through the DMBs in the DSPUs. The broadcast network is a 1-way circuit with only one return path to the backbone. Broadcast connections are actually formed outside the DMB in the CCN.

Other DSP circuit packs provide subrate channel data processing. Subrate processing includes those functions into the DACS II that are done by external DDS multijunction units and subrate multiplexers. These functions are described under the heading *Feature Functions*.

Frame Alarm Indications

Extensive error detection and handling takes place in the DACS II. For example for a hardware error, the DACS II evaluates all the error inputs including any from power units and reports the results in an ERR ANALYSIS message. These processes and those that check for software errors are not detailed in this manual. General descriptions of the following are provided here:

- Circuit pack failures
- Carrier failure alarms
- Facility performance alarms.

Circuit Pack Failures

Circuit pack communication and operations are continuously monitored by the main controller to check for errors. If errors are detected, the main controller institutes an error recovery routine which confirms that the error was not a transient and runs diagnostic tests on the suspect pack. The suspect pack is also removed from service, and service is switched to the other side if the circuit group is duplicated. If the tests fail, an office alarm is registered. If the tests pass, the CP (circuit pack) must be manually restored to service. In the DS3 unit, all the transmission packs are included in protection switching groups. This switching to a standby spare prevents the loss of service due to the failure of a single pack.

Carrier Failure Alarms

These show a loss of incoming signal, framing, or high transmission errors or receipt of a remote alarm signal from the equipment at the other end of the line. Incoming failures are reported in an output message as a red alarm, and the receipt of the signal that indicates a local alarm at the other end is reported as a yellow alarm. Either condition also generates an office alarm. Facility protection switching is provided with the *SLC* carrier feature to switch service to the protection line and thereby avert a carrier failure situation. Whenever a red alarm exists, DACS II sends a yellow alarm signal to the other end. Additional carrier failure alarm conditions that are reported in output messages are:

- Simultaneous red and yellow DS1 alarms
- AIS (alarm indication signal), also referred to as the all 1s signal
- Local and remote alarms from a digital multiplex interface frame (DMI/BOS signaling format).

The AIS (all 1s signal) is a digital signal associated with a maintenance alarm detected on a defective maintenance span. DACS II transmits the AIS signal in the direction of the failure as a substitute for the normal signal. It is intended to show other equipment (downstream) that a failure has occurred elsewhere and to inhibit local alarms so that the defective section can be identified by the local alarm indication.

The programmable AIS alarm allows the user to select how the alarm indication signal from the far end will be reported. The DACS II user can select whether a major alarm, minor alarm, or informational alarm (default) is generated.

During a carrier failure, the affected NPCs send trunk conditioning and trouble insertion words out on the channels. Trunk conditioning is used on channels with signaling to cause office switching equipment to discontinue calls and stop charges. Trouble insertion words are sent in the message part of the channel and are necessary to signal trouble on data circuits. The codes for these trunk conditioning or insertion words are entered as part of the cross-connect commands.

Facility Performance Alarms

Microprocessor circuits in the NPCs detect and record various line error conditions. The results of this monitoring are used to provide status information on demand and to register office alarms when prescribed thresholds are exceeded. The monitored parameters vary depending on the type of NPC, but the following list for DS1 lines serves as an example: (1) line bit errors, (2) errored seconds, (3) severely errored seconds, (4) cyclic redundancy check errors, and (5) carrier reframing activity. Current counts are available on demand by requesting the NPC status, and accumulated counts are obtained by requesting the count for a particular facility parameter or as provided in the daily (midnight) report.

The alarm thresholds for the facility parameters are set initially when the NPCs are provisioned for service. Unless specific alarm thresholds are entered, default values apply. Up to three additional values for each alarm can be loaded into the DACS II to serve as options that can be selected initially or by means of a change command.

Status Panel Functions

The status panel conveys status and alarm information regarding the DACS II and provides an administrative port (TTY1) for connection of a console terminal. This is a multiple of administrative link 1 and allows connection of a portable terminal while the regular terminal is disconnected from the back. The CEF status panel is mounted on a circuit pack.

There are five LED indicators on the status panel. The classification of the alarms and the color of the LEDs vary on panels used outside the U.S.A., but the following gives the domestic stampings:

- FRAME ALARM - CRITICAL: Indicates a service-affecting failure affecting more than 120 channels (red LED)
- FRAME ALARM - MAJOR: Indicates a service-affecting failure affecting equal to or less than 120 channels (red LED)
- FRAME ALARM - MINOR: Indicates a non-service-affecting failure (yellow LED)
- MAIN CONTROLLER - FAILURE: Indicates a failure of the main controller (red LED)
- FRAME ALARM -ACO (ALARM CUTOFF): Indicator that is lighted when the alarm cutoff switch is operated (green LED).

There are four switches on the status panel that do the following functions:

- FRAME ALARM - ACO: Disables the audible alarm
- FRAME ALARM - LAMP TEST: Checks for failed lamps by lighting all lamps on the status panel
- MAIN CONTROLLER - RESET ENABLE: Switch that enables (ON position) or disables (OFF position) the main controller reset switch
- MAIN CONTROLLER - RESET: Resets the main controller provided the RESET ENABLE switch is in the ON position.

Powering

Power distribution and fusing for the frame are done on the main fuse and alarm panel and on shelf fuse blocks. Office battery is delivered over four feeders so that the loss of any input will not interrupt service. These feeders are fused at the fuse and alarm panel with 70-type fuses that provide a visual indication when blown and automatically activate office alarms.

Power units in the frame produce lower DC voltages derived from the -48 volt input. Secondary feeders distribute power to groups of converters for the major circuit blocks in the frame (controllers, syncs, CCNs, DSPUs, and FTUs). Each side of the sync and CCN has its own converter group. Different codes of converters are used for the various output voltages needed in each group, but each one has common protection mechanisms. These mechanisms are: a power interlock, to turn the converter off whenever the latch is opened for removal; and power shutdown circuits, to prevent overvoltage or overcurrent damage. A red LED on each converter lights when a shutdown circuit operates, when the output fails, or when the latch switch is turned off. A power converter failure causes an office alarm. The 563A converters for the DS3 unit also have a green LED that lights to show that the power is on.

The power protection philosophy for circuit pack power units is based on the use of N+1 redundant power converters that supply the load in a converter group. Sufficient power reserve is available when a single converter fails. This is done by monitoring circuits and extra wiring that keeps the converter groups in a power sharing mode until a failure is detected. The number of standby power units needed in a power group is determined by the load requirements.

For the ECCN of the CEF frame, the CCI pack for each side contains the power converter circuitry to produce 5-volt power for itself and the ETSIs on the same side of the ECCN. Additional 3-volt power required by each TSI is produced on the ETSI itself.

Feature Functions

Gateway Feature

The DACS II gateway feature enables domestic 1.544 Mb/s and international 2.048 Mb/s facilities to coexist within a DACS II system for translation and cross-connection between the two disjointed facilities.

The DACS II performs several functions in providing the gateway feature. The DACS II does domestic μ-law and international A-law pulse code modulation (PCM) translation, provides signaling conversion between domestic robbed bit and the international abcd bit signaling, and performs point-to-point as well as point-to-multipoint DS0 cross-connections. In addition, the DACS II provides a host of performance monitoring and maintenance functions for efficient and effective facility translation and transmission.

When DACS II is used as a gateway between international and domestic facilities, the international side of the IFTU2 is equipped with the appropriate dual primary circuit (DPC) circuit packs and the domestic side is equipped with dual digroup circuit (DDC) circuit packs. Only 32 of the 40 NPC positions in an IFTU2 module can be equipped for the 2.048-Mb/s interface.

The DPC performs the conversions between the 4-bit and 2-bit signaling and the A-law and μ-law voice encoding in the two signals (Figure 1-25). Cross-connect command fields NAM, <tc>, and <sc>, are applicable for a gateway connection. The NAM field (no A-law to μ-law conversion) disables the conversion for data signals that are already in digital form (no encoding). The <tc> field identifies the type of DS1 circuit to DACS II (signaling or transparent) and specifies trunk conditioning. The <sc> field (signaling conversion) allows setting signaling bits (abcd) to 0 or 1, inverting bits, or passing bits through unchanged. This field is used in gateway to dictate how signaling bits (c and d) which are not used on both sides are to be set.

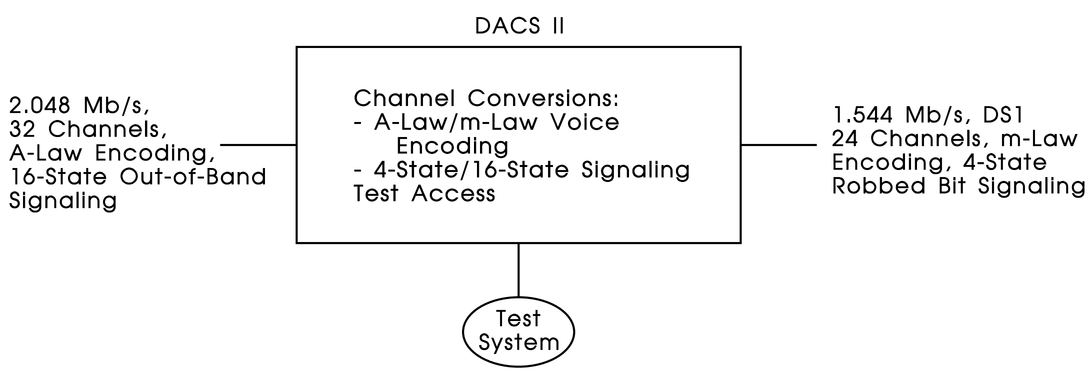


Figure 1-25. Gateway Signal Conversions

DACS II *SLC* Carrier Direct Interface

The *SLC* carrier direct interface eliminates costly external equipment required to terminate *SLC* carrier facilities and provides grooming functions for these interfaces. Special NPC circuit packs (S96D, SS5D, and TG80B) allow the DACS II to terminate lines from connecting RTs for the following: *SLC* carrier Modes I and III and *SLC* Series 5 carrier feature package B (FPB) and FPC. The *SLC* 96 carrier Mode III or *SLC* Series 5 carrier FPC configuration (Figure 1-26) multiplexes special service channels only, on up to two or four (Series 5 FPC) bidirectional DS1 facilities. Each Mode III configuration uses a 2.2-kb/s data link derived from the Fs framing bit to carry alarm and protection switching information between the RT (remote terminal) and DACS II. The Series 5 FPC configuration uses the ESF framing format that has a 4-kb/s data link. The DACS II terminates the Mode III or Series 5 carrier lines, processes and terminates the *SLC* carrier data link, supports facility protection switching between the *SLC* carrier RT and DACS II, and routes the associated DS0 channels onto intraoffice or interoffice facilities, depending on the application.

The *SLC* 96 carrier Mode I or Series 5 FPB configuration (Figure 1-27) carries both locally switched and special service channels on up to four bidirectional DS1 facilities. The *SLC* carrier data link carries alarm, protection switching, and maintenance information between the RT, DACS II, and the digital switch. DACS II terminates the Mode I or Series 5 FPB interface, passes the switched DS0 channels and its associated data link maintenance information to a digital switch, supports facility protection switching between the *SLC* carrier RT, and grooms out the nonswitched channels onto intraoffice or interoffice facilities, depending on the application.

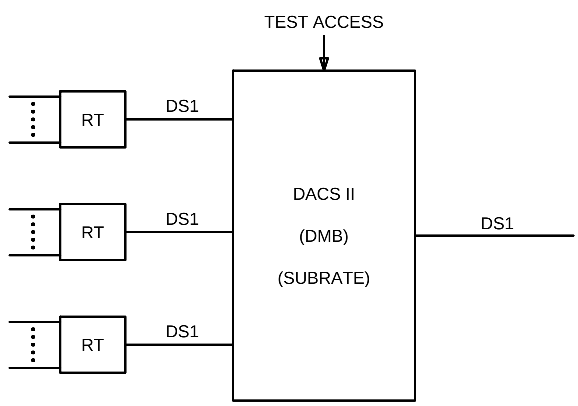


Figure 1-26. DACS II *SLC* 96 Carrier Mode III and *SLC* Series 5 Carrier FPC Interface

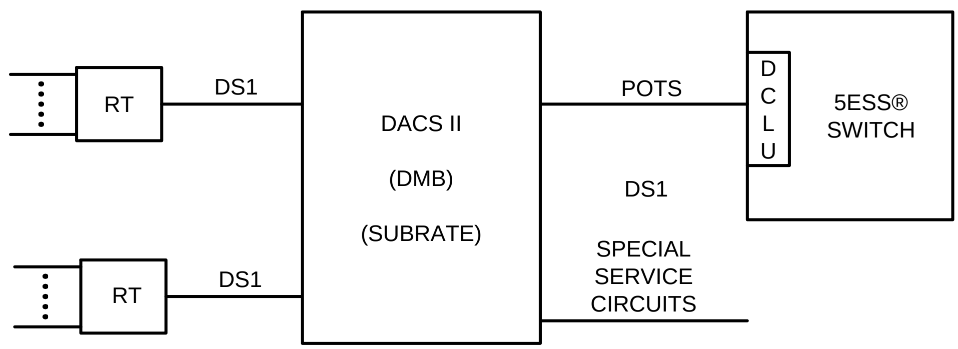


Figure 1-27. DACS II *SLC* 96 Carrier Mode I and *SLC* Series 5 Carrier FPB Interface

Framing Format for *SLC* 96 Carrier Interface

The *SLC* 96 carrier RT uses the derived Fs framing format to communicate with the central office equipment. he derived Fs framing format is a 4-kb/s data link (on digroup A) with 2.2kb/s carrying data and 1.8kb/s sharing the bit position with the D4 signaling frame (Fs) format.

SLC 96 Mode I 5:4 Protection Feature

A 5:4 protection arrangement for the Mode I and FPB interface feature replaced the existing 5:5 arrangement. There is no protection line between DACS II and the digital switch with the 5:4 arrangement. Every digroup (including DGA) will only be protected between DACS II and the RT; no protection switching is performed on the DL digroups.

Framing Format for *SLC* Series 5 Carrier FPC Interface

The *SLC* Series 5 carrier RTs communicate with the central office equipment by means of a 4-kb/s data link derived from the DS1 bit stream of digroup A. The framing format for this data link is the ESF (extended superframe format) with the D4 channel counting sequence.

Circuit Pack Requirements for *SLC* Carrier Interface

The DACS II hardware required to achieve the *SLC* carrier direct interface consists of the TG183 *SLC* 96 carrier dual card (S96D) and the TG184 *SLC* Series 5 carrier dual card (SS5D). The TG183 pack is also used for *SLC* Series 5 carrier FPB with Specials (FPBw/S) which is the Series 5 equivalent of *SLC* 96 carrier Mode I. These circuit packs can be used in any of the DDC (dual digroup circuit) slots of the facility terminating units. The S96D and SS5D circuit packs can be grown in DACS II as either a DS-type or a DE-type NPC. When grown as a type DS NPC, these cards provide a line interface with the following characteristics:

- Fs or ESF format DS1 signal (as required) with data link for status and protection switching communications
- 9-state signaling for coin telephone circuits
- *SLC* carrier alarm handling and data link communications
- Facility performance monitoring
- Line signal loopback capability.

The TG80B circuit pack can be used for the *SLC* 96 carrier Mode I and Mode III non-data-link-carrying digroups; it can also be used for the *SLC* Series 5 carrier FPBw/S interface for non-data-link-carrying digroups. The TG184 is required for all digroups for the *SLC* Series 5 carrier FPC interface.

When grown as a DE type, the S96D and SS5D circuit packs perform all the functions of the DDC. The DACS II software enables the line protection switching and allows all 96 channels from the different *SLC* carrier digroups to be addressed on digroup A by means of the DACS II commands. The protection switching is done by automatically cross-connecting the failed line channels to the standby protection line.

Alarms in *SLC* 96 Carrier Mode III Interface

The alarm field of the data link specifies framing, major, minor, power/miscellaneous, and digroup alarms as well as far-end loopback (FELP) command messages for all shelves. DACS II recognizes, detects, and declares the associated alarm condition when an alarm message is received in the alarm field of the data link from the RT.

Alarms in *SLC* 96 Carrier Mode I or Series 5 Carrier FPB Interface

DACS II can recognize, detect, and declare alarm conditions from either the RT end or the local switch end. DACS II will always intercept and overwrite the alarm bits of the data link, regenerate other bits, and transmit over the data link to the far end. Therefore, when a failure occurs between DACS II and the digital switch, instead of generating an alarm condition on the entire DS1, DACS II will trunk-condition each channel of the affected POTS circuits in the direction of the RT. In this way, the non-locally-switched channels between the RT and DACS II remain unaffected and their service is not impaired. DACS II always passes major and power/misc alarms received from the RTs to the local digital switch.

Alarms in *SLC* Carrier Series 5 FPC Interface

Three types of alarms are available from the *SLC* Series 5 carrier system:

- The alarm indication signal (AIS) on each digroup
- Yellow alarm on each digroup
- Alarm information on the digroup A data link for all digroups.

The alarm information carried on the data link includes major, minor, power/miscellaneous, and carrier line failure alarms for the near end and the far end. DACS II recognizes, detects, and declares all alarm conditions received from the *SLC* Series 5 carrier system.

Maintenance in Mode III or Series 5 FPC Interface

DS1 Facility Monitoring. DACS II monitors for and detects loss of data link data, out-of-frame (OOF) conditions, loss-of-signal (LOS) conditions, and bipolar violations (BPVs) for *SLC* 96 carrier, and cyclic redundancy checking (CRC) for Series 5 on the DS1 lines.

Line Loopbacks. There are two line loopbacks supported by DACS II in the *SLC* carrier interface. The first is the line interface loopback (LILB), where the DS1 signal is internally looped back to sectionalize a failure to the DS1 line interface. DACS II can do an LILB automatically after a manual protection switch is done. DACS II does this loopback the same way it is done in the *SLC* carrier systems. The second type of loopback is the line loopback (LLB). DACS II is capable of initiating or terminating an LLB in response to a manual request entered over one of the administrative links. If the LLB is initiated by DACS II, the FELP message is used to request that the channel bank loop the incoming DS1 signal to the output bitstream. If DACS II receives an FELP message from an RT or digital carrier line unit (DCLU), DACS II performs a full DS1 loopback towards the bank it received the message from. LLBs allow craft personnel to do single-ended fault location of the looped digroup from the near end. The LILB and LLB are illustrated in Figure 1-28.

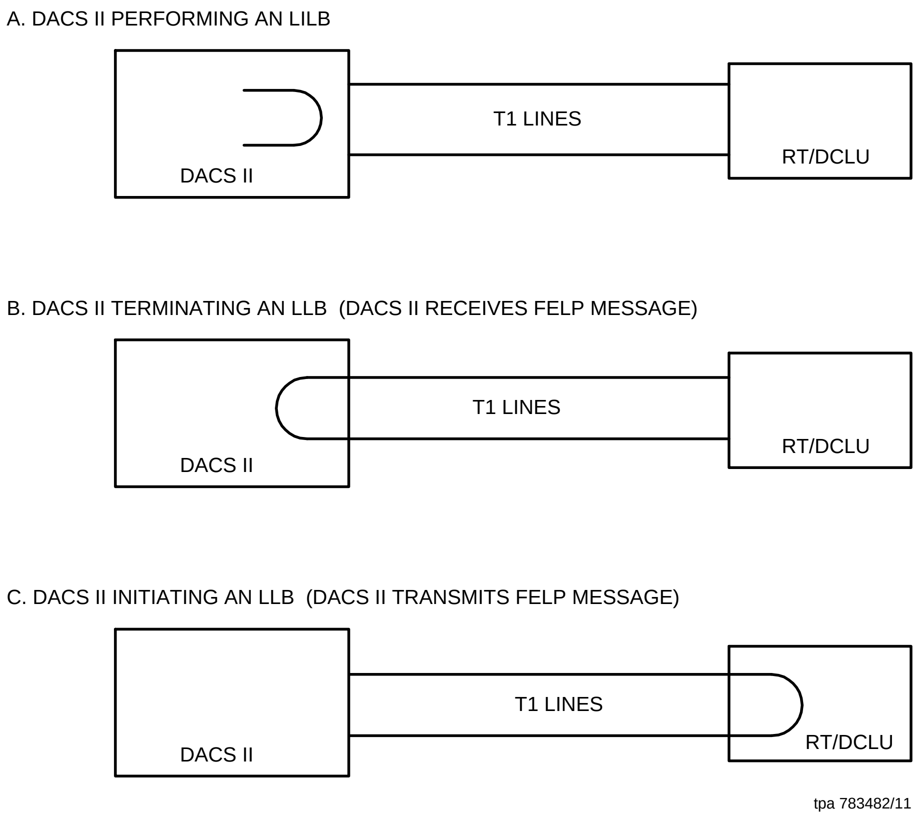


Figure 1-28. Line Interface and Line Loopbacks

Protection Line Switching. A protection line and the associated digroups at each end can be equipped to carry service if one of the primary lines fail. Switching of service onto the protection facility is accomplished by coordination of the equipment at each end of the facility over the *SLC* carrier data link. At the DACS II end, the facility switching is accomplished by automatically cross-connecting all the affected service channels to channels of the protection digroup. Protection switching can also be initiated manually by entry of a command. When not directly in use, the protection line is continuously powered and monitored and carries duplicate service for the RT A-shelf main line. Since the protection line must be able to carry DGA service, the DGP must be provisioned with a *SLC* carrier data link.

Maintenance in Mode I or Series 5 FPB Interface

DACS II performs the same maintenance procedures for both special service channels and POTS channels. For protection switching, there is a protection line on the RT side of DACS II. When the digroup with the data link needs to be protected, DACS II will ensure that the data link continues to be passed through to the switch. If non-locally-switched special service channels are involved on the failed line, DACS II reconfigures its cross-connect map and switches the special service channels to the protection digroup.

CIU for *SLC* Carrier and Series 5 Carrier

The craft interface unit (CIU) can be plugged into the channel test unit (CTU) of a Series 5 carrier RT, or it can be connected to a DACS II administrative port. All the transmission and signaling options for the channel units are entered from the CIU by commands sent to the RT bank controller (BC). The CIU transmits the information to the BC, which stores the information in nonvolatile system memory. Since the information is stored, the provisioning can be done before the channel units are installed; then when installed in the frame, the BC writes into the channel unit registers.

DACS II Subrate Feature

The DACS II Subrate feature is implemented in DACS II by adding two new circuit packs to the existing digital signal processing unit (DSPU). The subrate multiplexer (SRM) and the multipoint junction unit (MJU) circuit packs under the control of the software provide all the functions of a DDS hub including the following:

- Subrate multiplexing
- Dataport error correction
- DS0A and DS0B cross-connect capability
- Secondary channel capability
- Multipoint bridging
- Parity channel error correction.

Figure 1-29 shows that access to the Subrate feature is provided by cross-connecting an incoming channel from a facility digroup to a DSPU equipped with SRM and MJU circuit packs. The required digital data functions are performed, and the resulting signal is sent back to the cross-connect network (CCN). Multiple circuit processing functions such as those for a circuit that requires both subrate multiplexing and multipoint bridging are performed by connecting the desired functions in tandem by means of the CCN. Functions located on the same Subrate feature card can also be connected in tandem by means of the CCN. Subrate error correction can be associated with any multiplexer or MJU circuit, or it can exist as a separate stand-alone function. Once all required processing is performed, the signal is then cross-connected by means of the CCN to the outgoing facility. The internal cross-connections are done automatically by the system.

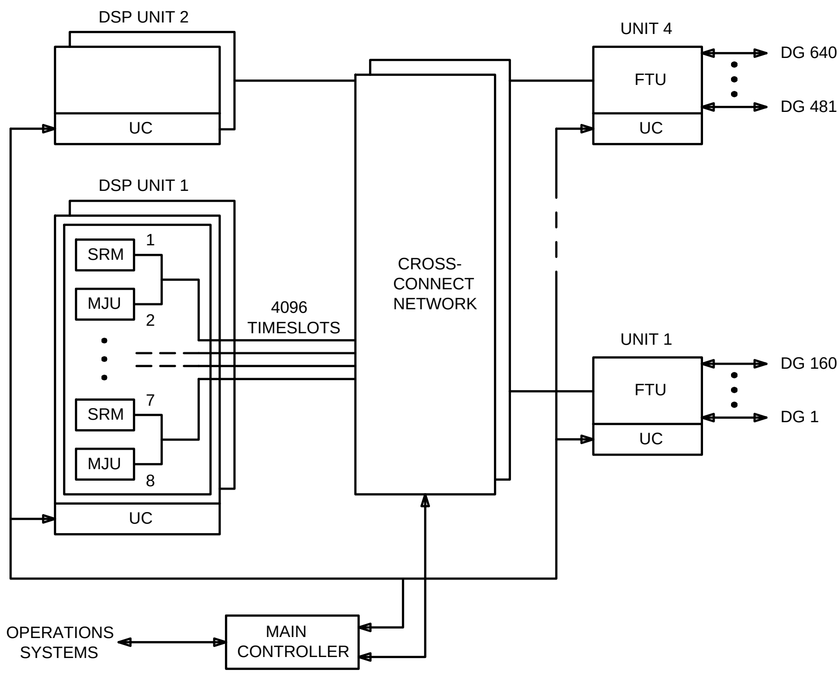


Figure 1-29. DACS II With Subrate Feature—System Architecture

SRM Circuit Pack

The SRM circuit pack provides standard digital data subrate multiplexing of 2.4, 4.8, and 9.6-kb/s DS0A formatted signals and dataport error correction. The SRM functions are illustrated in Figure 1-30. The SRM circuit pack provides three types of subrate multiplexers that multiplex five, ten, or twenty subrate channels. Any subrate channel interfacing the SRM circuit pack can have dataport subrate error correction performed on it as an independent function or in combination with multiplexer processing. Similarly, 56-kb/s DS0A channels can interface the circuit pack and have parity channel error correction performed as an independent function. This function can also be performed on the DS0B channel associated with any multiplexer.

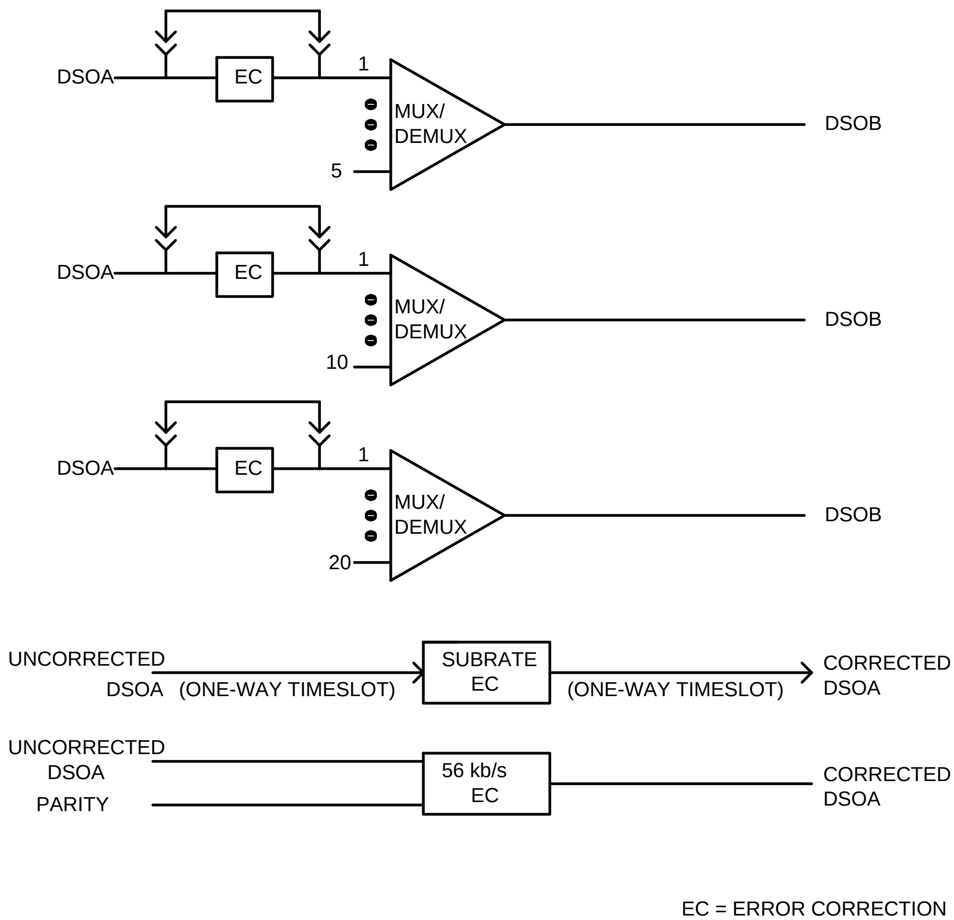


Figure 1-30. SRM Functions

MJU Circuit Pack

The MJU circuit pack provides multipoint bridging of subrate and 56-kb/s DS0A formatted signals and provides dataport error correction. These functions are illustrated in Figure 1-31. This bridging is equivalent to that done in external multipoint junction units. Each MJU provides one control leg and four branch circuits. Multipoint circuits requiring more than four branches are formed by cascading MJU branch circuits to the control leg of additional MJUs. The MJUs operate at 2.4, 4.8, 9.6, and 56 kb/s and do the signal processing necessary for the secondary channel capability. As with the SRM circuit pack, channels interfacing the MJU circuit pack can have subrate or parity channel dataport error correction done on them as an independent function or as part of the MJU processing. The MJU circuit pack also provides digital data system (DDS) maintenance functions (blocking, branching, and loopback) in response to automated bit access test system (ABATS) commands. The hub identifier (HUBID) must be provisioned by software before the MJU can be grown.

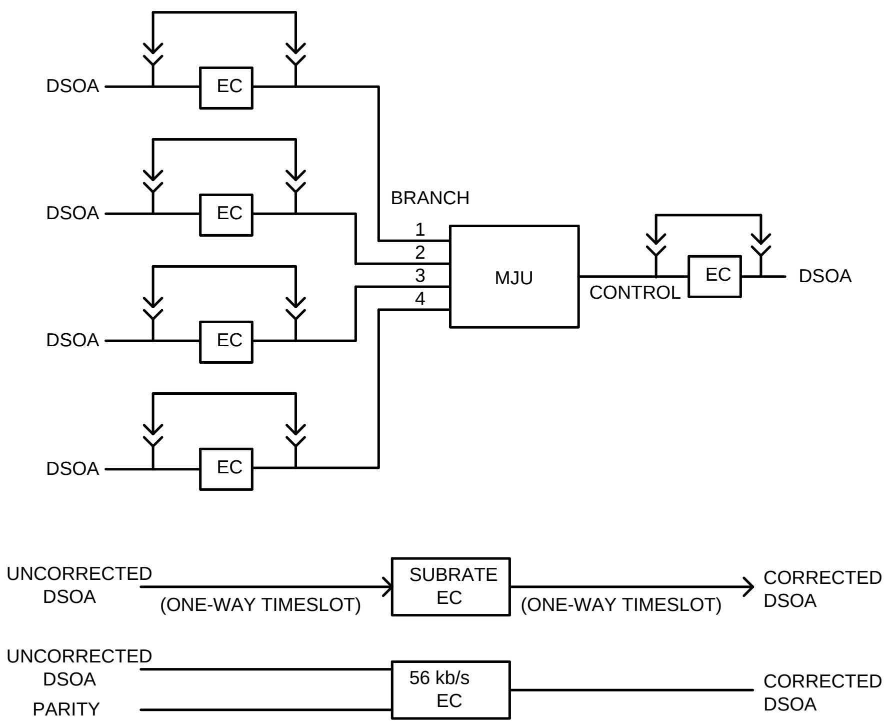


Figure 1-31. MJU Functions

DACS II Subrate Capacities

The DSPU supports up to eight circuit packs that are duplicated for protection. The DSPU can support any combination of SRM, MJU, and digital multipoint bridge (DMB). All are designed for use in the DSPU. Each circuit pack position has a capacity of 512 time slots.

The MJU circuit pack supports up to 102 multipoint junction units with 1 control leg and 4 branch circuits per multipoint junction unit. The number of subrate multiplexers supported on the SRM circuit pack depends on the mix of 2.4, 4.8, or 9.6-kb/s channels. The 5-channel SRM uses 6 time slots per multiplexer. The 10-channel SRM uses 11 time slots per multiplexer. The 20-channel SRM uses 21 time slots per multiplexer. These capacities do not include error correction. Three time slots are required if parity channel error correction is included on a 56-kb/s DS0A channel. Additional time slots are required to do subrate DS0A error correction only when there is no multiplexer or MJU involved. The system reserves the total number of time slots needed for each function to ensure that access is always possible for every channel or port. This ensures that the system will be nonblocking for all cross-connections.

DACS II Subrate Memory Administration

The subrate data base and all operations are controlled by the main controller in the frame. All equipment status and circuit maps associated with the Subrate feature are stored on the DACS II Primary Memory Card (PMEM) as a backup for the volatile memory in the frame. If there is a loss of data in the volatile memories (RAM), DACS II can be rebooted from a cold boot. Cold boot is defined as a manual reset of the DACS II that results in all controllers being reset, the data base being downloaded from the PMEM, and all hardware assignments being reestablished from PMEM information.

DS3 Termination Feature

Each DS3U terminates up to six DS3 coaxial lines and contains the equipment to demultiplex the DS3 asynchronous signals into component DS1 signals and to DS0 channels for connection to the existing CCN for cross-connection. DS0 channels from other facilities connected to the CCN are assembled into DS3 signals for connection to the DS3 lines in the other direction. Once derived, the DS0 channels can be cross-connected to other DS0 channels, to the DSPU, or to test access equipment for transmission and signaling tests. The DS3U equipment also offers DS3 and DS1 signal performance monitoring.

Since one DS3 signal contains 28 DS1 signals, protection switching is provided in the DS3U to prevent the loss of service owing to the failure of any single circuit pack in the DS3U. This switching is for a failure of any Multiplexer - Multiplexer Interface Unit pair; there is neither a spare DS3 facility nor DS3 facility switching.

The following subsections provide the functional description of the DS3U circuitry and the DS3U protection switching.

Transmission Paths

Figure 1-32 shows a simplified block diagram of the DS3U equipment. The facility line interface (FLI) pack forms the interface with the DS3 coaxial lines on the facility side of the unit, and the formatter (FMT) forms the interface with the CCN on the DACS II side. At the heart of the multiplexer-multiplexer functional group (MMFG) is the multiplexer (MXR) which contains the muldems (multiplexer-demultiplexers) to make the signal conversions between the DS1 and DS3 (M13 muldem) and between the DS1 and DS0 (M10 muldem). The functions of these packs are detailed in the following subheadings for those packs.

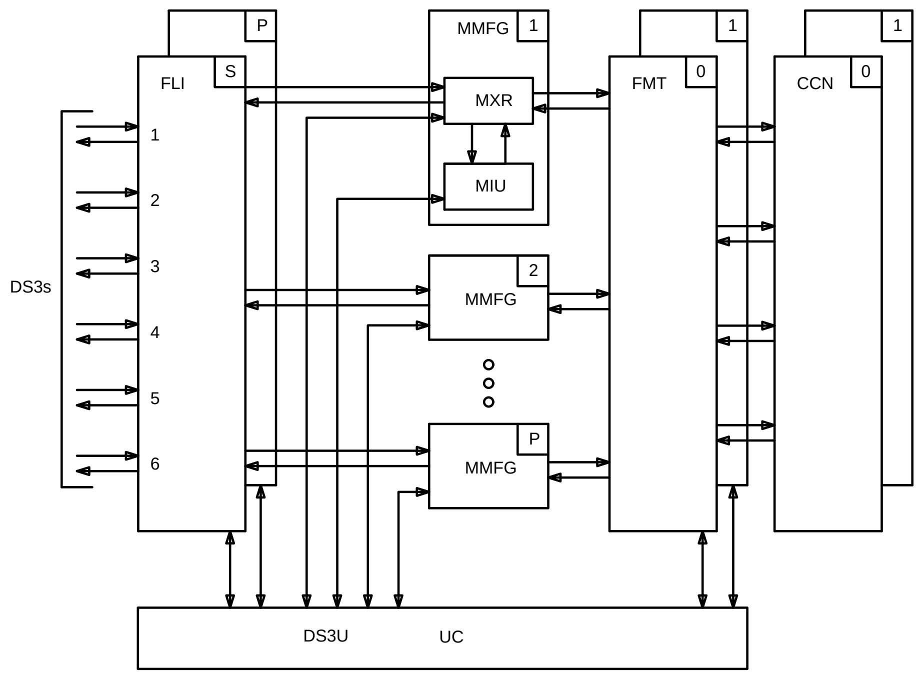


Figure 1-32. Simplified DS3U Block Diagram

FLI Pack. This pack terminates up to six DS3 coaxial lines for connection to the MXR positions in the DS3U. In addition to the signal termination that involves both impedance matching and signal level equalization, the FLI also: (1) performs bipolar/unipolar signal conversions, (2) recovers DS3 line clock signal for MXR demultiplexing functions, and (3) accomplishes DS3 signal loopback on an out-of-service MXR when the pack is diagnosed. Two FLI packs are provided in the DS3U for protection switching. The line signals pass through relay contacts for the service and protection FLI packs in the unit so that the DS3 signals can be connected around the service FLI to the protection FLI if the service pack fails. The FLIs (working with the FMT packs) also accomplish the MXR protection switching on the line side of the MMFG packs. If any of the six MMFGs fails, the FLIs and FMTs simultaneously switch DS3 data to the protection MMFG. Further details on the operation of the protection groups in the DS3U are covered under a separate heading. Circuitry in the two FLIs maintains 75-ohm line impedance whether one or both of the unit FLIs are present.

MXR Pack. Figure 1-33 shows an expanded block diagram of the data flow through the M13 and M10 muldems in the MXR pack. At the FLI interface on the pack, the MXR selects either the service or protection FLI to accomplish protection switching of the FLI on the DACS II side. In the direction of transmission toward the CCN, the M13 muldem demultiplexes the DS3 signal into 28 DS1s which are applied to the 28 PCM transceivers in the M10 muldem. Each transceiver reformats the 24-channel data and signaling and the facility data link (FDL) into a 32-channel 4.096-Mb/s serial signal that is combined with the signal from the other transceiver for the pair in the channel controller circuit. The channel controller multiplexes the two 4.096-Mb/s signals into a single 64-channel 8.192-Mb/s serial stream. The FMT interface interleaves two pairs of these 8.192-Mb/s signals into a 16.384-Mb/s serial stream. Seven such signals are developed for the seven pairs of channel controller signals in this interface and are applied to both the 0 and 1 side FMT packs. The 28 PCM transceivers correspond to 28 NPC positions in the MXR that are provisioned by DACS II commands.

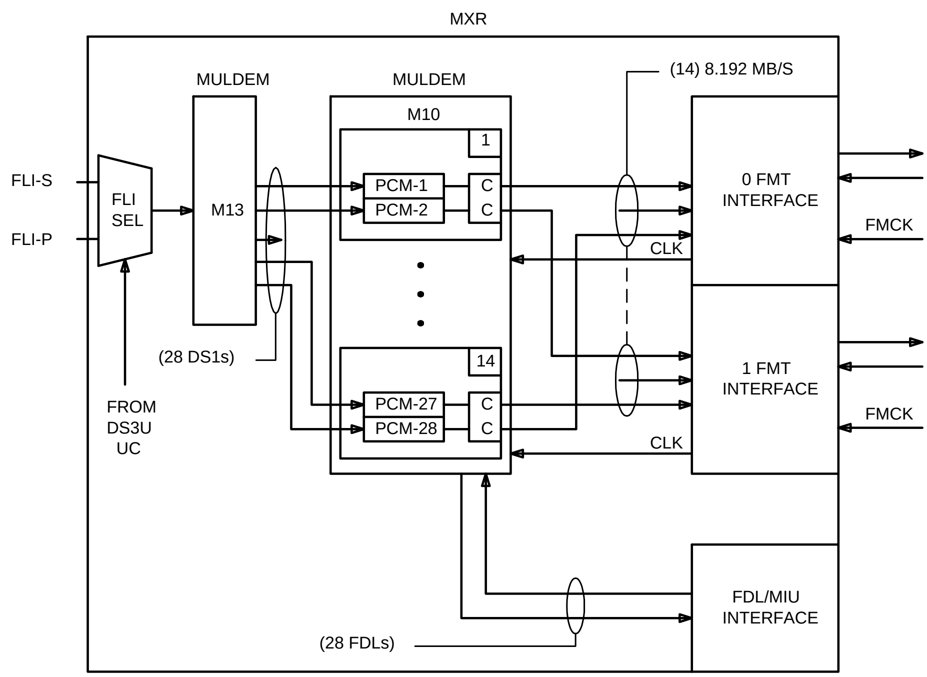


Figure 1-33. Simplified MXR Block Diagram

In the direction of transmission from the CCN, the MXR performs the reverse functions to produce one DS3 signal from the DS0 channels delivered by the CCN. The DS0 channels received from the FMT packs on the seven 16.384-Mb/s serial data streams are converted to fourteen 8.192-Mb/s signals that connect to the fourteen channel controllers. Signals are received from both FMT packs, and the channel controllers select the source based on the CCN status bus. The channel controllers further demultiplex those data signals into the 4.096-Mb/s signals and apply them to the respective PCM transceivers. The M13 muldem multiplexes the 28 DS1s from the PCM transceivers into the 44.736-Mb/s unipolar stream that is applied to both the service and protection FLI packs. This M13 muldem contains the necessary DS1 buffers for storage and the circuitry for bit stuffing to accomplish the mux/demux functions.

FMT Pack. The formatter pack contains MXR interface circuitry, four receive formatters feeding the CCN, four transmit formatters from the CCN, a clock generator, and DS3U UC interface. In the direction of transmission toward the CCN, the interface produces fourteen 8.192-Mb/s streams from the seven 16.384-Mb/s signals from the MXR pack. Circuitry for 2:1 selection of the 16.384-Mb/s signals from the service or protection MXR packs accomplish protection switching of the MXR pack on the CCN side. Each of the four receive formatters takes signals from the MXR interface circuitry (of 1-1/2 MXR packs) and applies them to one of the four receive ports to the CCN network. Each of these CCN ports is the standard interface provided for any of the FTU or DSPU units in the frame. The four CCN ports are 1024 time-slot, 8.192-Mb/s ports. Only 1008 slots out of the 1024 slots contain DS0 channel information from the DS3 signal.

In the direction of transmission from the CCN, each of the four transmit formatters receives a 1024 time-slot, 8.192-Mb/s signal from one of the four CCN ports. Signals from these formatter circuits are split into six signals that are connected to 2:1 selection circuitry for protection switching of this direction of transmission to the MXRs. The selected signals are converted by the MXR interface circuitry that produces the seven 16.384-Mb/s signals for the MXR packs.

There are two FMTs in the DS3U, each one associated with one side of the CCN. These form a protection group to protect against the loss of service owing to the failure of a single FMT pack. The FMT is switched with the CCN side which means that its failure causes the CCN side to switch and that the FMT switching follows the CCN switching (initiated by other causes). The clock generator in the FMT produces a local frame sync and an 8.192-MHz clock. These signals are distributed from the FMT on each CCN side to the six service MXRs and one protection MXR in the unit. The MXR selects the timing signals from the active FMT and in turn produces a 44.736-MHz clock that is used for timing the MXR’s DS3 output signal.

Protection Switching

The standby packs in the DS3U protect against the loss of service owing to a failure of any single pack. The strategy is implemented by having the following protection groups: the FLIs (1:1 protection), the MMFG (MXR) group (1:6 protection), the FMTs (1:1 protection), and the power units. Subsequent paragraphs describe the first three failure groups, and Figure 1-34 shows how the protection circuitry is placed to accomplish switch around of service. The power protection is based on the availability of reserve power. Three power units in the DS3U are diode OR’d together to supply the DS3U although only two are required for the load.

The FLI protection switching maintains service if one of the FLI packs fails in the DS3U. This switching is accomplished by relays in the FLI packs and switching circuitry in the MXR packs. The switching is so fast that the transmission may only perceive a framing error. This switching is under control of the DS3U UC, but if the UC is not present, the service FLI is automatically selected. If either FLI loses power or is physically disconnected, the select signal from the UC is overridden and the other FLI is automatically selected.

The MMFG protection switching maintains service if there is a failure of any single MMFG. There is one protection MMFG for the six service MMFGs. The MMFG includes the MXR packs and will be switched out as a group if any pack in the group fails. This switching is accomplished by circuitry on both sides of the MXR in the FLI and FMT packs. To accomplish this switching, the DS3U UC coordinates the switching operations on these packs and loads provisioning into the protection MXR to match that of the MXR to be switched out. The overall operation is managed by a fail-safe, lock-and-key mechanism administered by the DS3U UC. This mechanism is a step-by-step procedure in which the UC unlocks the involved packs and loads the provisioning information, but the switching can be locked again if any involved pack cannot be unlocked. Conversely, the UC can override locked conditions if one or more of the FLI and FMT packs are failed. However, the procedure also prevents a failed UC from falsely initiating a switch. The MXR switching is so fast that the transmission may only perceive a framing error.

The FMT protection switching maintains service if one of the FMT packs fails in the DS3U. The 0-side and 1-side FMT packs are part of the CCN failure group and are switched with the CCN side. The switching is controlled by the DACS II main controller that monitors the status of all CCN packs on both sides. If the MC is failed or out-of-service, the switching is automatically controlled by the error status of the CCN side (based on the status of all the packs on each side).

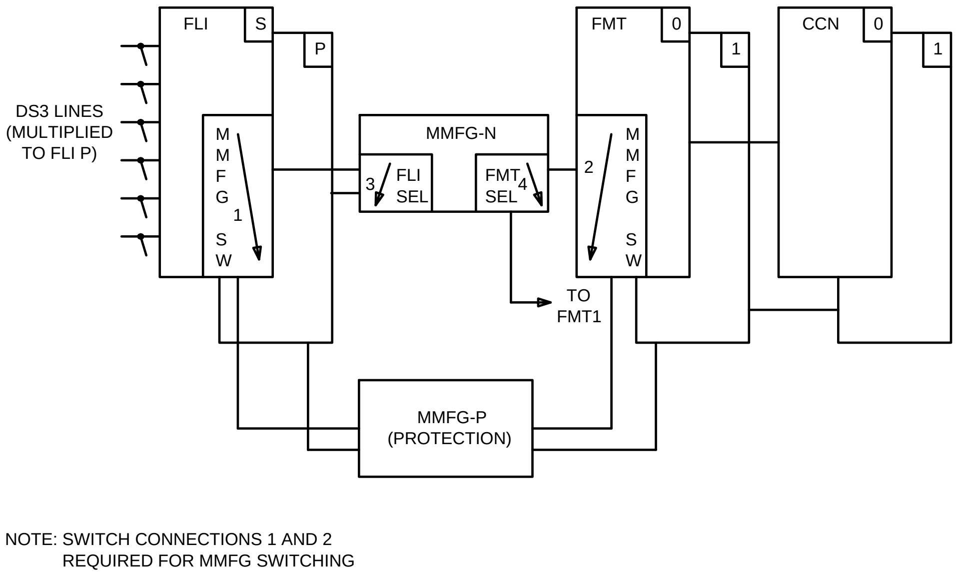


Figure 1-34. Protection Switching Circuitry

DS3 Hybrid Termination Feature

A Hybrid DS3U is very similar to the non-hybrid DS3U except that it is also able to demultiplex and multiplex E1 signals in addition to any DS1 signals that might be carried by the DS3 signal. The multiplexing standard for a DS3 signal is defined in Bellcore document TR-TSY-000009 entitled "Asynchronous Digital Multiplexes Requirements and Objectives". In that standard, it is shown that a DS3 signal carries seven DS2 signals, which have a transmission rate of 6.312 Megabits/second. Each DS2 signal may carry four DS1 signals of 1.544 Megabits/second rate. Therefore a DS3 signal may carry 28 DS1 signals.

A DS2 signal may also carry three E1 signals of rate 2.048 Megabits/second. This is described in the ITU-T standard G-747. If each DS2 within a DS3 signal carries E1 signals, then a total of 21 E1 signals may be carried within a DS3. A DS3 signal may carry both DS1 and E1 signals within its multiplex; however, the embedded DS2 signals carry either four DS1 signals or three E1 signals, but not both.

Each Hybrid DS3U terminates up to six DS3 coaxial lines and contains the equipment to demultiplex the DS3 asynchronous signals into component DS1 and/or E1 signals. In turn the DS1 and E1 signals are demultiplexed into their component DS0 channels for connection to the existing CCN for cross-connection. DS0 channels from other facilities connected to the CCN are assembled into DS3 signals for connection to the DS3 lines in the other direction. Once derived, the DS0 channels can be cross-connected to other DS0 channels, to the DSPU, or to test access equipment for transmission and signaling tests.

Since one DS3 signal contains 28 DS1 signals, 21 E1 signals, or a combination thereof, protection switching is provided in the Hybrid DS3U to prevent the loss of service owing to the failure of any single circuit pack in the HDS3U. This switching is for a failure of any Multiplexer - Multiplexer Interface Unit pair.

The following subsections provide the functional description of the HDS3U circuitry and the HDS3U protection switching.

Transmission Paths

As for the non-hybrid DS3U, Figure 1-32 shows a simplified block diagram of the DS3U equipment. The facility line interface (FLI) pack forms the interface with the DS3 coaxial lines on the facility side of the unit, and the Hybrid formatter (HFMT, the Figure shows only an FMT) forms the interface with the CCN on the DACS II side. At the heart of the MXR - MIU functional group (MMFG) is the Hybrid-multiplexer (HMXR, again the Figure shows only an MXR) which contains the muldems (multiplexer-demultiplexers) to make the signal conversions between the DS1/E1 and DS3 (M13 muldem) and between the DS1/E1 and DS0 (M10 muldem). (The Multiplexer Interface Unit (MIU) is not supported within the Hybrid DS3U at this time. However, the MMFG notation has been retained for consistancy.) The functions of these packs are detailed in the following subheadings for those packs.

FLI Pack. This pack terminates up to six DS3 coaxial lines for connection to the HMXR positions in the HDS3U. In addition to the signal termination that involves both impedance matching and signal level equalization, the FLI also: (1) performs bipolar/unipolar signal conversions, (2) recovers DS3 line clock signal for HMXR demultiplexing functions, and (3) accomplishes DS3 signal loopback on an out-of-service HMXR when the pack is diagnosed. Two FLI packs are provided in the HDS3U for protection switching. The line signals pass through relay contacts for the service and protection FLI packs in the unit so that the DS3 signals can be connected around the service FLI to the protection FLI if the service pack fails. The FLIs (working with the HFMT packs) also accomplish the HMXR protection switching on the line side of the MMFG packs. If any of the six MMFGs fails, the FLIs and HFMTs simultaneously switch DS3 data to the protection MMFG. Further details on the operation of the protection groups in the HDS3U are covered under a separate heading. Circuitry in the two FLIs maintains 75-ohm line impedance whether one or both of the unit FLIs are present.

HMXR Pack. Figure 1-33 shows an expanded block diagram of the data flow through the M13 and M10 muldems in the MXR pack. The HMXR has an identical structure except that there are 21 E1 PCM transceivers in addition to the 28 DS1 PCM transceivers. At the FLI interface on the pack, the HMXR selects either the service or protection FLI to accomplish protection switching of the FLI on the DACS II side. In the direction of transmission toward the CCN, the M13 muldem demultiplexes the DS3 signal into 28 DS1s, 21 E1s, or a combination thereof. The possible 28 DS1 signals are applied to the 28 DS1 PCM transceivers in the M10 muldem. The possible 21 E1 signals are applied to the 21 E1 PCM transceivers in the M10 muldem. Each DS1 transceiver reformats the 24-channel data and signaling into a 32-channel 4.096-Mb/s serial signal that is combined with the signal from the other transceiver for the pair in the channel controller circuit. Each E1 transceiver reformats the 32-channel data and signaling into a 32-channel 4.096-Mb/s serial signal that is also combined with the signal from the other transceiver for the pair in the channel controller circuit. The channel controller multiplexes the two 4.096-Mb/s signals into a single 64-channel 8.192-Mb/s serial stream. The HFMT interface interleaves two pairs of these 8.192-Mb/s signals into a 16.384-Mb/s serial stream. Seven such signals are developed for the seven pairs of channel controller signals in this interface and are applied to both the 0 and 1 side HFMT packs. The 28 DS1 PCM transceivers and the 21 E1 PCM transceivers correspond to 28 or 21 NPC positions respectively in the HMXR that are provisioned by DACS II commands.

In the direction of transmission from the CCN, the HMXR performs the reverse functions to produce one DS3 signal from the DS0 channels delivered by the CCN. The DS0 channels received from the HFMT packs on the seven 16.384-Mb/s serial data streams are converted to fourteen 8.192-Mb/s signals that connect to the fourteen channel controllers of either the DS1 or E1 type. Signals are received from both HFMT packs, the channel controllers select the source based on the CCN status bus. The channel controllers further demultiplex those data signals into the 4.096-Mb/s signals and apply them to the respective PCM transceivers. The M13 muldem multiplexes the signals from the PCM transceivers into the 44.736-Mb/s unipolar stream that is applied to both the service and protection FLI packs. This M13 muldem contains the necessary DS1 or E1 buffers for storage and the circuitry for bit stuffing to accomplish the mux/demux functions.

HFMT Pack. The hybrid formatter pack contains HMXR interface circuitry, four receive formatters feeding the CCN, four transmit formatters from the CCN, a clock generator, and an HDS3U UC interface. In the direction of transmission toward the CCN, the interface produces fourteen 8.192-Mb/s streams from the seven 16.384-Mb/s signals from the HMXR. Circuitry for 2:1 selection of the 16.384-Mb/s signals from the service or protection HMXR packs accomplish protection switching of the HMXR pack on the CCN side. Each of the four receive formatters takes signals from the HMXR interface circuitry (of 1-1/2 HMXR packs) and applies them to one of the four receive ports to the CCN network. Each of these CCN ports is the standard interface provided for any of the IFTU or DSPU units in the frame. The four CCN ports are 1024 time-slot, 8.192-Mb/s ports.

In the direction of transmission from the CCN, each of the four transmit formatters receives a 1024 time-slot, 8.192-Mb/s signal from one of the four CCN ports. Signals from these hybrid formatter circuits are split into six signals that are connected to 2:1 selection circuitry for protection switching of this direction of transmission to the HMXRs. The selected signals are converted by the HMXR interface circuitry that produces the seven 16.384-Mb/s signals for the HMXR packs.

There are two HFMTs in the HDS3U, each one associated with one side of the CCN. These form a protection group to protect against the loss of service owing to the failure of a single HFMT pack. The HFMT is switched with the CCN side which means that its failure causes the CCN side to switch and that the HFMT switching follows the CCN switching (initiated by other causes). The clock generator in the HFMT produces a local frame sync and an 8.192-MHz clock. These signals are distributed from the HFMT on each CCN side to the six service HMXRs and one protection HMXR in the unit. The HMXR selects the timing signals from the active HFMT and in turn produces a 44.736-MHz clock that is used for timing the HMXR's DS3 output signal.

Protection Switching

The standby packs in the HDS3U protect against the loss of service owing to a failure of any single pack. The strategy is implemented by having the following protection groups: the FLIs (1:1 protection), the MMFG (HMXR) group (1:6 protection), the HFMTs (1:1 protection), and the power units. Subsequent paragraphs describe the first three failure groups, and Figure 1-34 shows how the protection circuitry is placed to accomplish switch around of service. The power protection is based on the availability of reserve power. Three power units in the HDS3U are diode OR'd together to supply the HDS3U although only two are required for the load.

The FLI protection switching maintains service if one of the FLI packs fails in the HDS3U. This switching is accomplished by relays in the FLI packs and switching circuitry in the HMXR packs. The switching is so fast that the transmission may only perceive a framing error. This switching is under control of the HDS3U UC, but if the UC is not present, the service FLI is automatically selected. If either FLI loses power or is physically disconnected, the select signal from the UC is overridden and the other FLI is automatically selected.

The MMFG protection switching maintains service if there is a failure of any single MMFG. There is one protection MMFG for the six service MMFGs. The MMFG includes the HMXR packs and will be switched out as a group if any pack in the group fails. This switching is accomplished by circuitry on both sides of the HMXR in the FLI and HFMT packs. To accomplish this switching, the HDS3U UC coordinates the switching operations on these packs and loads provisioning into the protection HMXR to match that of the HMXR to be switched out. The overall operation is managed by a fail-safe, lock-and-key mechanism administered by the HDS3U UC. This mechanism is a step-by-step procedure in which the UC unlocks the involved packs and loads the provisioning information, but the switching can be locked again if any involved pack cannot be unlocked. Conversely, the UC can override locked conditions if one or more of the FLI and HFMT packs are failed. However, the procedure also prevents a failed UC from falsely initiating a switch. The HMXR switching is so fast that the transmission may only perceive a framing error.

The HFMT protection switching maintains service if one of the HFMT packs fails in the HDS3U. The 0-side and 1-side HFMT packs are part of the CCN failure group and are switched with the CCN side. The switching is controlled by the DACS II main controller that monitors the status of all CCN packs on both sides. If the MC is failed or out-of-service, the switching is automatically controlled by the error status of the CCN side (based on the status of all the packs on each side).

Commands and Messages

Introduction

DACS II is an interactive system controlled by software commands. There are two message languages that can be used by a user to communicate with DACS II. These are the PDS (Program Documentation Standards) and the MML (Man-Machine Language). Each language has a set of input commands and output messages that are used to communicate with DACS II. An *input command* is a communication between a user and DACS II. *Input commands* are sent from a user to DACS II. Output messages are originated by DACS II and sent to the user. This section gives an introduction to the format of the input commands and output messages.

Comprehensive discussions of input commands and output messages can be found in the PDS and MML versions of the DACS II command and message manuals. This section does not replace those documents, but it provides an overview to their information.

DACS II Administrative Links

The DACS II can be administered (managed, operated) from a local terminal or remotely from an OS (operations system) connected via an administrative link. Six physical links can be connected to the DACS II frame. Links 1 through 4 are asynchronous, and links 5 and 6 can be asynchronous or synchronous depending on the communications interface. Sixteen virtual circuits may be established on a synchronous link.

A level of message screening can be assigned to each link. A user may choose to always receive responses to his/her commands, to receive selected messages, or to receive all messages from the other links. Autonomous messages may be blocked for a particular link to prevent other output messages from being interspersed among the user's messages. Some examples of uses of an administrative link are:

- Common equipment and feature equipment provisioning and maintenance
- Equipment and channel status information
- Facility provisioning and maintenance
- Facility performance readings.

An output message is sent from the DACS II over one or more administrative links in response to one of the following occurrences:

- An input command

  The output message reports that the input command was either completed successfully or denied; additionally, it may contain information requested by the input command. A *normal response* is an output message reporting a successful completion; an *error response* is an output message reporting a denial.

- An autonomous change in DACS II operation state

  The output message reports the information on DACS II system operation state changes which includes alarms and other trouble indications. This output message is referred to as an *autonomous response*.

DACS II can be administered (managed, operated) from a local terminal or remotely from an OS (Operations System) connected via an administrative link. Six administrative links (ports) can be used. Each link may use the Snider protocol, but only the fifth and sixth links are X.25 protocol compatible when circuit pack TM736B is installed. A level of message screening can be assigned to each link. A user may choose to always receive an output message to his/her input commands, to receive selected messages, or to receive all messages from the other links. Autonomous messages may be blocked for a particular link to prevent other output messages from being interspersed among the user's messages. Some uses of an administrative link are as follows:

- DS0 channel and clear-DS1 signal cross-connections and test access
- Subrate data feature cross-connections
- Common equipment and feature equipment provisioning and maintenance
- Equipment and channel status information
- DS1 and DS3 facility provisioning and maintenance
- DS1 and DS3 facility performance readings
- DS3 facility alarm surveillance and control (AS&C) and DS3 performance monitoring using telemetry asynchronous block serial (TABS) protocol.

Administrative links carry output messages in response to one of the following occurrences:

- An input command

  The output message reports that the input command was either completed successfully or denied; additionally, it may contain information requested by the input command. A *normal response* is an output message reporting a successful completion; an *error response* is an output message reporting a denial.

- An autonomous change in DACS II operation state

  The output message reports a change in the DACS II system operation state which includes alarms and other trouble indications. This type of output message is referred to as an *autonomous response*.

Formatting Conventions

To interpret the commands presented in this document, you should be familiar with the formatting conventions presented in the following paragraphs. Each command is presented in actual input command format with accompanying explanations of keywords and variables providing sufficient information to fully understand the activity.

Uppercase and Lowercase Characters

In the command format of this manual, uppercase and lowercase letters distinguish between information that is constant (uppercase) and information that is variable (lowercase). Any character written in uppercase appears on the output device exactly as it is written.

Delimiters

Delimiters are used to enclose a field in a command.

- **[ ]** Brackets indicate an optional field, one which may or may not be used in the input command or appear in the output message.
- **{ }** Braces indicate a field containing alternate choices. For input commands, the user must select one of the choices. In output messages, braces indicate that only one of the fields within the braces will appear.
- **< >** The less than and greater than symbols enclose an abbreviation representing information too lengthy to display in the manual. These delimiters are never used in actual DACS II input commands or output messages but are used only in describing the command format in this manual.
- **( )** Parentheses **are** part of the message text and must be entered where shown.

Using the Commands

Input Command Mode

The input command requests an action to be performed; this command contains necessary information for DACS II to accomplish the requested action. The user has two basic modes for inputting commands: the command mode and the menu/prompt mode.

Command Mode

The command mode is for the experienced user or machine-machine operation. A command must be selected along with variables and entered within a single line. The user types a single-line command with the only carriage return occurring at the end. "Single-line" refers to the input *command*, not to the display of the command. *A long single-line command may extend for several lines on a display terminal.*

DACS II accepts up to 250 characters of input per command. If an input command exceeds 80 characters (the standard width of most terminal screens), the input will continue on the next line of the display beginning with the 81st character. However, the command line can be broken at a convenient place by typing a backslash (\) followed by a carriage return. The display of the input command will continue on the next line, but the command will be interpreted as a single-line command. If 250 characters is not sufficient or if the user finds entering long commands error-prone, the single-line command can be broken up into several smaller commands.

Entering a carriage return without the backslash terminates the input and causes the line to be interrupted. An exclamation point (!) also terminates the input command (i.e., DACS II interprets the carriage return and ! ; as the end of the command). If the carriage return is used, **!** is echoed back to the terminal.

Menu/Prompt Mode

This optional on-line help mode assists the user in completing the input command. The menu/prompt mode aids the user by providing a list of alternative parameters or keywords.

The user starts the menu/prompt mode by entering a question mark (**?**) in the command line at the point in question. In response, DACS II presents a list of possible keywords. This list is presented to the user in menu or prompt form. At this point, the user may continue or return to the command line. If the user continues, he/she should refer to the detailed examples (menu form and prompt form) in the *On-Line Help Feature* section.

Aborting an Input Command or Output Message

The **ABT** command is entered to interrupt a system response or abort an input command. If **ABT** is entered for a particular link, the output from this link will be interrupted just after **ABT** is entered or after one or two output lines. At other links, the output messages may or may not be interrupted. When the **ABT** option is used, the command generating the output will be completed unless the autonomous message, **CMD ABT STOPPED**, appears.

For a nonabortable command, the output message will not be affected.

If a nonabortable message is being output but DACS II is executing an abortable command, **ABT** will stop the execution of the abortable command and **CMD ABT STOPPED** will be output on all links.

Input Command Format

The general format of an input command is:

VERB:FRM xy,SEQ ww:DATA[]!

VERB is the action word telling the system to do something; add, change, cross-connect, restore, etc.

The **FRM xy** field identifies the DACS II frame to which the command is being sent. A DACS II frame is identified by a 2-digit number whose range is from 00 to nn. This number is assigned to the frame when it is placed into operation.

The sequence field, **SEQ ww**, assigns an identifying 2-digit number to the command. The number is arbitrarily chosen by the operator. This field is commonly used when two or more remote operators using an OS are sharing the same administrative link. Sequence numbers enable the operators to keep track of their commands.

The frame and sequence fields are optional. If the sequence field is omitted, a "00" number is assigned to the command by default.

The **DATA** field consists of keywords and numbers as required by the command. A delimiter, brackets [] in this case, encloses variable optional information that is required by the verb to execute that command. All variables are positional within the command line.

Colons are used to separate the variables (also called group, block, field); but if they are logically connected, they are separated by commas. The colon (:) is used as a variable field delimiter.

An Example of An Input Message

RST::FRM 05,SEQ 12:NPC 097! PF

The above command asks DACS II to restore to service (**RST**) network processing circuit number 97 (**NPC 097**) in DACS frame number 5 (**FRM 05**). The operator has arbitrarily assigned the sequence number 12 (**SEQ 12**) to the command.

Keywords

Input commands consist of *keywords* combined with equipment and circuit identification. The verb must come first, followed by the identification block and the sequence block. After that, the keywords can be entered in any order as long as the argument (if required) follows the keyword with a space (minimum of one) in between. A keyword is an alphanumeric string of characters representing:

- Verb (also called command or action verb)
- Entity identification
- Address specification
- Result of a command.

Command verbs are keywords that tell the system to do something.

Entity identification is a keyword that identifies a specific system or circuit pack within the system. For example, the keyword **NPC** refers to a network processing circuit pack.

Address specification is a keyword that refers to a specific address. **TP 03**, for example, refers to a specific test port (Test Port 03).

Keywords sometimes report the results of a command. In response to a diagnostic command, DACS II might return the keyword **ATP** to indicate "All Tests Passed."

Input Command Control Characters

In addition to input commands, DACS II responds to the following input command control characters or symbols:

- **& (or CONTROL-x** or **CTRL-x)**. *Abandon message*. Entering any one of these characters causes DACS II to abandon the message being entered and return the system prompt.
- **CONTROL-h** or **CTRL-h**, **UNDERLINE**, **BACKSPACE**. *Erase last character*. Depressing the CONTROL and h keys simultaneously or depressing the UNDERLINE key or the BACKSPACE key causes DACS II to ignore the last character of a message and echo an underline (_). Entering *n* number of erase character symbols causes DACS II to ignore the last *n* characters of a message.

- **BREAK**. *Interrupt output message*. The BREAK key interrupts an output message. The message continues after an allotted amount of time has passed or after the operator has finished entering an input command.

Input Command Acknowledgements

After DACS II has received the execute character of the input command, an immediate reply will appear with one of the following acknowledgements:

- **PF** (Printout Follows). DACS II received the input command and processed it. An output message will soon be returned. The output message will report the results of the work initiated by the command. If the system cannot complete the command, the reason will be printed.
- **RL** (Retry Later). DACS II cannot execute the requested command now because it does not currently have system resources available.
  - — The system could be temporarily overloaded.
  - — The command queue could be excessively long.
  - — The requested program may be busy, etc.

  Wait, and enter the command later.
- **NG** (No Good). The basic format of the command is correct, but the system is in trouble. An example is when the MP is in the MCOND state.
- **NA** (No Acknowledgement). The command has been accepted by the parser, but processing control has been lost, thus making correct acknowledgement impossible. An example is when the communication interface (CI) has detected a local area network (LAN) failure.

If either NA or RL is sent as an input acknowledgement, a normal or error output message may not be sent. Also, if the input command itself is in error, the input acknowledgement will indicate this fact and either the normal or error message will not be sent.

Acknowledgement	***Meaning***
?V<cr><lf>	Command code error
?D<cr><lf>	Parameter block error
?E<cr><lf>	Error in command, cannot be identified as either ?V or ?D
?P<cr><lf>	Parity error occurred in the input
?T<cr><lf>	The time between characters exceeded timeout threshold
?X<cr><lf>	Command aborted in response to a <cancel> or <break> from user.

Output Messages

There are three types of DACS II output messages. The normal or **completion message** indicates that the input command from the user has been executed and completed. An error response or **denial message** means that the input command has been denied and gives the reason or condition code for the denial. An **autonomous message** reports a change in the operational state of the DACS II.

The format for an output message is:

```
PA TIME FRM, SEQ LINK IDENT DATA TERM
```

The priority of action (PA) field is a 2-character field indicating the priority level as follows:

*C	Immediate action, critical alarm
**	Immediate action, major alarm
*	Action, minor alarm
M^	Results of manual action
A^	Autonomously generated action message
I^	Autonomously generated information message.

NOTE:
The ^ indicates a space.

TIME is the time of day using a 24-hour clock with an hours:minutes:seconds (**hh:mm:ss**) format.

The 2-digit **FRM** field identifies the DACS II frame that sent the message.

The **LINK n[vv]** field contains a digit from 1 through 6 that identifies the DACS II administrative link that originated the command. A blank in the **LINK n[vv]** field indicates an autonomous message generated within DACS II. The **[vv]** indicates the virtual circuit number from 1 through 16 when **n** is 5 or 6..

The **IDENT** and **DATA** fields identify the action verb with its associated keywords, variables, and data that the output message is responding to.

The termination field, **TERM**, indicates the results of a requested command. Some possible terminations are:

COMPL	Requested action is completed.
STOPPED	Requested action stopped before normal completion.
IN PROGRESS	Requested action is in progress.
[ ] DNY	Requested action is denied. The reason for denial is indicated in the output message. The brackets signify various keywords and data used to explain the reason.

Completion Message

A possible response to the input command **RST:FRM 05,SEQ 12:NPC 097!** (restore to service network processing circuit number 097 in DACS II Frame 05) could be:

M 07:39:20 05,12 2 RST NPC 097 TYPE DE100 COND 00 COMPL

M, the priority of action, indicates the result of a manually entered command. The time (07:39:20), the DACS II frame number executing the command (05), the message sequence number (12), and the link number (2) follow. The remaining fields reflect the input command that originated the output message and the results of the command. In this case, network processing circuit number 097 (NPC 097), a standard DE100 digroup card (TYPE DE100), was restored to service (RST). Restoration of the NPC occurred without error (COND 00), and the command was successfully completed (COMPL).

Denial Message

A possible response to the input command **RST:FRM 05,SEQ 12:NPC 097!** could be:

M 07:39:20 05,12 2 RST NPC 097 TYPE DE100 COND 02 DNY

The denial reason in this example (COND 02) means that the NPC is not equipped. The other fields in the message are the same as the completion message.

Autonomous Messages

This example of an autonomous output message (65041) reports that a major or minor alarm for a parameter has been idled or cleared:

Nonhierarchical Format
I 07:39:20 05,12 ALM IDLD <parameter> NPC 097 COMPL

Hierarchical Format
I 07:39:20 05,12 ALM IDLD <parameter> NPC 01423 COMPL

Table 1-4. Functional Categories of Messages

Message	Verb	Keyword
Input Denials	∗	BAD, CMD, STOPPED, INACT
Startup Messages	∗	STARTUP, BOOT, RESET
Error Messages	∗	ERR, OVERLOAD, RESET
One-Way Cross-Connect Two-Way Cross-Connect	OCON TCON	FROM, TO, MPM
One-Way Terminated and Two-Way Terminated Cross-Connections	OCNT TCNT	FROM, TO, MPM
Broadcast Cross-Connect	BCON	FROM, TO, TOX, BCAST, COND
Roll	SW	OLD,NEW,TWAY,INCL,FRC,OOS
Bridge	SW	BCAST,OLD,NEW
Alternate Cross-Connect	ACON	OLD, NEW, INCL, CUS, RDC
One-Way Disconnect Two-Way Disconnect	ODIS TDIS	FROM, TO, BCAST
Broadcast Disconnect	BDIS	FROM, TOX, BCAST
Change Circuit Parameters	CHG	TCON, OCON, FROM, TO
Change Circuit Parameters	CHG	BCON, SWCH
Edit Macro or Alternate Map	ED	MACRO, MAP, APPEND, OPEN DELETE, LIST, SAVE, MOVE
Two-Way Monitor Test Access	CTST TTST	FAD, FROM MON, TP, TG, ASSGN
Two-Way Split Test Access	TTST	SPL, TP, TG
Two-Way Hub Test Access	TTST	HUB, TP, TG
Two-Way Terminate and Leave Activate/Release Test Access	TTST	TLA, TLR, TP, TG, NUTST UASGN, PTLA, NTLA

∗ Autonomous Output Message

Continued on next page

Table 1-4. ***Continued***

Message	Verb	Keyword
Two-Way Test Port Release Test Access	TTST	TPR, TGR, TP, TG, ALL, COND
Two-Way Looped Test Access	TTST	LPD, TP, TG
Growth	GRTH	FRAME, SYNC, UNIT, TB NPC, TP, TG, TLI, FTMI, FC
Degrowth	DGRTH	SYNC, UNIT, TB, TLI NPC, TP, TG, FTMI, TYPE
Remove	RMV	MC, LINK, SYNC, CCNI CCB, TSI, TSIS, UNIT CRO, CCN, UC, FC, NPC CCI, ETSI, ETSIS, ECCN, FTMI
Restore	RST	MC, LINK, SYNC, CCNI CCB, TSI, TSIS, CCN UNIT, NPC, TLI, CRO ALL, UC, FC CCI, ETSI, ETSIS, ECCN, FTMI
Configure	CFR	XC, SYNC, FRAME
Add	ADD	LINK, LEV, LANG, USER
Edit/Delete	DLT	NPC, USER, FPKG
Change Unit, CCN, NPC Parameters, User/Link profile. and Memory Allotment	CHG	FRM, SYNC, UNIT, SETOP NPC, PASSWD, SCR GR, MAP SPACE
Activate Map. Execute Macro, Login, Logoff	ACT,EXC, STOP,LOGIN, LOGOFF	MAP, MACRO, USER
Diagnose	DGN	FRM, MC, LINK, CI, PMEM, SMEM, XC, SYNC, CCNI, CCB, TSI, TSIS, UNIT, NPC CCI, ETSI, ETSIS, ECCN, UC, FTMI, FC

Continued on next page

Table 1-4. ***Continued***

Message	Verb	Keyword
Utilities	UTL	TOD, ACO, INIT, WHO QRY, DATE, BMTR, CLR FRM, VERSN, RCY, PASSWD CNFGR, ALM, FPKG
Utilities	UTL	QRY, CMAP, DMAP, FROM TO, BCAST, TYPE, ALL, SYNC, EQD, UNITS, TSIS MARK
Utilities	UTL	QRY, EQD, TPS, TGS, OPTS PEST, FAIL, OOS, ALMS ETSIS
Utilities	UTL	QRY, ESR, STR, ECCN
Utilities	UTL	CLR, STATE, LOC
Utilities	UTL	BOOT, CLR
Alarm	ALM	CGA, DC, AR01, MJ, MN IDLD, ECCN, OOS, BMTR
Audits	AUD	QRY, ALL, FTU, NPCS
Frame Audits	FRADTS∗	DGN, FRCMP, BMCMP, MC

∗ Autonomous Output Message

NPC Addressing

Two addressing or numbering schemes for network processing circuits are available: the **nonhierarchical** and the **hierarchical**. These numbering methods are used to provide a means of locating network processing circuits.

Nonhierarchical Numbering

The **nonhierarchical** uses consecutive numbering to count through the units in the frame. Each unit has a fixed starting number (for example, 161 for unit 2; 321 for unit 3; 481 for unit 4). The starting number is the same forDS3U, FTU, or DSPU type units.

Within the nonhierarchical numbering scheme, there are 3-digit and 4-digit (extended) formats. The extended format is used for CEF frames. Therefore, NPC numbers represented by `[s]abc` in commands show both formats of the nonhierarchical numbering scheme (the `[s]` is used with a Capacity Expansion Frame).

Hierarchical Numbering

The **hierarchical method** uses a 3-part number: the unit number (uv), the module or group number within the unit (m), and the NPC number within the module (np) for a total of five digits (uvmnp).

On-Line Help Feature

Description

DACS II provides on-line assistance to the user when constructing commands at the terminal. This assistance is in the form of a menu-driven help routine. Different menus are displayed during the routine to provide the user with information on all of the command fields. The menu items include: command verbs, applicable keywords for a command, definitions of keywords, and the possible choices or number range for a variable field. Inappropriate selections bring error messages.

The help routine can be used to the degree needed to complete the command: either through the entire command in every field or only for a particular part of the command. Help will probably not be needed after some experience is gained at entering commands, since all the commands are documented and the direct entry of commands is so much faster.

The question mark and RETURN are entered to invoke the different levels of the help routine. A question mark is entered by simultaneously depressing SHIFT and ?/ . The question mark is used to initiate the routine or to get more information, and RETURN is used to see the alternative choices at a given point. The dialogue can be terminated either by typing CTRL-x or by completing the current command line when it is displayed. These functions are demonstrated in the following portion.

Summary: The Help Feature

By entering SHIFT ?/, the user may ask DACS II for help at any time before or during the construction of an input command.

In the help mode, DACS II will offer the user menus for the selection of the message keywords and/or prompt for values of variable fields. Entering SHIFT ?/ provides a greater detail of information on the keywords or variables.

A user may select a keyword from a menu by selecting its index number or by entering the keyword itself.

The RETURN key displays the command line that has been constructed so far. The user may then enter the remaining keywords and values to complete the command or may enter SHIFT ?/ to return to the menu/prompt mode.

Constructing an Entire Command Using Help

The following sequence demonstrates the use of the menus in the help routine to construct a simple `UTL` (utility) command. Only portions of long menu lists are shown here, but these examples still serve to demonstrate how selections are made.

(1) To invoke the help routine at the start level, enter **SHIFT** **?/**. DACS II responds with `OK` and the following menu:

```
Select from:

 1. ABT   22. INHSW   43. TTST
 2. ACON  23. LOGIN   44. UTL
 3. ACT   24. LOGOFF  45. X

    .          .
    .          .
    .          .

21. INH   42. TDIS

Selection?
```

(2) To obtain more explanation, enter **SHIFT** **?/**. DACS II responds with `OK` and the following list (The list is long; DACS II prompts the user to enter **RETURN** to page through it):

```
Select from:

     1.  ABT     (abort the current command)
     2.  ACON    (perform an alternate cross-connection)
     3.  ACT     (activate map)
          .
          .
          .
    44.  UTL      (perform a general utility)
    45.  X        (priority conference switch)

Selection?
```

(3) Here you can enter either 44 or UTL followed by SHIFT ?/. The DACS II responds with this menu:

```
Select from:

     1.  ,
     2.  :
     3.  FRM
     4.  SEQ

Selection?
```

(4) To bypass the frame and sequence number, which is normally done unless that information is needed for records or to direct the command to a different location, the user enters either **2** or **:** followed by SHIFT ?/. The question mark prompts DACS II to respond with a list of possible keywords that could appear next in the command. The list is long; DACS II prompts the user to enter RETURN to page through it.

```
Select from:

  1. ACO     22. BX      43. CVP     64. EOL
  2. AI      23. CCB     44. DATE    65. ER
  3. AIS     24. CCI     45. DBASE   66. ERCL

     .           .           .           .
     .           .           .           .
     .           .           .           .

104. PPBK    125. NPCTG  146. SCDG   167. STR
105. LV      126. OOF    147. SCHED  168. SWER

169. SYNC    190. UNIT
170. SYSTEM  191. UNITS

     .           .
     .           .
     .           .

174. TLI     195. WHO
175. TN      196. XC
176. TO      197. XCSB
177. TOD

     .
     .
     .

188. UBX
189. UC
```

(5) If the user enters a keyword and **?**, DACS II responds with `OK` and supplies the only appropriate keyword(s) to complete the command. For example, if the user enters `WHO` and SHIFT ?/ , DACS II responds:

```
UTL::WHO,QRY!
Command-line complete. Submit (YES/NO)?
```

(6) To enter the command, the user enters `Y` followed by RETURN .

Obtaining Help at a Particular Point on a Command Line

In addition to being used to construct a command from scratch, DACS II's on-line help can be used to obtain information on particular fields of a command. If the command format is not known or if the keywords or variables are not clear, the help dialogue can be initiated at any point by entering SHIFT ?/ .

Assume the user desires to cross-connect a multipoint circuit and enters the following command:

```
TCON::FROM 001001,TO 002003,MPM(SYM,LEG),TRSP!
```

DACS II responds:

```
M  08:19:06 01,00 2 TCON INERR BAD SYNTAX  2 LN MSG:
TCON::FROM 001001,TO 002003, =MPM=(SYM,LEG),TRSP! DNY
```

`=MPM=` indicates a problem.

The user can use the help feature to obtain information to reenter the correct command. He or she enters `TCON::FROM` and SHIFT ?/ . DACS II responds:

```
ds3u unit number =
```

The user desires a circuit using a DSPU NPC (digital signal processing unit network processing circuit), not a DS3U (digital signal 3 unit). He or she enters RETURN to see the next option which is:

```
ftu npc number (160+8 npcs on a ds3u unit) =
```

Another RETURN brings the desired option which is:

```
dspu npc number (first 2 npcs in every group of 20
on a dspu unit) =
```

To get more information at this point, the user enters SHIFT ?/ , and DACS II responds:

```
dspu npc number (3-digit decimal integer, range 641-941) =
```

This is where the trouble occurred in the original command; one of the NPCs must be an MB-type in the range 641-941. The user enters `641` and SHIFT ?/ .

DACS II responds:

```
dmb conference number =
```

The user enters SHIFT ?/ to get more information:

```
dmb conference number (decimal integer, range 1-85) =
```

The user enters the conference number, `2`. To view the current command line, the user enters RETURN. DACS II echoes the command line completed so far:

```
TCON::FROM 6412
```

The user may complete the command by directly entering the remaining keywords and parameter values. By entering SHIFT ?/ , DACS II proceeds with the menu and prompts for the remainder of the command:

```
Select from:
      1.  CUS
            .
            .
            .
      8.  TO
      9.  TRB
     10.  TRSP

Selection?
```

The user enters `8` selecting the `TO` keyword (`TCON::FROM 641002,TO . . .`). The user then enters SHIFT ? to ask for information in the next command field. DACS II responds:

```
ftu npc number =
```

The user enters SHIFT ? to get information on FTU NPC values. DACS II responds:

```
ftu npc number (3-digit decimal integer, range 001-640) =
```

The user enters FTU NPC number `002` and RETURN. DACS II responds with the command line developed to this point:

```
TCON::FROM 6412,TO 002
```

By entering SHIFT ?, the user may continue to be prompted through the construction of the remainder of the command or may directly input the remainder of the command for execution:

```
TCON::FROM 641002,TO 002003, MPM(SYM,LEG), TRSP!
```

Equipment Precautions

Electrical Discharges

The DACS II contains integrated circuits and other electronic equipment that are sensitive to static electrical discharges. Therefore, read the following caution BEFORE working on the system:

CAUTION:
Before touching any part of the frame including any circuit pack, reset switches, ACO, or LED TEST buttons, ALWAYS ground yourself to the frame with a WRIST STRAP provided with the equipment.

Removing and Installing Circuit Packs

You can easily damage circuit packs and other hardware by improperly removing and installing them in the frame.

The following describes how to correctly remove and install **4-inch** and **8-inch** high circuit packs with a single latch:

- **To Remove a Circuit Pack**: Unseat the circuit pack from the slot by carefully operating the latch. Then remove the circuit pack with one continuous motion. DO NOT ROCK THE CIRCUIT PACK BACK AND FORTH.
- **To Install a Circuit Pack**: Remove the plastic shipping protector from the contacts of new circuit packs. Insert the circuit pack into the slot. DO NOT ROCK THE CIRCUIT PACK BACK AND FORTH. Raise the latch. Push on the bottom part of the circuit pack until the latch engages the slot. DO NOT push with the latch.

  After the latch engages the slot, close the latch (push in) to seat the circuit pack. After closing the latch, with one thumb on the latch and the other thumb at the top of the circuit pack, press firmly to ensure that the circuit pack is fully seated.

The following describes how to correctly remove and install **12-inch** high DS3U and **16-inch** high ECCN circuit packs:

- **To Remove a Circuit Pack**: Unseat the circuit pack from the slot by carefully operating both the top and bottom latch. Then remove the circuit pack with one continuous motion. DO NOT ROCK THE CIRCUIT PACK BACK AND FORTH.

- **To Install a Circuit Pack**: Remove the plastic shipping protector from the contacts of new circuit packs. Insert the circuit pack into the slot and ensure that the latches are positioned to allow insertion. DO NOT ROCK THE CIRCUIT PACK BACK AND FORTH. Open both latches. Push on the lower part of the circuit pack until the latches engage the slot. DO NOT push with the latches.

  After the latches engage the slot, close the latches (push down top latch, push up lower latch) to seat the circuit pack together. After closing the latches, with one thumb on the top latch and the other thumb on the bottom latch of the circuit pack, press firmly to ensure that the circuit pack is fully seated.

A suffixal number after a circuit pack indicates a series version. Higher series versions can be substituted in slots labeled for a lower series version but not the reverse.

Recommended Memory Card Backup Strategy

Two memory cards should always be installed on the DACS II at all times except for short durations such as software installations and removing and restoring backed-up memory cards. The SMEM card should be removed on planned intervals for backup purposes and replaced with another memory card. In the event of a serious problem, the most recently backed-up memory card can then be used to restore the system to a known previous state.

Lucent Technologies recommends that the customer maintains a procedure of rotating a set of memory cards such that a memory card is removed and then placed in a safe place at regular intervals. This interval should be daily if frequent changes are made on the system. This interval may be extended longer than a day, if changes to the system are infrequent and any changes could be re-created manually in case of a failure. The oldest backed-up memory card in the backup set should be recycled back into the system each time a new backup is done.

In addition to a regular backup process where the cards are stored in a safe place in a close physical proximity to the frame, it may be prudent to perform backups at less frequent intervals and store them in a safe "off-site" location to guard against a catastrophy such as a fire. This off-site strategy should follow the customer’s internal standard operating procedures in guarding against such catastrophies.

The life expectancy of PCMCIA memory cards is quite high. The memory cards used for DACS II have a Mean Time Between Failures (MTBF) of more than 30 years, if the number of write operations is modest. Write operations eventually wear the card out; the PCMCIA cards tolerate about 300,000 write operations before they wear out. When estimating the life of the PCMCIA memory cards the user should consider that a single cross-connect command generates one write operation. A utility query only generates read operations, which do not wear the card out. Also, under normal conditions the cards should tolerate at least 10,000 physical removals and insertions before the contacts wear out. The customer should ensure that the contact area of the memory cards in particular is kept free of dust and chemical contamination while they are stored to guard against contact failure.

Acceptance

2

Contents

Contents

2 Acceptance

Perform Visual Inspection

Overview: Use this procedure to inspect the front and back of the frame for obvious structural damage.

Inspect Front of Frame

1. Check front of frame for damage (such as dents or broken mountings) resulting from transporting and mounting of equipment.
2. At front, look over shelf mountings to verify that shelves are properly aligned and securely mounted. Figure 2-1 shows the location of equipment in a fully equipped CEF (capacity expansion frame).
3. Verify that shelf designation labels are installed in front over shelf slots.

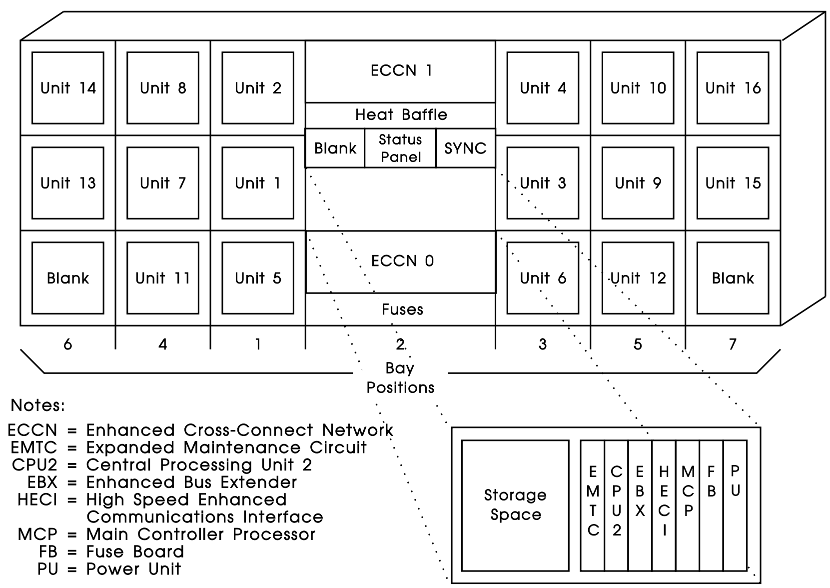


Figure 2-1. Fully Equipped CEF

Inspect Back of Frame

4. At back of frame, do Steps **5** through **12**.
5. Check back of frame for damage such as dents or broken mountings.
6. Look for broken or bent pins near the edges of each printed backplane panel; these pins can be damaged even with the covers installed.
7. Verify that the metal covers are securely mounted over the backplane panels. Ribbon cables are used for connections between the shelves, and these connections are not likely to give trouble.
8. For DSPUs (digital signal processing units), check that the wiring from these units to the main controller is neat and that no pins were damaged during wire wrapping. When these units are added to an existing frame, this wiring will be done by the installer.
9. Verify that local TTY (teletypewriter terminal) is connected to TTY connector for Link 1 behind the main controller using an ED-2C646-30, G2 adaptor.
10. If data sets (such as 202T) are required for remote connections or for equipment more than 50 feet (RS-232C specification) or 2,000 feet (RS-449 specification, 1200 baud) away, verify that data sets have been installed. Data set specifications are given with the information notes in SD-96662-01.

11. Connect data link cable (for example, M25B) to the TTY connector for the link (behind DACS II main controller). No adapter is required for RS-449 format, but ED-2C646-30 adapters are required for RS-232C format as follows:

    — Use a G1 (group 1) or G14 adapter for any interface via data sets (asynchronous or synchronous).

    — Use a G2 or G15 adapter for a direct TTY or CRT terminal (without data sets).

    — Use a G3 or G8 adapter for local operations systems such as SARTS (Switched Access Remote Test System) or TABS (telemetry asynchronous block serial) protocol link (asynchronous 4-wire – data only without data sets).

    — Use a G9 adapter for a link to CIU (craft interface unit) for *SLC*® Series 5 carrier. This is for an asynchronous link.

NOTE:
The G1 and G2 adapters interoperate with RS232C per EIA Pub. 12 and give maximum receiver margin and minimum pulse distortion. The G14 and G15 adapters contain termination and biasing networks to detect disconnected or unpowered RS232C equipment. The G1 and G2 adapters are recommended for use in normal installations where the equipment remains powered up.

12. Verify that cable adapter are securely mated at back of each facility terminating unit. Also verify that shield is grounded at DACS II frame or at DSX-1 jack bay.

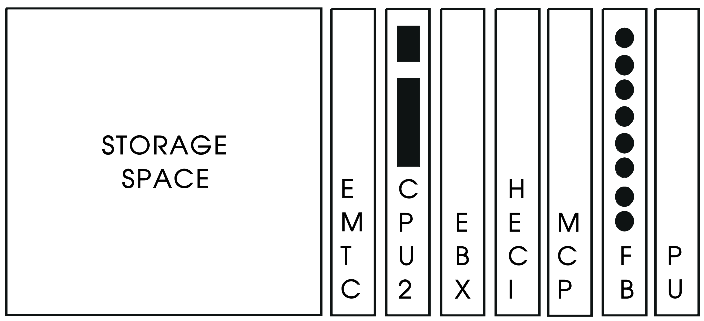
13. Talk with an installation representative to verify that cabling to DSX-1 bay has been tested for continuity (buzzed and CGAs [carrier group alarms] registered when lines were opened).

14. Verify that DACS II and DSX-1 bays have been stamped with office relay rack identification per office drawings.

Check Circuit Pack Installation

Check Main Controller Installation

1. Verify that the main controller has been installed. See Figure 2-2.



Notes:

EMTC = Expanded Maintenance Circuit
CPU2 = Central Processing Unit 2
EBX = Enhanced Bus Extender
HECI = High Speed Enhanced Communications Interface
MCP = Main Controller Processor
FB = Fuse Board
PU = Power Unit

Figure 2-2. Main Controller

Check Sync Circuit Pack Installation

Overview: Use this procedure to verify that sync circuit packs in the frame are properly installed and to query the units to see how they are configured.

1. From system layout information and installation records, determine the following on the sync:
   - The configuration, MASTER or SLAVED.
   - The number and types (digital line, office clock, etc.) of incoming signals for slaved timing.
   - Timing distribution, whether DACS II supplies timing to other equipment in the office.
2. Enter **`UTL::QRY,SYNC,TYPE!`** to see the TB (time base) and TLI (timing link interface) type designations.
3. Read the query output using Table 2-1 for the TLI types and read the following:
   - The TB types are TB000 for domestic-stratum 3, TB100 for 2.048-Mb/s Interface - local office, TB200 for 2.048-Mb/s Interface - toll office, and TB300 for domestic-stratum 2.
   - The TLI types are given by the letter codes, and the signal formats are given by the associated number codes.
   - The SRC is the priority of TLI sources — from the highest (1) to the lowest (8).
4. Enter **`UTL::QRY,STATE,SYNC!`** and read the sync configuration and status using Table 2-2.
5. If CFR (sync configuration) = MASTER, verify that a TB card is installed in the designated slots. See Table 2-1 for equipment codes.
6. Verify that there are duplicate TLI cards (on sides 0 and 1) for each incoming and timing distribution link. See Table 2-1 for equipment codes.
7. If TG68 or TG75 TLIs are used, verify that the packs are installed in the TLI 2 positions of the sync where terminations are provided for connection of coaxial cable.
8. If timing signals are to be distributed from the DACS II, verify that the correct code of TLI is installed and check connection of timing cables behind shelf slots. Both the TG70 and TG71 packs provide four multipled outputs.

Table 2-1. Sync Circuit Packs

Circuit Pack	Code	Growth Type	Description
TB	TG60	TB000	TBS3 (Time Base, Stratum 3) — Domestic Use
	TG61	TB100	TBCL (Time Base, CEPT Local Office)
	TG62	TB200	TBCT (Time Base, CEPT Toll Office)
	TG63	TB300	TBS2 (Time Base, Stratum 2) — Domestic Use
TLI	TG64	TExyz	TXB1 (DS1 Timing Extractor)
	TG65	TPxyz	TXB2 (2.048-Mb/s Primary Block Timing Extractor)
	TG66	TCxyz	TXCC (64 kb/s Composite Clock Timing Extractor)
	TG67	TUxyz	TXUC (Unipolar Clock Timing Extractor)
	TG68	TRxyz	TXRS (BSRF [Reference Frequency] Timing Extractor)
	TG70	TD1yz	TDCC (64 kb/s Composite Clock Timing Distributor)
	TG71	TD2yz	TDS2 (2.048-Mb/s Sine Wave Timing Distributor)
	TG75	TPxyz	TXBT (Primary Block Extractor, 75-Ohm)

Table 2-2. Sync Status Output

Message Field	Outputs and Meanings
CFR	MASTER or SLAVED sync configuration.
STRATUM	STR2, STR3, CEPT TOLL, or CEPT LOCAL.
MODE	HOLDOVER, FAST, or NORMAL for each DPLL.
SOURCE	Source for sync DPLL (HOLDOVER, TLI, or CRO; other side will be MATE).
IN SERVICE-DPLL	DPLL side 0 side 1, TB side 0 side 1, SOURCE side 0 side 1; presence of a 0 for side means out-of-service and a 1 means in-service.
ACTIVE-LINK	Gives TLI No. and its SSP (0, 1) which is active on each side (0 and 1).
PLL TIMING ERROR	Presence of 0 for side means no error and presence of 1 for side means error.

Check FTU Circuit Pack Installation

Overview: Use this procedure to verify that all FTU circuit packs in the frame are properly installed (Figures 2-3 and 2-4).

1. Determine which unit and FTMs (facility terminating modules) are to be equipped. See Table 2-3 for unit and FTMI numbering (table only shows nonhierarchical numbering).
2. Review the three versions of FTUs shown in Figures 2-3, 2-4, and 2-5. Figure 2-3 shows the FTUs used in the original side bays, and Figure 2-4 shows the IFTUs (integrated FTUs) used in flexible side bays.
3. Verify the **TG81** code FTMI and the **TG79** code of FCs (format converters) are installed for the equipped FTMs; see Figure 2-3 or 2-4
4. Verify the circuit pack dual digroup cards (for example, DDC) for the equipped NPCs are installed in the NPC slots.

NOTE:
Each circuit pack card contains the circuitry for two NPCs.

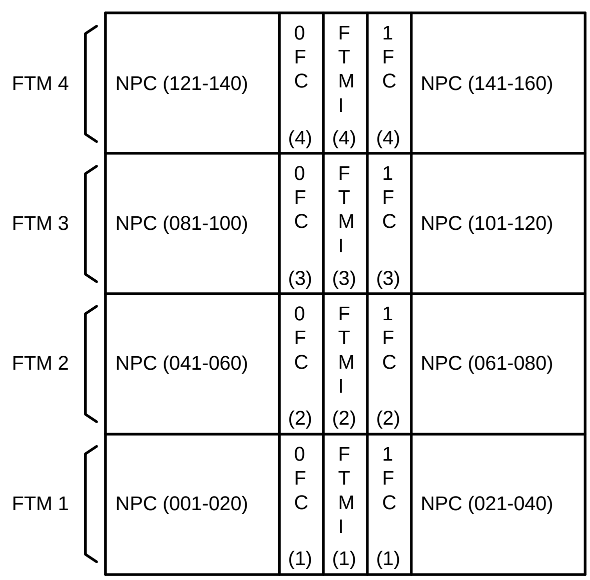


Figure 2-3. Original FTU

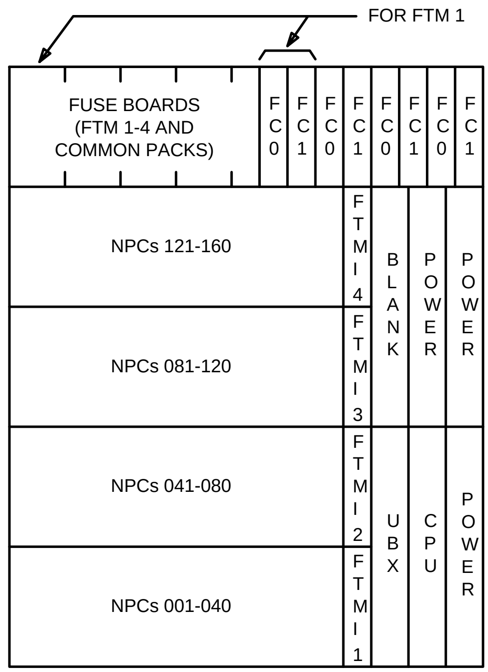


Figure 2-4. Integrated Facility Terminating Unit

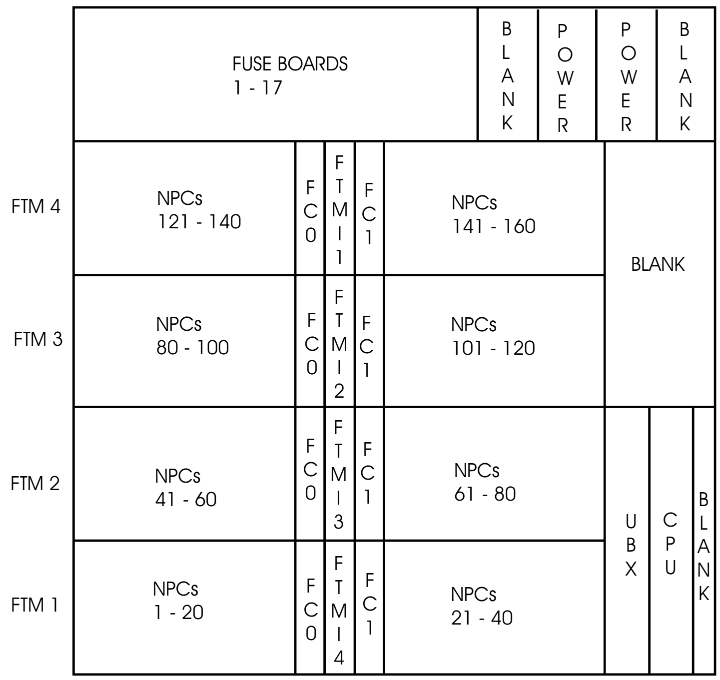


Figure 2-5. Integrated Facility Terminating Unit 2

Table 2-3. NPC Location in Unit

Nonhierarchical NPC Number	Unit Number	FTMI Number
001-040	1	1
041-080	1	2
081-120	1	3
121-160	1	4
161-200	2	1
201-240	2	2
241-280	2	3
281-320	2	4
321-360	3	1
361-400	3	2
401-440	3	3
441-480	3	4
481-520	4	1
521-560	4	2
561-600	4	3
601-640	4	4
641-680	5	1
681-720	5	2
721-760	5	3
761-800	5	4
801-840	6	1
841-880	6	2
881-920	6	3
921-960	6	4
961-1000	7	1
1001-1040	7	2
1041-1080	7	3
1081-1120	7	4
1121-1160	8	1
1161-1200	8	2
1201-1240	8	3
1241-1280	8	4
1281-1320	9	1
1321-1360	9	2

Continued on next page

Table 2-3. ***Continued***

Nonhierarchical NPC Number	Unit Number	FTMI Number
1361-1400	9	3
1401-1440	9	4
1441-1480	10	1
1481-1520	10	2
1521-1560	10	3
1561-1600	10	4
1601-1640	11	1
1641-1680	11	2
1681-1720	11	3
1721-1760	11	4
1761-1800	12	1
1801-1840	12	2
1841-1880	12	3
1881-1920	12	4
1921-1960	13	1
1961-2000	13	2
2001-2040	13	3
2041-2080	13	4
2081-2120	14	1
2121-2160	14	2
2161-2200	14	3
2201-2240	14	4
2241-2280	15	1
2281-2320	15	2
2321-2360	15	3
2361-2400	15	4
2401-2440	16	1
2441-2480	16	2
2481-2520	16	3
2521-2560	16	4

Check ECCN/CCN Circuit Pack Installation

Check Multibay Circuit Pack Installation

Overview: Use this procedure to verify that all the multibay circuit packs in the frame are properly installed. Procedures to install circuit packs are included in the *Provisioning* section.

1. Locate ECCN (expanded cross-connect network) in the switch bay. See Figure 2-6.

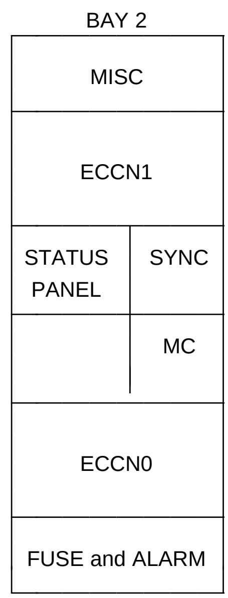


Figure 2-6. Switch Bay

2. Verify that the BT (bus terminator, BBR1 code) packs are securely installed in the designated far-left and far-right slots on each side of the network (ECCN0 and ECCN1). See Figure 2-7 for ECCN circuit packs and Figure 2-8 for CCN circuit packs.
3. Verify that the CCI (clock control interface, BBS1 code) pack is securely installed in the designated slot on each side of the network (ECCN0 and ECCN1).

4. Verify both active and inactive ETSI (expanded time slot interface) circuit packs are installed for each equipped unit.

NOTE:
The ETSI slots are assigned on each side of the common CCI pack to roughly match the associated unit positions and ordering of the units in the CEF configuration.

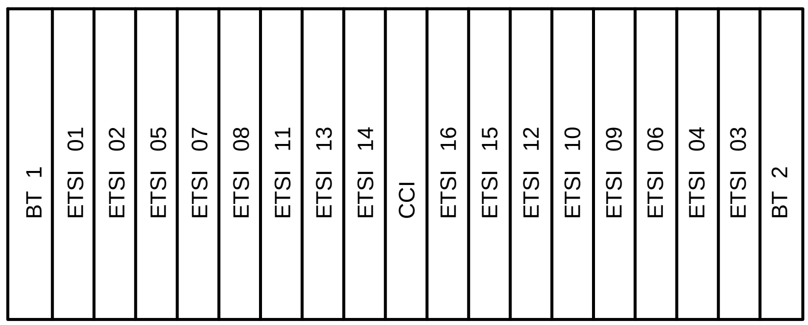


Figure 2-7. Location of Circuit Packs on ECCN Shelf

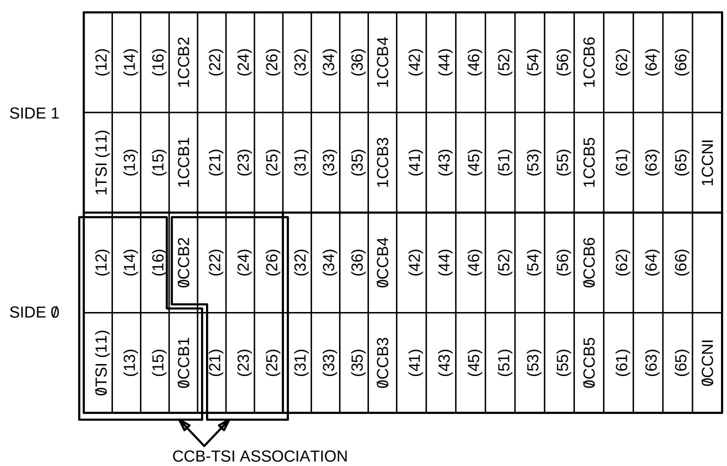


Figure 2-8. Location of Circuit Packs on CCN Shelf

Check Single-Bay Circuit Pack Installation

Use this procedure to verify that all single-bay circuit packs in the frame are properly installed.

1. Locate the CCN2 (cross-connect network) in the frame and notice the organization within the network; see Figure 2-9.

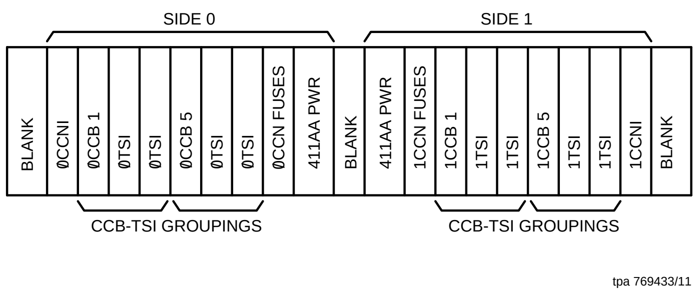


Figure 2-9. CCN2 Network

2. Verify that the CCNI (cross-connect interface) card (UM30 code) is installed in the designated slots on both sides of CCN2.
3. Verify that the circuit packs for CCB 1 and TSI 11 are installed on both sides of CCN2 to allow cross-connections within unit 1. The code of the CCB cards is UM26 and the code of the TSI cards is TM660.

   NOTE:
   The TSI designation numbers indicate how the cards are connected; for example, TSI 11 connects data from unit 1 back to unit 1.

4. If unit 5 (bottom shelf) is also to be equipped, verify that the circuit packs for slots CCB 5 and TSI 55 are installed on both sides of CCN2 to allow cross-connections within unit 5.
5. If unit 5 was install, verify that the circuit packs for slots TSI 15 and TSI 51 is installed on both sides of CCN2 to allow cross-connections between unit 1 and unit 5. The code of the TSI card is TM660.

Check Power Units and Fuses

Overview: Use this procedure to verify that all power units and fuses are properly installed (see Figure 2-10). Use the appropriate table from the following list to determine the required unit and fuses for the CEF or non-CEF frame.

Power Unit Summary (Single-Bay)	Table 2-5
48-Volt Power (CEF)	Table 2-6
48-Volt Power (Single-Bay)	Table 2-7
Sync and Main Controller (CEF)	Table 2-8
Sync and Main Controller (Single-Bay)	Table 2-9
77-Type, FTU Fuses (Original Interface Bay)	Table 2-10
IFTU Fuse Assignment	Table 2-11
DSPU5 and DSPU6 Fuses (Original Interface Bay)	Table 2-12
DSPU Fuses (Flexible Bay)	Table 2-13
Power Unit Requirements	Table 2-14

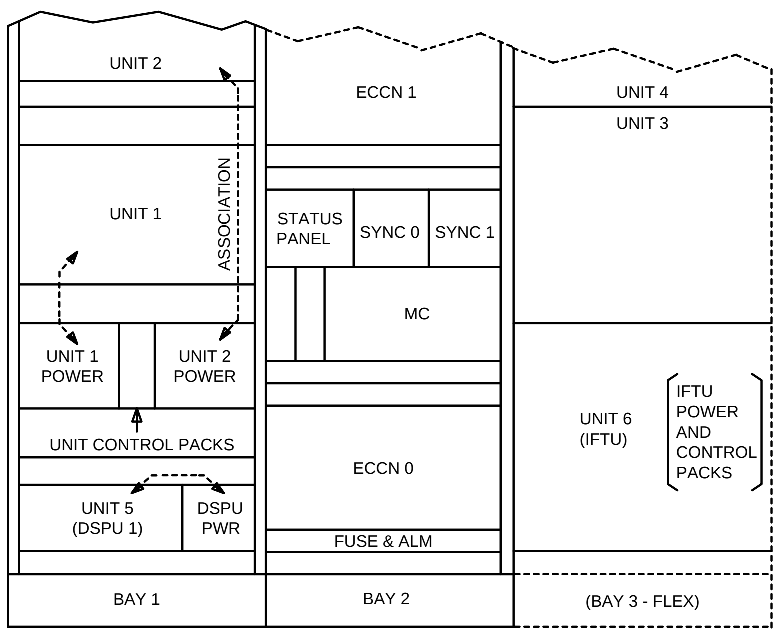


Figure 2-10. Original Interface Bay (Bay 1)

1. Locate the power unit slots for the section of the frame being equipped using shelf designation strips. Figure 2-10 shows the location of power units in an original interface bay (bay 1) for a retrofit of an existing installation.
2. Verify the required codes and quantities of power units are installed.
3. Verify the required 48-volt input fuses are installed in the fuse and alarm panel (bottom frame).
4. Verify the LED output fuses are installed in fuse boards per designation strips and appropriate tables for sync and main controller, IFTU, and units in original interface bays.

NOTE:
FTUs in original interface bays use two GRP 1 (5A) DFBs and one GRP 2 (7.5A & 5A) DFB; the GRP 2 board is for fuses CQ-JX. The DSPU uses GRP 3 (7.5A) DFBs.

5. Verify the required 48-volt fuses are installed.
6. Verify the required LED fuses are installed.
7. If any of the required responses did not occur, replace the power unit and confirm the operation of the faceplate LED.
8. Get digital multimeter (such as KS-20599 DMM) and set it to read DC "" range.
9. Measure each power unit output between the + and – V1 jacks (or between each V jack and RTN) per Table 2-14. The SPU (sync power unit) does not have test jacks to make this test.

   NOTE:
   The FTU power units feed a common bus, and low voltage can only be detected if one power unit is disconnected and the test is repeated for all combinations of the power units.

   - If the requirement of Table 2-14 is met, disconnect the meter.
   - If the requirement of Table 2-14 is not met, replace the power unit.

Table 2-4. Power Unit Summary (CEF)

Circuit Block	CP Code	Designation/ Location	Equipage
EFC	SM565 411AA	MCP /04-144 PU /04-160	One. One.
SYNC	TG58 TG58	0SPU /14-106 1SPU /14-160	One. One.
ECCN 0	—	—	The CCI and ETSI packs have built-in power converters.
ECCN 1	—	—	The CCI and ETSI packs have built-in power converters.
IFTU (Flex Bay)	411AA 411AA 411AA	PU /x06-168 PU /x14-145 PU /x14-158	All PUs for unit supply a common bus; an extra PU is always provided for backup (for example, PUs 1 & 2 required for FTM 1).
IFTU 2	424AA	PU /16-132 PU /16-144 PU /16-156	Same as IFTU.
DSPU (Flex Bay)	SM566 411AA 411AA	DCP /x04-130 1PU /x04-142 0PU /x04-150	One. One. One.
FTU1/3	411AA 411AA 411AA	PU /x28-012 PU /x28-024 PU /x28-048	All PUs for unit supply a common bus; an extra PU is always provided for backup (for example, PUs 1 & 2 required for FTM 1). Location x = 1 for units 1 & 3 and x = 3 for units 2 & 4.
FTU2/4	411AA 411AA 411AA	PU /x28-124 PU /x28-148 PU /x28-160	Same as FTU 1.
DSPU5/6	SM566 411AA 411AA	DCP5/6 /X12-130 1PU /X12-142 0PU /X12-160	One. Location x = 1 for unit 5 and x = 3 for unit 6. One. One.
DS3U5/6 HDS3U	563A 563A 563A	1 PU/11-140 for unit 6. 2 PU/11-148 3 PU/11-156	One. Location x = 1 for unit 5 and x = 3 One. One.

Table 2-5. Power Unit Summary (Single-Bay)

Circuit Block	CP Code	Designation/Location
MC	SM565	MCP/132-136
	411AA	PU/132-148
SYNC	TG58	0SPU/134-010
	TG58	1SPU/134-064
FTU1	411AA	PU/123-012
	411AA	PU/123-024
	411AA	PU/123-048
CCN0	411AA	0PU/149-078
CCN1	411AA	1PU/149-096
DSPU5	SM566	DCP5/109-130
	411AA	1PU/109-142
	411AA	0PU/109-160

Table 2-6. 48-Volt Power (CEF)

Feed A Fuse	Power Unit/CP			
	Type (Note)	Assignment	Size	Bead Color
A1	411A,SM566, 424AA, or 563A	Unit 1	70D,5A	Green
A2	411A,SM566, 424AA, or 563A	Unit 2	70D,5A	Green
A3	411A,SM566, 424AA, or 563A	Unit 3	70D,5A	Green
A4	411A,SM566, 424AA, or 563A	Unit 4	70D,5A	Green
A5-1	Indicator for A5-2	-	70G,0.5A	Red
A5-2	CCI,ETSIs	ECCN 0	74J,7.5A	-
A6-1	-	-	-	-
A6-2	-	-	-	-
A7	411AA,SM566, 424AA, or 563A	Unit 5	70D,5A	Green
A8	TG58	0SPU (SYNC 0)	70D,5A	Green
A9	411AA,SM566, 424AA, or 563A	Unit 6	70D,5A	Green
A12	411AA,SM566, 424AA, or 563A	Unit 7 (0PU)	70D,5A	Green
A13	411AA,SM566, 424AA, or 563A	Unit 8 (0PU)	70D,5A	Green
A14	411AA,SM566, 424AA, or 563A	Unit 10	70D,5A	Green
A15	411AA,SM566, 424AA, or 563A	Unit 11 (0PU)	70D,5A	Green
A16	411AA,SM566, 424AA, or 563A	Unit 13 (0PU)	70D,5A	Green
A17	411AA,SM566, 424AA, or 563A	Unit 14 (0PU)	70D,5A	Green
A18	411AA,SM566, 424AA, or 563A	Unit 15	70D,5A	Green
A19	-	-	-	-

Note: The type depends on the type of unit (IFTU, DSPU, DS3U, or HDS3U).

Table 2-6. ***Continued***

Feed B Fuse	Power Unit/CP			
	Type (Note)	Assignment	Size	Bead Color
B1	411A,SM566, 424AA, or 563A	Unit 1	70D,5A	Green
B2	411A,SM566, 424AA, or 563A	Unit 2	70D,5A	Green
B3	411A,SM566, 424AA, or 563A	Unit 3	70D,5A	Green
B4	411A,SM566, 424AA, or 563A	Unit 4	70D,5A	Green
B5-1	-	-	-	-
B5-2	-	-	-	-
B6-1	-	-	-	-
B6-2	-	-	-	-
B7	411AA,SM566, 424AA, or 563A	Unit 5	70D,5A	Green
B8	-	CRO	70D,5A	Green
B9	411AA,SM566, 424AA, or 563A	Unit 6	70D,5A	Green
B12	411AA,SM566, 424AA, or 563A	Unit 7	70D,5A	Green
B13	411AA,SM566, 424AA, or 563A	Unit 9 (0PU)	70D,5A	Green
B14	411AA,SM566, 424AA, or 563A	Unit 10 (0PU)	70D,5A	Green
B15	411AA,SM566, 424AA, or 563A	Unit 11	70D,5A	Green
B16	411AA,SM566, 424AA, or 563A	Unit 12 (0PU)	70D,5A	Green
B17	411AA,SM566, 424AA, or 563A	Unit 14	70D,5A	Green
B18	411AA,SM566, 424AA, or 563A	Unit 15 (0PU)	70D,5A	Green
B19	411AA,SM566, 424AA, or 563A	Unit 16 (0PU)	70D,5A	Green

Note: The type depends on the type of unit (IFTU, DSPU, DS3U, or HDS3U).

Table 2-6. ***Continued***

Feed C Fuse	Power Unit/CP			
	Type (Note)	**Assignment**	**Size**	**Bead Color**
C1	411A,SM566, 424AA, or 563A	Unit 1 (1PU)	70D,5A	Green
C2	411A,SM566, 424AA, or 563A	Unit 2 (1PU)	70D,5A	Green
C3	411A,SM566, 424AA, or 563A	Unit 3 (1PU)	70D,5A	Green
C4	411A,SM566, 424AA, or 563A	Unit 4 (1PU)	70D,5A	Green
C5-1	Indicator for C5-2	-	70G,0.5A	Red
C5-2	CCI,ETSIs	ECCN 1	74J,7.5A	-
C6-1	-	-	-	-
C6-2	-	-	-	-
C7	411AA,SM566, 424AA, or 563A	Unit 5	70D,5A	Green
C8	TG58	1SPU (SYNC 1)	70D,5A	Green
C9	411AA,SM566, 424AA, or 563A	Unit 6 (1PU)	70D,5A	Green
C12	411AA,SM566, 424AA, or 563A	Unit 7 (1PU)	70D,5A	Green
C13	411AA,SM566, 424AA, or 563A	Unit 8 (1PU)	70D,5A	Green
C14	411AA,SM566, 424AA, or 563A	Unit 9	70D,5A	Green
C15	411AA,SM566, 424AA, or 563A	Unit 11 (1PU)	70D,5A	Green
C16	411AA,SM566, 424AA, or 563A	Unit 12	70D,5A	Green
C17	411AA,SM566, 424AA, or 563A	Unit 13 (1PU)	70D,5A	Green
C18	411AA,SM566, 424AA, or 563A	Unit 16	70D,5A	Green
C19	-	-	-	-

Note: The type depends on the type of unit (IFTU, DSPU, DS3U, or HDS3U).

Table 2-6. ***Continued***

Feed D Fuse	Power Unit/CP			
	Type (Note)	**Assignment**	**Size**	**Bead Color**
D1	-	-	-	-
D2	-	-	-	-
D3	-	-	-	-
D4	-	-	-	-
D5-1	-	-	-	-
D5-2	-	-	-	-
D6-1	-	-	-	-
D6-2	-	-	-	-
D7	411AA,424AA, or	+5 MC Power	70D,5A	Green
D9	SM565 (MCP)	MC Power	70B,2A	Orange
D10	-	MTC	70G,0.5A	Red
D12	411AA,SM566, 424AA, or 563A	Unit 8 (0PU)	70D,5A	Green
D13	411AA,SM566, 424AA, or 563A	Unit 9 (1PU)	70D,5A	Green
D14	411AA,SM566, 424AA, or 563A	Unit 10 (1PU)	70D,5A	Green
D15	411AA,SM566, 424AA, or 563A	Unit 12 (1PU)	70D,5A	Green
D16	411AA,SM566, 424AA, or 563A	Unit 13	70D,5A	Green
D17	411AA,SM566, 424AA, or 563A	Unit 14 (1PU)	70D,5A	Green
D18	411AA,SM566, 424AA, or 563A	Unit 15 (1PU)	70D,5A	Green
D19	411AA,SM566, 424AA, or 563A	Unit 16 (1PU)	70d,5A	Green

Note: The type depends on the type of unit (IFTU, DSPU, DS3U, or HDS3U).

Table 2-7. 48-Volt Power (Single-Bay)

	Power Unit	
Fuse	**Type**	**Designation/Location**
A1	411AA	FTU1-First PU
A2	TG58	0SPU (Sync Power)
A3	411AA	0PU (DSPU Side 0 Power)
A4	411AA	CCN2 Side 0 Power Unit
B1	411AA	FTU1-Second PU
B2	TG58	1SPU (Sync Power)
B3	411AA	1PU (DSPU Side 1 Power)
B4	411AA	CCN2 Side 1 Power Unit
C1	411AA	FTU1-Third PU
C2	NONE	48 Volts to TLIs 1-4, Both Sides
C3	SM566	DCP (DSPU Power)
D2	411AA	+5 Controller Power
D4	SM565	MCP (Main Controller Power)
D5	NONE	48 Volts to MTC Pack

Table 2-8. Sync and Main Controller (CEF)

Power Unit/ Location	Associated Circuit Pack/Location	Power Unit/ Location	Associated Circuit Pack/Location
	0TLI2 /10-112		EBX /04-128
	0TLI3 /10-120		CPU2 /04-120
	0TLI4 /10-128		EMTC /04-112
	0DPLL /12-084		CI /04-136
1SPU /14-160	1TLI4 /10-136		EBX /04-128
	1TLI3 /10-144		CPU2 /04-120
	1TLI2 /10-152		EMTC /04-112
	1TLI1 /10-160		CI /04-136

Table 2-9. Sync and Main Controller (Single-Bay)

Synchronizer		Main Controller	
Power Unit/ Location	**Associated Circuit Pack/Location**	**Power Unit/ Location**	**Associated Circuit Pack/Location**
	0TLI2 /130-016		BX /132-100
	0TLI3 /130-024		CPU2 /132-108
	0TLI4 /130-032		MTC /132-120
	0DPLL /132-076		CI /132-128
	1TLI2 /130-056		BX /132-100
	1TLI3 /130-048		CPU2 /132-108
	1TLI4 /130-040		MTC /132-120
	1DPLL /132-084		CI /132-128

Table 2-10. 77-Type, FTU Fuses (Original Interface Bay)

Fuse (Note)	Associated NPCs FTU 1	FTU 2	FTU 3	FTU 4
CA	1-8	161-168	321-328	481-488
CB	9-16	169-176	329-336	489-496
CC	17-24	177-184	337-344	497-504
CD	25-32	185-192	345-352	505-512
CE	33-40	193-200	353-360	513-520
CF	41-48	201-208	361-368	521-528
CG	49-56	209-216	369-376	529-536
CH	57-64	217-224	377-384	537-544
CI	65-72	225-232	385-392	345-552
CJ	73-80	233-240	393-400	553-560
CK	81-88	241-248	401-408	561-568
CL	89-96	249-256	409-416	569-576
CM	97-104	257-264	417-424	577-584
CN	105-112	265-272	425-432	585-592
CO	113-120	273-280	433-440	593-600
CP	121-128	281-288	441-448	601-608
CQ	129-136	289-296	449-456	609-616
CR	137-144	297-304	457-464	617-624
CS	145-152	305-312	465-472	625-632
CT	153-160	313-320	473-480	633-640
CU	(0)FC 1-4	(0)FC 1-4	(0)FC 1-4	(0)FC 1-4
CV	(1)FC 1-4	(1)FC 1-4	(1)FC 1-4	(1)FC 1-4
JW	FTMI 1-4	FTMI 1-4	FTMI 1-4	FTMI 1-4
JX	CPU, UBX	CPU, UBX	CPU, UBX	CPU, UBX

Note: The unit number that the fuses supply is identified on the fuse panel.

Table 2-11. IFTU Fuse Assignment

Fuse Boards	Designation (Note)	Associated Plug-Ins
ED-9C011-30 ED-9C011-30	+5A1 through +5A4 (1-4 through 17-20) +5A5	 4 plug-ins (8 NPCs) per fuse (see +5A5 below)
ED-9C012-30 ED-9C011-30	+5A1 through +5A4 (1 through 20) +5A5, number 1 +5A5, number 2 +5A5, number 3 +5A5, number 4 +5A5, number 5	 1 plug-in (2 NPCs) per fuse CPU UBX FTMI 0-Side FC 1-Side FC

Note: Designations +5A1 through +5A4 correspond to the modules (shelves) of the unit. The fuse numbers correspond to the plug-ins on the shelf (either 1 for 1 or 1 fuse per 4 plug-ins, depending on the fuse board).

Table 2-12. DSPU5 and DSPU6 Fuses (Original Interface Bay)

DSPU5		DSPU6	
Fuse or PU/ Location	**Associated Circuit Pack/Location**	**Fuse or PU/ Location**	**Associated Circuit Pack/Location**
(SIDE 0)		(SIDE 0)	
0PU/112-160		0PU/312-160	
JBH/112-148	NPC641 /112-006 NPC661 /112-012	JBH/312-148	NPC801 /312-006 NPC821 /312-012
JBG	NPC681 /112-018 NPC701 /112-024	JBG	NPC841 /312-018 NPC861 /312-024
JBF	NPC721 /112-030 NPC741 /112-036	JBF	NPC881 /312-030 NPC901 /312-036
JBE	NPC761 /112-042 NPC781 /112-048	JBE	NPC921 /312-042 NPC941 /312-048
(SIDE 1)		(SIDE 1)	
1PU/112-142		1PU/312-142	
JBD/112-148	NPC641 /112-074 NPC661 /112-080	JBD/312-148	NPC801 /312-074 NPC821 /312-080
JBC	NPC681 /112-086 NPC701 /112-092	JBC	NPC841 /312-086 NPC861 /312-092
JBB	NPC721 /112-098 NPC741 /112-104	JBB	NPC881 /312-098 NPC901 /312-104
JBA	NPC761 /112-110 NPC781 /112-116	JBA	NPC921-310 NPC941 /312-116
DCP5 /112-130	CPU5 /112-056 DSPI5 /112-062	DCP6 /312-130	CPU6 /312-056 DSPI6 /312-062

Table 2-13. DSPU Fuses (Flexible Bay)

Fuse	Side	DSP Position (Note)
(Top) No. 1 No. 2 No. 3 No. 4	0 DSPU	(Left Panel) First and second Third and fourth Fifth and sixth Seventh and eighth
(Bottom) No. 5 No. 6 No. 7 No. 8	1 DSPU	(Right Panel) First and second Third and fourth Fifth and sixth Seventh and eighth

Note: Each fuse supplies two DSP circuit packs.

Table 2-14. Power Unit Requirements

Power Unit Code	Output Requirement (DC Volts)	Meter Connections	
		Positive Lead	Negative Lead
SM565	+11.75 to +12.25 –11.75 to –12.25	+V2 –V2	RTN RTN
411AA	+5.1 to +5.3	+	–
TG58	+4.75 to +5.25 –4.95 to –5.45	+ +	– –
424AA	+5.0 to +5.5	+	–
485AB	+5.1 to +5.4	+	–
SM566	+4.75 to +5.25	+	–
563A	+4.9 to +5.3	5.5V	GRD

Check DSPU Circuit Pack Installation

Overview: Use this procedure to verify that all the DSPU circuit packs in the frame are properly installed.

1. Familiarize yourself with the DSPU shelf. See Figure 2-11.
2. Verify that all DSPUs are properly installed. See Table 2-15.

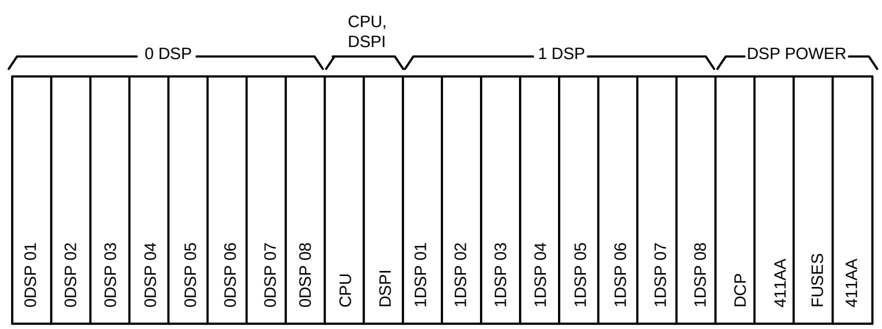


Figure 2-11. DSPU Shelf

Table 2-15. DSPU Power Units and Fuses

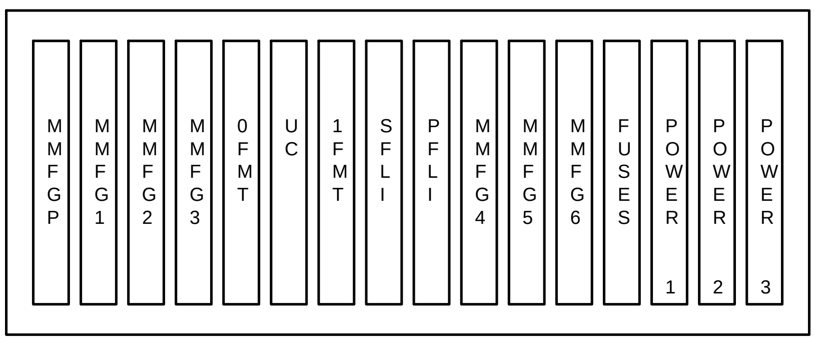
Fuse	Side	DSP Position (Note)
(Top)	0 DSPU	(Left Panel)
No. 1		First and second
No. 2		Third and fourth
No. 3		Fifth and sixth
No. 4		Seventh and eighth
(Bottom)	1 DSPU	(Right Panel)
No. 5		First and second
No. 6		Third and fourth
No. 7		Fifth and sixth
No. 8		Seventh and eighth

Note: Each fuse supplies two DSP circuit packs.

Check DS3U or HDS3U Circuit Pack Installation

Overview: Use this procedure to verify that all the DS3U or HDS3U circuit packs in the frame are properly installed.

1. Familiarize yourself with the designated positions on the DS3U or HDS3U shelf. Notice that an MMFG consists of MXR (or HMXR) positions and that there is an MMFG for protection switching. See Figure 2-12 (MIU is not supported).
2. Familiarize yourself with the method of installing packs as follows:
   - Use the wrist strap and observe ESD precautions when handling the pack.
   - While holding the circuit pack by the front piece, bring it up and place it into the slot. Also support the bottom edge if necessary.
   - Gently push the card in the slot to the point where the top and bottom latches can be used to pull the card evenly into the slot.



NOTE: EACH MMFG CONSISTS OF MXR AND MIU POSITIONS

Figure 2-12. Location of MMFGs on DS3U or HDS3U Shelf

3. If not already installed, install the 563A power units in designated slots. Verify that all the green power LEDs are lighted and that no red failure LED is lighted.

   NOTE:
   Two of the three power units will supply the load, but the third one is required for backup reserve power.

4. Verify that all the 80-type fuses are installed in the fuse board. See Table 2-16 for the fuse assignments.
5. Disconnect any one of the power units and verify that the red failure indicator on the other two power units does not light.
6. Return the power unit to operation.
7. Repeat the above test (disconnecting a different 563A unit, observing the LEDs on others, and repowering) to test all combinations in the power group.

Table 2-16. DS3U (HDS3U) Fuse Assignment

Fuse Designation	Associated CPs
L	P MXR (HMXR)
K	1 MXR (HMXR)
J	2 MXR (HMXR)
I	3 MXR (HMXR)
H	0 FMT (HFMT)
G	UC
F	1 FMT (HFMT)
E	S FLI
D	P FLI
C	4 MXR (HMXR)
B	5 MXR (HMXR)
A	6 MXR (HMXR)

Reprovision the Frame

NOTE:
This procedure clears the current cross-connect database and has the potential to interrupt and/or terminate service if not performed properly. Therefore, contact your next level of technical support for details on how to reprovision the frame.

Review Frame and Link Setup

Overview: Use this procedure to review the frame and link configuration. This procedure is used to query the command prioritization and output message screening on administrative links. A user can only query these settings on his or her link or login. Prioritizing and screening are assigned by the frame coordinator who can query any or all user links; users can change their own output screening but not their input priority. Prioritization determines which commands are available to the user and the priority (0, 1, 2, or 3) for processing different command groups. Screening allows reducing or increasing the number of output messages that appear on the link. Unless changed, all autonomous outputs and only the output messages for inputs on the same user link appear at that link.

Check Frame, Software, and Feature Setup

1. If command has not already been entered to see the configuration, enter **`UTL:[FRM xy,SEQ ww]:QRY,CNFGR!`**.
2. Read the requested information using Table 2-17.
3. To see the frame ID and the version of software, enter **`UTL::QRY,WHO!`**.
4. To see which features are enabled, enter **`UTL::QRY,FPKG!`**.

Table 2-17. Configuration Meanings

Item	Meaning
ID xy	Frame number recorded in software
UID abc ...	Unique frame identifier
SS 0123456789	Software serial number
BAY aa	Number of bays in frame configuration
TYPE xxx-xxx	Bay type: 1 for original interface, 2 for flexible, or dash for bay 2 and unequipped
UNITS bb	Total number of units equipped
CCN c	Type of cross-connect network: 1 for CCN- multibay, non-CEF, 2 for single bay, or E for ECCN
HG d	Height of bays: 0 for 7 feet (2133 mm) 1 for 11 feet 6 inches (3505 mm) 2 for 7 feet 2.6 inches (2200 mm)
UNIT (groups of 4) (1-16 left to right)	Unit designations: 1 for FTU Version 1, 2 for DSPU, 3 for DS3U, 4 for IFTU, or dash for not designated
NPCAD (options set by ADD LINK command)	NPC addressing: E for extended, H for hierarchical, or X for 4-digit extended

Check Link Setup

1. Enter **UTL::QRY,SCR,{LINK j[mm]|USER <user id>|LINKS|USERS}!**

   Where:

j[mm]	=	Physical link number (1 through 6) and virtual circuit (mm = 01 through 16) for synchronous link (links 5 and 6)
USER <user id>	=	User identification consisting of 2 to 8 alphabetical characters
USER/LINK	=	Selects whether user or link identification will be used in command.

2. Familiarize yourself with the following link setup options.

   — To read the priority level (LEV) for different commands, relate the level — 0 (excluded group), 1 (lowest), 2, and 3 (highest), given after LEV word in the output message to the command groups per Table 2-18.

   — To read the screening, find the SCR number (1 through 5) in the output corresponding to the position under the SCR category heading in the explanation line and refer to Table 2-19. For numbers 3 and 4, use Table 2-18 to determine the command groups indicated by 1s and 0s in the GR field of the output.

   — The restricted maintenance option (RMON/RMOFF) determines whether the user has permission to use commands in that category.

   — The link language (LANG) is given as either P (Program Documentation Standards), M (Man-Machine Language), or F (Facility Data Link Communication Protocol Language).

   NOTE:
   The FDL language may only be provisioned for a single virtual circuit on an x.25 link. Once the X.25 link is set up, provisioning this function only requires the user to specify the language "F" for the virtual circuit; no other I/O parameters affect this channel, except the NPC addressing option.

   — The NPC addressing (NPCAD) scheme for messages is given as either E for extended (for example, 001), X for 4-digit extended (for example, 0001), or H for hierarchical (for example, 01101).

   — The MCON/MCOFF option determines if macro component completion messages are output.

   — The RLK option removes link privilege, output will be either RLK A (allowed) or RLK I (inhibited).

Table 2-18. Command Grouping

a (Circuit PROV)	b (EQPT PROV)	c (MTCE)	d (Test Access)	e (Monitor)	f (Common)
XCONs	GRTH	RMV	TTST	AUD	CHG
XCNTs	DGRTH	RST	STST	UTL	ED
XDISs	ADD	DGN	—	—	EXC
SW	DLT	CFR	—	—	ACT
CONF	—	—	—	—	ADD
SECH	—	—	—	—	DLT
SDCH	—	—	—	—	—
SCON	—	—	—	—	—
SCNT	—	—	—	—	—
SDIS	—	—	—	—	—

X represents cross-connect types — TCON, OCON, BCON.

Restricted Maintenance (RMON Option)

RST::SMEM,CLR!
UTL::BOOT,FRAME!
UTL::BMTR,FROM SMEM,TO PMEM[,EXCT]!

Table 2-19. Screening Options

Screening Option (n)	Definition
1	Only the responses to inputs entered on that particular link and by that user are output.
2	The responses to inputs entered on that particular link and by that user are output as well as all autonomous messages (default).
3	Responses to input messages on that particular link and by that user are output as well as responses from specified groups of action verbs from other links. The selection of message groups is made using the GR (a, b, c, d, e, f) field in the screening command.
4	Responses to input messages on that particular link and by that user, responses from specified groups of action verbs from other links (see above), and autonomous messages are output.
5	All responses to all input messages on all links are output as well as all autonomous messages.

Check Status Register

1. Enter **`UTL::QRY,STR,LINK j[mm]!`** to familiarize yourself with the output.

   Where:
   j = Link number
   mm = Synchronous link virtual.

2. Refer to Figure 2-13 to see the bit definition (meaning of 1s) of the raw data field.

ASYNCHRONOUS

M...UTL QRY STR LINK j PTCOL S 2LN MSG:
STATUS bb e k q m p x hh COMPL

SYNCHRONOUS

PACKET LAYER FORMAT

M...UTL QRY STR LINK j[mm]PTCOL X 4 LN MSG:
STATUS bb e k m p hh
LNKL <X.25 LINK LAYER parameters> <frame addressing>
PKTL <X.25 PACKET LAYER parameters> <VC ranges (ppss)> <VC grps (gghh)>

LINK LAYER FORMAT

M...UTL QRY STR LINK j PTCOL X 4 LN MSG:
STATUS bb e k m FFFF hh
LNKL <X.25 LINK LAYER parameters> <frame addressing>
PKTL T20 R20 <VC ranges> <VC groups>

PTCOL = link protocol (Snider/X.25)

<X.25 Link Layer Parameters>
k T1 T3 N2

<X.25 Packet Layer Parameters>
T20 R20
W P T20 T22 T23 T25 T26 R20 R22 R23 R25 (for Virtual Circuit, e.g., 501)

STATUS:

e = 0 for true backspace or 1 for underscore backspace or dash (—) for synchronous. link (no backspace option).
m = 0 (idle), 1 (input message), or 2 (output message)
bb = Baud rate (03, 06, 12, 24, 48, or 96) or 00 for synchronous link (baud not detectable)
FFFF = For X.25 links, when a specific virtual circuit number is NOT entered, the protocol field is 4 HEX characters (16 bits of information), each bit representing a specific virtual circuit. Each HEX character can contain a value from 0 - F. All zeros indicates all 16 virtual circuits are active. All ones indicates all 16 virtual circuits are not active.
hh = 03 (hardware in-service) or 04 (hardware out-of-service)
k = 1 (link alarm defined as minor) or 2 (defined as major)
q = ENQ/ACK protocol 0 disabled, 1 enabled (default)
x = XON/XOFF protocol 0 disabled (default), 1 enabled.
ppss = Number of permanent and switched virtual circuits (00-16)
gghh = Permanent and switched virtual circuit groups (00-15)

Figure 2-13. Link Status Register

Initialize and Test Alarms

Initialize Alarms

Overview: Use this procedure to verify alarms have been set up to match your frame configuration.

1. Enter **`UTL:[FRM xy,SEQ ww]:INIT,ALM a!`**

   Where:
   xy = DACS II frame number (01 through ZZ)
   ww = Command sequence number (01 through 49)
   a = 3 for both local and remote alarm indications, or 2 for remote alarm indications alarms.

   - If the command is denied and the input message was entered correctly, refer trouble to the installer.

Test Alarm Operation

Overview: Use this procedure to test the alarm(s) operation.

1. In the first facility terminating unit (bay 1), locate the FTMI pack for one of the four modules of NPCs.
2. Disengage that FTMI pack.
3. If the **MINOR** (or **DMA MINOR** for 2.048-Mb/s line) LED is lighted on the status panel and the office alarm is operating, press the **ACO** button on the status panel.
   - If LED does not light and the alarm is operating, proceed to Step **11**.
4. Push the FTMI back into the slot and enter **`RST::UNIT [q]q,FTMI d!`**

   Where:
   [q]q = Unit number (1 through 16)
   d = FTMI number (1 through 4).
5. Disengage one of the DDC (or DPC) packs (two NPCs) in the same module.

6. If the **MAJOR** (or **PMA MAJOR** for 2.048-Mb/s line) LED is lighted on the status panel and the office alarm is operating, press the **ACO** button on the status panel.
   - If LED does not light and the alarm is operating, proceed to Step **11**.
7. Disengage two more DDCs (or DPCs).
8. If the **CRITICAL** (or **PMA CRITICAL** for 2.048-Mb/s line) LED is lighted on the status panel, continue with Step **9**.
   - If LED does not light and the alarm is operating, proceed to Step **11**.
9. Push the DDCs (or DPCs) back into the slots and enter **`RST::NPC <npc No.>[-<range>]!`** to restore each NPC (two per each card) to service.

   Where:

   <npc No.> = NPC number, either extended (for example, [0]001) or hierarchical (for example, 01101).

   <range> = Last NPC in a continuous range.
10. Verify that all the alarms clear.
    - If the alarms are clear, proceed to *Check and Set Time-Clock, Facility Report Utilities, and Auto Backup Memory* to check and set the time-clock and facility report utilities.
    - If the alarms are not clear, replace the EMTC pack in the main controller as outlined in subsequent steps for the ECI.
11. If office alarm operates but LED does not light, press the **LAMP TEST** button on the status panel to determine if the LED is burned out.
    - If the LED is burned out, replace it and start again with Step **3**.
    - If the LED is not burned out, enter **`RMV::MC!`** to remove the MC from service.
12. Replace the ECI pack.
13. On the status panel, hold the **RESET ENABLE** switch to **ON** and momentarily press the **RESET** button.
    - If the office alarm still does not operate after the reset completes, refer trouble to installation group or clear trouble in office alarm wiring.

Check and Set Time-Clock, Facility Report Utilities, and Auto Backup Memory

Check and Set Time-Clock Utilities

Overview: Use this procedure to review and, if required, to set the time-clock utilities.

1. If current time needs to be set in DACS II, enter correct time using **`UTL::TOD hrmnsc!`**.

   - If time does not need to be set, continue with Step **2**.

   Where:
   hr = Hour (00 through 23)
   mn = Minutes (00 through 59)
   sc = Seconds (00 through 59).

2. Enter correct date using
   `UTL::DATE {moda[ce]yr|damo[ce]yr}[,INT bb],FORMAT ggg!`

   Where:
   yr = Last 2 digits of year (00 through 99)
   mo = Month (01 through 12)
   [ce] = Century
   da = Day (01 through 31)
   ggg = MDY for month, day, year format or DMY for day, month, year format. Default is DMY.
   INT bb = Optional, to set period (bb=01,02,04,06,08,12, or 24 hours).

Check and Set Facility Report Utilities and Auto Backup Memory

Overview: Use this procedure to review and, if required, to set the facility report utilities. The facility report utilities are used to specify the items included in the daily report message, to set the time the daily report message will be issued, and to set up the backup memory report. (Refer to *Performance Monitoring* for detailed information regarding facility reports.)

1. Which of the following facility parameters do you want to be included in the daily report message?
   - If **CGAs** and **Errored Seconds**, continue with Step **2**.
   - If **selected parameters**, proceed to Step **3**.
   - If **only CGAs** (no entry required), proceed to Step **6**.

   NOTE:
   To see what facility reports are scheduled to occur enter **`UTL::QRY,TOD,CFA`**.

2. To set the time for the facility report enter **`UTL::TOD hrmnsc,CFA!`**. Proceed to Step **6**.
3. Familiarize yourself with the command (shown below) to set the time for facility report and select parameters. For Gateway, both FAC and PRIM parameters must be entered, and common bits (for example, ERS) must be set the same in both.
   `UTL::TOD hrmnsc,FAC X'abcdef[,PRIM X'abcd]!`

   Where:

FAC X'abcdef	=	Field to select DS1 facility reports; "abcdef" is hexadecimal word for 24 bits that specify parameters
PRIM X'abcd	=	Field to select 2.048 Mb/s facility reports; "abcd" is hexadecimal word for 16 bits that specify parameters.

4. Study hexadecimal word construction per Figure 2-14 for FAC and Figure 2-15 for PRIM and the following examples. Whatever parameters are selected will show up in the AUD CGA command and the midnight report. Construct the hexadecimal word as follows:

   — Decide which parameters are needed using Figures 2-14 and 2-15. Each parameter is represented by a digit in the hexadecimal word.

   — Work with each part of the hexadecimal word (a, b, c, d or a, b, c, d, f) individually.

   — Construct a 4-digit binary number for each part by placing a 0 in each position representing an unwanted parameter and a 1 in each position representing a wanted parameter.

     Remember that the bit positions read right-to-left, low-to-high (i.e., the bit positions for b in PRIM are: 10 9 8; the bit positions for b in FAC are: 18 17 16).

     For example, to select MER and FRER in PRIM, the 4-digit binary number for part b is 0011.

     Repeat this step for each part.

   — Convert each 4-digit binary number to a hexadecimal character using the following chart:

0000 = 0	0100 = 4	1000 = 8	1100 = C
0001 = 1	0101 = 5	1001 = 9	1101 = D
0010 = 2	0110 = 6	1010 = A	1110 = E
0011 = 3	0111 = 7	1011 = B	1111 = F

   — Put the 4 (PRIM) or 6 (FAC) hexadecimal charaters together in the proper order (a b c d or a b c d e f) to create a 4- or 6-digit hexadecimal number.

EXAMPLE 1: For FAC, to select CGA and ERS, the 4-digit binary numbers would be: a = 0000; b = 0000; c = 0000; d = 0000; e = 0001; f = 0001. The resulting FAC hexword is 000011. (HEX A=1010, B=1011, C=1100, D=1101, E=1110, F=1111).

EXAMPLE 2: For PRIM, to select PBA, ERS and DM, the 4-digit binary numbers would be: a = 0000; b = 0000; c = 0101; d = 0001. The resulting PRIM hexword is 0051. (HEX A=1010, B=1011, C=1100, D=1101, E=1110, F=1111).

Hex Digit	Bit	Parameter
f	0	CGA
	1	OOF
	2	SLIPS
	3	BER (Bit Errors)
e	4	ERS (Errored Second)
	5	SERS (Severe Errored Second)
	6	COFA (Change Of Frame Alignment)
	7	CRC6
d	8	BPV (Bipolar Violation)
	9	FRER (Frame Bit Error)
	10	Not Used
	11	Not Used
c	12	Not Used
	13	Not Used
	14	Not Used
	15	Not Used
b	16	SANE (Shelf Alarm)
	17	SAFE (Shelf Alarm)
	18	DS3 Alarm
	19	Not Used
a	20	Not Used
	21	Not Used
	22	Not Used
	23	Not Used

Figure 2-14. FAC Hex-Word Construction

5. Enter required command for facility reporting. The selected parameters will show up in the AUD CGA command and the midnight report.

Hex Digit	Bit	Parameter
d	0	PBA
	1	LOFA
	2	SLIPS
	3	US (Unavailable Seconds)
c	4	ERS (Errored Seconds)
	5	SERS (Severely Errored Seconds)
	6	DM (Degraded Minute)
	7	CRC4
b	8	MER (Multiframe Error)
	9	FRER (Frame Bit Error)
	10	MBER (Minor Bit Error)
	11	Not Used
a	12	Not Used
	13	Not Used
	14	Not Used
	15	Not Used

Figure 2-15. PRIM Hex-Word Construction

Check and Change Line Buildout, Equalizers and Impedance

Check and Change DS3 Line Buildout

Check DS3 Line Buildout

Overview: Use this procedure to check the DS3 LBO (line buildout).

1. Enter **`UTL::QRY,DS3,LBO!`**.
2. For each equipped DS3U (or HDS3U), read the LBO value (ON/OFF) for each DS3 position from the output message. Unequipped DS3 positions will have dashes for the LBOs. If there are no DS3s positions in the frame, the output will say LBO NONE.
3. Compare the settings with the required values per Table 2-20.
   - If Table 2-20 indicates an incorrect setting, proceed to *Change DS3 Line Buildout* to change the LBO setting.

Table 2-20. DS3 Line Buildout

	TO DSX-3		TO NETWORK ELEMENT	
LBO SETTING	**KS-19224, L2 CABLE**	**734A CABLE**	**KS-19224, L2 CABLE**	**734A CABLE**
ON	0 to 75 feet	0 to 225 feet	0 to 150 feet	0 to 450 feet
OFF	75 to 150 feet	225 to 450 feet	150 to 300 feet	450 to 900 feet

Change DS3 Line Buildout

Overview: Use this procedure to change incorrect values of DS3 line buildout.

1. Enter **`CHG::UNIT [q]q,DS3 c[-d],LBO {ON|OFF}!`**

   Where:
   c = DS3 number associated with MXR (or HMXR) (1 through 6).
   d = Optional, last DS3 number of range of DS3s in same unit.
   ON|OFF = To change the line buildout on or off, OFF is default.

   - If the command is denied, find the reason for denial and perform corrective action to obtain command completion (*Command Denials* has explanations of denial codes).

2. Check output message to verify command entries.

Check/Change DS1 Equalizer

Check DS1 Equalizer

Overview: Use this procedure to check the DS1 equalizer setting.

1. For each equipped FTU/IFTU and FTM shelf, enter the following command: **`UTL::QRY,UNIT [q]q,FTMI b,EQL!`**

   Where:
   [q]q = Unit number (1 through 16).
   b = FTMI (and shelf) number (1 through 4) in unit.
   EQL = Selects equalizer settings for DS1 shelf.

2. For DS1 shelf, compare the left and right shelf values (1 through 5) to the required settings for the length of office cabling per Table 2-21.

   - If the value per Table 2-21 indicates an incorrect setting, proceed to *Change DS1 Equalizer* to change the DS1 equalizer setting.

Table 2-21. DS1 Equalizer Settings

Setting	Cable Length (22 Gauge)	Cable Length (26 Gauge)
1	0 through 133 feet	0 through 90 feet
2	133 through 267 feet	90 through 180 feet
3	267 through 400 feet	180 through 270 feet
4	400 through 533 feet	270 through 360 feet
5	533 through 655 feet	360 through 450 feet

Change DS1 Equalizer

1. Enter the command with the value of equalization (or a dash for unchanged) for each half of the shelf (see Table 2-21):
   `CHG::UNIT [q]q,FTMI b,EQL(l,r)!`

   Where:
   b = FTMI (and shelf) number (1 through 4)
   l = Equalizer setting (1 through 5) for left half of shelf (20 NPC positions).
   r = Equalizer setting (1 through 5) for right half of shelf (20 NPC positions).

   - If the command is denied, find the reason for denial and perform corrective action to obtain command completion (*Command Denials* has explanations of denial codes).

2. Check output message to verify command entries.

Check and Change Impedance Setting

Check Impedance Setting

Overview: Use this procedure to check the impedance setting.

1. For each equipped FTU/IFTU and FTM shelf, enter
   `UTL::QRY,UNIT [q]q,FTMI b,IMP!`

   Where:
   [q]q = Unit number (1 through 16)
   b = FTMI (and shelf) number (1 through 4) in unit
   IMP = Requests impedance setting for 2.048-Mb/s Interface shelf.

2. For 2.048 Mb/s-shelf, check the impedance setting with the type of facility as follows: 075 ohms for coaxial cable, and 120 ohms for twisted wire cable.

   - If any settings need to be changed, continue with Step **3** (see Note.)

   NOTE:
   This procedure must be repeated to check all other units (including different type units that have not been checked) in the frame.

3. If you want to enter commands to change settings instead of referring the trouble to the installation group, proceed to *Change 2.048-Mb/s Impedance Setting*.

   - If you do not want to change the settings yourself, refer all incorrect settings to the installation group.

Change 2.048-Mb/s Impedance Setting

1. Enter **RMV::UNIT [q]q,FTMI b!** for the unit and FTMI shelf to be changed.

   Where:
   [q]q = Unit number (1 through 16)
   b = FTMI (and shelf) number (1 through 4).

2. Enter **DGRTH::UNIT [q]q,FTMI b!** for the same unit and shelf.

   NOTE:
   The FCs will be autonomously removed when the FTMI is degrown.

3. Enter command to grow the FTMI with the required impedance setting:
   GRTH::UNIT [q]q,FTMI b,IMP zzz!

   Where: zzz = For 2.048-Mb/s line; use 075 for 75-ohm coaxial or 120 for 120-ohm twisted pair.

4. Enter **RST::UNIT [q]q,FTMI b!** for the unit and FTMI.

   - If the command is denied, find the reason for denial and perform corrective action to obtain command completion (*Command Denials* has explanations of denial codes).

5. Enter **RST::UNIT [q]q,FC sb!** to restore the FCs that were removed from service when the FTMI was degrown.

   Where:
   s = Side number (0 or 1)
   b = Format converter number (1 through 4).

6. Check output message to verify command entries.

Test DS3U or HDS3U Protection Switching

Check Multiplexer Protection Switching

Overview: Use this procedure to verify that the multiplexer units have the ability to switch from the service unit to the protection unit and back.

1. Enter command to initiate the MMFG protection switch as follows: **SW::UNIT [q]q,MMFG c,TOPRTN[,FRC]!**. Option FRC forces the switch even if it means releasing protection connected to another service MMFG.

   Where:
   [q]q = Unit number (1 through 16)
   c = MMFG number (1 through 6) to be switched.
   FRC = Optional, to force removal without accompanying protection switching (required when protection switching is not available).

   NOTE:
   The switch can also be initiated by pulling a service MXR (HMXR) pack or entering the MMFG remove command, **RMV::UNIT [q]q,MMFG c!**.

2. Notice SW ...COMPL message and verify that ALM message is not received on a line which has been switched onto protection.

3. Enter **UTL::QRY,PSTATE,UNIT [q]q!** to see the overall protection state for the unit.

4. Observe the following in the query output message:
   - The message is divided into the top half for the FLI status and the bottom half for the MMFG status.
   - In the FLI portion, the maintenance status and then the protection are listed for both the service and protection FLIs.
   - In the MMFG portion, there are 7 MMFG groupings; the leftmost is for the protection MMFG and the others are for MMFGs 1 through 6. In each grouping, the first item is the MXR/EMXR/HMXR maintenance status, followed by the MIU maintenance status (MIU is not supported but EMIU is supported), followed by the protection status, followed by the availability of switching (if MMFG switching was requested).

5. Refer to Table 2-22 to interpret the maintenance and protection status keywords. The codes are consolidated; you will never see some of the keywords under the heading in the table for the pack.

Table 2-22. Maintenance and Protection Keywords

Keyword	Meaning
Maintenance Status	
IS	In-Service
ISF	In-Service, but Failed and Pested
OOS	Out-Of-Service
UEQD	Unequipped
Protection Status	
SLT	Protection MMFG/FLI Selected
USLT	Protection MMFG/FLI Unselected
SALW	MMFG Is Carrying Service and Switching Is Allowed
SINH	MMFG Is Carrying Service and Switching Is Inhibited
MPALW	Manual Protection Switch Active and Auto Switchback Allowed
APALW	Auto Protection Switch Active and Auto Switchback Allowed
MPINH	Manual Protection Switch Active and Auto Switchback Inhibited
APINH	Auto Protection Switch Active and Auto Switchback Inhibited
(dashes)	Service MMFG Not Equipped
Protection Availability	
AVL	Available for Switching
NVL	Not Available for Switching
(dashes)	MMFG Not Selected for Service

6. Enter **`UTL::QRY,STATE,UNIT [q]q,DS3 c!`** for same unit and MMFG (c = MMFG No.) to obtain PSTATE summary.

7. Enter command for manual switchback as follows: **`SW::UNIT [q]q,MMFG c,TOSRVC!`** for the MMFG that was switched.

   NOTE:
   If switch was initiated by pulling a pack or removing the MMFG, do the reverse operation (install, restore) here to cause switchback.

8. If you want to compare the status to the switched status, enter **`UTL::QRY,PSTATE,UNIT [q]q!`** and read status as before.

   - If this procedure has been completed, continue to *Check Facility Line Interface Switching* to check facility line interface protection switching.

Check Facility Line Interface Switching

Overview: Use this procedure to verify that the FLI (facility line interface) units have the ability to switch from the service unit to the protection unit and back.

1. If you want to test the FLI switching, enter **`SW::UNIT [q]q,FLI,TOPRTN!`** and after the completion, enter **`UTL::QRY,PSTATE,UNIT [q]q!`** to read the status as before.
2. To switch back the FLI, enter **`SW::UNIT [q]q,FLI,TOSRVC!`**.

Check Sync Switchover

Overview: Use this procedure to verify that sync units have the ability to switch from the active to the inactive side and back.

1. Enter **`UTL::QRY,STATE,SYNC!`** to determine the active sync side which is given by SOURCE field (inactive side will show MATE). See Table 2-23 for message field output and meanings.

Table 2-23. Sync Status Output

Message Field	Outputs and Meanings
CFR	MASTER or SLAVED sync configuration.
STRATUM	STR2, STR3, CEPT TOLL, or CEPT LOCAL.
MODE	HOLDOVER, FAST, or NORMAL for each DPLL.
SOURCE	Source for sync DPLL (HOLDOVER, TLI, or CRO; other side will be MATE).
IN SERVICE-DPLL	DPLL side 0 side 1, TB side 0 side 1, SOURCE side 0 side 1; presence of a 0 for side means out-of-service and a 1 means in-service.
ACTIVE-LINK	Gives TLI No. and its SSP (0, 1) which is active on each side (0 and 1).
PLL TIMING ERROR	Presence of 0 for side means no error and presence of 1 for side means error.

2. Enter **`RMV::SYNC a!`** for active side to cause switchover.
3. Obtain STATE SYNC again and check SOURCE.
4. Enter **`RST::SYNC a!`** to restore SYNC side.

Check Cross-Connect Operation

Make Random Cross-Connect Tests Using A Digital Access Test Set

Overview: Use this procedure to check the operation of the cross-connect network. The cross-connect operation is checked by sending a signal through randomly chosen cross-connect circuits. The preferred method of testing the cross-connect operation uses a J1C140A Digital Access Test Set (DATS). The DATS is used in this procedure to send tone over cross-connected channels and to detect the returned tone, thereby verifying the cross-connection. To enable this test, the DATS is connected to the DSX-1 bay jacks of one NPC and the other NPC named in the command is looped at the DSX-1 bay jacks. These NPCs must be ones that have been grown and restored, or NPCs can be moved to various slots in equipped units and grown as TYPE DE100 and restored to service for the test. Additional cross-connections involving different units are entered at random to ensure that the frame is operational.

1. Enter commands as follows to grow two NPCs, one which will have signal looped at DSX-1 bay and one to terminal DATS:

   `GRTH::NPC <npc No.>[,TYPE DE100]!`

2. Verify that TG80(B) plug-ins are installed in the test NPC positions.

3. Enter **`RST:[FRM xy,SEQ ww]:NPC <npc No.>!`** to restore the test NPCs.

   Where:

   xy = DACS II frame number (00 through ZZ)

   ww = Command sequence number (00 through 49)

   <npc No.> = NPC number, either extended (for example, [0]001) or hierarchical (for example, 01101).

   NOTE:
   The restore operation causes diagnostics to be run and places the NPC in an in-service state. The NPCs must either have the line signal connected or be looped at the DSX-1 bay jacks.

4. At DSX-1, do Steps **5** through **9**. (See Figure 2-16.)
5. Get J1C140A DATS and connect to 120 V AC outlet.
6. Turn power on and enter C-C-F-O-D on DATS keypad.
7. At back of DATS, connect 474A plug end of P6AA cord to DS1 IN/OUT jack.
8. Connect other end of cord to first NPC to be tested with red 310 plug to OUT jack (plug orientation is not critical).
9. Verify that other NPC to be entered in cross-connect command has cord between IN and OUT jacks to loop the NPC signal.
10. Compare the list of settings (E1,FE,E5,EC,F2,C2, and A01 for test channel 01) to what is lighted on the DATS. Select any that are not already set by entering the command letter followed by "D" (for do it).

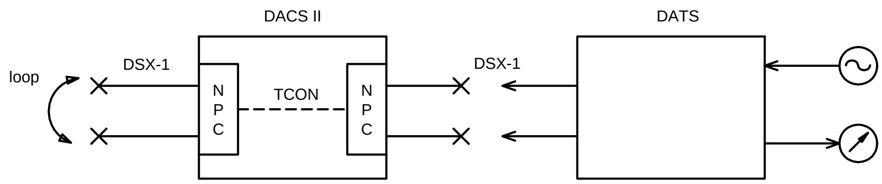


Figure 2-16. Cross-Connection Using DATS

11. Enter **`TCON::FROM <npc No.1>ddd, TO <npc No.2>jjj,TRSP!`** at DACS II to cross-connect channel of one NPC to channel of other NPC.

    Where:

    <npc No.1> = One test NPC number, either extended (for example, [0]001) or hierarchical (for example, 01101). Channel 1 of NPC is selected for test.

    <npc No.2> = Other (different) test NPC number; channel 1 of NPC is selected.

    - If tone is heard at DATS (note tone level adjustment) and completion message is received, proceed to Step **12**.
    - If tone is not heard at DATS, verify test connections and DATS settings.
    - If the command is denied, find the reason for denial and perform corrective action to obtain completion (*Command Denials* has explanations of denial codes).

12. Remove cross-connection as follows:
    `TDIS::FROM <npc No.1>ddd,TO <npc No.2>jjj!`.

    - If the command is denied, find the reason for denial and perform corrective action to obtain completion (*Command Denials* has explanations of denial codes).

13. Repeat test as necessary to include different DACS II units by moving connections to different NPCs (grown and restored). Enter the TCON command to make the cross-connection.

14. When tests are finished, remove the test connections. Remove service from and degrow any NPCs that were added for the tests. (Refer to *Test Access.*)

Make Random Cross-Connect Tests Using Unassigned Voice Terminal

Overview: Use this procedure to check the operation of the cross-connect network using an unassigned voice terminal. The cross-connect operation is checked by sending a signal through randomly chosen cross-connect circuits. These NPCs must be ones that have been grown and restored, or NPCs can be moved to various slots in equipped units and grown as TYPE DE100 and restored to service for the test. Additional cross-connections involving different units are entered at random to ensure that the frame is operational.

1. Enter commands as follows to grow two NPCs, one which will have signal looped at DSX-1 bay and one to an unassigned voice terminal:
   GRTH::NPC <npc No.>[,TYPE DE100]!.
2. Verify that TG80(B) plug-ins are installed in the test NPC positions.
3. Enter **RST:[FRM xy,SEQ ww]:NPC <npc No.>!** to restore the test NPCs.

   Where:

   xy = DACS II frame number (00 through ZZ)

   ww = Command sequence number (00 through 49)

   <npc No.> = NPC number, either extended (for example, [0]001) or hierarchical (for example, 01101).

   NOTE:
   The restore operation causes diagnostics to be run and places the NPC in an in-service state. The NPCs must either have line signal connected or be looped at the DSX-1 bay jacks.

4. At DSX-1, do the following (see Figure 2-17):
   - Patch unassigned channel bank (for example, D4 channel bank which is equipped with the proper plug-in units) to one of the NPCs to be used for cross-connect tests.
   - Verify that other NPC for tests has the signal looped with looping cord between IN and OUT jacks.
5. At unassigned voice terminal, connect transmission test set to transmit signal on selected channel for test and to receive signal on same channel.

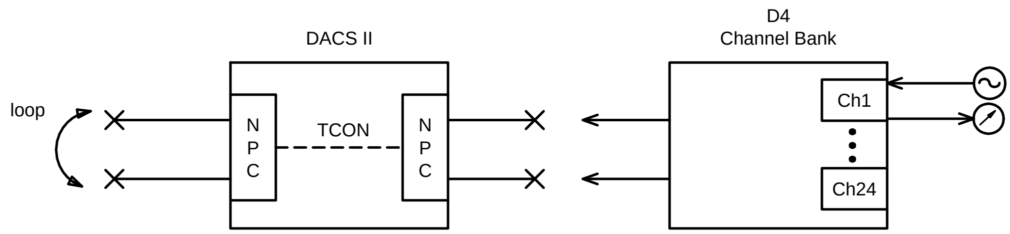


Figure 2-17. Cross-Connection Using Unassigned Voice Terminal

6. Enter **`TCON::FROM <npc No.>ddd,TO <npc No.>jjj,TRSP!`** at DACS II to cross-connect any channel from one test NPC to the other looped NPC.

   Where:
   ddd = Any channel (1 through 24) on first NPC for test
   jjj = Any channel (1 through 24) on second NPC for test.

   - If tone is detected at transmission test set and a completion message is received, continue with Step **7**.
   - If tone is not detected, verify test connections and signal settings on the unassigned voice terminal.
   - If the command is denied, find the reason for denial and perform corrective action to obtain command completion (*Command Denials* has explanations of denial codes).

7. To remove cross-connection, enter **`TDIS::FROM <npc No.1>ddd,TO <npc No.2>jjj!`**

   - If the command is denied, find the reason for denial and perform corrective action to obtain command completion (*Command Denials* has explanations of denial codes).

8. Repeat test as necessary to include different DACS II units by moving connections to different NPCs (grown and restored). Enter the TCON command to make the cross-connection.

9. When tests are finished, remove the test connections. Remove service from and degrow any NPCs that were added for the tests. (Refer to *Test Access*.)

Check for Equipped, Out-Of-Service, or Cross-Connected Circuits

Overview: Use this procedure to check for equipped circuit packs, out-of-service circuits packs, and cross-connected circuits. When acceptance is complete, there should not be any equipped Unit circuit packs.

Check for Equipped Circuit Packs

1. Enter **`UTL::QRY,EQD[,{UNIT [q]q|UNITS|ETSIS|TSIS|NPCS|MXRS}]!`**

   Where:

UNIT [q]q, UNITs, ETSIs, TSIs, NPCs, MXRs	=	Optional, to request the equipage in specific unit or of specific entity instead of entire frame.

   See Figure 2-18 for link and CCN/ECCN circuit packs if entire frame is checked.

   NOTE:
   Equipped CPs are indicated by a "1" alongside the CP or by the CP number in the sequence. For duplicated entities (FC, ETSIs/TSIs), there will be listings for both the zero and one sides for each duplicated circuit packs.

```
M...UTL QRY <parameter> g h i j k l  m n  o p EOM

g = Link 1
h = Link 2
i = Link 3
j = Link 4
k = Link 5
l = Link 6
m = Cross-Connect Side 0
n = Cross-Connect Side 1
o = CCI 0 / CCNI 0
p = CCI 1 / CCNI 1
```

Figure 2-18. Common Equipment Readout

Check for Out-of-Service Circuit Packs

2. Check for out-of-service circuit packs by entering
   `UTL::QRY,OOS[,UNIT [q][q]q]!`

   Where: [q]q = Unit number (1 through 16).

   NOTE:
   Enter OOS if you do not expect any out of service circuits during acceptance. However, ALL is used most frequently to show all (OOS, FAIL,PEST) conditions. If XON was used when the link was provisioned, CTRL-s or CTRL-q can be used to temporarily stop or start long output messages.

   NOTE:
   The conditions are indicated by the presence of a "1" after the entity in the printout. For duplicated entities (FC, CCN/ECCN), there will be listings for both the zero and one sides for the duplicated plug-in. Unequipped NPCs are indicated by dashes.

3. If any circuit packs are equipped but out-of-service, enter:
   - the RST (restore) command for the pack if it should be in-service, or
   - the DGRTH (degrow) command for the pack if acceptance testing is complete.

   Refer to Figure 2-19.

verb::<CP identification>[,option]!

{RMV::	SYNC a!	a =	0 or 1
/RST::	SYNC a,TLI n[,SSP b]!	n =	1-4; b = sync port (0 or 1)
/DGRTH::	CCI s!	s =	side 0 or 1
/DGN::}	CCNI s!	s =	side 0 or 1
	ETSI sqq!	qq =	unit 1-16
	TSI sft!	f =	unit (receiving from) (1-6)
	CCB sf!	t =	unit (transmitting to) (1-6)
	ETSIS,ECCN s,ALL!		For all ETSIs on the side
	TSIS,CCN s,ALL!		For all TSIs on the side
	UNIT [q]q,UC!	[q]q =	unit (1-16)
	UNIT [q]q,{FTMI d|DSPI}!	d =	module interface for units 1-4
	UNIT [q]q,FC sd!	sd =	FC side (0,1) and FC No. (1-4)
	UNIT [q]q,FLI k!	k =	service (S) or protection (P)
	UNIT [q]q,FMT s!	s =	side (0,1)
	UNIT [q]q,MMFG c	c =	DS3 group (1-6,P)
	[,FRC][,INCL]!	FRC =	forces remove with no prot. switch
		INCL =	removes/restores MXR NPCs
	NPC <npc No.>[,SIDE s]!	<npc No.> =	NPC number
		s =	SIDE for DSPU
	LINK j!	j =	link 1-6
DGN::	UNIT [q]q,MXR c!	c =	DS3 group (1-6,P)
	UNIT [q]q,MIU c!	c =	DS3 group (1-6,P)

NOTE: Removing the NPC is service affecting.

Figure 2-19. Maintenance Command Construction

Check for Cross-Connect Circuits

4. If you need information on what cross-connect circuits are up on the frame, continue with Step **5**.

   - If you do not need information on what cross-connect circuits are up on the frame, proceed to Step **6**.

5. Use the following commands as needed to see any cross-connections:

   - **`UTL::QRY,CMAP <npc No.>[-<range>]!`** shows the connections on a single NPC or range of NPCs.

     Where: <range> = Optional, last NPC of a continuous range.

   - **`UTL::QRY,DMAP!`** gives a long listing of connections on all NPCs. To abort listing while in progress, enter CTRL x and carriage return to gain access to the link; then enter ABT. If XON was used when the link was provisioned, CTRL-s or CTRL-q can be used to temporarily stop or start long output messages.

     NOTE:
     If any cross-connections remain, remove any test connections and remove service from and degrow any NPCs that were added for the cross-connections.

6. When acceptance is complete, there should not be any equipped Unit circuit packs. If all procedures in this chapter have been successfully completed, acceptance testing is completed.

Provisioning

3

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Frame

Before performing any provisioning procedure, familiarize yourself with the method of installing circuit packs as follows:

— Unpack the circuit packs at the frame location where they will be used.

— Use the wrist strap and observe ESD (electrostatic discharge) precautions when handling the pack.

— While holding the plug-in by the front piece, bring it up and place it into the slot. Also support the bottom edge if necessary.

— Gently push the card in the slot to the point where the top and bottom latches can be used to pull the card evenly into the slot.

Configure Frame

Overview: This procedure deals with the menu driven CFR FRAME routine used to enter bay configuration information into the data base. The frame number and unique frame ID can be protected against change using this procedure, or existing protected numbers can be changed using this routine. The bay assignments are made by specifying the HT (height), the type of bay (original or flexible), the cross-connect network designation, and the unit types [IFTU2 (integrated facility terminating unit 2), DSPU (digital signal processing unit), DS3U (DS3 unit), HDS3U (Hybrid DS3 unit), NONE] in each bay. Separate growth commands must still be entered to equip units. The unit designations in the configuration define the use of the units and establish the location of circuit packs.

NOTE:
A timeout can occur if entries are delayed during any part of the session; so you may want to read through the procedure first to help prevent a timeout and the need to reenter the information.

NOTE:
The configure session is started from the Main Menu and is concluded from the Main Menu, but you can abort the session and return to this menu (all entries discarded) by entering CTRL D and carriage return.

1. Log in on link 1 as user DAX (refer to Administration).

   NOTE:
   Configuring the frame must be performed by user DAX on link 1, any attempt to configure the frame by any other user or on any other link will be denied.

2. If you are using the configure routine to expand the CEF bay configuration beyond three bays, enter **`UTL::QRY,SCR,{LINKS|USERS}!`**
   to verify that all users and in-service links have the NPCAD (network processing circuit addressing) option set for either 4-digit extended (X) or hierarchical (H).

   NOTE:
   If any users or links are provisioned with NPCAD = E, enter **`ADD::NPCAD H,ALL!`** to temporarily change all users and links to the hierarchical addressing scheme.

3. Enter **UTL::BMTR,FROM RAM,TO MEM!** to ensure that any recent frame activities are recorded on the primary memory card.
4. At link 1, enter **RST::MC,MCOND!** to place the frame in the maintenance condition which limits the frame activity to maintenance commands.
5. To initiate the routine, enter **CFR::FRAME!**.
6. Notice the Main Menu selections and consider the following:
   — The initialize/reset configuration file includes the entries for the software serial number, protected frame numbers, the number of bays in the frame, the height of the bays, the allowable non-hierarchical NPCAD scheme, and the types of units to be equipped. These entries must be made and the configuration must be initialized in the data base before any of the other options on the menu can be performed.

   — The add new bay(s) and unit(s) option will be denied if all bays have already been configured.

   — The add unit(s) to existing bay(s) will be denied if no units were previously designated as unit type NONE.

   — The change unit(s) type will be denied if selected unit(s) have already been grown via commands.

   — The remove unit(s) or bay(s) and unit(s) option will be denied if all units were previously designated as NONE or if selected unit(s) have already been grown via commands.

   — The recall option displays what has been entered or what currently exists in the data base configuration.

   — The exit option executes the configure command and records what was entered on the primary memory card.
7. Consider the following items that have to do with making selections within any of the Main Menu routines:
   — To make a selection from a submenu listing, enter the item number for the selection and enter RETURN. To select the default item, simply enter RETURN.

   — If entered information is incompatible with the rest of the configuration, an error explanation will appear and the previous question will be displayed again.

8. Select the Main Menu item followed by RETURN for the part of the configure routine you want to do.
   - If initialize/reset was selected, continue with Step **9**.
   - If initialize/reset was not selected, proceed through the session making the choices to all submenus and after all parts have been completed, proceed to Step **17**.
9. If you do not want to enter a unique software serial number, simply press RETURN. This is how existing or default values are maintained; the system responds with OK, NO CHANGE, or DEFAULT ACCEPTED.

   NOTE:
   The software serial number identifies the frame so that the data bases transferred to SMEM are restricted for use in that frame.

10. If a unique software serial number is to be entered or the number is to be changed to accommodate a memory card from another frame, enter the number and RETURN.
11. Enter information on bay height, the CCN (cross-connect network) type (type is fixed as ECCN), and the option for the number of digits needed for extended NPC numbering.

    NOTE:
    Four digits will be needed for extended NPC (network processing circuit) numbers starting in unit 7 (NPC 1000). The 3- or 4-digit option only applies when there are three bays or less.

    NOTE:
    Even if hierarchical numbering is to be used, the extended NPC option must be selected correctly in order to continue without an error message. An error message will also occur if the selected option conflicts with what was previously entered by the ADD USER/LINK command.

12. Answer the question about the number of bays and answer the question about bay 1.

    NOTE:
    An original interface bay has a fixed assignment of units (units 5 and 6 can only be DSPU or DS3U types), and the flexible interface bay allows varied assignment of unit types.

    NOTE:
    Original interface bays will only be found in bays 1 and 3 of an older non-CEF frame, and only when the frame is a retrofit installation.

13. Continue with the questions to number all the bays in the frame.

    NOTE:
    The bay numbering portion of the initialize/reset option commences with the lowest numbered bay which has not already been entered.

    NOTE:
    The default order of numbering the bays is in consecutive order, but you can make selections to configure the bays in a different order.

14. Continue with the questions to select the unit types in the bays. The possible unit types are IFTU2, DSPU, DS3U, or NONE; Please note the HDS3U is initially selected as a DS3U. The unit must first be configured as a DS3U and becomes an HDS3U once it is grown as an HDS3U with the type field HT100. An HDS3U should only be grown with hybrid formatters, a protection hybrid multiplexer, the FLI packs, and the UC physically in place.
15. When asked whether the frame number and unique identifier are to be unprotected, answer accordingly. If they are not to be protected, which means they can be subsequently changed using GRTH FRAME, answer YES and enter the numbers when requested. Otherwise, answer NO.
16. After you have completed the menu portion, examine the configuration that is displayed. If not displayed, enter the recall configuration data.
    - To keep the entries and go to the Main Menu to exit, enter RETURN.
    - To discard the entries, enter CTRL D and return.
17. When back at the Main Menu, either select another menu item to make changes or select Exit to incorporate the entries in the data base and update the primary memory card.

18. If CFR COMPL message is received, enter **`RST::MC!`** to exit the MCOND state. (See Note 1.) The procedure to configure the frame has been completed.

    - If denial message is received, continue with Step **19**.

    NOTE 1:
    When you exit, there will be a delay before getting the completion message.

    NOTE 2:
    The user can now re-establish specific users and links to the 4 digit extended addressing scheme by entering the following command **`ADD::{LINK j[mm]|USER <user id},NPCAD X!`**.

19. Which denial explanation is received?

    - If **COND 8D or 92**, proceed to Step **21.**
    - If **COND 8F**, proceed to Step **22.**
    - If **COND 97**, continue with Step **20.**
    - If **COND 98**, proceed to Step **23.**

20. The configuration routine was aborted before the entire routine was completed. Enter **`UTL::QRY,CNFGR!`**.

    - If pertinent information was not included, repeat the procedure from Step **5**.
    - If pertinent information has been entered, enter **`RST::MC!`** to exit the MCOND state. The procedure to configure the frame has been completed.

21. Enter **`RST::PMEM!`** to clear the buffers and ensure that the primary memory card is powered.

    - If you are now able to repeat the configure frame routine and write to PMEM, enter **`RST::MC!`** to exit the MCOND state. The procedure to configure the frame has been completed.
    - If trouble persists, continue with Step **22**.

22. Enter **`DGN::PMEM!`**.
    - If DGN ...STF message is received, refer to *Manual Diagnostic Failures* in Volume II.
    - If message was not received and trouble persists, do not continue with this procedure. Contact a technical consultant.
23. At the DACS II status panel, hold the **RESET ENABLE** switch to **ON** and momentarily press the **RESET** button.
    - If RESET ...COMPL (with no COND) is received, repeat the procedure to configure the frame.
    - If RESET ...COMPL (with COND) is received, refer to *Data Base Troubles* in Volume II to clear reset trouble.

Grow Frame ID

Overview: This frame growth command: (1) places a nonzero frame number and optional unique identifier into the data base, (2) enables the use of a 3-character frame field (if developed), and (3) grows virtual NPCs [9]961 (and others) as TYPE VI100 for network broadcast connections. If the frame number and any UID (unique identifier) were protected against change using the CFR FRAME routine, these numbers are fixed, and the same numbers must be entered in the command. If the frame numbers were not protected, different frame and UID numbers can be entered in this procedure. The UID allows distinguishing the frame from others having the same unique frame ID; frequently, the COMMON LANGUAGE* code is used as the identifier.

1. Enter the frame growth command as follows:
   `GRTH::FRAME fg[,CHAR n][,UID abc123...]!`

   Where:
   abc123... = Unique Frame ID (UID); up to 20 alphanumeric characters.
   fg = Two-digit, alphanumeric frame number (00 through ZZ).
   n = Optional, 3 for 3-character frame field in command (n = 2 is default).

   - If command COMPL message is received, the procedure to grow the frame ID has been completed.
   - If GRTH ...COND 81 DNY message is received, you must grow the frame with the same numbers contained in the software configuration file; the numbers can only be changed using the **`CFR::FRAME!`** command per *Configure Frame*.
   - If other denial code is received, find the explanation for the denial in *Command Denials*.

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

Synchronizers

Install Synchronizer Circuit Packs

NOTE:
The only way to switch SYNC sides is to issue a RMV::SYNC command followed by a RST::SYNC command. When the SYNC switches sides, the (E)CCN also switches. Switching SYNC sides is not necessary for normal operation.

1. Familiarize yourself with the layout of the equipment in the frame. The sync is always mounted with the main controller in bay 2 (switch bay) in an original interface frame. Figure 3-1 shows the location in the CEF (capacity expansion frame).

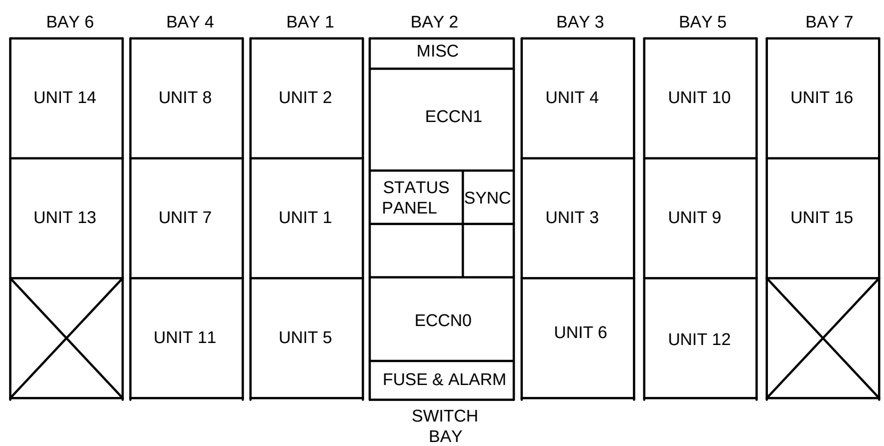


Figure 3-1. Fully-Equipped CEF

2. From system layout information and installation records, determine the following on the sync:
   - — The configuration, MASTER or SLAVED.
   - — The number and types (digital line, office clock, etc.) of incoming links for slaved timing.

— Timing distribution, whether DACS II supplies timing to other equipment in the office.

3. Check and install the TB (time base) using the TB portion of Table 3-1.
4. Install the 0SPU and SPU (synchronizer power unit) (TG58).
5. Check and install TLI (timing link interface) type designations per TLI part of Table 3-1.
6. Verify that there are duplicate TLI cards (on sides 0 and 1) for each incoming and timing distribution link. See Table 3-1 for equipment codes.
7. If TG68 or TG75 TLIs are used, verify that the packs are installed in the TLI 2 positions of the sync; four inputs for coaxial cable are provided at the top of the frame.
8. If timing signals are to be distributed from the DACS II, verify that the correct code of TLI is installed and check connection of timing cables. Both the TG70 and TG71 packs provide 4 multipled outputs.

NOTE:
Unused ports do not need terminations.

Table 3-1. Sync Circuit Pack Cards

Circuit Pack	Code	Growth Type	Description
TB	TG60	TB000	TBS3 (Time Base, Stratum 3) — Domestic Use
	TG61	TB100	TBCL (Time Base, CEPT Local Office)
	TG62	TB200	TBCT (Time Base, CEPT Toll Office)
	TG63	TB300	TBS2 (Time Base, Stratum 2) — Domestic Use
TLI	TG64	TExyz	TXB1 (DS1 Timing Extractor)
	TG65	TPxyz	TXB2 (2.048-Mb/s Primary Block Timing Extractor)
	TG66	TCxyz	TXCC (64 kb/s Composite Clock Timing Extractor)
	TG67	TUxyz	TXUC (Unipolar Clock Timing Extractor)
	TG68	TRxyz	TXRS (BSRF [Reference Frequency] Timing Extractor)
	TG70	TD1yz	TDCC (64 kb/s Composite Clock Timing Distributor)
	TG71	TD2yz	TDS2 (2.048-Mb/s Sine Wave Timing Distributor)
	TG75	TPxyz	TXBT (Primary Block Extractor, 75-Ohm)

Check NPC Timing Option Wiring

Use this procedure to check the NPC timing option wiring.

1. Refer to the following lists to find the NPC positions in the first two modules of units 1 and 2 that can be used as sources for the 2.048-Mb/s sync clocks.

Hierarchical numbering	Extended numbering
01130	030
01132	032
01230	070
01232	072
02130	190
02132	192
02230	230
02232	232

NOTE:
Only the last NPC position on each of these DPCs is used to prevent losing two sources if the DPC fails.

2. Locate miscellaneous terminal strip A at the top rear of bay 2.
3. Verify that the two twisted pair leads (sync clock and ground) of the NPCs that are used go to the top-bay miscellaneous terminal strip A.
4. Verify that the 0SYNC TP and TN (ground) leads (SD-96699-01 or SD-96648-01) from those NPCs at TSA are wired to the corresponding leads at TSB going to sync port 0 of a TLI. Verify that the same is true for the 1SYNC TP and TN leads and sync port 1.

Grow Sync Timebase, Configure Sync Mode, and Restore Sync

NOTE:
Since one TLI must be grown for timing distribution in the MASTER Sync Mode; it is covered in this procedure.
Additional TLIs are grown in *Grow and Restore Sync TLIs*.

1. Enter **`GRTH::SYNC,TB,TYPE TBpqr!`** to grow the sync time base.

   Where: pqr = 000 for North American Stratum 3
   100 for CEPT, local office
   200 for CEPT, toll office
   300 for North American Stratum 2.

2. Verify that circuit pack cards for the TBs and TLIs are installed to enable restoring sync and to enable hardware matchup when TLIs are grown. Always wait 30 minutes for TB oven to reach temperature before attempting to restore sync to service. The TG68 and TG75 cards can only be installed in TLI 2 position because of the 75-ohm coaxial connections.
3. Which sync configuration is required?
   - If **MASTER**, continue with Step **4.**
   - If **SLAVED**, proceed to Step **10.**
4. Enter **`CFR::SYNC,MASTER!`**.
5. Enter **`RST::SYNC 0!`** and then **`RST::SYNC 1!`**.
6. Enter **`GRTH::SYNC,TLI 1,TYPE TDpqr!`** to grow TLI 1 for timing distribution.

   Where: pqr = Format specification; 100 for composite clock (TG70 pack) or 200 for sine wave 2.048 MHz (TG71 pack).

7. Verify TB circuit pack is installed in TLI-3 side 1 position before entering **`GRTH::SYNC,TLI 3,TYPE TBpqr!`** to grow additional TB (same stratum as others) for use as clock reference oscillator.
8. Enter **`RST::SYNC 0,TLI 1!`** and **`RST::SYNC 1,TLI 1!`** to restore TLI 1 on both sides.
9. Wait 30 minutes for the timebase to warm up then enter, **`RST::SYNC,TLI 3,CRO!`** to restore TLI 3.

   The procedure to configure the sync for MASTER mode has been completed.
10. Enter **`CFR::SYNC,SLAVED!`**.

11. Enter **RST::SYNC 0!** and then **RST::SYNC 1!**.

Grow and Restore Sync TLIs

Use this procedure to grow and restore the sync TLIs.

1. How will the TLI pack be used?
   - If **TIMING EXTRACTOR**, continue with Step **2.**
   - If **TIMING DISTRIBUTOR**, proceed to Step **7.**

2. Note the following comments about the command fields:
   - — The sync ports (SSP 0 and SSP 1) on each TLI are grown separately; the type (TE versus TU) must be the same, but the parameters may be different.
   - — The source priority for the two SSPs on a TLI must be different.
   - — The optional NPC field is used when an NPC is used as a timing source for the TLI. In this case, the TLI is a TU type and the unipolar signal is wired through the miscellaneous terminal strip on the frame.

3. To grow SSP 0 for the TLI, enter **GRTH::SYNC,TLI n,TYPE texyz,SSP a,SRC p[,NPC <npc No.>]!**

   Where: n = TLI number (1 through 4)

   te = TE for code TG64 card; TP for code TG65 or TG75 cards; TC for code TG66 card; TU for code TG67 card; or TR for code TG68 card

   xyz = Signal format specification; for TP, see Table 3-2; for TE, see Table 3-3; for the TC, TU, and TR timing extractors, xyz can be any value (000 to 999).

   a = Sync port (0 or 1)

   p = Priority for sync port, p=1 (highest) to p=8 (lowest)

   <npc No.> = Optional, to name NPC supplying timing from incoming line; This field only appropriate with TLI type TU.

4. To restore the same SSP on both sides, enter **RST::SYNC 0,TLI n,SSP 0!** and then **RST::SYNC 1,TLI n,SSP 0!**.
5. Repeat Steps **3** and **4** to grow SSP 1 and restore it on both sides (substitute SSP 1 for SSP 0 in commands).
6. Repeat Steps **3**, **4**, and **5** as required to grow and restore remaining timing extractor TLIs. The procedure to provision TLIs has been completed. If additional TDs (timing distributors) are needed, continue with Step **7**.

Table 3-2. TP-Type Growth Options

TP (Primary Block Timing Extractor)	
Option x	**Frame Format**
1 or 5	Common Channel Signaling
2 or 6	Channel Associated Signaling - Mode 0
3 or 7	Channel Associated Signaling - Mode 1
4 or 8	European Remote Switching Module (ERSM)
0 or 9	Invalid
Option y	**Line Format**
0 or 2	Alternate Mark Inversion
1 or 3	High Density Bipolar of Order 3 (HDB3)
4 or 9	Invalid
Option z	**Channel Format**
0 through 9	Unassigned

Table 3-3. TE-Type Growth Options

TE-Type TLI xyz Fields	
Option x	**Frame Format**
0	Invalid
1	D4 Format
2, 3	ESF Format
4	DDS (T1DM) Format
5-9	Invalid
Option y	**Line Format**
0, 1	Bipolar Line Coding
2	B8ZS Line Coding
3	Invalid
4, 5	Bipolar Line Coding
6	B8ZS Line Coding
7-9	Invalid
Option z	**Channel Format**
0 through 9	Unassigned

7. Enter **`GRTH::SYNC,TLI n,TYPE TDpqr!`**

   Where:

n = TLI number (1, 3 or 4)

pqr = Signal format specification;
100 for composite clock (TG70 pack)
200 for sine wave (TG71 pack).

8. Enter **RST::SYNC 0,TLI n!** and then **RST::SYNC 1,TLI n!** to restore the TLI on both sides.
9. Repeat Steps **7** and **8** as needed to grow and restore other timing distributor TLIs.
10. Enter **UTL::QRY,ALL,COMMON!** to check the source priority.
11. Enter **UTL::QRY,STATE,SYNC!** and notice the status of the new links as shown in the message.

NOTE:
Sync 0 occurs before (left of) sync 1 in the status listings and the presence of a 1 alongside a condition indicates that the condition exists.

Query Sync Status

1. Read the query output using Table 3-4 for the TLI types and read the following:
   — The TB types are TB000 for domestic-stratum 3, TB100 for CEPT - local office, TB200 for CEPT - toll office, and TB300 for domestic-stratum 2.
   — The TLI types are given by the letter codes, and the signal formats are given by the associated number codes (xyz) which for TE and TP types are the same as for NPC growth (see Table 3-4).
   — The SRC is the priority of TLI sources (from the highest 1 to the lowest 8).
2. Enter **UTL::QRY,STATE,SYNC!** and read the sync configuration and status using Table 3-5.
3. Enter **UTL::QRY,STR,SYNC a!** and read the output.

   Where: a = Sync side (0 or 1) to get the equivalent information.

   Crosscouple is the normal running mode in which the sync sides are locked together (in-phase). See Figure 3-2.
4. If the sync configuration = MASTER, verify that additional TB circuit pack is installed in TLI 3, side 1 slot. This time base pack will also take up TLI 4 position. Timing distributor packs must also be installed in duplicated TLI 1 or TLI 2 slots for this application. See Figure 3-3 and Table 3-4 for equipment codes.

Table 3-4. Sync Circuit Pack Cards

Circuit Pack	Code	Growth Type	Description
TB	TG60	TB000	TBS3 (Time Base, Stratum 3) — Domestic Use
	TG61	TB100	TBCL (Time Base, CEPT Local Office)
	TG62	TB200	TBCT (Time Base, CEPT Toll Office)
	TG63	TB300	TBS2 (Time Base, Stratum 2) — Domestic Use
TLI	TG64	TExyz	TXB1 (DS1 Timing Extractor)
	TG65	TPxyz	TXB2 (2.048-Mb/s Primary Block Timing Extractor)
	TG66	TCxyz	TXCC (64 kb/s Composite Clock Timing Extractor)
	TG67	TUxyz	TXUC (Unipolar Clock Timing Extractor)
	TG68	TRxyz	TXRS (BSRF [Reference Frequency] Timing Extractor)
	TG70	TD1yz	TDCC (64 kb/s Composite Clock Timing Distributor)
	TG71	TD2yz	TDS2 (2.048-Mb/s Sine Wave Timing Distributor)
	TG75	TPxyz	TXBT (Primary Block Extractor, 75-Ohm)

Table 3-5. Sync Status Output

Message Field	Outputs and Meanings
CFR STRATUM MODE SOURCE	MASTER or SLAVED sync configuration. STR2, STR3, CEPT TOLL, or CEPT LOCAL. HOLDOVER, FAST, or NORMAL for each DPLL. Source for sync DPLL (HOLDOVER, TLI, or CRO; other side will be MATE).
IN SERVICE-DPLL ACTIVE-LINK PLL TIMING ERROR	DPLL side 0 side 1, TB side 0 side 1, SOURCE side 0 side 1; presence of a 0 for side means out-of-service and a 1 means in-service. Gives TLI No. and its SSP (0, 1) which is active on each side (0 and 1). Presence of 0 for side means no error and presence of 1 for side means error.

```
M...UTL QRY STR SYNC a
byte1, byte2, byte3, byte4, byte5, byte6
byte7,byte8,byte9,byte10,byte11, byte12 COMPL
```

BYTE 1 (BITS abcdefgh)

a = spare	e = TLI 1 in service
b = sync hardware failed	f = TLI 2 in service
c = mate failed or OOS	g = TLI 3 in service
d = TB failed or OOS	h = TLI 4 in service

BYTE 3 (BITS abcdefgh)

a = sync reset, needs config.	e = crosscouple trouble
b = DPLL hardware error	f = CRO timing trouble
c = TB error	g = spare
d = PLL symmetry error	h = spare

BYTE 5 BIT POSITIONS: ab cde fgh

SOURCE (BITS ab)	ACTIVE PORT (BITS cde) (if BITS ab = 01)
00 = holdover	000 = TLI 1, SSP 0
01 = timing link	001 = TLI 1, SSP 1
10 = cross-couple	010 = TLI 2, SSP 0
11 = CRO	011 = TLI 2, SSP 1
	100 = TLI 3, SSP 0
	101 = TLI 3, SSP 1
	110 = TLI 4, SSP 0
BITS fgh (unused)	111 = TLI 4, SSP 1

BYTE 9 (BITS abcdefgh)

a = loss of energy	d = TB oven still cold
b = TB command error	e = spare
c = TB oscillator drift (master mode)	fgh = 000 for stratum 3, 001 for 2-Mb/s local 010 for 2-Mb/s toll, 011 for stratum 2

Figure 3-2. Sync Status Register

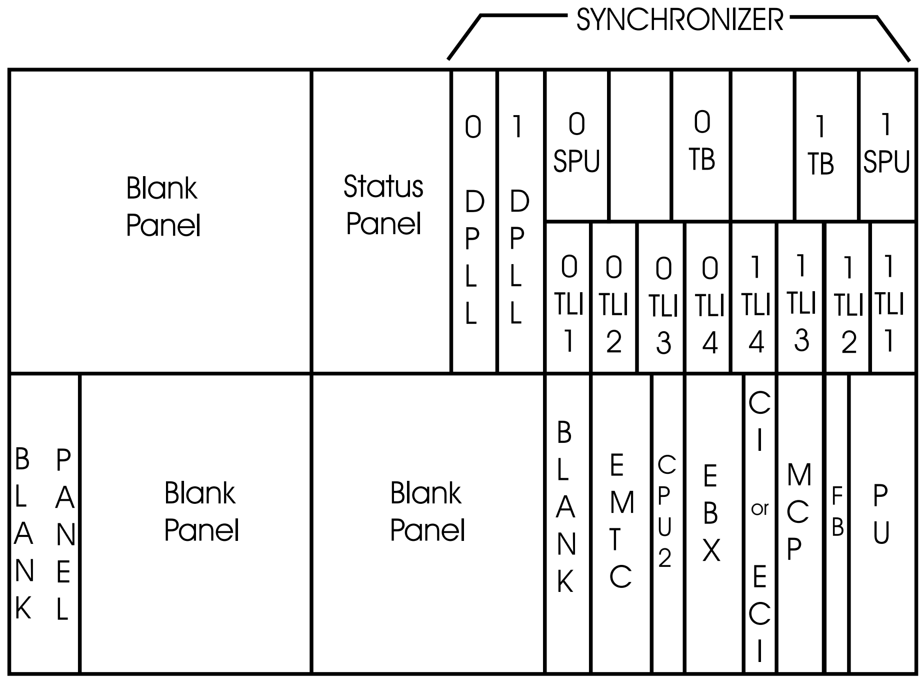


Figure 3-3. Identification of Main Controller Slots in CEF

Add/Change Synchronizer Timing Link Interface

Overview: This procedure allows: (1) connecting additional TLIs (timing link interfaces) for timing extraction or (2) changing the existing TLI types, NPC source, or sync port priority. Any NPC timing sources are entered in the data base in this procedure. Additional links may be used to provide extra protection in case the other links fail or to provide different priority source signals. Each TLI has two sync ports (SSP) and is duplicated on both sides of the sync. If an active SSP fails, the sync will switch to the other SSP on the TLI; if there are no more sources on the side, the sync will switch to the other side.

CAUTION:
Performing this procedure incorrectly can interrupt service. Perform each step of the procedure in the order given.

1. If office timing source is to be connected to DACS II, verify that timing signals have been wired to miscellaneous terminal strip on DACS II frame. Each DACS II sync TLI circuit pack has two ports.
2. Verify that correct code(s) of timing extractor packs were installed for the additional timing links per Table 3-6. The same code must be installed in the corresponding TLI slots of both syncs. The TG68 and TG75 packs can only be installed in the TLI 2 position because of the 75-ohm coaxial connections.
3. If timing for added link is to be extracted from 2.048 Mb/s line, the involved NPC must be named in the data base so that sync failures will be related to NPC source failures. Only one of the eight allowable NPCs can be used per TLI SSP. These NPCs are the last NPCs on the designated cards in units 1 and 2 as follows:

   Hierarchical numbering

   01130, 01132, 01230, 01232, 02130, 02132, 02230, and 02232.

   Extended numbering

   030, 032, 070, 072, 190, 192, 230, and 232
4. Do you need to add timing links or change existing TLIs?
   - If **add links,** continue with Step **5.**
   - If **change TLIs,** proceed to Step **12.**

5. To grow SSP 0 on the next TLI, enter
   `GRTH::SYNC,TLI n,TYPE tepqr,SSP a,SRC p[,NPC <npc No.>]!`

   Where:

   n = TLI number (1 through 4).

   tepqr = Input signal type (TE,TP,TC,TU,TR per Table 3-6) and format; for type TE, use same format as NPC growth (for example, TE100); for type TP, see Table 3-7, for others listed, pqr is not defined (000 through 999).

   a = Sync port 0 or 1.

   p = Sets the priority, p=1 (highest) to p=8 (lowest).

   <npc No.> = Optional, to name NPC supplying timing from incoming line; either extended (for example, [0]030) or hierarchical (for example, 01130). Only appropriate with TLI type TU.

6. To restore sync port 0 in the TLIs in both syncs, enter
   `RST::SYNC 0,TLI n,SSP 0!` and **`RST::SYNC 1,TLI n,SSP 0!`**.
7. Repeat Step **5** to grow the other sync port (substituting SSP 1) on the same TLI.
8. Repeat Step **6** (substituting SSP 1) to restore sync port 1 on the same TLIs and in both syncs.
9. If more TLIs are to be added at this time, repeat Steps **5** through **8** for the next TLI.
   - If no more TLIs are to be added, continue with Step **10**.

Table 3-6. Sync Circuit Pack Cards

Circuit Pack	Code	Growth Type	Description
TB	TG60	TB000	TBS3 (Time Base, Stratum 3) — Domestic Use
	TG61	TB100	TBCL (Time Base, CEPT Local Office)
	TG62	TB200	TBCT (Time Base, CEPT Toll Office)
	TG63	TB300	TBS2 (Time Base, Stratum 2) — Domestic Use
TLI	TG64	TExyz	TXB1 (DS1 Timing Extractor)
	TG65	TPxyz	TXB2 (2.048-Mb/s Primary Block Timing Extractor)
	TG66	TCxyz	TXCC (64 kb/s Composite Clock Timing Extractor)
	TG67	TUxyz	TXUC (Unipolar Clock Timing Extractor)
	TG68	TRxyz	TXRS (BSRF [Reference Frequency] Timing Extractor)
	TG70	TD1yz	TDCC (64 kb/s Composite Clock Timing Distributor)
	TG71	TD2yz	TDS2 (2.048-Mb/s Sine Wave Timing Distributor)
	TG75	TPxyz	TXBT (Primary Block Extractor, 75-Ohm)

Table 3-7. Growth Options

TP (Primary Block Timing Extractor)	
Option x	**Frame Format**
1 or 5	Common Channel Signaling
2 or 6	Channel Associated Signaling - Mode 0
3 or 7	Channel Associated Signaling - Mode 1
4 or 8	European Remote Switching Module (ERSM)
0 or 9	Invalid
Option y	**Line Format**
0 or 2	Alternate Mark Inversion
1 or 3	High Density Bipolar of Order 3 (HDB3)
4 or 9	Invalid
Option z	**Channel Format**
0 through 9	Unassigned

10. Enter **`UTL::QRY,STATE,SYNC!`** and notice the status of the new links as shown in the message (see Table 3-8).

    NOTE:
    Sync 0 occurs before (left of) sync 1 in the status listings and the presence of a 1 alongside a condition indicates that the condition exists.

11. For additional sync information, enter the appropriate command and read the registers:

    - For SYNC: **`UTL::QRY,STR,SYNC a!`** (Figure 3-4).
    - For TLI: **`UTL::QRY,STR,SYNC a,TLI n!`** (Figure 3-5).
    - For SSP: **`UTL::QRY,STR,SYNC a,TLI n,SSP s!`** (Figure 3-6).

    The procedure to add the synchronizer timing link interface has been completed.

12. Enter the UTL QRY commands given in Steps **10** and **11** to check the existing status and characteristics of the TLIs to be changed.

13. To remove sync port 0 on the subject TLI in both syncs, enter **`RMV::SYNC 0,TLI n,SSP 0!`** and **`RMV::SYNC 1,TLI n,SSP 0!`**.

Table 3-8. Sync Status Output

Message Field	Outputs and Meanings
CFR	MASTER or SLAVED sync configuration.
STRATUM	STR2, STR3, CEPT TOLL, or CEPT LOCAL.
MODE	HOLDOVER, FAST, or NORMAL for each DPLL.
SOURCE	Source for sync DPLL (HOLDOVER, TLI, or CRO; other side will be MATE).
IN SERVICE-DPLL	DPLL side 0 side 1, TB side 0 side 1, SOURCE side 0 side 1; presence of a 0 for side means out-of-service and a 1 means in-service.
ACTIVE-LINK	Gives TLI No. and its SSP (0, 1) which is active on each side (0 and 1).
PLL TIMING ERROR	Presence of 0 for side means no error and presence of 1 for side means error.

14. Repeat Step **13** (substituting SSP 1) to remove sync port 1 on the same TLIs in both syncs.

15. Which change do you need to make?

    - If **TLI type** or **NPC source,** continue with Step **16.**
    - If **sync port priority,** proceed to Step **17.**

16. Enter **CHG::SYNC,TLI n,SSP a,{TYPE tepqr|NPC <npc No.>}!**.

17. Enter **CHG::SYNC,TLI,SRC(i/(a,b)[,j/(c,d) ...,l/(g,h)])!**. You will also have to change the NPC growth specifications to remove/add the sync source option.

    Where:
    i,j ...**l** = Subject TLI (1 through 4)
    a,b ...g,h = Priorities (8 through 1, low to high) for the sync ports (0,1) on the subject TLI.

    - If command is denied, find the reason for denial and perform corrective action to obtain command completion (*Command Denials* has explanations of the denial codes).

18. To restore sync port 0 on the subject TLI in both syncs, enter **RST::SYNC 0,TLI n,SSP 0!** and **RST::SYNC 1,TLI n,SSP 0!**.

19. Repeat Step **18** (substituting SSP 1) to restore sync port 1 on the same TLIs in both syncs.

20. Repeat procedure from Step **10**.

```
M...UTL QRY STR SYNC a
byte1, byte2, byte3, byte4, byte5, byte6
byte7,byte8,byte9,byte10,byte11, byte12 COMPL
```

BYTE 1 (BITS abcdefgh)

a = spare	e = TLI 1 in service
b = sync hardware failed	f = TLI 2 in service
c = mate failed or OOS	g = TLI 3 in service
d = TB failed or OOS	h = TLI 4 in service

BYTE 3 (BITS abcdefgh)

a = sync reset, needs config.	e = crosscouple trouble
b = DPLL hardware error	f = CRO timing trouble
c = TB error	g = spare
d = PLL symmetry error	h = spare

BYTE 5 BIT POSITIONS: ab cde fgh

SOURCE (BITS ab)	ACTIVE PORT (BITS cde) (if BITS ab = 01)
00 = holdover	000 = TLI 1, SSP 0
01 = timing link	001 = TLI 1, SSP 1
10 = cross-couple	010 = TLI 2, SSP 0
11 = CRO	011 = TLI 2, SSP 1
	100 = TLI 3, SSP 0
	101 = TLI 3, SSP 1
	110 = TLI 4, SSP 0
BITS fgh (unused)	111 = TLI 4, SSP 1

BYTE 9 (BITS abcdefgh)

a = loss of energy	d = TB oven still cold
b = TB command error	e = spare
c = TB oscillator drift (master mode)	fgh = 000 for stratum 3, 001 for 2-Mb/s local 010 for 2-Mb/s toll, 011 for stratum 2

Figure 3-4. Sync Status Register

M...QRY STR SYNC a TLI n byte1, byte2, byte3 COMPL

BYTE 1 BIT POSITIONS: abcd e f g h

0000 = 1.544 Mb/s	0100 = BSRF	e = TLI grown
0001 = 2.048 Mb/s	0101 = 64 kb/s Clock Out	f = TLI out-of-service
0010 = Composite Clock	0110 = 2.048 Mb/s Clock Out	g = TLI hardware error
0011 = Unipolar Clock		h = spare

Figure 3-5. TLI Status Register

M...UTL QRY STR SYNC a TLI n SSP b [NPC <source npc>] 2 LN MSG:
byte1, byte2, byte3, byte4, byte5 COMPL

BYTE 2 SELECTION PRIORITY (01-08) FOR SSPs.

BYTE 3 BIT POSITIONS: abc de fgh

FRAME FORMAT (abc)		LINE FORMAT (de)	FREQ (fgh)
NORTH AMER.	CEPT		
000 = D4	000 = NSA	00 = Bipolar	000 = 512 KHz
001 = ESF	001 = ERSM	01 = B8ZS	001 = 1.0 MHz
010 = DDS	010 = CAS0	10 = AMI	010 = 1.544 MHz
	011 = CAS1	01 = HDB3	011 = 2.048 MHz
			100 = 5.0 MHz

BYTE 4 (BITS abcdefgh)

BIT a = Carrier Failure	BIT e = Jitter
BIT b = Energy Loss	BIT f = Phase Step
BIT c = Unipolar Clock Not Defined	BIT g = Spare
BIT d = Spare	BIT h = Spare

Figure 3-6. Sync Port Status Register

Change Synchronizer Time Base Stratum

Overview: This procedure allows changing the level (stratum) of the sync time base while the sync remains in operation. The procedure is to remove one side, degrow the TB and replace it, regrow the sync at the new stratum, configure the sync mode, and restore the side; then repeat the procedure for the TB on the other side. For master timing, the third TB must be replaced before the TB on the other side. A higher stratum (2 versus 3 or toll versus local) provides a more precise timing signal for the network sync plan or office application.

CAUTION:
Performing this procedure incorrectly can interrupt service. Perform each step of the procedure in the order given. Clear any alarms or OOS conditions in the synchronizer before beginning this procedure.

1. Enter the following commands to see the status of each side of sync and to determine which is supplying timing (active). The active side is indicated in the SOURCE field of the STATE message by one of the following: TLI, CRO, or HOLDOVER. The other side will show MATE.

   `UTL::QRY,STATE,SYNC!` and **`UTL::QRY,STR,SYNC a!`**

   Where: a = Side 0 or 1.

2. Enter **`RMV::SYNC a!`** to remove the inactive sync side.

3. Enter **`RMV::UNIT [q]q,FC sb!`** to remove all FCs (format converters) *on the same side* for all FTU units and modules in each unit.

   Where:
   [q]q = Unit number (1 through 16)
   sb = FC side and module number.

   NOTE:
   The FCs (same side as inactive sync) are being removed and disconnected to prevent noise on circuits, but this precaution will not be necessary after a change notice is implemented to add a wiring termination to the ECCN.

4. Unplug the same FCs that were previously removed from service.

   CAUTION:
   Unplugging FC packs on the active side of the sync will cause loss of service in the unit.

5. Enter **`DGRTH::SYNC,TB!`** to degrow sync time base.

6. Replace TB pack for same side with code (TG60-TG63) for required stratum (equipment codes are listed in Table 3-9).

Table 3-9. Sync Circuit Pack Cards

Circuit Pack	Code	Growth Type	Description
TB	TG60	TB000	TBS3 (Time Base, Stratum 3) — Domestic Use
	TG61	TB100	TBCL (Time Base, CEPT Local Office)
	TG62	TB200	TBCT (Time Base, CEPT Toll Office)
	TG63	TB300	TBS2 (Time Base, Stratum 2) — Domestic Use
TLI	TG64	TExyz	TXB1 (DS1 Timing Extractor)
	TG65	TPxyz	TXB2 (2.048-Mb/s Primary Block Timing Extractor)
	TG66	TCxyz	TXCC (64 kb/s Composite Clock Timing Extractor)
	TG67	TUxyz	TXUC (Unipolar Clock Timing Extractor)
	TG68	TRxyz	TXRS (BSRF [Reference Frequency] Timing Extractor)
	TG70	TD1yz	TDCC (64 kb/s Composite Clock Timing Distributor)
	TG71	TD2yz	TDS2 (2.048-Mb/s Sine Wave Timing Distributor)
	TG75	TPxyz	TXBT (Primary Block Extractor, 75-Ohm)

7. Enter **`GRTH::SYNC,TB,TYPE TBpqr!`** to grow new time base.

   Where: pqr = 000 for North American stratum 3
   = 100 for international local
   = 200 for international toll
   = 300 for North American stratum 2.

   NOTE:
   The completion of this command causes the stratum of the time base in the DACS II data base to differ from the actual in-service sync. FRADTS messages (test number 312) will occur because of this difference, but the situation will be corrected and the FRADTS will cease when this procedure is completed.

8. Enter **`CFR::SYNC,{MASTER|SLAVED}!`** to configure the sync for the mode that existed previously.

9. If the sync is to be operated at a lower stratum (than it was equipped for above, see Note), enter **`CFR::SYNC,STRATUM <level>!`**

   Where: <level> = STR2 or STR3 for TB TG63;
   TOLL, or LOCAL for TB TG62.

   NOTE:
   This step is provided in case the stratum must be changed for a trouble situation, but it is not likely that the sync would be operated at the lower stratum.

10. Wait 30 minutes for TB oven to reach temperature and then enter **`RST::SYNC a!`** to restore sync side.

    NOTE:
    A conditional command completion (COND 94) will be received because the other side must still be changed.

11. How was sync configured?
    - If configured as MASTER, continue with Step **12**.
    - If configured as SLAVED, proceed to Step **17.**
12. Enter **`RMV::SYNC,TLI 3,CRO!`** to remove additional TB pack from service.
13. Replace additional TB pack (located in center TLI slots) with new code for stratum.
14. Enter **`DGRTH::SYNC,TLI 3!`** to degrow the additional TB.
15. Enter **`GRTH::SYNC,TLI 3,TYPE TBpqr!`** to regrow same TB with same type field as the TBs on the sides.
16. Wait 30 minutes for TB oven to reach temperature and then enter **`RST::SYNC,TLI 3,CRO!`**.
17. Reinstall the FC packs in their slots and enter **`RST::UNIT [q]q,FC sb!`** to restore each one.
18. Verify that each one restored correctly.
19. Enter **`RMV::SYNC a!`** to remove other sync side.
20. Enter **`RMV::UNIT [q]q,FC sb!`** to remove all FCs *on the same side* for all FTU units and modules in each unit.

21. Unplug the same FCs that were previously removed from service.

    CAUTION:
    Unplugging FC packs on the active side of the sync will cause loss of service in the unit.

22. Replace TB pack for same side.
23. Wait 30 minutes for TB oven to reach temperature and then enter **`RST::SYNC a!`**.
24. Reinstall the FC packs in their slots and enter **`RST::UNIT [q]q,FC sb!`** to restore each one.
25. Enter **`UTL::QRY,STATE,SYNC!`** to check status of sync.
26. If additional timing links are to be added in SLAVED configuration, proceed to add the links (see *Grow and Restore Sync TLIs*).
27. For stratum 2 operation, it may take 2 hours to reach the rated operating precision.

Cross-Connect Network/Expanded Cross-Connect Network (CCN/ECCN)

Install ECCN Circuit Packs

NOTE:
If necessary, the installation of the power units for the CCN and CCN2 can be checked per *Install Power Units and Fuses*. The ECCN circuit packs have built-in power converters.

NOTE:
If this procedure is being used to check the installation of the ECCN circuit packs, you can simply read through the procedure and check the location of the circuit packs.

NOTE:
The TSI/CCB/CCN/CCNI entities are used in conjunction with the Non-CEF frames while the ETSI/CCI entities are used the CEF frames.

1. Locate the side 0 and side 1 shelves of the ECCN in bay 2 of the frame. See Figure 3-7.
2. Verify that the BT (bus terminator, BBR1 code) circuit packs are securely installed in the designated far-left and far-right slots on each side of the network (ECCN0 and ECCN1). See Figure 3-8.

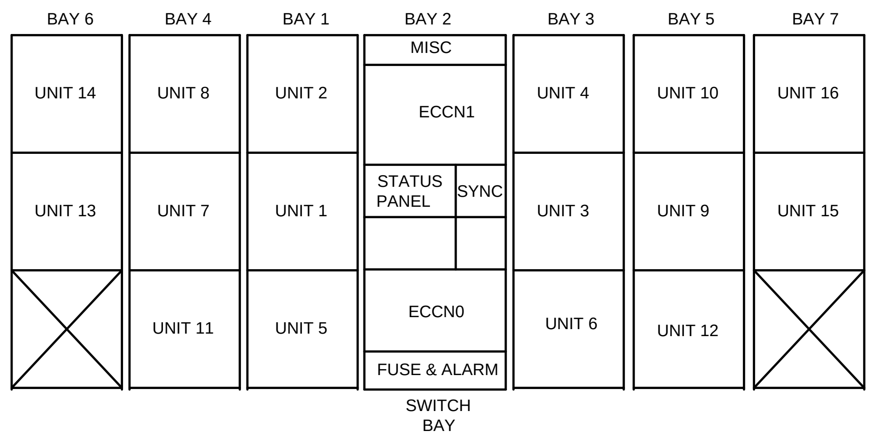


Figure 3-7. Fully-Equipped Capacity Expansion Frame

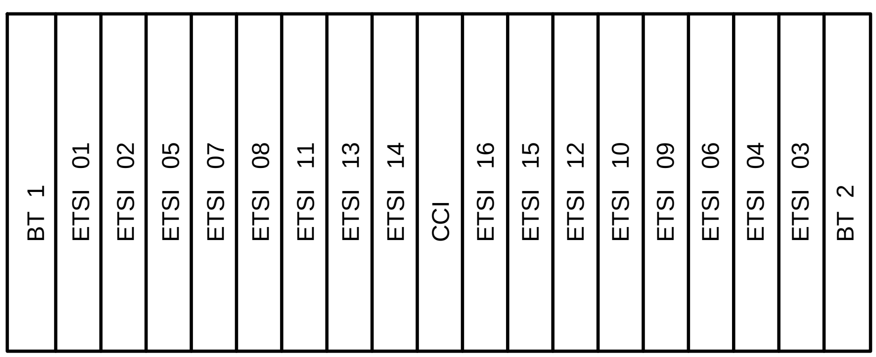


Figure 3-8. Location of Circuit Packs on ECCN Shelf

3. Verify that the CCI (clock control interface, BBS1 code) circuit pack is securely installed in the designated slot on each side of the network (ECCN0 and ECCN1). See Figure 3-8.

4. Enter **`UTL::QRY,STR,XC a!`** and determine the active and inactive sides. The active side is indicated when the right most data byte equals 05.

   Where: a = Either side (0 or 1).

5. Enter **`RMV::CCI s!`** to remove the *inactive* side from service.

6. Working in the network shelf for the inactive side, install the ETSI (expanded time slot interface) (BBS2) for each unit to be equipped. Push at top and bottom of circuit pack to evenly seat it; then use the latches to secure it in the slot.

   NOTE:
   The ETSI slots are assigned on each side of the common CCI pack to roughly match the associated unit positions and ordering of the units in the CEF configuration.

   NOTE:
   Plugging into the out-of-service side prevents possible transmission hits and possible service removal of NPCs on the ETSI ports.

7. Enter **`RST::CCI s!`** to restore the CCI for the inactive side to service.

   Where: s = Same side.

8. Enter **CFR::XC a!**

   Where a = Inactive side to cause side switch (change active side).

   NOTE:
   Switching (E)CCN sides does not cause the SYNCs to switch sides.

9. Enter **RMV::CCI s!** to remove the side (*that was made inactive by the side switch*) from service.

   Where: s = New inactive side.

10. Install the required ETSIs on the shelf for the remaining side (now inactive). The equipage is duplicated on both sides of the network so that service can be switched to the duplicated side if the active side fails.

11. Enter **RST::CCI s!** to restore the CCI for the inactive side to service.

    Where: s = Same side.

Install Multibay CCN Circuit Packs

1. Locate CCN (cross-connect network) in the frame and notice the organization within the CCN; Figure 3-9 shows the organization.
2. Verify that the CCNI (cross-connect interface) card (UM30) is installed in designated slots on both sides of the CCN.

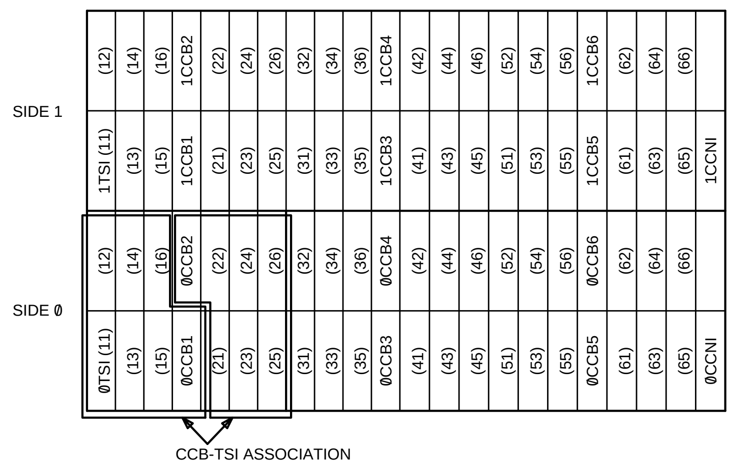


Figure 3-9. Duplicated Cross-Connect Network for Multibay Frame

3. From Table 3-10, determine which CCB (cross-connect buffer) (UM26) and TSI (TM660) circuit pack slots must be equipped to support the DACS units which will be used (1 through 6).

   NOTE 1:
   The TSI slot numbers show how the cards are connected; for example, TSI 21 connects data from unit 2 to unit 1.

   NOTE 2:
   Normally, as units are added, TSIs are installed to connect the new unit with every other one and the total number of TSIs equals the total number of units squared.

4. Enter **`UTL::QRY,STR,XC a!`** and determine the active and inactive sides. The active side is indicated when the rightmost data byte equals 05.

   Where a = Either side (0 or 1).

5. Install the required CCBs (UM26) and TSIs (TM660) on the inactive side. Plugging into the inactive side prevents possible transmission hits.
6. Enter **`UTL::QRY,ALL,COMMON!`** and verify that the inactive side is not failed because switching to a failed side will cause loss of service.
7. Enter **`CFR::XC a!`**

   Where a = Inactive side to cause side switch.

8. Install the required CCBs and TSIs on the remaining side (now inactive).

Table 3-10. Circuit Packs Needed

Unit Number	TSI Number	CCB Number
1	11	1
1, 2	11, 12, 21, 22,	1, 2
1, 2, 3	11, 12, 13, 21, 22, 23, 31, 32, 33	1, 2, 3
1, 2, 3, 4	11, 12, 13, 14, 21, 22, 23, 24, 31, 32, 33, 34, 41, 42, 43, 44	1, 2, 3, 4
1, 2, 3, 4, 5	11, 12, 13, 14, 15, 21, 22, 23, 24, 25, 31, 32, 33, 34, 35, 41, 42, 43, 44, 45, 51, 52, 53, 54, 55	1, 2, 3, 4, 5
1, 2, 3, 4, 5, 6	11, 12, 13, 14, 15, 16, 21, 22, 23, 24, 25, 26, 31, 32, 33, 34, 35, 36, 41, 42, 43, 44, 45, 46, 51, 52, 53, 54, 55, 56, 61, 62, 63, 64, 65, 66	1, 2, 3, 4, 5, 6

Install Single-Bay CCN Circuit Packs

1. Locate the CCN (cross-connect network) in the frame and notice the organization within the network; see Figure 3-10.

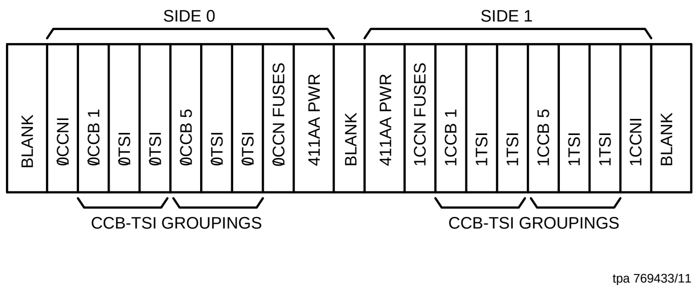


Figure 3-10. CCN Network

2. Verify that the CCNI (cross-connect interface) card (UM30 code) is installed in the designated slots on both sides of CCN.
3. Enter **`UTL::QRY,STR,XC a!`** and determine the active and inactive sides. The active side is indicated when the rightmost data byte equals 05.

   Where a = Either side (0 or 1).
4. Install the required CCBs (UM26) and TSIs (TM660) on the inactive side. Plugging into the inactive side prevents possible transmission hits.

   NOTE:
   The TSI designation numbers (11, 15, and 51) indicate how the cards are connected; for example, TSI 11 connects data from unit 1 back to unit 1. If unit 5 is not to be equipped, the procedure to install single-bay CCN circuit packs has been completed.

5. Enter **`UTL::QRY,ALL,COMMON!`** and verify that the inactive side is not failed because switching to a failed side will cause loss of service.
6. Enter **`CFR::XC a!`**

   Where a = Inactive side to cause side switch.
7. Install the required CCBs and TSIs on the remaining side (now inactive).

Units (IFTU, DS3U, HDS3U, and DSPU)

Install Power Units and Fuses

Install CEF (Capacity Expansion Frame) Power Units and Fuses

1. Locate the power unit slots for the section of the frame being equipped using shelf designation strips. See Figure 3-11 for the original interface bay; where the power units are not included with the unit or circuit group.
2. Determine whether the required codes and quantities of power units are installed per Table 3-11.
3. Determine whether the required 48-volt input fuses are installed in the fuse and alarm panel (bottom frame) per Table 3-12.

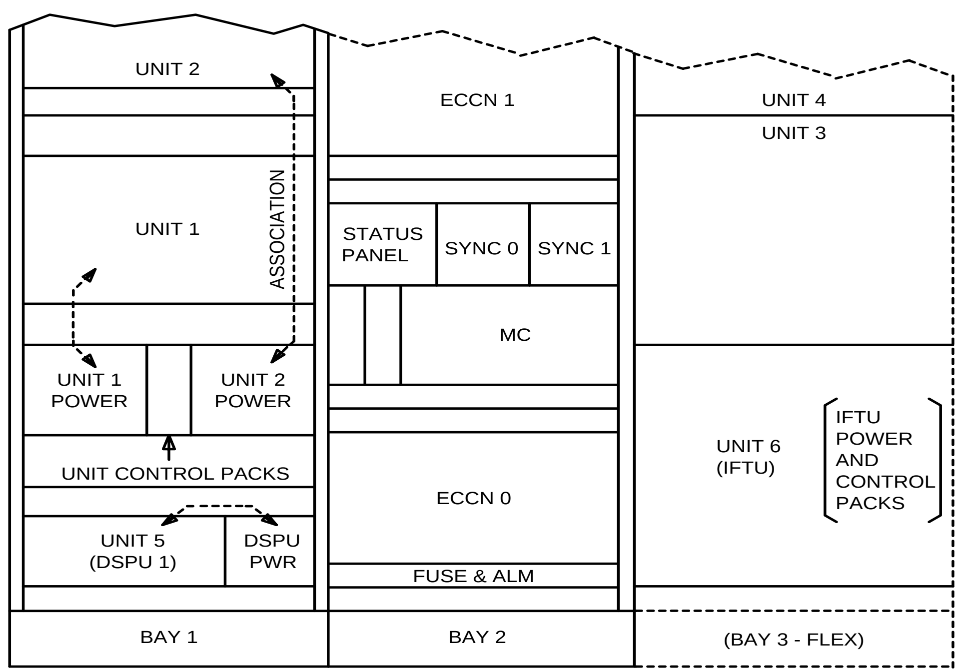


Figure 3-11. Original Interface Bay (Bay 1)

4. Determine whether the fuses are installed in fuse boards per designation strips and Table 3-13 (sync and main controller), Table 3-14 (IFTU), Table 3-15 (DSPU fuses), Table 3-16 (DSPUs 5 and 6 fuses, original interface bay), and Table 3-17 (77-Type Fuses).

   NOTE:
   FTUs in original interface bays use two GRP 1 (5A) DFBs and one GRP 2 (7.5A & 5A) DFB; the GRP 2 board is for fuses CQ-JX. The DSPU and multibay CCN both use GRP 3 (7.5A) DFBs.

   - If the proper power units and fuses have already been installed, the procedure to install CEF power units and fuses has been completed.
   - If power units and fuses have not been installed, continue with Step **5**.

5. Install the required 48-volt fuses per Table 3-12.
6. Install the required LED fuses per Tables 3-13 through 3-17.
7. Install the required power units. As you move the latch/switch on each to the closed position, notice the LED on the power unit.

   Response: The red LED on the power unit is lighted while the latch/switch is open and goes off and remains off when the latch is closed.

8. If any of the required responses did not occur, replace the power unit and confirm the operation of the faceplate LED.
9. Get digital multimeter (such as KS-20599 DMM) and set it to read DC "" range.
10. Measure each power unit output between the + and – V1 jacks (or between each V jack and RTN) per Table 3-18. The SPU (sync power unit) does not have test jacks to perform this test.

    - If the requirement of Table 3-18 is met, disconnect the meter.
    - If the requirement of Table 3-18 is not met, replace the power unit.

    NOTE:
    The FTU power units feed a common bus, and low voltage can only be detected if one power unit is disconnected and the test is repeated for all combinations of the power units.

Table 3-11. CEF Power Unit Summary

Circuit Block	CP Code	Designation/ Location	Equipage
EFC	SM565 411AA	MCP /04-144 PU /04-160	One. One.
SYNC	TG58 TG58	0SPU /14-106 1SPU /14-160	One. One.
ECCN 0	—	—	The CCI and ETSI packs have built-in power converters.
ECCN 1	—	—	The CCI and ETSI packs have built-in power converters.
IFTU (Flex Bay)	411AA 411AA 411AA	PU /x06-168 PU /x14-145 PU /x14-158	All PUs for unit supply a common bus; an extra PU is always provided for backup (for example, PUs 1 & 2 required for FTM 1).
IFTU 2	424AA	PU /16-132 PU /16-144 PU /16-156	Same as IFTU.
DSPU (Flex Bay)	SM566 411AA 411AA	DCP /x04-130 1PU /x04-142 0PU /x04-150	One. One. One.
FTU1/3	411AA 411AA 411AA	PU /x28-012 PU /x28-024 PU /x28-048	All PUs for unit supply a common bus; an extra PU is always provided for backup (for example, PUs 1 & 2 required for FTM 1). Location x = 1 for units 1 & 3 and x = 3 for units 2 & 4.
FTU2/4	411AA 411AA 411AA	PU /x28-124 PU /x28-148 PU /x28-160	Same as FTU 1.
DSPU5/6	SM566 411AA 411AA	DCP5/6 /X12-130 1PU /X12-142 0PU /X12-160	One. Location x = 1 for unit 5 and x = 3 for unit 6. One. One.
DS3U5/6 HDS3U	563A 563A 563A	1 PU/11-140 for unit 6. 2 PU/11-148 3 PU/11-156	One. Location x = 1 for unit 5 and x = 3 One. One.

Table 3-12. 48-Volt Power (For CEF)

Feed A Fuse	Power Unit/CP			
	Type (Note)	**Assignment**	**Size**	**Bead Color**
A1	411A,SM566, 424AA, or 563A	Unit 1	70D,5A	Green
A2	411A,SM566, 424AA, or 563A	Unit 2	70D,5A	Green
A3	411A,SM566, 424AA, or 563A	Unit 3	70D,5A	Green
A4	411A,SM566, 424AA, or 563A	Unit 4	70D,5A	Green
A5-1	Indicator for A5-2	-	70G,0.5A	Red
A5-2	CCI,ETSIs	ECCN 0	74J,7.5A	-
A6-1	-	-	-	-
A6-2	-	-	-	-
A7	411AA,SM566, 424AA, or 563A	Unit 5	70D,5A	Green
A8	TG58	0SPU (SYNC 0)	70D,5A	Green
A9	411AA,SM566, 424AA, or 563A	Unit 6	70D,5A	Green
A12	411AA,SM566, 424AA, or 563A	Unit 7 (0PU)	70D,5A	Green
A13	411AA,SM566, 424AA, or 563A	Unit 8 (0PU)	70D,5A	Green
A14	411AA,SM566, 424AA, or 563A	Unit 10	70D,5A	Green
A15	411AA,SM566, 424AA, or 563A	Unit 11 (0PU)	70D,5A	Green
A16	411AA,SM566, 424AA, or 563A	Unit 13 (0PU)	70D,5A	Green
A17	411AA,SM566, 424AA, or 563A	Unit 14 (0PU)	70D,5A	Green
A18	411AA,SM566, 424AA, or 563A	Unit 15	70D,5A	Green
A19	-	-	-	-

Note: The type depends on the type of unit (IFTU, DSPU, DS3U, or HDS3U).

Table 3-12. ***Continued***

Feed B Fuse	Power Unit/CP			
	Type (Note)	**Assignment**	**Size**	**Bead Color**
B1	411A,SM566, 424AA, or 563A	Unit 1	70D,5A	Green
B2	411A,SM566, 424AA, or 563A	Unit 2	70D,5A	Green
B3	411A,SM566, 424AA, or 563A	Unit 3	70D,5A	Green
B4	411A,SM566, 424AA, or 563A	Unit 4	70D,5A	Green
B5-1	-	-	-	-
B5-2	-	-	-	-
B6-1	-	-	-	-
B6-2	-	-	-	-
B7	411AA,SM566, 424AA, or 563A	Unit 5	70D,5A	Green
B8	-	CRO	70D,5A	Green
B9	411AA,SM566, 424AA, or 563A	Unit 6	70D,5A	Green
B12	411AA,SM566, 424AA, or 563A	Unit 7	70D,5A	Green
B13	411AA,SM566, 424AA, or 563A	Unit 9 (0PU)	70D,5A	Green
B14	411AA,SM566, 424AA, or 563A	Unit 10 (0PU)	70D,5A	Green
B15	411AA,SM566, 424AA, or 563A	Unit 11	70D,5A	Green
B16	411AA,SM566, 424AA, or 563A	Unit 12 (0PU)	70D,5A	Green
B17	411AA,SM566, 424AA, or 563A	Unit 14	70D,5A	Green
B18	411AA,SM566, 424AA, or 563A	Unit 15 (0PU)	70D,5A	Green
B19	411AA,SM566, 424AA, or 563A	Unit 16 (0PU)	70D,5A	Green

Note: The type depends on the type of unit (IFTU, DSPU, DS3U, or HDS3U).

Table 3-12. ***Continued***

Feed C Fuse	Power Unit/CP			
	Type (Note)	**Assignment**	**Size**	**Bead Color**
C1	411A,SM566, 424AA, or 563A	Unit 1 (1PU)	70D,5A	Green
C2	411A,SM566, 424AA, or 563A	Unit 2 (1PU)	70D,5A	Green
C3	411A,SM566, 424AA, or 563A	Unit 3 (1PU)	70D,5A	Green
C4	411A,SM566, 424AA, or 563A	Unit 4 (1PU)	70D,5A	Green
C5-1	Indicator for C5-2	-	70G,0.5A	Red
C5-2	CCI,ETSIs	ECCN 1	74J,7.5A	-
C6-1	-	-	-	-
C6-2	-	-	-	-
C7	411AA,SM566, 424AA, or 563A	Unit 5	70D,5A	Green
C8	TG58	1SPU (SYNC 1)	70D,5A	Green
C9	411AA,SM566, 424AA, or 563A	Unit 6 (1PU)	70D,5A	Green
C12	411AA,SM566, 424AA, or 563A	Unit 7 (1PU)	70D,5A	Green
C13	411AA,SM566, 424AA, or 563A	Unit 8 (1PU)	70D,5A	Green
C14	411AA,SM566, 424AA, or 563A	Unit 9	70D,5A	Green
C15	411AA,SM566, 424AA, or 563A	Unit 11 (1PU)	70D,5A	Green
C16	411AA,SM566, 424AA, or 563A	Unit 12	70D,5A	Green
C17	411AA,SM566, 424AA, or 563A	Unit 13 (1PU)	70D,5A	Green
C18	411AA,SM566, 424AA, or 563A	Unit 16	70D,5A	Green
C19	-	-	-	-

Note: The type depends on the type of unit (IFTU, DSPU, DS3U, or HDS3U).

Table 3-12. ***Continued***

Feed D Fuse	Power Unit/CP			
	Type (Note)	**Assignment**	**Size**	**Bead Color**
D1	-	-	-	-
D2	-	-	-	-
D3	-	-	-	-
D4	-	-	-	-
D5-1	-	-	-	-
D5-2	-	-	-	-
D6-1	-	-	-	-
D6-2	-	-	-	-
D7	411AA,424AA, or	+5 MC Power	70D,5A	Green
D9	SM565 (MCP)	MC Power	70B,2A	Orange
D10	-	MTC	70G,0.5A	Red
D12	411AA,SM566, 424AA, or 563A	Unit 8 (0PU)	70D,5A	Green
D13	411AA,SM566, 424AA, or 563A	Unit 9 (1PU)	70D,5A	Green
D14	411AA,SM566, 424AA, or 563A	Unit 10 (1PU)	70D,5A	Green
D15	411AA,SM566, 424AA, or 563A	Unit 12 (1PU)	70D,5A	Green
D16	411AA,SM566, 424AA, or 563A	Unit 13	70D,5A	Green
D17	411AA,SM566, 424AA, or 563A	Unit 14 (1PU)	70D,5A	Green
D18	411AA,SM566, 424AA, or 563A	Unit 15 (1PU)	70D,5A	Green
D19	411AA,SM566, 424AA, or 563A	Unit 16 (1PU)	70d,5A	Green

Note: The type depends on the type of unit (IFTU, DSPU, DS3U, or HDS3U).

Table 3-13. Secondary Power Distribution (Sync and Main Controller) (CEF)

Power Unit/ Location	Associated Circuit Pack/Location	Power Unit/ Location	Associated Circuit Pack/Location
1SPU /14-160	0TLI2 /10-112 0TLI3 /10-120 0TLI4 /10-128 0DPLL /12-084 1TLI4 /10-136 1TLI3 /10-144 1TLI2 /10-152 1TLI1 /10-160		EBX /04-128 CPU2 /04-120 EMTC /04-112 CI /04-136 EBX /04-128 CPU2 /04-120 EMTC /04-112 CI /04-136

Table 3-14. IFTU Fuse Assignment

Fuse Boards	Designation (Note)	Associated Plug-Ins
ED-9C011-30 ED-9C011-30	+5A1 through +5A4 (1-4 through 17-20) +5A5	 4 plug-ins (8 NPCs) per fuse (see +5A5 below)
ED-9C012-30 ED-9C011-30	+5A1 through +5A4 (1 through 20) +5A5, number 1 +5A5, number 2 +5A5, number 3 +5A5, number 4 +5A5, number 5	 1 plug-in (2 NPCs) per fuse CPU UBX FTMI 0-Side FC 1-Side FC

Note: Designations +5A1 through +5A4 correspond to the modules (shelves) of the unit. The fuse numbers correspond to the plug-ins on the shelf (either 1 for 1 or 1 fuse per 4 plug-ins, depending on the fuse board).

Table 3-15. DSPU Fuses (Flexible Bay)

Fuse	Side	DSP Position (Note)
(Top) No. 1 No. 2 No. 3 No. 4	0 DSPU	(Left Panel) First and second Third and fourth Fifth and sixth Seventh and eighth
(Bottom) No. 5 No. 6 No. 7 No. 8	1 DSPU	(Right Panel) First and second Third and fourth Fifth and sixth Seventh and eighth

Note: Each fuse supplies two DSP circuit packs.

Table 3-16. DSPU5 and DSPU6 Fuses (Original Interface Bay)

DSPU5		DSPU6	
Fuse or PU/ Location	**Associated Circuit Pack/Location**	**Fuse or PU/ Location**	**Associated Circuit Pack/Location**
(SIDE 0)		(SIDE 0)	
0PU/112-160		0PU/312-160	
JBH/112-148	NPC641 /112-006 NPC661 /112-012	JBH/312-148	NPC801 /312-006 NPC821 /312-012
JBG	NPC681 /112-018 NPC701 /112-024	JBG	NPC841 /312-018 NPC861 /312-024
JBF	NPC721 /112-030 NPC741 /112-036	JBF	NPC881 /312-030 NPC901 /312-036
JBE	NPC761 /112-042 NPC781 /112-048	JBE	NPC921 /312-042 NPC941 /312-048
(SIDE 1)		(SIDE 1)	
1PU/112-142		1PU/312-142	
JBD/112-148	NPC641 /112-074 NPC661 /112-080	JBD/312-148	NPC801 /312-074 NPC821 /312-080
JBC	NPC681 /112-086 NPC701 /112-092	JBC	NPC841 /312-086 NPC861 /312-092
JBB	NPC721 /112-098 NPC741 /112-104	JBB	NPC881 /312-098 NPC901 /312-104
JBA	NPC761 /112-110 NPC781 /112-116	JBA	NPC921-310 NPC941 /312-116
DCP5 /112-130	CPU5 /112-056 DSPI5 /112-062	DCP6 /312-130	CPU6 /312-056 DSPI6 /312-062

Table 3-17. 77-Type, FTU Fuses - Original Interface Bay

Fuse	Associated NPCs			
(Note)	FTU 1	FTU 2	FTU 3	FTU 4
CA	1-8	161-168	321-328	481-488
CB	9-16	169-176	329-336	489-496
CC	17-24	177-184	337-344	497-504
CD	25-32	185-192	345-352	505-512
CE	33-40	193-200	353-360	513-520
CF	41-48	201-208	361-368	521-528
CG	49-56	209-216	369-376	529-536
CH	57-64	217-224	377-384	537-544
CI	65-72	225-232	385-392	345-552
CJ	73-80	233-240	393-400	553-560
CK	81-88	241-248	401-408	561-568
CL	89-96	249-256	409-416	569-576
CM	97-104	257-264	417-424	577-584
CN	105-112	265-272	425-432	585-592
CO	113-120	273-280	433-440	593-600
CP	121-128	281-288	441-448	601-608
CQ	129-136	289-296	449-456	609-616
CR	137-144	297-304	457-464	617-624
CS	145-152	305-312	465-472	625-632
CT	153-160	313-320	473-480	633-640
CU	(0)FC 1-4	(0)FC 1-4	(0)FC 1-4	(0)FC 1-4
CV	(1)FC 1-4	(1)FC 1-4	(1)FC 1-4	(1)FC 1-4
JW	FTMI 1-4	FTMI 1-4	FTMI 1-4	FTMI 1-4
JX	CPU,UBX	CPU,UBX	CPU,UBX	CPU,UBX

Note: The unit number that the fuses supply is identified on the fuse panel.

Table 3-18. Power Unit Requirements

Power Unit Code	Output Requirement (DC Volts)	Meter Connections: Positive Lead	Meter Connections: Negative Lead
SM565	+11.75 to +12.25 –11.75 to –12.25	+V2 –V2	RTN RTN
411AA	+5.1 to +5.3	+	–
TG58	+4.75 to +5.25 –4.95 to –5.45	+ +	– –
424AA	+5.0 to +5.5	+	–
485AB	+5.1 to +5.4	+	–
SM566	+4.75 to +5.25	+	–
563A	+4.9 to +5.3	5.5V	GRD

Install Multibay Power Units and Fuses

1. Locate the power unit slots for the section of the frame being equipped using Figure 3-12 and the shelf designation strips. A DSPU is shown in unit 5; but with flexible side bays, DSPUs can be mounted in other unit positions.

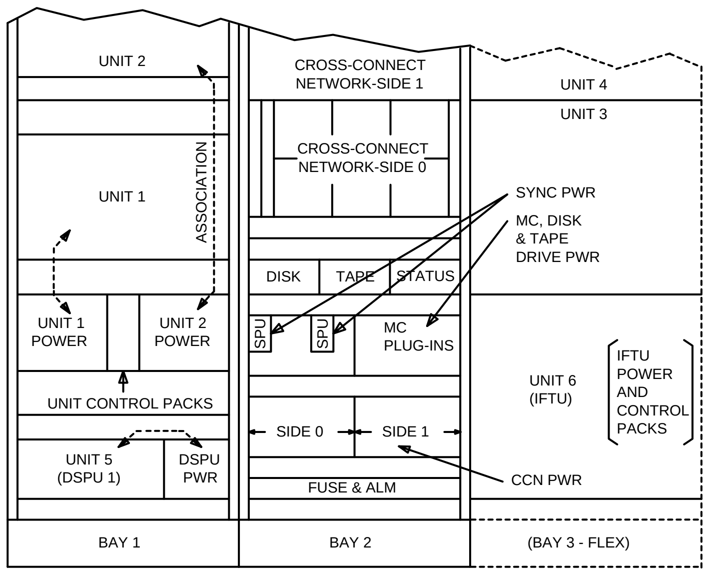


Figure 3-12. Multibay Frame Layout

2. Determine whether the required codes and quantities of power units are installed per Table 3-19.

NOTE:
Only three power units are needed in FTUs equipped with the codes of Series 5 (or later) TG80 DDCs (for DS1 lines). Because of the lower power requirements, three power units will supply the load and provide reserve power in case one fails.

3. Determine whether the required 48-volt input fuses are installed in the fuse and alarm panel (bottom frame) per Table 3-20.

4. Determine whether the LED output fuses are installed in ED-2C863-30 DFBs (dual fuse boards) per designation strips and Tables 3-21 through 3-25.

   NOTE:
   Version 1 FTUs use two GRP 1 (5A) DFBs and one GRP 2 (7.5A & 5A) DFB; the GRP 2 board is for fuses CQ-JX. The DSPU and multibay CCN both use GRP 3 (7.5A) DFBs.

   - If the proper power units and fuses already have been installed, the procedure to install multibay power units and fuses has been completed.
   - If proper units and fuses have not been installed, continue with Step **5**.

5. Install the required 48-volt fuses per Table 3-20.
6. Install the required LED fuses per Tables 3-21 through 3-25.
7. Install the required power units. As you move the latch/switch on each to the closed position, notice the LED on the power unit.

   Response: The red LED on the power unit is lighted while the latch/switch is open and goes off and remains off when the latch is closed.

8. If any of the required responses did not occur, replace the power unit and confirm the operation of the faceplate LED.
9. Get digital multimeter (such as KS-20599 DMM) and set it to read DC "" range.
10. Measure each power unit output between the + and – V1 jacks (or between each V jack and RTN) per Table 3-26. The SPU (sync power unit) does not have test jacks to perform this test.

    - If the requirement of Table 3-26 is met, disconnect the meter.
    - If the requirement of Table 3-26 is not met, replace the power unit.

    NOTE:
    The FTU power units feed a common bus, and low voltage can only be detected if one power unit is disconnected and the test is repeated for all combinations of the power units.

Table 3-19. Power Unit Summary (Non-CEF)

Circuit Block	CP Code	Designation/ Location	Equipage
MC	SM565 411AA 484GA	MCP /225-136 PU /225-148 PU /225-160	One One One
SYNC	TG58 TG58	0SPU /227-010 1SPU /227-064	One One
FTU1	411AA 411AA 411AA 411AA	PU /128-012 PU /128-024 PU /128-048 PU /128-064*	All PUs for unit supply a common bus; an extra PU is always provided for backup (for example, PUs 1 & 2 required for FTM 1).
FTU2	411AA 411AA 411AA 411AA	PU /128-108* PU /128-124 PU /128-148 PU /128-160	Same as unit 1.
FTU3	411AA 411AA 411AA 411AA	PU /328-012 PU /328-024 PU /328-048 PU /328-064*	Same as unit 1.
FTU4	411AA 411AA 411AA 411AA	PU /328-108* PU /328-124 PU /328-148 PU /328-160	Same as unit 1.
CCN0	485AB 485AB 485AB 485AB 485AB	PU1 /215-016 PU2 /215-032 PU3 /215-048 PU4 /215-068	PU1 for CCNI, CCBs 1, 2, TSIs 11, 12, 13, 14, 15, 16, 21, 22 PU2 for CCB 3, TSIs 23, 24, 25, 26, 31, 32, 33, 34, 35, 36 PU3 for CCB 4, TSIs 41, 42, 43, 44, 45, 46, 51, 52, 53, 54 PU4 for CCBs 5, 6, TSIs 55, 56, 61, 62, 63, 64, 65, 66
CCN1	485AB 485AB 485AB 485AB 485AB	PU5 /215-108 PU6 /215-128 PU7 /215-144 PU8 /215-160	PU5 Same assignment as Side 0 PU6 PU7 PU8
DSPU5	SM566 411AA 411AA	DCP5 /109-130 1PU /109-142 0PU /109-160	One One One
DSPU6	SM566 411AA 411AA	DCP6 /312-130 0PU /312-142 1PU /312-160	One One One

*These PUs are not required with Series 5 (or later) TG80 and new DDC codes; three PUs per unit will supply the load plus reserve in case one fails.

Table 3-20. 48-Volt Power (Non-CEF)

	Power Unit/CP			
Fuse	Type	Designation/ Location	Size	Bead Color
A1	411AA	128-012	70D,5A	Green
A2	411AA	128-108	70D,5A	Green
A3	411AA	328-012	70D,5A	Green
A4	411AA	328-108	70D,5A	Green
A5-1	485AB	PU1 (CCN0)	70D,5A	Green
A5-2	-	-	-	-
A6-1	485AB	PU2 (CCN 0)	70D,5A	Green
A6-2	-	-	-	-
A7	411AA	1PU (Unit 5)	70D,5A	Green
A8	TG58	0SPU (SYNC 0)	70D,5A	Green
A8	-	0TB	70D,5A	Green
A9	411AA	1 PU (UNIT 6)	70D,5A	Green
B1	411AA	128-024	70D,5A	Green
B2	411AA	128-124	70D,5A	Green
B3	411AA	328-024	70D,5A	Green
B4	411AA	328-124	70D,5A	Green
B5-1, B5-2	485AB	PU3 (CCN 0)	70D,5A	Green
B6-1, B6-2	485AB	PU4 (CCN 0)	70D,5A	Green
B7	411AA	0PU (UNIT 5)	70D,5A	Green
B8	TG58	1SPU (SYNC 1)	70D,5A	Green
B8	-	1TB	70D,5A	Green
B9	411AA	0PU (UNIT 6)	70D,5A	Green

Table 3-20. ***Continued***

	Power Unit/CP			
Fuse	**Type**	**Designation/ Location**	**Size**	**Bead Color**
C1	411AA	128-048 (Unit 1)	70D,5A	Green
C2	411AA	128-148 (Unit 2)	70D,5A	Green
C3	411AA*, 424AA, SM566, or 563A	328-048* (Unit 3)	70D,5A	Green
C4	411AA*, 424AA, SM566, or 563A	328-148* (Unit 4)	70D,5A	Green
C5-1	-	Indicator for C5-2	70G,.5A	Red
C5-2,	485AB	PU5 (1CCN)	70D,5A	Green
C6-1	-	Indicator for C6-2	70G,.5A	Red
C6-2,	485AB	PU6 (1CCN)	70D,5A	Green
C7	411AA	(Unit 5)	70D,5A	Green
C8	-	TLIs	70D,5A	Green
C9	SM566*, 424AA, 411AA, or 563A	DCP6* (Unit 6)	70D,5A	Green
D1	411AA	128-064 (Unit 1)	70D,5A	Green
D2	411AA	128-160 (Unit 2)	70D,5A	Green
D3	411AA*, 424AA, SM566, or 563A	328-064* (Unit 3)	70D,5A	Green
D4	411AA*, 424AA, SM566, or 563A	326-160* (Unit 4)	70D,5A	Green
D5-1	-	Indicator for D5-2	70G,.5A	Red
D5-2	485AB	PU7 (1CCN)	70D,5A	Green
D6-1	-	Indicator for D5-2	70G,.5A	Red
D6-2,	485AB	PU8 (1CCN)	70D,5A	Green
D7	411AA	226-148	70D,5A	Green
D8	-	226-160	70D,5A	Green
D9	411AA	226-136 (MCP)	70,2A	Orange
D10	-	MTC	70G,.5A	Red

Note: These are power units and locations for non-flex bay 3; An FTU in units 3 and 4, and a DSPU in unit 6.

Table 3-21. Sync and Main Controller (Non-CEF)

Synchronizer		Main Controller	
Power Unit/ Location	**Associated Circuit Pack/Location**	**Power Unit/ Location**	**Associated Circuit Pack/Location**
0SPU /227-010	0TLI1 /223-008	MCP /225-136	
	0TLI2 /223-016		BX /225-100
	0TLI3 /223-024		CPU2 /225-108
	0TLI4 /223-032		MTC /225-120
	0DPLL /225-076		CI /225-128
A8 FUSE	0TB /227-032	PU /225-148	
1SPU /227-064	1TLI1 /223-064		BX /225-100
	1TLI2 /223-056		CPU2 /225-108
	1TLI3 /223-048		MTC /225-120
	1TLI4 /223-040		CI /225-128

Table 3-22. IFTU Fuse Assignment

Fuse Boards	Designation (Note)	Associated Plug-Ins
ED-9C011-30	+5A1 through +5A4	
ED-9C011-30	(1-4 through 17-20)	4 plug-ins (8 NPCs) per fuse
	+5A5	(see +5A5 below)
ED-9C012-30	+5A1 through +5A4	
ED-9C011-30	(1 through 20)	1 plug-in (2 NPCs) per fuse
	+5A5, number 1	CPU
	+5A5, number 2	UBX
	+5A5, number 3	FTMI
	+5A5, number 4	0-Side FC
	+5A5, number 5	1-Side FC

Note: Designations +5A1 through +5A4 correspond to the modules (shelves) of the unit. The fuse numbers correspond to the plug-ins on the shelf (either 1 for 1 or 1 fuse per 4 plug-ins, depending on the fuse board).

Table 3-23. CCN Fuses (Original Interface Bay)

CCN0 Fuse/ Location	CCN0 Associated Circuit Pack/Location	CCN1 Fuse/ Location	CCN1 Associated Circuit Pack/Location
JA1 /215-072	0CCNI /246-150	JA1 /215-088	1CCNI /269-150
	0TSI11 /246-014		1TSI11 /269-014
	0TSI13 /246-020		1TSI13 /269-020
JA2	0CCB1 /246-032	JA2	1CCB1 /269-032
	0TSI15 /246-026		1TSI15 /269-026
	0TSI21 /246-038		1TSI21 /269-038
JA3	0TSI12 /254-014	JA3	1TSI12 /277-014
	0TSI14 /254-020		1TSI14 /277-020
	0TSI16 /254-026		1TSI16 /277-026
JA4	0CCB2 /254-032	JA4	1CCB2 /277-032
	0TSI22 /254-038		1TSI22 /277-038
JA5	0TSI23 /246-044	JA5	1TSI23 /269-044
	0TSI25 /246-050		1TSI25 /269-050
	0TSI31 /246-056		1TSI31 /269-056
JA6	0CCB3 /246-078	JA6	1CCB3 /269-078
	0TSI33 /246-066		1TSI33 /269-066
	0TSI35 /246-072		1TSI35 /269-072
JA7	0TSI24 /254-044	JA7	1TSI24 /277-044
	0TSI26 /254-050		1TSI26 /277-050
	0TSI32 /254-056		1TSI32 /277-056
JA8	0TSI34 /254-066	JA8	1TSI34 /277-066
	0TSI36 /254-072		1TSI36 /277-072
JB1 /215-076	0TSI41 /246-084	JB1 /215-092	1TSI41 /269-084
	0TSI43 /246-090		1TSI43 /269-090
	0TSI45 /246-096		1TSI45 /269-096
JB2	0TSI51 /246-102	JB2	1TSI51 /269-102
	0TSI53 /246-108		1TSI53 /269-108
JB3	0CCB4 /254-078	JB3	1CCB4 /277-078
	0TSI42 /254-084		1TSI42 /277-084
	0TSI44 /254-090		1TSI44 /277-090
JB4	0TSI46 /254-096	JB4	1TSI46 /277-096
	0TSI52 /254-102		1TSI52 /277-102
	0TSI54 /254-108		1TSI54 /277-108
JB5	0CCB5 /246-124	JB5	1CCB5 /269-124
	0TSI55 /246-118		1TSI55 /269-118
	0TSI61 /246-130		1TSI61 /269-130
JB6	0TSI63 /246-136	JB6	1TSI63 /269-136
	0TSI65 /246-142		1TSI65 /269-142
JB7	0CCB6 /254-124	JB7	1CCB6 /277-124
	0TSI56 /254-118		1TSI56 /277-118
	0TSI62 /254-130		1TSI62 /277-130
JB8	0TSI64 /254-136	JB8	1TSI64 /277-136
	0TSI66 /254-142		1TSI66 /277-142

Table 3-24. 77-Type, FTU Fuses (Original Interface Bay)

Fuse	Associated NPCs			
(Note)	FTU 1	FTU 2	FTU 3	FTU 4
CA	1-8	161-168	321-328	481-488
CB	9-16	169-176	329-336	489-496
CC	17-24	177-184	337-344	497-504
CD	25-32	185-192	345-352	505-512
CE	33-40	193-200	353-360	513-520
CF	41-48	201-208	361-368	521-528
CG	49-56	209-216	369-376	529-536
CH	57-64	217-224	377-384	537-544
CI	65-72	225-232	385-392	345-552
CJ	73-80	233-240	393-400	553-560
CK	81-88	241-248	401-408	561-568
CL	89-96	249-256	409-416	569-576
CM	97-104	257-264	417-424	577-584
CN	105-112	265-272	425-432	585-592
CO	113-120	273-280	433-440	593-600
CP	121-128	281-288	441-448	601-608
CQ	129-136	289-296	449-456	609-616
CR	137-144	297-304	457-464	617-624
CS	145-152	305-312	465-472	625-632
CT	153-160	313-320	473-480	633-640
CU	(0)FC 1-4	(0)FC 1-4	(0)FC 1-4	(0)FC 1-4
CV	(1)FC 1-4	(1)FC 1-4	(1)FC 1-4	(1)FC 1-4
JW	FTMI 1-4	FTMI 1-4	FTMI 1-4	FTMI 1-4
JX	CPU, UBX	CPU, UBX	CPU, UBX	CPU, UBX

Note: The unit number that the fuses supply is identified on the fuse panel.

Table 3-25. DSPU5 and DSPU6 Fuses

DSPU5		DSPU6	
Fuse or PU/ Location	**Associated Circuit Pack/Location**	**Fuse or PU/ Location**	**Associated Circuit Pack/Location**
(SIDE 0)		(SIDE 0)	
0PU/112-160		0PU/312-160	
JBH/112-148	NPC641 /112-006 NPC661 /112-012	JBH/312-148	NPC801 /312-006 NPC821 /312-012
JBG	NPC681 /112-018 NPC701 /112-024	JBG	NPC841 /312-018 NPC861 /312-024
JBF	NPC721 /112-030 NPC741 /112-036	JBF	NPC881 /312-030 NPC901 /312-036
JBE	NPC761 /112-042 NPC781 /112-048	JBE	NPC921 /312-042 NPC941 /312-048
(SIDE 1)		(SIDE 1)	
1PU/112-142		1PU/312-142	
JBD/112-148	NPC641 /112-074 NPC661 /112-080	JBD/312-148	NPC801 /312-074 NPC821 /312-080
JBC	NPC681 /112-086 NPC701 /112-092	JBC	NPC841 /312-086 NPC861 /312-092
JBB	NPC721 /112-098 NPC741 /112-104	JBB	NPC881 /312-098 NPC901 /312-104
JBA	NPC761 /112-110 NPC781 /112-116	JBA	NPC921-310 NPC941 /312-116
DCP5 /112-130	CPU5 /112-056 DSPI5 /112-062	DCP6 /312-130	CPU6 /312-056 DSPI6 /312-062

Table 3-26. Power Unit Requirements

Power Unit Code	Output Requirement (DC Volts)	Meter Connections	
		Positive Lead	**Negative Lead**
SM565	+11.75 to +12.25 –11.75 to –12.25	+V2 –V2	RTN RTN
411AA	+5.1 to +5.3	+	–
TG58	+4.75 to +5.25 –4.95 to –5.45	+ +	– –
424AA	+5.0 to +5.5	+	–
485AB	+5.1 to +5.4	+	–
SM566	+4.75 to +5.25	+	–
563A	+4.9 to +5.3	5.5V	GRD

Install Single-Bay Power Units and Fuses

1. Locate the power unit slots for the section of the frame being equipped using Figure 3-13 and the shelf designation strips.
2. Determine whether the required codes and quantities of power units.
3. Determine whether the required 48 V input fuses are installed in the fuse and alarm panel (top-frame) per Table 3-27.

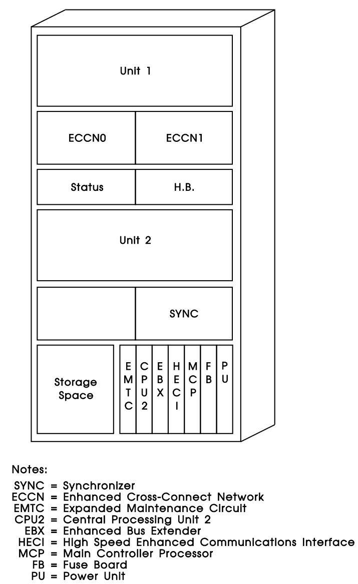


Figure 3-13. Single-Bay Frame

4. Determine whether the LED output fuses are installed in the ED-2C863-30 DFBs (dual fuse boards) per designation strips and Tables 3-28 (only FTU 1 column of Table 3-28 applies to a singe-bay frame), Table 3-29 (DSPU 5 side only), and Table 3-30. The FTU uses two GRP 1 (5A) DFBs and one GRP 2 (7.5A & 5A) DFB; the GRP 2 board is for fuses CQ-JX. The DSPU uses a GRP 3 (7.5A) DFB, and the CCN2 uses a GRP 4 (5A) DFB.

   - If the proper power units and fuses have already been installed, the procedure to install single-bay power units and fuses has been completed.
   - If power units and fuses have not been installed, continue with Step **5**.

5. Install the required 48 V fuses per Table 3-27.
6. Install the required LED fuses per Tables 3-28, 3-29, and 3-30.
7. Install the required power units. The FTU power units should be equipped in left-to-right order even though they all feed a common bus.

   Response: The red LED on the power unit lights and remains lighted with the power unit latch/switch open.

8. Close the power unit latch/switch.

   Response: The red LED on the power unit goes off and remains off.

9. If any of the responses did not occur, replace the power unit, turn the replacement on, and confirm the operation of the power unit LED.
10. Get digital multimeter (such as KS-20599 DMM) and set it to read DC "" range.
11. Measure each power unit output between the + and – V1 jacks (or between each V jack and RTN) per Table 3-31. The SPU (sync power unit) does not have test jacks to perform this test.

    - If the requirement of Table 3-31 is met, disconnect the meter.
    - If the requirement of Table 3-31 is not met, replace the power unit.

NOTE:
The FTU power units feed a common bus, and low "" can only be detected if one power unit is disconnected and the test is repeated for all combinations of the power units.

Table 3-27. Single-Bay 48-Volt Fuses

Fuse	Power Unit Type	Power Unit Designation/Location
A1	411AA	FTU1-First PU
A2	TG58	0SPU (Sync Power)
A3	411AA	0PU (DSPU Side 0 Power)
A4	411AA	CCN2 Side 0 Power Unit
B1	411AA	FTU1-Second PU
B2	TG58	1SPU (Sync Power)
B3	411AA	1PU (DSPU Side 1 Power)
B4	411AA	CCN2 Side 1 Power Unit
C1	411AA	FTU1-Third PU
C2	NONE	48 Volts to TLIs 1-4, Both Sides
C3	SM566	DCP (DSPU Power)
D2	411AA	+5 Controller Power
D4	SM565	MCP (Main Controller Power)
D5	NONE	48 Volts to MTC Pack

Table 3-28. 77-Type, FTU Fuses - Single-Bay Frame

Fuse (Note)	Associated NPCs FTU 1
CA	1-8
CB	9-16
CC	17-24
CD	25-32
CE	33-40
CF	41-48
CG	49-56
CH	57-64
CI	65-72
CJ	73-80
CK	81-88
CL	89-96
CM	97-104
CN	105-112
CO	113-120
CP	121-128
CQ	129-136
CR	137-144
CS	145-152
CT	153-160
CU	(0)FC 1-4
CV	(1)FC 1-4
JW	FTMI 1-4
JX	CPU, UBX

Note: The unit number that the fuses supply is identified on the fuse panel.

Table 3-29. DSPU5 Fuses

DSPU5		DSPU6	
Fuse or PU/ Location	**Associated Circuit Pack/Location**	**Fuse or PU/ Location**	**Associated Circuit Pack/Location**
(SIDE 0)		(SIDE 0)	
0PU/109-160		0PU/312-160	
JBH/109-148	NPC641 /109-006	JBH/312-148	NPC801 /312-006
	NPC661 /109-012		NPC821 /312-012
JBG	NPC681 /109-018	JBG	NPC841 /312-018
	NPC701 /109-024		NPC861 /312-024
JBF	NPC721 /109-030	JBF	NPC881 /312-030
	NPC741 /109-036		NPC901 /312-036
JBE	NPC761 /109-042	JBE	NPC921 /312-042
	NPC781 /109-048		NPC941 /312-048
(SIDE 1)		(SIDE 1)	
1PU/109-142		1PU/312-142	
JBD/109-148	NPC641 /109-074	JBD/312-148	NPC801 /312-074
	NPC661 /109-080		NPC821 /312-080
JBC	NPC681 /109-086	JBC	NPC841 /312-086
	NPC701 /109-092		NPC861 /312-092
JBB	NPC721 /109-098	JBB	NPC881 /312-098
	NPC741 /109-104		NPC901 /312-104
JBA	NPC761 /109-110	JBA	NPC921-310
	NPC781 /109-116		NPC941 /312-116
DCP5 /109-130	CPU5 /109-056	DCP6 /312-130	CPU6 /312-056
	DSPI5 /109-062		DSPI6 /312-062

Table 3-30. Sync and Main Controller (Single-Bay)

Synchronizer		Main Controller	
Power Unit/ Location	**Associated Circuit Pack/Location**	**Power Unit/ Location**	**Associated Circuit Pack/Location**
	0TLI2 /130-016		BX /132-100
	0TLI3 /130-024		CPU2 /132-108
	0TLI4 /130-032		MTC /132-120
	0DPLL /132-076		CI /132-128
	1TLI2 /130-056		BX /132-100
	1TLI3 /130-048		CPU2 /132-108
	1TLI4 /130-040		MTC /132-120
	1DPLL /132-084		CI /132-128

Table 3-31. Power Unit Requirements

Power Unit Code	Output Requirement (DC Volts)	Meter Connections	
		Positive Lead	Negative Lead
SM565	+11.75 to +12.25 –11.75 to –12.25	+V2 –V2	RTN RTN
411AA	+5.1 to +5.3	+	–
TG58	+4.75 to +5.25 –4.95 to –5.45	+ +	– –
424AA	+5.0 to +5.5	+	–
485AB	+5.1 to +5.4	+	–
SM566	+4.75 to +5.25	+	–
563A	+4.9 to +5.3	5.5V	GRD

Install Plugs-Ins, Grow and Restore FTU/IFTU

Install FTM Circuit Packs (FTMIs and FCs)

1. Determine which unit and FTMs (facility terminating modules) need to be equipped to support the added service; see Table 3-32 for NPC location in the unit (table shows extended numbering).
2. Notice the three versions of FTUs shown in Figures 3-14, 3-15, and 3-16.
3. If not already installed, install the **TG81** code FTMI and the **TG79** code of FCs (format converters) for the FTMs to be equipped (Figure 3-14 or 3-15).
4. If the circuit pack dual cards (for example, DDC) for the NPCs to be equipped are provided, install them in the NPC slots.

   NOTE:
   Each circuit pack card contains the circuitry for two NPCs.

   NOTE:
   Various codes of circuit packs for the NPCs are available to provide the required line interface and functions. If you do not know the NPC requirement, wait until the facility is established to install NPC circuit packs.

Table 3-32. NPC Location in Unit (Extended Numbering)

Nonhierarchical NPC Number	Unit Number	FTMI Number
001-040	1	1
041-080	1	2
081-120	1	3
121-160	1	4
161-200	2	1
201-240	2	2
241-280	2	3
281-320	2	4
321-360	3	1
361-400	3	2
401-440	3	3
441-480	3	4
481-520	4	1
521-560	4	2
561-600	4	3
601-640	4	4
641-680	5	1
681-720	5	2
721-760	5	3
761-800	5	4
801-840	6	1
841-880	6	2
881-920	6	3
921-960	6	4
961-1000	7	1
1001-1040	7	2
1041-1080	7	3
1081-1120	7	4
1121-1160	8	1
1161-1200	8	2
1201-1240	8	3
1241-1280	8	4
1281-1320	9	1
1321-1360	9	2

Continued on next page

Table 3-32. ***Continued***

Nonhierarchical NPC Number	Unit Number	FTMI Number
1361-1400	9	3
1401-1440	9	4
1441-1480	10	1
1481-1520	10	2
1521-1560	10	3
1561-1600	10	4
1601-1640	11	1
1641-1680	11	2
1681-1720	11	3
1721-1760	11	4
1761-1800	12	1
1801-1840	12	2
1841-1880	12	3
1881-1920	12	4
1921-1960	13	1
1961-2000	13	2
2001-2040	13	3
2041-2080	13	4
2081-2120	14	1
2121-2160	14	2
2161-2200	14	3
2201-2240	14	4
2241-2280	15	1
2281-2320	15	2
2321-2360	15	3
2361-2400	15	4
2401-2440	16	1
2441-2480	16	2
2481-2520	16	3
2521-2560	16	4

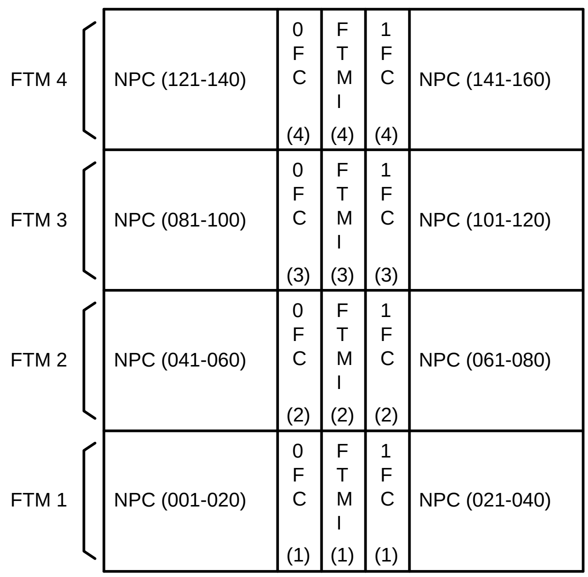


Figure 3-14. Original FTU

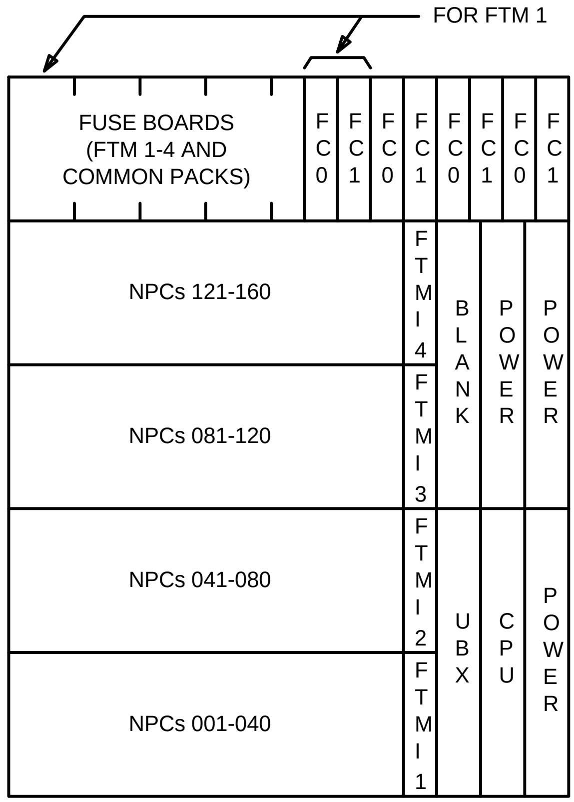


Figure 3-15. Integrated Facility Terminating Unit ED9C004-30 G1 or G2

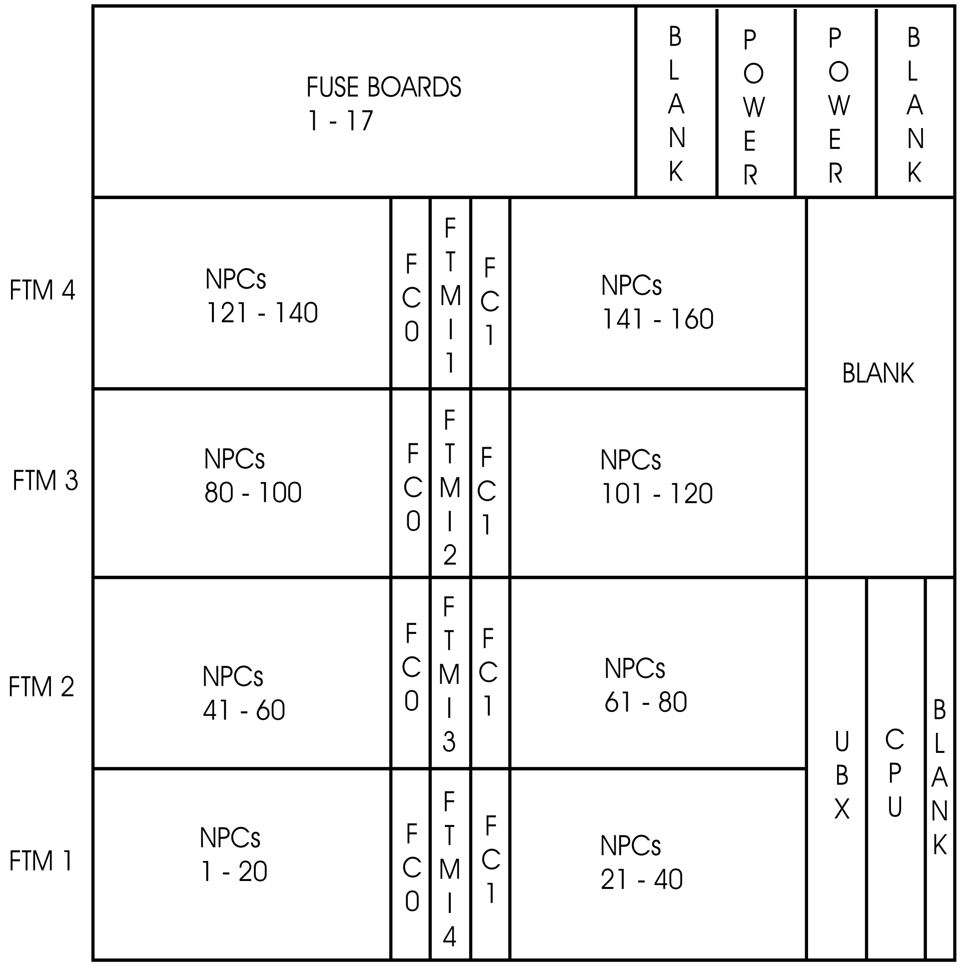


Figure 3-16. Integrated Facility Terminating Unit 2 ED9C004-30 G3

Grow FTU/IFTU

Overview: This procedure is used to grow the unit in the data base and to define the type of application (FTU/IFTU). The associated ETSI in the cross-connect network is grown when this command is executed as indicated in the completion message. The ETSI will be restored in *Restore ECCN and CCN* in this section.

NOTE:
If the peripheral unit is not recorded in the software configuration file, the growth command in this procedure will be denied (INERR BAD ARG).

1. If you need to see the unit assignments that have been entered in the software configuration file, enter **`UTL::QRY,CNFGR!`** (see Note). This configuration was set during the equipment installation and acceptance, but it can still be changed with the CFR FRAME program.

   NOTE:
   Unit designations (1 through 16, left to right) are 1 for FTU Version 1, 2 for DSPU, 3 for DS3U, 4 for FTU Version 2, or dash for not designated.

2. Familiarize yourself with the command
   `GRTH:[FRM xy,SEQ ww]:UNIT [q]q,[TYPE FTxyz]`

   Where: xy = DACS II frame number (00 through ZZ)
   ww = Command sequence number (00 through 49)
   [q]q = Unit number (1 through 16)
   mn = Unit type; FT for DS1 FTU.
   Default is FT100
   xyz = Variables that define type parameters;
   xyz = 100 unless different value is given in
   circuit order information.

3. Enter the command with the required information.
   - If the command is denied, find the reason for denial and perform corrective action to obtain command completion (*Command Denials* has explanations of denial codes).

4. Repeat the procedure for any other units to be grown.

Restore ECCN and CCN

Restore ECCN

1. If the CCI pack was just installed in a previous procedure, enter **`RST:[FRM xy,SEQ ww]:CCI s!`**

   Where: xy = DACS II frame number (00 through ZZ)
   ww = Command sequence (00 through 49)
   s = Network side (0 or 1).

   NOTE:
   The two BTs (bus terminators) for the shelf are also restored with the CCI circuit pack.

2. Use one of the following commands to restore the ETSIs:

   Restore all ETSIs - **`RST:[FRM xy,SEQ ww]:ETSIS,ECCN s,ALL!`**

   Restore ETSIs individually - **`RST::ETSI sqq!`**

   Where: sqq = ETSI number consisting of Side (0 or 1) and peripheral unit number (01 through 16).

   - If any restore command is denied, find the reason for the denial and perform corrective action to obtain command completion (*Command Denials* has explanations of denial codes).

If the DACS II has a CCN, then proceed to the next section, *Restore CCN.* Otherwise, proceed to the section, *Restore UC.*

Restore CCN

Overview: The restore commands in this procedure are given in the order which establishes communications within the network and enables the restoral of the next pack in the list. The CCB and TSI packs that need to be restored after a new unit is grown are listed in the growth completion message.

1. If the network interface pack (CCNI) was just installed in a previous procedure, enter **`RST:[FRM xy,SEQ ww]:CCNI s!`**

   Where:
   xy = DACS frame number (00 through ZZ)
   ww = Command sequence (00 through 49)
   s = Network side (0 or 1).

2. If a DSPU CCB was just installed in a previous procedure, enter **`RST:[FRM xy,SEQ ww]:CCB sf!`**

   Where: sf = CCB number consisting of the Side (0 or 1) and position (1 through 6); for example, CCB 12 is on side 1 and is associated with Unit 2 TSIs.

3. Use one of the following commands to restore the TSIs:

   Restore all TSIs in a unit

   `RST:[FRM xy,SEQ ww]:TSIS,CCN s,UNIT q [,CONN (a[,b[,c[,d[,e[,f]]]]])]!`

   Restore all the TSIs on a side (see Note)

   `RST::TSIS,CCN s,ALL!`

   Restore TSIs individually

   `RST::TSI sft!`

   NOTE:
   Each of the 72 TSIs is listed in the output by the From-, To-Unit ID along with results (DGN A, C, S, D and RST C or D).

   A = ATP (all tests passed)
   C = Completed
   D = Denied
   S = STF (same test failed)

   - If any restore command is denied, find the reason for the denial and perform corrective action to obtain command completion (*Command Denials* has explanations of denial codes).

   Where: q = Unit number (1 through 6).
   s = Side (0 or 1)
   (a[,b[,c[,d[,e[,f]]]]]) = Optional, to specify the limited unit connectivity (thereby the associated TSIs)
   sft = TSI number consisting of Side (0 or 1), FROM-unit (1 through 6), and TO-unit (1 through 6); for example, TSI 013 is on Side 0 and receives data FROM unit 1 and connects TO unit 3.

Restore UC

1. Enter **`RST::UNIT [q]q,UC!`** to restore unit controller.
   Where [q]q = Unit number (1 through 16).

   NOTE:
   For the CEF, the unit UC diagnostic for the restore operation runs wiring tests between the unit and the EMC.

   - If the command is denied, find the reason for the denial and perform corrective action to obtain command completion (*Command Denials* has explanations of denial codes).

Grow FTMI

This procedure presents the command to grow the FTMI in the data base. This growth operation results in the associated FCs being grown also. If TYPE DE NPCs are going to be installed in the module for 1.544-Mb/s lines, the setting for the line signal equalizers in the transmit direction is entered here. If TYPE PB/PC PBCs are going to be installed in the module for 2.048-Mb/s lines, the impedance of the line interfaces, either 75-ohm coaxial or 120-ohm twisted wire, is entered here.

1. Which type (and line rate) NPCs will be installed in the module?
   - If **TYPE-PB/PC (2.048-Mb/s Line),** continue with Step **2**.
   - If **TYPE-DE (1.544-Mb/s Line),** proceed to Step **5.**
2. Do you want to enter the initial impedance setting or change the impedance (or change from equalization)?
   - If **INITIAL SETTING**, continue with Step **3.**
   - If **CHANGE SETTING**, proceed to Step **8.**
3. Enter **`GRTH:[FRM xy,SEQ ww]:UNIT [q]q,FTMI d,IMP zzz!`**

   Where:
   xy = DACS II frame number (00 through ZZ)
   ww = Command sequence number (00 through 49)
   [q]q = Unit number (1 through 16)
   d = FTM interface number (1 through 4)
   zzz = 075 for 75-ohm coaxial impedance or 120 for 120-ohm twisted pair impedance.

   - If the command is denied, find the reason for denial and perform corrective action to obtain command completion (*Command Denials* has explanations for denial codes).

4. Repeat the procedure for other FTMs to be grown. The procedure to grow the FTMI has been completed.
5. Obtain (or measure) the line cable length from the DACS II to the line-jack bay in order to select equalizer values at DACS II; there are 5 equalizer settings per Table 3-33.
6. Enter **`GRTH:[FRM xy,SEQ ww]:UNIT [q]q,FTMI d,EQL(l,r)!`**

   Where:

   [q]q = Unit number (1 through 16)
   d = FTM interface number (1 through 4)
   l = Equalizer setting (1 through 5) for left half of shelf (20 NPCs)
   r = Equalizer setting (1 through 5) for right half of shelf (20 NPCs).

   NOTE:
   Something must be entered for both halves even if the same value is used on both sides.

   NOTE:
   FCs will also be grown.

   - If the command is denied, find the reason for denial and perform corrective action to obtain command completion (*Command Denials* has explanations for denial codes).

Table 3-33. DS1 (1.544 Mb/s) Equalizer Settings

Setting	Cable Length (22 Gauge)	Cable Length (26 Gauge)
1	0 through 133 feet	0 through 90 feet
2	133 through 267 feet	90 through 180 feet
3	267 through 400 feet	180 through 270 feet
4	400 through 533 feet	270 through 360 feet
5	533 through 655 feet	360 through 450 feet

7. Repeat the procedure for other FTMs to be grown. The procedure to grow the FTMI has been completed.

8. Enter commands to remove (see Note) and degrow any equipped NPCs in the module. The commands are:
   RMV::NPC <npc No.>[-<range>]!
   DGRTH::NPC <npc No.>[-<range>]!

   Where:
   <npc No.> = NPC number, either extended (for example, 001) or hierarchical (for example, 01101).
   <range> = Optional, to name the last NPC of range.

   NOTE:
   It is unlikely that the NPCs are still in-service because different codes of NPCs and different facilities will be used.

   CAUTION:
   If the NPCs must still be removed from service, arrangements must be made with customers because the service on the channels of the NPCs will be interrupted.

9. Enter **RMV:[FRM xy,SEQ ww]:UNIT [q]q,FTMI b!**

   Where:
   xy = DACS II frame number (00 through ZZ)
   ww = Command sequence number (00 through 49)
   [q]q = Unit number (1 through 16)
   b = FTM interface number (1 through 4).

10. Enter **DGRTH::UNIT [q]q,FTMI d!** to degrow the current FTMI and impedance from the data base.

11. Return to Step **3** to enter the new impedance value. The FTMI must also be restored to service after the impedance is changed and before NPCs can be added to service.

Restore FTMI and FCs

Overview: The following restore commands are given in the order which establishes communications with the unit and enables the restoral of the next pack in the list. After a higher level pack is restored, all the next lower packs can be restored which in turn allows restoral of any of the lower level packs.

1. Enter **`RST:[FRM xy,SEQ ww]:UNIT [q]q,FTMI b!`**

   Where: b = FTM interface number (1 through 4).

2. Enter **`RST:[FRM xy,SEQ ww]:UNIT [q]q,FC sf!`** to restore the FCs (format converters) associated with the FTMI.

   Where: sf = FC number consisting of side (0 or 1) and position in FTU (1 through 4).

   - If the command is denied, find the reason for denial and perform corrective action to obtain command completion (*Command Denials* has explanations for denial codes).

Install Circuit Packs, Grow and Restore DS3U or HDS3U

Install Common Equipment and Protection MMFG

1. Familiarize yourself with the designated positions on the DS3U shelf. See Figure 3-17.

NOTE:
Each MMFG (MXR function group) position shown in the DS3U or HDS3U consists of MXR or HMXR (multiplexer) positions. The MMFG for protection switching is located

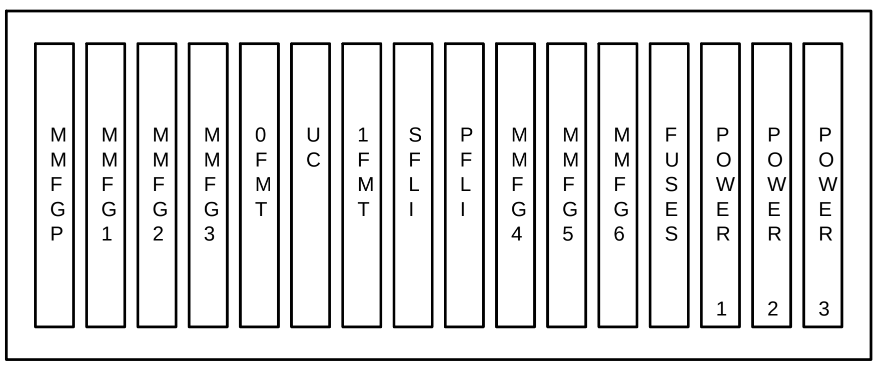


Figure 3-17. Location of MMFGs on DS3U or HDS3U Shelf

2. If not already installed, install the 563A power units in designated slots. Verify that all the green power LEDs are lighted and that no red failure LED is lighted.

   NOTE:
   Two of the three power units will supply the load, but the third one is required for backup reserve power.

3. Verify that all the 77H LED fuses are installed in the fuse board. See Table 3-34 for the fuse assignments.
4. Disconnect any one of the power units and verify that the red failure indicator on the other two power units does not light.
5. Return the power unit to operation.
6. Repeat the above test (disconnecting a different 563A unit, observing the LEDs on others, and repowering) to test all combinations in the power group.

Table 3-34. DS3U Fuse Assignment

Fuse Designation	Associated CPs
L	P MXR (HMXR)
K	1 MXR (HMXR)
J	2 MXR (HMXR)
I	3 MXR (HMXR)
H	0 FMT (HFMT)
G	UC
F	1 FMT (HFMT)
E	S FLI
D	P FLI
C	4 MXR (HMXR)
B	5 MXR (HMXR)
A	6 MXR (HMXR)

Grow DS3U or HDS3U Common Equipment and Protection MMFG

Overview: This command is used to grow the unit in the data base and to define the type of application (FTU, DSPU, DS3U, HDS3U). The associated ETSI, or the associated CCBs and TSIs, in the cross-connect network are grown when this command is executed as indicated in the completion message. The FLI S and P, FMT 0 and 1, and protection MXR are also grown when this command is executed.

> **NOTE:**
> If the peripheral unit is not recorded in the software configuration file, the growth command in this procedure will be denied.

1. If you need to see the unit assignments that have been entered in the software configuration file, enter **`UTL::QRY,CNFGR!`** (see Note). This configuration was set during the equipment installation and acceptance, but it can still be changed with the CFR FRAME program.

   > **NOTE:**
   > Unit designations (1 through 16 left to right) are 1 for FTU Version 1, 2 for DSPU, 3 for DS3U, 4 for FTU Version 2, or dash for not designated.

2. Familiarize yourself with the command
   `GRTH:[FRM xy,SEQ ww]:UNIT [q]q,TYPE mnxyz!`

   Where:
   xy = DACS II frame number (00 through ZZ).
   ww = Command sequence number (00 through 49).
   [q]q = Unit number (1 through 16).
   mn = Unit type; DT for DS3U.
   HT for HDS3U.
   Default is FT.
   xyz = Variables that define type parameters; xyz = 100 unless different value is given in circuit order information.

   > **NOTE:**
   > When growing an HDS3U, the protection MXR slot must be equipped with an HMXR circuit pack (type HX100).

3. Enter the command with the required information.
   - If the command is denied, find the reason for denial and perform corrective action to obtain command completion (*Command Denials* has explanations for denial codes).

4. Repeat procedure for any other units to be grown.

Activate/Deactivate DS3 Unprotected Service Alarm

This procedure is used to either activate or deactivate a minor alarm that will be generated when DS3 service is left manually unprotected. This alarm is applicable only to the FLI, MMFG, and UC circuit packs. This alarm is activated by default.

To activate this alarm, enter the following command:

CHG::DS3UNPROTALM ON

To deactivate this alarm, enter the following command:

CHG::DS3UNPROTALM OFF

Restore ECCN/CCN

Restore ECCN

1. If the CCI pack was just installed in a previous procedure, enter
RST:[FRM xy,SEQ ww]:CCI s!

   Where: xy = DACS II frame number (00 through ZZ)
   ww = Command sequence (00 through 49)
   s = Network side (0 or 1).

   NOTE:
   The two BTs (bus terminators) for the shelf are also restored with the CCI circuit pack.

2. Use one of the following commands to restore the ETSIs:

   Restore all ETSIs

   RST:[FRM xy,SEQ ww]:ETSIS,ECCN s,ALL!

   Restore ETSIs individually

   RST::ETSI sqq!

   Where: sqq = ETSI number consisting of Side (0 or 1) and peripheral unit number (01 through 16).

   - If the command is denied, find the reason for denial and perform corrective action to obtain command completion (*Command Denials* has explanations for denial codes).

If the DACS II has a CCN, then proceed to the next section, *Restore CCN.* Otherwise, proceed to the section, *Restore UC.*

Restore CCN

Overview: The restore commands in this procedure are given in the order which establishes communications within the network and enables the restoral of the next pack in the list. The CCB and TSI packs that need to be restored after a new unit is grown are listed in the growth completion message.

1. If the network interface pack (CCNI) was just installed in a previous procedure, enter **`RST:[FRM xy,SEQ ww]:CCNI s!`**

   Where:

   xy = DACS frame number (00 through ZZ)

   ww = Command sequence (00 through 49)

   s = Network side (0 or 1).

2. If a DSPU CCB was just installed in a previous procedure, enter **`RST:[FRM xy,SEQ ww]:CCB sf!`**

   Where: sf = CCB number consisting of the Side (0 or 1) and position (1 through 6); for example, CCB 12 is on side 1 and is associated with Unit 2 TSIs.

3. Use one of the following commands to restore the TSIs:

   Restore all TSIs in a unit

   `RST:[FRM xy,SEQ ww]:TSIS,CCN s,UNIT q[,CONN (a[,b[,c[,d[,e[,f]]]]]])]!`

   Restore all the TSIs on a side (see Note)

   `RST::TSIS,CCN s,ALL!`

   Restore TSIs individually

   `RST::TSI sft!`

NOTE:
Each of the 72 TSIs are listed in the output by the From-, To-Unit ID along with results (DGN A, C, S, D and RST C or D).

- If any restore command is denied, find the reason for the denial and perform corrective action to obtain command completion (*Command Denials* has explanations of denial codes).

Where:

q	=	Unit number (1 through 6).
s	=	Side (0 or 1)
(a[,b[,c[,d[,e[,f]]]]])	=	Optional, to specify the limited unit connectivity (thereby the associated TSIs)
sft	=	TSI number consisting of Side (0 or 1), FROM-unit (1 through 6), and TO-unit (1 through 6); for example, TSI 013 is on Side 0 and receives data FROM unit 1 and connects TO unit 3.

Restore UC

1. Enter **RST::UNIT [q]q,UC!** to restore unit controller.
   Where [q]q = Unit number (1 through 16).

   NOTE:
   For the CEF, the unit UC diagnostic for the restore operation runs continuity tests between the unit and the EMC.

   - If the command is denied, find the reason for the denial and perform corrective action to obtain command completion (*Command Denials* has explanations of denial codes).

Restore DS3U or HDS3U Common Equipment

NOTE:
This procedure is for restoring the DS3U or HDS3U common equipment. It is assumed the ECCN/CCN and unit UC has been grown and restored. See *Restore ECCN/CCN* in this section to restore ECCN/CCN.

1. Enter commands to restore FMT packs as follows:
   RST:[FRM xy,SEQ ww]:UNIT [q]q,FMT 0!
   RST:[FRM xy,SEQ ww]:UNIT [q]q,FMT 1!.

   NOTE:
   For CEF, the FMT diagnostic runs continuity test with ECCN.

2. Enter commands to restore the protection and service FLIs as follows (see Note):
   RST:[FRM xy,SEQ ww]:UNIT [q]q,FLI P!
   RST:[FRM xy,SEQ ww]:UNIT [q]q,FLI S!.

   NOTE:
   When you restore the protection FLI, the protection FLI will be switched into the signal path; when you restore the service FLI, the service FLI will be switched into the signal path.

   - If any command is denied, find the reason for the denial and perform corrective action to obtain command completion (*Command Denials* has explanations for denial codes).

Grow MMFG [MXR (KCR-1), EMXR (KCR-5), or HMXR (KCR8)]

Overview: This command is used to enter the type specification and any operating options for the MXR being equipped. The options are for the bit error rate calculation method and threshold and for the insertion of line buildout in the transmission path to compensate for low cabling loss. Growing the MXR also grows the facility in the data base.

1. Enter the command as follows:
   `GRTH:[FRM xy,SEQ ww]:UNIT [q]q,`
   `MXR c[-d][,TYPE mnxyz][,BERM s][,BERT t][,LBO {ON|OFF}]!`

   Where:

xy	=	DACS II frame number (00 through ZZ).
ww	=	Command sequence number (00 through 49).
[q]q	=	Unit number (flexible bay, 1 through 16).
c	=	MXR number (1 through 6).
d	=	Optional, last MXR number of range of MXRs in same unit.
mn	=	Circuit pack type: MX for MXR (KCR-1), EX for EMXR (KCR-5), or HX for HMXR (KCR-8).
xyz	=	Type specification; see Table 3-35 . Default is MX100 for DS3U. Default is HX100 for HDS3U.
s	=	BER calculation method: s=B for bipolar violations (default), s=P for DS3 parity errors, or s=C for both methods combined (HDS3U only).
t	=	BER threshold, t=3 for 10^{-3} (default) or t=6 for 10^{-6}.
ON|OFF	=	Turns the line buildout on or off, defaults to OFF.

   - If the command is denied, find the reason for the denial and perform corrective action to obtain command completion (*Command Denials* has explanations of denial codes).

2. Check output message to verify type and option entries.

3. To familiarize yourself with query outputs, enter **`UTL::QRY,EQD,UNIT [q]q!`** and **`UTL::QRY,PSTATE,UNIT [q]q!`** and notice the following in the output:

   — In the EQD UNIT output, the subject MXR is shown as equipped. The first MXR position is for the protection MXR.

   — In the PSTATE output, the MXRs are shown as UEQD, IS (in-service), or OOS. The PSTATE codes are explained in Table 3-36.

Table 3-35. MXR Type Specification

Option	Meaning
X	**DS3 FRAMING FORMAT**
1	M13 Format (Default)
2	C-Bit Parity Format
Y	**NOT ASSIGNED (USE 0)**
Z	**NOT ASSIGNED (USE 0)**

Table 3-36. Maintenance and Protection Keywords

Keyword	Meaning
Maintenance Status	
IS	In-Service
ISF	In-Service, but Failed and Pested
OOS	Out-Of-Service
UEQD	Unequipped
Protection Status	
SLT	Protection MMFG/FLI Selected
USLT	Protection MMFG/FLI Unselected
SALW	MMFG Is Carrying Service and Switching Is Allowed
SINH	MMFG Is Carrying Service and Switching Is Inhibited
MPALW	Manual Protection Switch Active and Auto Switchback Allowed
APALW	Auto Protection Switch Active and Auto Switchback Allowed
MPINH	Manual Protection Switch Active and Auto Switchback Inhibited
APINH	Auto Protection Switch Active and Auto Switchback Inhibited
(dashes)	Service MMFG Not Equipped
Protection Availability	
AVL	Available for Switching
NVL	Not Available for Switching
(dashes)	MMFG Not Selected for Service

Grow MIU/EMIU Multiplexer Interface Unit (KCR2/KCR6)

Overview: This command is used to establish the MIU/EMIU entity(ies) in the Unit database. The MIU/EMIU circuit packs, in conjunction with the "Enhanced DS1 Performance Monitoring" feature, provide the ANSI performance monitoring capability for T1 NPCs embedded in DS3 facilities.

1. Enter the command as follows:
   `GRTH:[FRM xy,SEQ ww]:UNIT [q]q,MIU c[d][,TYPE mnxyz]!`

   Where:

   FRM = Frame
   SEQ = Sequence
   xy = DACS II frame number (00 through ZZ)
   ww = Command sequence number (00 through 49)
   [q]q = Unit number (1 through 16)
   MIU = Multiplexer Interface unit (used for both MIU/EMIU)
   c,d = MIU/EMIU numbers within a unit (P, and 1 through 6)
   mnxyz = MIU/EMIU type. MI100 is the only permissible type.

   If the command is denied, find the reason for the denial and perform corrective action to obtain command completion. (*Command Denials* has explanations for denial codes).

Restore MIU/EMIU Multiplexer Interface Unit (KCR2/KCR6)

Overview: This command is used to restore one or a group of MIU/EMIU circuit packs in a particular DS3U. If the associated MXR/EMXR circuit packs are out of service, you may use the command in the Section, "Restore Protection MMFG and Service MMFG" to restore the entire MMFG(s). If the associated MXR/EMXRs are in service, you may use the following command to restore the MIU/EMIUs to service.

1. Enter the command as follows:
   `RST:[FRM xy,SEQ ww]:UNIT [q]q,MIU c[-d] [,INCL]!`

   Where:

   xy = DACS II frame number (00 through ZZ)
   ww = Command sequence number (00 through 49)
   [q]q = Unit number (1 through 16)
   MIU = Multiplexer Interface unit (used for both MIU/EMIU)
   c,d = MIU/EMIU numbers within a unit (P, and 1 through 6)
   INCL = Keyword to restore all equipped TA-type NPCs in an MMFG

If the command is denied, find the reason for the denial and perform corrective action to obtain command completion. (Consult the *Command Denials* at the back of this volume.)

NOTE:
Failure to restore all equipped TA-type NPCs will result in denial of the whole command. This keyword will be ignored if the associated MMFG is not selected to carry service.

Restore Protection MMFG and Service MMFG

Overview: This procedure is used to change the status of the MMFG (MXR function group) and the DS3 facility to in-service. This operation invokes diagnostic tests which are reported in messages. The failure of either pack in the MMFG causes the restoral to be denied. When placed in-service, the DS3 line and component NPCs are monitored for alarm conditions; so, to avoid alarms, the DS3 signal must be looped back at the DSX-3 or a good signal must be connected through to the DACS II. The INCL keyword for the command causes all grown NPCs on the MXR to also be restored to service. These NPCs must have already been grown in the data base.

NOTE:
This procedure is for restoring the MMFG and protection MMFG. It is assumed the ECCN has been grown and restored. See *Restore ECCN/CCN* in this section to restore ECCN/CCN.

1. Enter **`RST:[FRM xy,SEQ ww]:UNIT [q]q,MMFG c[-d][,INCL]!`**.

   Where:

   xy = DACS II frame number (00 through ZZ)
   ww = Command sequence number (00 through 49)
   [q]q = DACS II unit number (1 through 16)
   c = MMFG number (1 through 6 or P for protection)
   d = Optional, to give last MMFG of continuous range of MMFGs in unit
   INCL = Optional, for service MMFGs to cause all resident DS1 NPCs (full complement of 28) to also be restored to service. See Note.
   MMFG = Restored with only MXR grown because MIU is optional entity that may not need to be grown. If MIU is grown (1 through 6) then MIUP must be grown also.

NOTE:
If information was not available to grow the embedded NPCs, the INCL cannot be used to restore the NPCs. The NPCs can be grown and restored when facilities are established.

- If any command is denied, find the reason for the denial and perform corrective action to obtain command completion (*Command Denials* has explanations for denial codes).

Install Circuit Packs, Grow and Restore DSPU

Install DSPI and CPU Circuit Packs

1. Install DSPI Card (UM29 Code) and CPU2 Card (TM778) in designated slots. See Figure 3-18.

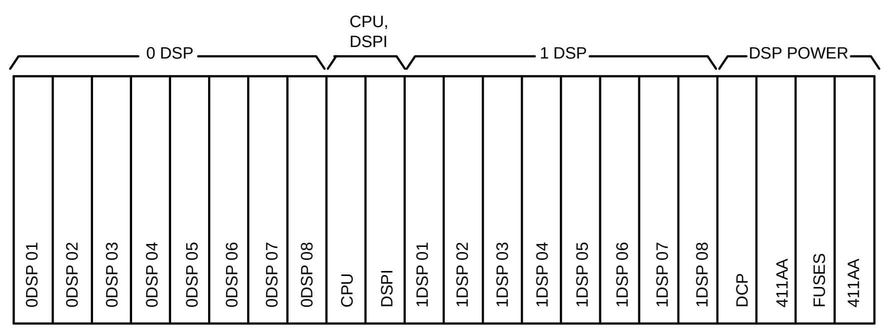


Figure 3-18. DSPU Shelf

Grow DSPU

Overview: This command is used to grow the unit in the data base and to define the type of application (DSPU). The associated ETSI, or the associated CCBs and TSIs, in the cross-connect network are grown when this command is executed as indicated in the completion message.

> **NOTE:**
> If the peripheral unit is not recorded in the software configuration file, the growth command in this procedure will be denied.

1. If you need to see the unit assignments that have been entered in the software configuration file, enter **`UTL::QRY,CNFGR!`** (see Note). This configuration was set during the equipment installation and acceptance, but it can still be changed with the CFR FRAME program.

   > **NOTE:**
   > Unit designations (1 through 16, left to right) are 1 for FTU Version 1, 2 for DSPU, 3 for DS3U, 4 for FTU Version 2 (IFTU), or dash for not designated.

2. Familiarize yourself with the command

   `GRTH:[FRM xy,SEQ ww]:UNIT [q]q,TYPE DP100`

   `Where:`

xy	=	DACS II frame number (00 through ZZ).
ww	=	Command sequence number (00 through 49).
[q]q	=	Unit number (1 through 16).
a[,b[,c[,d[,e[,f]]]]]	=	Optional, to limit unit connectivity to itself (a) or certain other units (b,c, etc.).

   1. Enter the command with the required information.
      - If the command is denied, find the reason for denial and perform corrective action to obtain command completion (*Command Denials* has explanations of denial codes).
   2. Repeat the procedure for any other units to be grown.

Restore ECCN/CCN

Restore ECCN

Use this procedure to restore an ECCN frame (for CCN see the next section).

1. If the CCI pack was just installed in a previous procedure, enter **`RST:[FRM xy,SEQ ww]:CCI s!`**

   Where: xy = DACS II frame number (00 through ZZ)
   ww = Command sequence (00 through 49)
   s = Network side (0 or 1).

   NOTE:
   The two BTs (bus terminators) for the shelf are also restored with the CCI circuit pack.

2. Use one of the following commands to restore the ETSIs:

   Restore all ETSIs
   `RST:[FRM xy,SEQ ww]:ETSIS,ECCN s,ALL!`

   Restore individually
   `RST::ETSI sqq!`

   Where: sqq = ETSI number consisting of Side (0 or 1) and peripheral unit number (01 through 16).

   - If any restore command is denied, find the reason for the denial and perform corrective action to obtain command completion (*Command Denials* has explanations of denial codes).

     Proceed to *Restore UC and DSPI* to restore the UC and DSPI.

Restore CCN

Overview: The restore commands in this procedure are given in the order which establishes communications within the network and enables the restoral of the next pack in the list. The CCB and TSI packs that need to be restored after a new unit is grown are listed in the growth completion message.

1. If the network interface pack (CCNI) was just installed in a previous procedure, enter **`RST:[FRM xy,SEQ ww]:CCNI s!`**

   Where s = Network side (0 or 1).

2. If a CCB was just installed (for DSPU growth) in a previous procedure, enter **`RST:[FRM xy,SEQ ww]:CCB sf!`**

   Where: sf = CCB number consisting of the Side (0 or 1) and position (1 through 6); for example, CCB 12 is on side 1 and is associated with Unit 2 TSIs.

3. Use one of the following commands to restore the TSIs:

   Restore all TSIs in a unit

   RST:[FRM xy,SEQ ww]:TSIS,CCN s,UNIT q [,CONN (a[,b[,c[,d[,e[,f]]]]])]!.

   Restore all the TSIs on a side (see Note)

   RST::TSIS,CCN s,ALL!.

   Restore TSIs individually

   RST::TSI sft!

   Where:

q	=	Unit number (1 through 6)
s	=	Side (0 or 1)
a[,b[,c[,d[,e[,f]]]]]	=	Optional, to specify the limited unit connectivity (thereby the associated TSIs)
sft	=	TSI number consisting of Side (0 or 1), FROM-unit (1 through 6), and TO-unit (1 through 6); for example, TSI 013 is on Side 0 and receives data FROM unit 1 and connects TO unit 3.

   NOTE:
   Each of the 72 TSIs is listed in the output by the From-, To-Unit ID along with results (DGN A, C, S, D and RST C or D).

   - If any restore command is denied, find the reason for the denial and perform corrective action to obtain command completion (*Command Denials* has explanations of denial codes).

Restore UC and DSPI

1. Enter **RST::UNIT [q]q,UC!** to restore unit controller

   Where [q]q = Unit number (1 through 16).

   NOTE:
   For the CEF, the unit UC diagnostic for the restore operation runs wiring tests between the unit and the EMC.

2. Enter **RST::UNIT [q]q,DSPI!** to restore DSPI.

Change DS1/DS3/HDS3 Parameters

Change DS1 Equalizer Value

Overview: This procedure uses the command to change the value of the equalizers for the facility terminating module. The equalization for each half of the shelf, which contains 10 dual digroup cards, can be set to different values. This command is used to enter new values of equalization (or make corrections) and is used to enter the value for the second half of the shelf if it was not entered initially. The FTMI must be in-service to change an equalizer value.

1. Familiarize yourself with the five values of equalization for the length of cabling to the line interface jacks (for example, DSX-1 bay) per Table 3-37.

2. Enter the command with the value of equalization for each half of the shelf as follows (see Note):
   `CHG:[FRM xy,SEQ ww]:UNIT [q]q,FTMI d,EQL(l,r)!`

   Where:
   xy = DACS II frame number (00 through ZZ)
   ww = Command sequence number (00 through 49)
   [q]q = Unit number (1 through 16)
   d = FTMI number (1 through 4)
   l = Equalizer value (1 through 5) for left half of shelf (lower 20 NPC slots)
   r = Equalizer value (1 through 5) for right half of shelf (upper 20 NPC slots).

   NOTE:
   For DS1 equalizers, you can use a dash (--) in place of the value for one side to indicate that the existing value remains the same.

   - If the command is denied, find the reason for the denial and perform corrective action to obtain command completion (*Command Denials* has explanations of denial codes).

3. Check NEW STATE EQL values in output message to verify that correct information was entered; if there is an error, repeat this procedure to make corrections.

Table 3-37. DS1 Equalizer Values

Setting	Cable Length (22 Gauge)	Cable Length (26 Gauge)
1	0 through 133 feet	0 through 90 feet
2	133 through 267 feet	90 through 180 feet
3	267 through 400 feet	180 through 270 feet
4	400 through 533 feet	270 through 360 feet
5	533 through 655 feet	360 through 450 feet

Change DS1 Equalizer Value on 19.2-kb/s MJU Circuit Pack

1. With the MJU circuit pack out of the shelf, locate the two miniature switches (DIP switches) on the component side of the MJU circuit board. These switches are located near the bottom edge; switch SW2 is not used.
2. Set the rockers on the DIP switch SW1 to select the required equalizer values based on the distance to the DSX-1 bay per Table 3-38.

   NOTE:
   To set a switch to the on position, push the rocker to the 1 position.

   NOTE:
   The selected equalization will be effective when the circuit pack is inserted (with the reset that occurs when the MJU is powered up) and will be read again whenever the **RESET** button on the circuit pack is operated.

3. Repeat the procedure to set the equalizers on the other MJUs in the self.

Table 3-38. 19.2-kb/s Equalization Settings

Cable Length (Feet)		Switch Setting		
Type 609 (22 GA.)	**Type 1249 (26 GA.)**	**Rocker 1**	**Rocker 2**	**Rocker 3**
0 through 50	0 through 90	on	on	on
51 through 267	91 through 180	on	on	off
268 through 400	181 through 270	on	off	on
401 through 533	271 through 360	on	off	off
534 through 655	361 through 450	off	on	on

Change DS3 MXR/HDS3 HMXR Parameters

Overview: The command in this procedure is used to change the type specification and any operating options of an MXR or HMXR pack that has been already grown in the data base. These options are: the bit error rate calculation method, bit error threshold, and cable loss line buildout in the transmission path. The MXR or HMXR and facility must be removed from service to change the type specification; this is accomplished by removing the MMFG for the MXR or HMXR.

1. If the type specification is to be changed, enter the command to remove the MMFG for the MXR/HMXR as follows:

   `RMV::UNIT [q]q,MMFG c[-d][,FRC][,INCL]!`

   Where:
   [q]q = Unit number (1 through 16)
   c = MMFG number (1 through 6)
   d = Optional, last MMFG number of range of MMFGs
   FRC = Optional, to force removal without accompanying protection switching (required when protection switching is not available)
   INCL = Optional, to remove all equipped component NPCs from service.

2. Enter command as follows:

   `CHG:[FRM xy,SEQ ww]:UNIT [q]q,`
   `DS3 c[-d][,BERM s][,BERT t][,LBO b][,TYPE mnxyz]!`.

   Where:
   xy = DACS II frame number (00 through ZZ).
   ww = Command sequence number (00 through 49).
   c = DS3/HDS3 number associated with MXR/HMXR (1 through 6).
   d = Optional, last DS3/HDS3 number of range of DS3s/HDS3s in same unit.
   mnxyz = Type specification; see Table 3-39 .
   Default is MX100 for DS3U.
   Default is HX100 for HDS3U.
   s = BER calculation method: s=B for bipolar violations (default) , s=P for DS3 parity errors, or s=C for combined methods (HDS3U only).
   t = BER threshold, t=3 for 10^{-3} (default) or t=6 for 10^{-6}.
   b = Line buildout, OFF (default), or ON.

   - If the command is denied, find the reason for the denial and perform corrective action to obtain command completion (*Command Denials* has explanations of denial codes).

3. Check output message to verify type and option entries.
4. Enter command to restore MMFG as follows:
   `RST::UNIT [q]q,MMFG c[-d][,INCL]!`

   Where: INCL = Causes all component NPCs to also be restored.

Table 3-39. MXR Type Specification

Option	Meaning
X	**DS3 FRAMING FORMAT**
1	M13 Format (Default)
2	C-Bit Parity Format
Y	**NOT ASSIGNED (USE 0)**
Z	**NOT ASSIGNED (USE 0)**

NPC

Set Optional Alarm Threshold in Data Base

Overview: This procedure is used to enter (or change) values which are stored as options for facility NPC alarm thresholds. Up to three options can be entered for any of the NPC alarm parameters; these options can then be selected for an NPC via the GRTH or CHG commands. If the alarm thresholds for an NPC are not specified, the internal default values apply. Different alarm types apply to the NPCs for DS1 and 2.048-M/bs Interface.

1. To see if other options have been established, enter **`UTL::QRY,OPT[,{TYPE mn|ALL}],NPCS!`** where the options for one type (for example, DE or PB) or all types can be displayed. The default values are listed in the first column and any options, to the right; dashes appear if no options have been set.

2. Familiarize yourself with the command as follows and with the parameter identifiers and default values per Table 3-40:

   `CHG::SETOP rr,{TYPE mn|ALL},NPCOP(set1,set2,set3)!`

   Where:

TYPE mn|ALL	=	Selects all NPCs in frame or only those of specified type (for example, TYPE DE).
rr	=	Identifier for parameter to be changed per Table 3-40.
set1,set2,set3	=	Any of three values to be stored for the parameter from the range listed in Table 3-40.

3. See the following example which shows two values being added as options for degraded minutes (1 hour) alarm threshold.

   EXAMPLE: **`CHG::SETOP 31,TYPE DE,NPCOP(50,40,-)!`**

4. Enter command to set any one or all three of the options; use a dash when additional options for a parameter are not required. Remember that a minor alarm threshold must be lower than a major alarm option for the same facility parameter.

   - If the command is denied, find the reason for the denial and perform corrective action to obtain command completion (*Command Denials* has explanations of denial codes).

5. Check completion message to verify changes.

6. Enter **`UTL::BOOT,FRAME!`** to boot in new values and prevent FRADTS messages.

Table 3-40. DE/DS/TE/PB/PC Type Setup Options

NPC Type	Option (rr)	Performance Parameter	Threshold Range	Default Value
DE/TE/ DS	01	SLIP Major Alarm	001-255	255
	02	SLIP Minor Alarm	001-255	4
	03	Bit Error Rate Major Alarm	10^{-6} to 10^{-3} *	10^{-3} †
	04	Bit Error Rate Minor Alarm	10^{-6} to 10^{-3} * †	10^{-6}
	05	Errored Seconds (T1DM & ESF Formats)	00001-65535	864
	06	Severely Errored Seconds	001-255	255
	07	COFA Major Alarm	001-511	511
	08	COFA Minor Alarm	1-255	17
DS only	09	SANE (Self Alarm - Near End)	0-65535	0
	10	SAFE (Self Alarm - Far End)	0-65535	0
PB/PC	31	DM, Degraded Minutes, 1 hour	1-60	60
	32	DM, Degraded Minutes, 24 hours	1-1440	1440
	33	SERS, Severely Errored Seconds, 15 minutes	1-900	900
	34	SERS, Severely Errored Seconds, 24 hours	1-65535	65535
	35	ERS, Errored Seconds, 15 minutes	1-900	900
	36	ERS, Errored Seconds, 24 hours	1-65535	65535
	37	US, Unavailable Seconds, 15 minutes	1-900	900
	38	US, Unavailable Seconds, 24 hours	1-65535	65535
	39	SLIPS, 15 minutes	1-900	900
	40	SLIPS, 24 hours	1-65535	65535

* Range is 10^{-7} to 10^{-3} with ESF or T1DM line format.
† Range is 10^{-6} to 10^{-4} (default) for clear-DS1.

Table 3-41. DA/TA Type Setup Options

rr	Parameter	Threshold Value Range	Default Threshold Value
41	Daily Near-end Path Coding Violations	000000000 to 134217727	132960†
42	Daily Near-end Path Errored Seconds	00000 to 86400	648
43	Daily Near-end Path Severely Errored Seconds	00000 to 86400	100
44	Daily Near-end Severely Errored Framing Seconds	00000 to 86400	17
45	Daily Near-end Controlled Slip Seconds	00000 to 86400	4
46	Daily Near-end Unavailable Seconds	00000 to 86400	10
47	Daily Near-end Line Coding Violations	000000000 to 134217727	133400
48	Daily Near-end Line Errored Seconds	00000 to 86400	648
49	Daily Near-end Line Severely Errored Seconds	00000 to 86400	100
50	Daily Far-end Path Coding Violations	000000000 to 134217727	132960†
51	Daily Far-end Path Errored Seconds	00000 to 86400	648
52	Daily Far-end Path Severely Errored Seconds	00000 to 86400	100
53	Daily Far-end Severely Errored Framing Seconds	00000 to 86400	17
54	Daily Far-end Controlled Slip Seconds	00000 to 86400	4
55	Daily Far-end Unavailable Seconds	00000 to 86400	10
56	Daily Far-end Line Errored Seconds	00000 to 86400	648
57	15-Minute Near-end Path Coding Violations	0000000 to 2097151	13296‡
58	15-Minute Near-end Path Errored Seconds	000 to 900	65
59	15-Minute Near-end Path Severely Errored Seconds	000 to 900	10
60	15-Minute Near-end Severely Errored Framing Seconds	000 to 900	2
61	15-Minute Near-end Controlled Slip Seconds	000 to 900	1
62	15-Minute Near-end Unavailable Seconds	000 to 900	10
63	15-Minute Near-end Line Coding Violations	0000000 to 2097151	13340
64	15-Minute Near-end Line Errored Seconds	000 to 900	65
65	15-Minute Near-end Line Severely Errored Seconds	000 to 900	10
66	15-Minute Far-end Path Coding Violations	0000000 to 2097151	13296‡
67	15-Minute Far-end Path Errored Seconds	000 to 900	65
68	15-Minute Far-end Path Severely Errored Seconds	000 to 900	10
69	15-Minute Far-end Severely Errored Framing Seconds	000 to 900	2
70	15-Minute Far-end Controlled Slip Seconds	000 to 900	1
71	15-Minute Far-end Unavailable Seconds	000 to 900	10
72	15-Minute Far-end Line Errored Seconds	000 to 900	65

† The value shown applies to ESF framing and is a count of CRC errors. When the DS1 has D4 or T1DM framing, framing errors are counted and the default Daily value is 691.

‡ The value shown applies to ESF framing and is a count of CRC errors. When the DS1 has D4 or T1DM framing, framing errors are counted and the default 15-Minute value is 72.

Install Circuit Packs, Grow and Restore IFTU2 NPC (Without *SLC*® Carrier)

Install Circuit Packs and Grow Type DE NPC

Overview: This command defines the operating characteristics of the NPC in the data base. When the NPC is subsequently restored to service, it will be provisioned per the growth specification. Included in the specification are: DS1 line and channel formats, facility alarm thresholds, and the channel insertion word. The DS1 line formats are given by the TYPE specification; TYPE DE100 is the default. If used, alarm threshold options must already be defined in the data base per *Set Optional Alarm Threshold in Data Base*. The IW (insertion word) for the NPC is sent out on all channels when the NPC is removed from service and, unless overridden by the DCC option in the disconnect command(s), the IW is sent on any non-connected channel.

1. Install the appropriate circuit pack cards in the NPC slots to be equipped from the following list: TG80 or TG80B DDC, or TG186 ZDC (for special zero code suppression, Z BTSI).

2. Familiarize yourself with the following command:
   follows: **GRTH::NPC <npc No.>[-<range>][,TYPE DExyz] [,OPTS(rr/l,ss/m,tt/n,...)][,IW X'pq][,AIS {INFO|MJ|MN}]!**

   Where:

   <npc No.> = NPC number, either extended (for example, [0]001) or hierarchical (for example, 01101).

   <range> = Optional, last NPC of continuous range of NPCs.

   xyz = Line and channel format specification; DE100 is the default. See Table 3-42 for values.

   rr/**l**,ss/m,tt/n,... = Optional, to list any or all alarm types (01 through 08) per Table 3-43 and predefined number (0 through 3) per Table 3-44 which sets alarm threshold. See EXAMPLE in Step **5**.

   pq = Optional, to enter IW in hexadecimal form; default is 7F. See typical values in Step **4**. **The IW field is not applicable for clear-DS1 NPC**.

   AIS field = Optional; to specify class of output message issued when AIS is received: INFO (default) for information, MJ for major alarm, or MN for minor alarm.

3. If you are going to use the OPTS field, consider the following items:
   - The errored second parameters are only applicable with the ESF line format and T1DM format.
   - Only alarm types 01 through 04 are applicable to IFTU2 clear-DS1s.
   - When TG80B is used as clear-DS1, BER is calculated from BPV and the high-end BER threshold is 10^{-4} instead of 10^{-3}.

4. If you are going to use the IW field, consider the following:
   - The two hexadecimal digits define an 8-bit insertion word for unassigned channels. To prevent the generation of a yellow alarm condition (with D4 line format), the hexadecimal number for the left digit must not be one that corresponds to a binary number with bit 2 = 0 (that is, decodes to x0xx).
   - Insertion word 7F is defined as the UAC (unassigned channel code) and is typically used for type DE/TE 1yz and type DS NPCs.
   - Insertion word 18 is defined as the UMC (unassigned multiplexer code) and is required for a type DE4yz NPC (T1DM format for Digital Data System).
   - MUX keyword - IW = IA.
   - Insertion word FF is all ones and is used for 2.048-Mb/s Interface NPC applications.

5. Enter command with required information. See Table 3-45 for explanation of line format terminology. **For clear-DS1, the only y-option that are applicable are 1 or 2**.

   EXAMPLE: **`GRTH::NPC 012,TYPE DE400,OPTS (01/1,03/2,07/2),IW X’18!`**

   - If the command is denied, find the reason for the denial and perform corrective action to obtain command completion (*Command Denials* has explanations of denial codes).

6. Check completion message to verify changes.

Table 3-42. DE Type NPC Options

X	Multiframe Format
0	Unassigned
1	D4 Channel Bank
2	Extended Super Frame - Voice
3	Extended Super Frame - Data
4	DDS T1DM Word 24
5-7	Unassigned
8	Ericson Cellular Framing Format
9	No Framing, Clear-DS1
Y	**Zero Suppression**
0	Zero Code Suppression (ZCS)
1	No Zero Code Suppression
2	Bipolar with 8 Zero Substitution (B8ZS)
3	ZBTSI for TG186 Pack and ESF Format
4	DMI with ZCS
5	DMI with no ZCS
6	DMI with B8ZS
Z	**Channel Counting**
0	D4 Channel Numbering (Sequential)
1	D2 Channel Numbering
2	D1D Channel Numbering
3-8	Unassigned
9	No Channels, Clear-DS1

Table 3-43. Alarm Parameters

Type (rr,ss,tt,...)	Meaning
01	SLIPs, Major Alarm
02	SLIPs, Minor Alarm
03	BER (bit error rate), Major Alarm
04	BER, Minor Alarm
05	ERS (errored seconds) T1DM and ESF Formats
06	SERS (severely errored seconds)
07	COFA (change of frame alignment), Major Alarm
08	COFA, Minor Alarm

Table 3-44. DS1 Option Selection

Option (l,m,n)	Meaning
0	Default Value
1	First Option Value (set1)
2	Second Option Value (set2)
3	Third Option Value (set3)

Table 3-45. Option Types

Term	Explanation
ESF	Extended superframe (24-frame); bit 193 shared for framing, 4 kb/s data link, and 2 kb/s cyclic redundancy check (CRC-6)
ESF-voice	Voice with robbed-bit signaling; D4 alarm recognition times; yellow alarm sent over data link
ESF-data	Data transmit and additional use of data link; alarm times shorter than D4
DDS	Digital Data System; high reliability special service
DDS-T	T1DM type which uses D4 superframe and bit 191 (R bit) data link connection via channel 24
SLC	For *SLC*® 96 carrier; 9-state signaling and facility data link
ZCS	Zero code suppression which inserts 1s after strings of 0s for adequate T1 line drive. No ZCS is normally used for data circuits.*
B8ZS	Bipolar with 8 zero substitution; for unrestricted data transmit via code for strings of 0s or any general application. This mode eliminates the need for Zero Code Suppression.
ZBTSI	Zero byte time slot interchange; different algorithm for zero code suppression available with ESF format
DMI	Digital multiplex interface for digital PBXs (for example, Type 75); uses A and B non-robbed-bit signaling and 64 kb/s channel transmission.

* No ZCS can also be used for voice and wideband program channels where zero code suppression is undesirable and facilities capable of B8ZS line coding are not available. This application requires that digitally encoded voice signals not violate the 1's density requirements of the DS-1 transmission facility (no more than 15 consecutive 0's and an average of 12.5% 1's density) prior to transmission.

Install Circuit Packs and Grow Type PB/PC NPC

Overview: This procedure is used to enter information (grow) into the data base to provision the PBC (primary block circuit). Entered are the line interface impedance, the mode NSA (nonsignaling associated) or CAS (channel associated signaling), and selection of line signal format options. These format options include assigning alarm meanings to transitions of bits 3, 4 and 5 of time slot 0 (TS0). The NPC also monitors the following facility parameters: slips, errored seconds, severely errored seconds, degraded minutes, and unavailable seconds. The alarm thresholds for any or all of these can be specified by listing the parameter and threshold option in the command. The IW (insertion word), which is sent by the NPC on any not-connected channels or on all channels when the NPC is removed from service, can be specified in this command.

NOTE:
Only bits a through g (for xy values) can be used for NPC provisioning with the basic 2.048-Mb/s Interface software feature. The remaining bits are used with the Enhanced 2.048-Mb/s Interface feature to assign alarm meanings to TS0 bits. The TG187 pack is needed for growth option jkl = 011 or 101 to provide MBER (minor bit error rate) operation.

1. Install the appropriate circuit pack cards in the NPC slots to be equipped from the following list: TG182 - 120 ohms, TG185 - 75 ohms, TG187 - 120 ohms, or TG192 - 75/120 ohms for minor error rate.
2. Familiarize yourself with the command as follows:
   GRTH::NPC <npc No.>[-<range>],TYPE mnxyz [,OPTS(rr/l,ss/m...,tt/n)][,AIS {MI|PMA|DMA}][,IW X'pw[r]]!

   Where:

   <npc No.> = NPC number, either extended (for example, [0]001) or hierarchical (for example, 01101).

<range>	=	Optional, last NPC of continuous range of NPCs.
mn	=	NPC type, **PB** for 120-ohm line interface or **PC** for 75-ohm coaxial line interface.
xyz	=	3-digit hexadecimal number; each digit corresponds to a 4-bit binary number, the bits of which represent NPC options per Table 3-46. Only bits a through g are for Basic 2.048-Mb/s Interface. The default type specification for 2.048-Mb/s Interface frame is PB100.
rr/l ...,tt/n	=	Optional, to list any one or all facility parameters (31-40) per Table 3-47 and predefined number (0 through C) per Table 3-48 which selects alarm threshold. See examples in Step **3**.
AIS field	=	Optional, to specify class of output message issued when AIS is received: INFO (default) for information, MJ for alarm major, or MN for minor alarm.
IW X'pw[r]	=	Insertion word given as hexadecimal code; each digit specifies 4 bits. The r-digit is for disconnect channel signaling. Default for 2.048-Mb/s Interface is X-D5D.

3. Notice the following examples which show the command to select TYPE options, no CRC-4, no sync source, consequent AIS, CAS, and telephone channel numbering, and specifies different deferred alarm threshold for 1-hour DM and 15-minute SLIP.

   EXAMPLE 1: GRTH::NPC 01112,TYPE PB900,OPTS(31/3,39/3)!

   EXAMPLE 2: GRTH::NPC 02132,TYPE PB87C! (for TRANSMIC 1G)

   NOTE:
   Bit c of "x" (xyz field) selects the use of the <tc> field and, for Enhanced 2.048-Mb/s Interface, determines the alarm network timer as follows: c = 0 for 144 ms and c = 1 for 480 ms for local alarms. The c = 1 selection is required to specify <tc> for a DS1 connection (gateway).

4. Enter command with required TYPE options. If default alarm thresholds are appropriate for the NPC application, the OPTS field can be omitted from the command. To disable any facility alarms, enter "C" for the value of "m" in the "rr/l ...,tt/n" field.

   - If the command is denied, find the reason for denial and perform corrective action to obtain command completion (*Command Denials* has explanations of denial codes).

5. Check output message to verify type and option selections. Also notice the TS0 and TS0M output fields which give the default values for the spare TS0 bits and bits monitored.

Table 3-46. Hexadecimal/Binary Numbers

Hex	Bit	Value	Meaning
x	a	0 1	CRC-4 multiframe in TS0 Non-CRC-4 framing in TS0
	b	0 1	NPC is not used as a synchronization source NPC is used as a synchronization source
	c	0 1	CCITT G.732 Consequent AIS in signaling Specified consequent action; <tc> field in commands
	d	0 1	Nonsignaling associated (NSA) 16-state channel associated signaling (CAS)
y	e	0 1	Telephone Channel Numbering Time Slot Channel Numbering (NSA)
	f	0 1	Convert the abcd bits of TS16 to 1111 if 0000 Pass signaling bits through unchanged
	g	0 1	AIS applied to receive TS16 upon RAI, RAIS, or R16 AIS not applied to receive TS16 upon RAI, RAIS, or R16
	h	0 1	TS0 bit 5 = SFI unaffected by synchronizer holdover TS0 bit 5 = SFI inverted on synchronizer holdover
z	jkl	000 001 010 011 100 101 110 111	TS0 bit 3 = RAI indication within 2 ms. TS0 bit 3 = RAI indication in *t** TS0 bit 4 = RAIS in *t** and RAI within 2 ms.* TS0 bit 4 = Detect BER, enable RBER in *t** and RAI in 2 ms. TS0 bit 4 = RAIS and RAI in *t** (Transmic 2G)* TS0 bit 4 = Detect BER, disable RBER and RAI within 2 ms* Bits 3 through 8 in *t** (Transmic 1G) Unassigned
	m	0	Unassigned, only m = 0 is valid

* When bit c=0, time *t* is 144 ms; when bit c=1, *t* is 144 ms for remote alarms, but *t* is 480 ms for local alarms except for jkl = 011 or 101 (MBER selected). With MBER, *t* is 2496 ms (SFDT).

Reference: HEX A=1010, B=1011, C=1100, D=1101, E=1110, F=1111.

Table 3-47. Facility Parameter

Type (rr,ss,tt)	Meaning
31	DM, 1 Hour
32	DM, 24 Hour
33	SERS, 15 Minute
34	SERS, 24 Hour
35	ERS, 15 Minute
36	ERS, 24 Hour
37	US, 15 Minute
38	US, 24 Hour
39	SLIPs, 15 Minute
40	SLIPs, 24 Hour

Table 3-48. Alarms Option

Alarm Class	Option 0 (Default)	Option 1	Option 2	Option 3*
MI (Info)	0	3	6	9
DMA (Deferred)	1	4	7	A
PMA (Prompt)	2	5	8	B

* Only valid option for PB/PC types.

Note: C - disables monitoring of a facility parameter

Install Circuit Packs and Grow Type PA NPC

Overview: This procedure is used to enter information (grow) into the database to provision the NPC as a type PA. This allows the enhanced facility monitoring feature to be used (refer to *Performance Monitoring*). The facility monitoring feature is also supported with type PA NPCs.

1. Install the TG192 circuit pack in the NPC slot.
2. Familiarize yourself with the command as follows:

```
GRTH::NPC <npc No.> [-<range>],TYPE mnxyz\
[,OPTS(rr/m[,rr/m][...])][,IX X'pq[,INCL][,AIS {MI|DMA|PMA}]
```

Where:

<npc No.> = NPC number.

<range> = Optional, last NPC of continuous range of NPCs.

mn = NPC type PA.

xyz = NPC type identifier. The following tables contain identifier definitions. A Y in a column of the table indicates that the feature at the top of the column is enabled by the corresponding x, y, or z provisioning value.

x Value	CRC-4 Mode	Automatic CRC-4	Far-End PM	NPC Used as Sync Sourc	TS0 Bit 5 Used for SFI
0	Y				
1	Y		Y		Y
2	Y				Y
3	Y		Y		
4	Y			Y	
5	Y		Y	Y	Y
6	Y			Y	Y
7	Y		Y	Y	
8		Y	Y		
9		Y	Y		Y
A					Y
B					
C		Y	Y	Y	
D		Y	Y	Y	Y
E				Y	Y
F				Y	

NOTE: Although a value of B does not enable any of the features shown in the table, it is a valid value for x.

y Value	CAS Mode	NSA Mode	Telephone Numbering	Timeslot Numbering	Convert CTS 16	AIS in CTS 16	Framed Clear	Unframed Clear
0	Y		Y		Y	Y		
2	Y		Y		Y			
4	Y		Y			Y		
6	Y		Y					
8		Y	Y					
9		Y		Y				
C							Y	
D								Y

NOTE: Values 1, 3, 5, 7, A, B, E, and F are unassigned and not valid.

z	C.A. Timing		RAI Set Time			NFW Bit 4 Use		RAIS Set Time		MBER
Value	HW	FW	2ms	144ms	480ms	RAIS	RBER	144ms	480ms	Enabled
0	Y		Y							
1		Y	Y							
2	Y			Y						
3		Y			Y					
4	Y		Y			Y		Y		
5		Y	Y			Y			Y	
6	Y		Y				Y			Y
7		Y	Y				Y			Y
8	Y			Y		Y		Y		
9		Y			Y	Y			Y	
A	Y		Y							Y
B		Y	Y							Y
C	Y									

NOTE: Values D, E, and F are unassigned and not valid.

rr = Facility performance parameter number. The following table contains valid values.

rr	Parameter
11	Daily CRC Block Errors
12	Daily Framing Errors
13	Daily Out-of-Frame Seconds
14	Daily Errored Seconds
15	Daily Severely Errored Seconds
16	Daily Controlled Slip Seconds
17	Daily Coding Violations
18	Daily Unavailable Seconds
19	Daily Unavailable Time Count
20	Daily Multiframe Errors
21	Daily Far-End Block Errors
22	Daily Far-End Errored Seconds
23	Daily Far-End Severely Errored Seconds
24	Daily Far-End Unavailable Seconds
81	15-Minute CRC Block Errors
82	15-Minute Framing Errors
83	15-Minute Out-of-Frame Seconds
84	15-Minute Errored Seconds
85	15-Minute Severely Errored Seconds
86	15-Minute Controlled Slip Seconds
87	15-Minute Coding Violations
88	15-Minute Unavailable Seconds
89	15-Minute Unavailable Time Count
90	15-Minute Multiframe Errors
91	15-Minute Far-End Block Errors
92	15-Minute Far-End Errored Seconds
93	15-Minute Far-End Severely Errored Seconds
94	15-Minute Far-End Unavailable Seconds

m = Facility performance threshold index (0 through 3).

IW = Insertion word.

INCL = Inclusive.

AIS = Alarm Indication Signal.

MI = Maintenance information.

DMA = Deferred action.

PMA = Prompt action.

PL = Payload loopback

ENA = Enabled

DSA = Disabled

3. Enter command with required TYPE options. If default alarm thresholds are appropriate, the OPTS field can be omitted from the command.
4. Check the output mesage to verify type and option selections.
5. When the PL field is not specified, the default is payload loopback enabled.

Install Circuit Packs and Grow Type TH NPC

Overview: This procedure is used to enter information (grow) into the database to provision the NPC as a type TH.

1. Familiarize yourself with the command as follows:

```
GRTH::NPC <npc No.> [-<range>],TYPE mnxyz[,OPTS(rr/m[,rr/m]\
[...])][,IW X'pq[,INCL][,AIS {MI|DMA|PMA}]
```

Where:

<npc No.> = NPC number.

<range> = Optional, last NPC of continuous range of NPCs.

mn = NPC type TH.

xyz = NPC type identifier. The following tables contain identifier definitions. A Y in a column of the table indicates that the feature at the top of the column is enabled by the corresponding x, y, or z provisioning value.

x Value	CRC-4 Mode	Automatic CRC-4
0	Y	
8		Y
B		

NOTE: Although a value of B does not enable any of the features shown in the table, it is a valid value for x. The values 0, 8, and B are the only valid values for x.

y Value	CAS Mode	NSA Mode	Telephone Numbering	Timeslot Numbering	Convert CTS 16	AIS in CTS 16	Framed Clear	Unframed Clear
0	Y		Y		Y	Y		
2	Y		Y		Y			
4	Y		Y			Y		
6	Y		Y					
8		Y	Y					
9		Y		Y				
C							Y	
D								Y

NOTE: Values 1, 3, 5, 7, A, B, E, and F are unassigned and not valid.

z	C.A. Timing		RAI Set Time			NFW Bit 4 Use		RAIS Set Time		MBER
Value	HW	FW	2ms	166ms	500ms	RAIS	RBER	166ms	500ms	Enabled
0	Y		Y							
1		Y	Y							
2	Y			Y						
3		Y			Y					
4	Y		Y			Y		Y		
5		Y	Y			Y			Y	
6	Y		Y				Y			Y
7		Y	Y				Y			Y
A	Y		Y							Y
B		Y	Y							Y

NOTE: Values 8, 9, D, E, and F are unassigned and not valid.

rr = Facility performance parameter number. The following table contains valid values.

rr	Parameter
11	Daily CRC Block Errors
12	Daily Framing Errors
13	Daily Out-of-Frame Seconds
14	Daily Errored Seconds
15	Daily Severely Errored Seconds
16	Daily Controlled Slip Seconds
18	Daily Unavailable Seconds
19	Daily Unavailable Time Count
20	Daily Multiframe Errors
81	15-Minute CRC Block Errors
82	15-Minute Framing Errors
83	15-Minute Out-of-Frame Seconds
84	15-Minute Errored Seconds
85	15-Minute Severely Errored Seconds
86	15-Minute Controlled Slip Seconds
88	15-Minute Unavailable Seconds
89	15-Minute Unavailable Time Count
90	15-Minute Multiframe Errors

m = Facility performance threshold index (0 through 3).

IW = Insertion word.

INCL = Inclusive.

AIS = Alarm Indication Signal.

MI = Maintenance information.

DMA = Deferred action.

PMA = Prompt action.

PL = Payload loopback

ENA = Enabled

DSA = Disabled

2. Enter command with required TYPE options. If default alarm thresholds are appropriate, the OPTS field can be omitted from the command.
3. Check the output mesage to verify type and option selections.
4. When the PL field is not specified, the default is payload loopback enabled.

Install Circuit Packs and Grow Type DA NPC

1. Install the TG191 circuit pack in the NPC slot.
2. Familiarize yourself with the command as follows:

```
GRTH::NPC <npc No.> [-<range>],TYPE mnxyz\
[,OPTS(rr/m[,rr/m][...])][,IW X'pq[,INCL]\
[,AIS {INFO|MJ|MN}][,PL {ENA|DSA}]!
```

Where:

<npc No.> = NPC number.

<range> = Optional, last NPC of continuous range of NPCs.

mn = NPC type DA.

xyz = NPC type identifier. The following table contains identifier definitions.

Bit	Value	Explanation
x	0	Not assigned
	1	D4
	2	ESF - voice
	3	ESF - data
	4	DDST (T1DM - R bit connection via channel 24)
	5-7	Not assigned
	8	Ericson Cellular Framing Format
	9	Not assigned
y	0	Zero Code Suppression
	1*	No Zero Code Suppression
	2*	Bipolar with 8 Zero Substitution
	3	Not assigned
	4	Zero Code Suppression/DMI signaling
	5	No Zero Code Suppression/DMI signaling
	6	Bipolar with 8 Zero Substitution/DMI signaling
	7-9	Not assigned
z	0	D4 channel bank channel numbering
	1	D2 channel bank channel numbering
	2	D1D channel bank channel numbering
	3-8	Not assigned
	9	Unchannelized 193-bit Clear Ds1 cross-connection

* Options 1 and 2 are only applicable to DA type clear-DS1 NPCs.

NOTE:
DMI signaling cannot be specified in the y field if the x field is set to 4 (DDST framing).

rr = Facility performance parameter number. The following table contains valid values.

rr	Parameter
41	Daily near-end path coding violations
42	Daily near-end path errored seconds
43	Daily near-end path severely errored seconds
44	Daily near-end severely errored framing seconds
45	Daily near-end path controlled slip seconds
46	Daily near-end path unavailable seconds
47	Daily near-end line coding violations
48	Daily near-end line errored seconds
49	Daily near-end line severely errored seconds
50	Daily far-end path coding violations
51	Daily far-end path errored seconds
52	Daily far-end path severely errored seconds
53	Daily far-end severely errored framing seconds
54	Daily far-end path controlled slip seconds
55	Daily far-end path unavailable seconds
56	Daily far-end line errored seconds
57	15-minute near-end path coding violations
58	15-minute near-end path errored seconds
59	15-minute near-end path severely errored seconds
60	15-minute near-end severely errored framing seconds
61	15-minute near-end path controlled slip seconds
62	15-minute near-end path unavailable seconds
63	15-minute near-end line coding violations
64	15-minute near-end line errored seconds
65	15-minute near-end line severely errored seconds
66	15-minute far-end path coding violations
67	15-minute far-end path errored seconds
68	15-minute far-end path severely errored seconds
69	15-minute far-end severely errored framing seconds
70	15-minute far-end path controlled slip seconds
71	15-minute far-end path unavailable seconds
72	15-minute far-end line errored seconds

m = Facility performance threshold index (0 through 3).

IW = Insertion word.

INCL = Inclusive.

AIS = Alarm Indication Signal.

INFO = Information message (not an alarm).

MJ = Major

MN = Minor

PL = Payload loopback

ENA = Enabled

DSA = Disabled

3. Enter command with required TYPE options. If default alarm thresholds are appropriate, the OPTS field can be omitted from the command.
4. Check the output mesage to verify type and option selections.
5. When the PL field is not specified, the default is payload loopback enabled.

Restore NPC

Overview: Until NPCs are restored to service, facility alarms are not registered and DACS II sends trunk conditioning out over the facility. In the process of restoring, the DACS II runs both an out-of-service and in-service diagnostic and provisions the NPCs according to the NPC growth information. The looped tests that are included in the diagnostics test the transmission paths in the NPC (except line transformers) and test some of the facility checking circuitry. A hardware failure will cause a failed diagnostic and a restore denial. A facility problem will cause a CGA or PBA alarm.

NOTE:
Early TG80s (before Series 5) cannot be grown as clear-DS1.

1. Enter **`RST:[FRM xy,SEQ ww]:NPC <npc No.>[-<range>]!`**

   Where:

   xy = DACS II frame number (00 through ZZ)

   ww = Command sequence number (00 through 49)

   <npc No.> = NPC number, either extended (for example, [0]001) or hierarchical (for example, 01101)

   <range> = Optional, to name the final NPC when it is desired to restore a continuous range of IFTU2-NPCs.

   - If the command is denied, find the reason for the denial and perform corrective action to obtain command completion (*Command Denials* has explanations of denial codes).

2. Repeat the procedure as needed to restore other NPCs (or groups of NPCs).

   NOTE:
   If a NPC is restored but its FTMI is OOS the **`UTL::QRY,STATE!`** command will not show the alarm counts and alarms will not be displayed.

Install Circuit Packs and Grow IFTU2 NPC (with *SLC* Carrier)

Install Circuit Packs

SLC 96 Carrier Mode III

Consider the following guidelines on the assignment of NPC slots and install the circuit pack cards for the NPCs to be equipped:

— All lines from the same RT (remote terminal) should go to the same IFTU2.

— The NPCs for DGA and DGP must be fed by different IFTU2 fuses; each IFTU2 fuse feeds eight NPCs.

— Two digroups from the same RT must connect to different dual digroup cards for service diversity.

— The TG183 (S96D) card must be used for *SLC* carrier digroups carrying the data link (DGA and DGP), but either the TG183 or TG80B can be used for the other *SLC* carrier digroups.

SLC 96 Carrier Mode I

Consider the following guidelines on the assignment of NPC slots and install the circuit pack cards for the NPCs to be equipped:

— All lines from the same RT (remote terminal) must go to the same IFTU2.

— The NPCs for DGA and DGP must be fed by different IFTU2 fuses; each IFTU2 fuse feeds eight NPCs.

— Two digroups from the same RT must connect to different dual digroup cards for service diversity.

— The TG183 (S96D) card must be used for *SLC* carrier digroups carrying the data link (DGA and DGP), but either the TG183 or TG80B can be used for the other *SLC* carrier digroups.

— The NPCs going to DGA at the RT and DCLU must be on the same S96D card.

NOTE:
There is no DGP at the DCLU, thereby eliminating the protection line between the DCLU and DACS II.

SLC Series 5 Carrier FPC (Feature Package C) - Retrofit Facility and New Facility

Consider the following guidelines on the assignment of NPC slots and install the circuit pack cards for the NPCs to be equipped:

— All lines from the same RT must go to the same FTM for *SLC* Series 5 carrier.

— The NPCs for DGA and DGP must be fed by different IFTU2 fuses; each IFTU2 fuse feeds eight NPCs.

— Two digroups from the same RT must connect to different dual digroup cards for service diversity.

— Install TG184 (SS5D card) for *SLC* Series 5 carrier.

SLC Series 5 Carrier FPB (Feature Package B)

Consider the following guidelines on the assignment of NPC slots and install the circuit pack cards for the NPCs to be equipped:

— All lines from the same RT or DCLU (digital carrier line unit) must go to the same IFTU2.

— The TG183 (S96D) card must be used for *SLC* carrier digroups carrying the data link (DGA and DGP), but either the TG183 or TG80B can be used for the other *SLC* carrier digroups.

— The TG183 (S96D card) must be used for *SLC* Series 5 carrier FPB digroups.

— The NPCs going to DGA at the RT and DGA at the DCLU must be on the same S96D card.

— Two digroups from the same RT (or DCLU) must connect to different S96D cards for diversity.

NOTE:
There is no DGP at the DCLU, thereby eliminating the protection line between the DCLU and DACS II.

Grow NPC

Grow Type DS NPC

Overview: DS1 line formats, alarm threshold options, and the channel insertion word are entered in this command. The NPC records facility slips, bit error rate, errored seconds, severe errored seconds, change of frame alignment and, for *SLC* 96 carrier, records shelf alarms from the RT equipment. Either default values or stored optional values for the alarm thresholds and shelf alarms are selected with this command. These options (not the default values) must first be entered in the data base by the CHG SETOP command. The IW (insertion word) that is defined here for the NPC is sent out on the channels when the NPC is out of service or the channels are not yet cross-connected.

1. Familiarize yourself with the command as follows and the variables per Table 3-49: **`GRTH::NPC <npc No.>[-<range>],TYPE DSxyz [,OPTS(rr/l,ss/m...,tt/n)][,IW X'pq]!`**

   Where:

<npc No.>	=	NPC number, either extended (for example, [0]001) or hierarchical (for example, 01101).
<range>	=	Last NPC in a range.
xyz	=	DS1 line format and channel counting options per Table 3-49. See example in Step **2**.
rr/l, tt/n	=	Optional to select any one or all alarm types (01 through 10) per Table 3-50 and previously defined options (1, 2, or 3). Shelf alarms are not selectable for *SLC* Series 5 carrier.
IW X'pq	=	Optional to specify HEX code for IW pattern either pq = FF for all 1s pattern, or pq = 7F for unassigned channel code (default value).

2. See the following example and notes. If optional alarm thresholds or IW are not given (nor required), the corresponding fields can be omitted from the command.

   EXAMPLE: **`GRTH::NPC 012,TYPE DS600,OPTS(01/1,03/2),IW X'FF!`**

   NOTE:
   The y value for the line format will always be as follows:

   y = 0 or 2 for a line going to a *SLC* 96 carrier RT.
   y = 0 for a line going to a *SLC* Series 5 FPB RT.
   y = 0 or 2 for a line going to a *SLC* Series 5 FPC RT.

   NOTE:
   The Fs framing format (DS60-) is used for *SLC* 96 carrier and Series 5 FPB: DGA (with data link) and DGP NPCs.

   NOTE:
   The extended superframe (ESF) line format is required for lines going to *SLC* Series 5 carrier FPC RTs.

3. Enter command with required information.
   - If the command is denied, find the reason for the denial and perform corrective action to obtain command completion (*Command Denials* has explanations of denial codes).

NOTE:
For *SLC* Series 5 carrier, the same type of zero code suppression (ZCS or B8ZS) must be used at both the DACS II and RT equipment or CRC6 errors can occur on the line.

4. Check output message to verify type and option selections.

Table 3-49. Type DS Options

Option	Meaning
X	**Multiframe Format**
0	Unassigned
1	D4 bank
2	ESF (extended superframe) - voice
3	Unassigned
4	Unassigned
5	Unassigned
6	*SLC*® 96 carrier Fs format
7	*SLC* Series 5 ESF with data link
8,9	Unassigned
Y	**Zero Code Suppression**
0	ZCS (zero code suppression
1	NZCS (no zero code suppression)
2	B8ZS (bipolar with 8 zero substitution)
3-9	Unassigned
Z	**Channel Counting Sequence**
0	*SLC* 96 carrier Mode III, D4 bank sequence
1	*SLC* 96 carrier Mode III, D1D bank sequence
2	*SLC* 96 carrier Mode I, D1D bank sequence
3	*SLC* Series 5 carrier, D4 bank sequence
4-9	Unassigned

Table 3-50. Facility Thresholds

Option (rr)	Parameter	Range	Default
01	SLIP major	000* to 255	255
02	SLIP minor	000* to 255	4
03	Bit error rate major	10^{-6} to 10^{-4}	10^{-4}
04	Bit error rate minor	10^{-6} to 10^{-4}	10^{-4}
05	Errored seconds	00001 to 65535	864
06	Severe errored seconds	001 to 255	225
07	Change of frame alignment, major	001 to 511	511
08	Change of frame alignment, minor	001 to 255	17
09	Shelf alarm, near end	00000 to 65535	00000
10	Shelf alarm, far end	00000 to 65535	00000

* Setting the SLIP threshold to zero suppresses the alarm.

Grow and Restore DS3U or HDS3U NPC

Grow NPCs (Part of EMXRs/MXRs/HMXRs)

Overview: This procedure is used to enter the type specifications of the NPCs on the EMXR/MXR/HMXR pack. These NPCs are incorporated in the EMXR/MXR/HMXR pack and are not separate circuit packs. The type specification determines the basic operation and the line and channel formats of the DS1 signal. Optional fields in the growth command allow selecting different facility performance alarm thresholds and specifying a particular insertion word. The alarm threshold options are only applicable to the TE type. The IW for the NPC is sent out on all 24 channels when the NPC is out-of-service, and unless set otherwise by a disconnect command, is sent out on any not-connected channel. The IW is not applicable to clear-channel DS1 for which an AIS is sent in the disconnected or idle state.

1. Familiarize yourself with the command as follows:
   GRTH:[FRM xy,SEQ ww]:NPC <npc No.>[-<range>],
   TYPE mnxyz[,OPTS(rr/l,ss/m,...tt/n)][,IW X'pq[,INCL]]!

   Where:

   xy = DACS II frame number (00 through ZZ).
   ww = Command sequence number (00 through 49).
   <npc No.> = NPC number, either extended (for example, [0]001) or hierarchical (for example, 01101). The additional NPCs on the DS3 are identified by suffix, A through H for extended.
   <range> = Optional, for last NPC of continuous range to be grown.
   mn = Type designation, mn = **TE** for DS1.
   xyz = Format specification; see Table 3-51. TE100 is default.

rr,ss,tt = Optional field for type TE NPC to select nondefault alarm thresholds; see Table 3-52 for code to represent facility parameter.

l,m,n = Option number (1 through 3) which has been predefined in the data base; 0 selects default value.

pq = Optional, hexadecimal notation to specify IW pattern. Typical values are 7F (default), 18 for T1DM format, or FF for all 1s.

INCL = Optional, used when provisioning an NPC with D4 framing and an insertion word with bit 2 equal to zero.

2. Consider the following restrictions:
   - Only y = 1 (NZCS) is applicable for Type TE clear-channel NPC.
   - For clear-DS1, only SLIP major and minor thresholds (rr = 01 and 02) can be specified in the OPTS field. The IW field is not used at all.

3. Enter command with required information. If default alarm thresholds and IW are appropriate for the NPCs, the corresponding optional fields can be omitted from the command. See Note.

   EXAMPLE: GRTH::NPC 16A,TYPE TE110,OPTS(01/1,03/2,07/2),IW X'FF!

   - If the command is denied, find the reason for the denial and perform corrective action to obtain command completion (*Command Denials* has explanations of denial codes).

4. Check output message to verify type and option entries.

Table 3-51. NPC Options

Option	Type TE	Type TI
X	**Multiframe Format**	**Multiframe Format**
0	Unassigned	Unassigned
1	D4 Bank	Interface Unit, D4-Bank
2	Extended Super Frame - Voice	Interface Unit, ESF
3	Extended Super Frame - Data	Unassigned
4	DDS T1DM Word 24 FDL	Interface Unit, T1DM
5-8	Unassigned	Unassigned
9	No Framing, Clear-DS1	Unassigned
Y	**Zero Suppression**	**Zero Suppression**
0	Zero Code Suppression (ZCS)	Same as TE
1	No Zero Code Suppression	Same as TE
2	Not Allowed	Not Allowed
3	Not Allowed	Unassigned
4	DMI with ZCS	Unassigned
5	DMI with no ZCS	Unassigned
6	Not Allowed	Unassigned
7-9	Unassigned	Unassigned
Z	**Channel Counting**	**Channel Counting**
0	D4 Bank/Sequential	Same as TE
1	D2 Bank	Same as TE
2	D1D Bank	Same as TE
3-8	Unassigned	Same as TE
9	No Channels, Clear-DS1	Unassigned

Table 3-52. Facility Parameters

Type (rr,ss,tt,...)	Meaning
01	SLIPs, Major Alarm
02	SLIPs, Minor Alarm
03	BER (bit error rate), Major Alarm
04	BER, Minor Alarm
05	ERS (errored seconds) T1DM and ESF Formats
06	SERS (severely errored seconds)
07	COFA (change of frame alignment), Major Alarm
08	COFA, Minor Alarm

Install Circuit Packs and Grow Type TA NPC

1. Install the KCR5 and KCR6 circuit pack in the EMXR/EMIU slot. Please note that TA type NPCs are not allowed with a Hybrid DS3U, even if equipped with KCR5 circuit packs.

   NOTE:
   When installing a EMXR/EMIU in the service slot, one must also be installed in the protection slot.

2. Familiarize yourself with the command as follows:

```
GRTH::NPC <npc No.> [-<range>],TYPE mnxyz\
[,OPTS(rr/m[,rr/m][...])][,IW X'pq[,INCL]]\
[,AIS {INFO|MJ|MN}][,PL {ENA|DSA}]
```

   Where:

   <npc No.> = NPC number.

   <range> = Optional, last NPC of continuous range of NPCs.

   mn = NPC type TA.

   xyz = NPC type identifier. The following table contains identifier definitions.

Bit	Value	Explanation
x	0	Not assigned
	1	D4
	2	ESF - voice
	3	ESF - data
	4	DDST (T1DM - R bit connection via channel 24)
	5-7	Not assigned
	8	Ericson Cellular Framing Format
	9	Not assigned
y	0	Zero Code Suppression
	1*	No Zero Code Suppression
	2	Not assigned
	3	Not assigned
	4	Zero Code Suppression/DMI signaling
	5	No Zero Code Suppression/DMI signaling
	6-9	Not assigned
z	0	D4 channel bank channel numbering
	1	D2 channel bank channel numbering
	2	D1D channel bank channel numbering
	3-8	Not assigned
	9	Unchannelized 193-bit Clear Ds1 cross-connection

* Option 1 is only applicable to TA type clear-DS1 NPCs.

NOTE:
DMI signaling cannot be specified in the y field if the x field is set to 4 (DDST framing).

rr = Facility performance parameter number. The following table contains valid values.

m = Facility performance threshold index (0 through 3).

rr	Parameter
41	Daily near-end path coding violations
42	Daily near-end path errored seconds
43	Daily near-end path severely errored seconds
44	Daily near-end severely errored framing seconds
45	Daily near-end path controlled slip seconds
46	Daily near-end path unavailable seconds
50	Daily far-end path coding violations
51	Daily far-end path errored seconds
52	Daily far-end path severely errored seconds
53	Daily far-end severely errored framing seconds
54	Daily far-end path controlled slip seconds
55	Daily far-end path unavailable seconds
57	15-minute near-end path coding violations
58	15-minute near-end path errored seconds
59	15-minute near-end path severely errored seconds
60	15-minute near-end severely errored framing seconds
61	15-minute near-end path controlled slip seconds
62	15-minute near-end path unavailable seconds
66	15-minute far-end path coding violations
67	15-minute far-end path errored seconds
68	15-minute far-end path severely errored seconds
69	15-minute far-end severely errored framing seconds
70	15-minute far-end path controlled slip seconds
71	15-minute far-end path unavailable seconds

IW	=	Insertion word.
INCL	=	Inclusive.
AIS	=	Alarm Indication Signal.
INFO	=	Information message (not an alarm).
MJ	=	Major
MN	=	Minor
PL	=	Payload loopback
ENA	=	Enabled
DSA	=	Disabled

3. Enter command with required TYPE options. If default alarm thresholds are appropriate, the OPTS field can be omitted from the command.
4. Check the output mesage to verify type and option selections.
5. When the PL field is not specified, the default is payload loopback enabled.

Grow Type TE NPCs

Overview: This procedure is used to enter the type specifications of the NPCs on the MXR or HMXR pack. The procedure is optional if the NPCs were restored with the MXR or HMXR. These NPCs are incorporated in the MXR or HMXR pack and are not separate circuit packs. The type specification determines the basic operation (TE) and the line and channel formats of the DS1 signal. Optional fields in the growth command allow selecting different facility performance alarm thresholds and specifying a particular insertion word. The IW for the NPC is sent out on all 24 channels when the NPC is out-of-service, and unless set otherwise by a disconnect command, is sent out on any not-connected channel. The IW is not applicable to clear-channel DS1 for which an AIS is sent in the disconnected or idle state.

1. Familiarize yourself with the command as follows:
   `GRTH:[FRM xy,SEQ ww]:NPC <npc No.>[-<range>],`
   `TYPE mnxyz[,OPTS(rr/l,ss/m,...tt/n)][,IW X'pq[,INCL]]!`

   Where:

xy	=	DACS II frame number (00 through ZZ).
ww	=	Command sequence number (00 through 49).
<npc No.>	=	NPC number, either extended (for example, [0]001) or hierarchical (for example, 01101). The additional NPCs on the DS3 are identified by suffix, A through H.
<range>	=	Optional, for last NPC of continuous range to be grown.
mn	=	Type designation, mn = **TE** for DS1 without interface unit operation.
xyz	=	Format specification; see Table 3-53. TE100 is default.
rr,ss,tt	=	Optional field for type TE NPC to select nondefault alarm thresholds; see Table 3-54 for code to represent facility parameter.
l,m,n	=	Option number (1 through 3) which has been predefined in the data base; 0 selects default value.
pq	=	Optional, hexadecimal notation to specify IW pattern. Typical values are 7F (default), 18 for T1DM format, or FF for all 1s.
INCL	=	Optional, used when provisioning an NPC with D4 framing and an insertion word with bit 2 equal to zero.

2. Consider the following restrictions:

   — Only y = 1 (NZCS) is applicable for Type TE clear-channel NPC.

   — For clear-DS1, only SLIP major and minor thresholds (rr = 01 and 02) can be specified in the OPTS field. The IW field is not used at all.

3. Enter command with required information. If default alarm thresholds and IW are appropriate for the NPCs, the corresponding optional fields can be omitted from the command. See Note.

EXAMPLE: GRTH::NPC 16A,TYPE TE110,OPTS(01/1,03/2,07/2),IW X'FF!

NOTE:
For clear-DS1, the IW field is not applicable and only SLIP major and minor alarm thresholds can be specified.

- If the command is denied, find the reason for the denial and perform corrective action to obtain command completion (*Command Denials* has explanations of denial codes).

4. Check output message to verify type and option entries.

Table 3-53. NPC Options

Option	Type TE
X	**Multiframe Format**
0	Unassigned
1	D4 Bank
2	Extended Super Frame - Voice
3	Extended Super Frame - Data
4	DDS T1DM Word 24 FDL
5-7	Unassigned
8	Ericson Cellular Framing Format
9	No Framing, Clear-DS1
Y	**Zero Suppression**
0	Zero Code Suppression (ZCS)
1	No Zero Code Suppression
2	Not Allowed
3	Not Allowed
4	DMI with ZCS
5	DMI with no ZCS
6	Not Allowed
7-9	Unassigned
Z	**Channel Counting**
0	D4 Bank/Sequential
1	D2 Bank
2	D1D Bank
3-8	Unassigned
9	No Channels, Clear-DS1

Table 3-54. Facility Parameters

Type (rr,ss,tt,...)	Meaning
01	SLIPs, Major Alarm
02	SLIPs, Minor Alarm
03	BER (bit error rate), Major Alarm
04	BER, Minor Alarm
05	ERS (errored seconds) T1DM and ESF Formats
06	SERS (severely errored seconds)
07	COFA (change of frame alignment), Major Alarm
08	COFA, Minor Alarm

Restore NPCs

Overview: In the process of restoring, the DACS II runs both an out-of-service and in-service diagnostic and provisions the NPCs according to the NPC growth information. A hardware failure will cause a failed diagnostic and a restore denial.

1. Enter **`RST:[FRM xy,SEQ ww]:NPC <npc No.>[-<range>]!`**

   Where:

   xy = DACS II frame number (00 through ZZ).

   ww = Command sequence number (00 through 49).

   <npc No.> = NPC number, either extended (for example, [0]001) or hierarchical (for example, 01101).

   <range> = Optional, to name the final NPC when it is desired to restore a continuous range of IFTU2-NPCs.

   - If the command is denied, find the reason for the denial and perform corrective action to obtain command completion (*Command Denials* has explanations of denial codes).

2. Repeat the procedure as needed to restore other NPCs (or groups of NPCs).

Install, Grow Circuit Packs and Restore DSPU NPC

Install DSP NPC Circuit Packs (DMB or Subrate -- SRM, MJU)

1. Working on either DSPU side, enter **`RMV::{CCNI|CCI} s!`**

   Where:
   CCNI = CCN for non-CEF
   CCI = ECCN for CEF
   s = DSPU side (0 or 1).

   NOTE:
   The ECCN side is removed here to prevent an alarm (and DSP removal) on other in-service DSPs on the same port.

2. Install required processing CPs (for example, TM655 DMBs) in assigned NPC/DSP slots.
3. Enter **`RST::{CCNI|CCI} s!`** for the same side, and then enter **`RMV::{CCNI|CCI} s!`** for the other side of the DSPU.
4. Install required processing CPs (for example, TM655 DMBs) in assigned NPC/DSP slots. The NPCs are duplicated in both the 0DSPU and 1DSPU sides; cards must be installed in the same NPC slots on both sides.
5. Enter **`RST::{CCNI|CCI} s!`** to restore the corresponding network side to service.

Grow DSP NPC

1. Check circuit order information and office records to determine the next NPC to be grown for use for DMBs (digital multipoint bridges) or subrate data processing.

   NOTE:
   For DMB circuits, the pair of NPCs for each DMB is grown simultaneously by naming the lower NPC number in the command.

2. Enter **`GRTH:[FRM xy,SEQ ww]:NPC <npc No.>,TYPE mnxyz!`** to grow the next NPC.

   NOTE:
   The command completion message will name both NPCs of the pair that has been grown.

   - If the command is denied, find the reason for the denial and perform corrective action to obtain command completion (*Command Denials* has explanations of denial codes).

Where:

xy	=	DACS II frame number (00 through ZZ).
ww	=	Command sequence number (00 through 49).
<npc No.>	=	Next addressable NPC in DSPU (lower NPC of each pair), either extended (for example, [0]001) or hierarchical (for example, 01101).
mnxyz	=	Type specification. MB100 for digital multipoint bridge, SR100 for subrate data multiplexer, or MJ100 for subrate data multipoint junction unit.

Change Subrate Hub ID

Overview: This procedure sets or changes the HUBID number.

1. Enter **`CHG:[:FRM xy,SEQ ww]:HUBID O'ab!`**

   Where:

   xy = Double-digit number assigned to the frame when it is placed in service. If command is issued to a remote frame, the frame number **must** be entered.

   ww = Identifying double-digit number assigned to the command (arbitrarily chosen by the operator). If the command is being issued to a remote frame, the sequence number **must** be entered.

   ab = HUBID code (two octal digits; each digit can have a value of 0 to 7).

   - If the command is denied, find the reason for the denial and perform corrective action to obtain command completion (*Command Denials* has explanations for denial codes).

Change Hub ID on 19.2-kb/s MJU Circuit Pack

1. With the MJU circuit pack out of the shelf, locate the 6-position miniature switch (DIP switch) on the backside of the MJU circuit board. This switch is the only one on the backside of the board, and it is located near the right-side edge.

2. Familiarize yourself with making settings on the switch. The six rocker positions designated 1 through 6 allow setting hub ID numbers from 1 to 64. The six rockers correspond to six digits of a binary number (2^0, 2^1, 2^2, 2^3, 2^4, and 2^5 which have the values 1, 2, 4, 8, 16, and 32 respectively).

   NOTE:
   Counting with binary numbers proceeds as follows - 00001, 00010, 00011, 00100, 00101, 00110, 00111, 01000. For higher numbers, you add the selected values together; for example, to represent the number 50, the binary number would be 11010 (32 + 16 + 2).

3. Set the rockers on the DIP switch to select the required hub ID number. To select a position value, push the rocker to the on (1) position.

   NOTE:
   The selected hub ID will be effective when the circuit pack is inserted (with the reset that occurs when the MJU is powered up) and will be read again whenever the **RESET** button on the circuit pack is operated.

4. Repeat the procedure to set the hub ID on the other MJUs in the self.

Restore DSPU NPC

NOTE:
In the process of restoring, the DACS II runs both an out-of-service and in-service diagnostic and provisions the NPCs according to the NPC growth information. A hardware failure will cause a failed diagnostic and a restore denial.

1. Enter **`RST:[FRM xy,SEQ ww]:NPC <npc No.>,SIDE s!`**

   Where:

   xy = DACS II frame number (00 through ZZ)

   ww = Command sequence number (00 through 49)

   <npc No.> = NPC number, either extended (for example, [0]001) or hierarchical (for example, 01101)

   s = DSPU side (0 or 1).

   - If the command is denied, find the reason for the denial and perform corrective action to obtain command completion (*Command Denials* has explanations of denial codes).

   NOTE:
   With DMB circuit packs, both the NPCs on the circuit pack will be restored when the lower numbered NPC of the pair is entered in the command.

2. Repeat the procedure as needed to restore NPC on the other side and any other NPCs, as required.

Change NPC Parameters

Change NPC Type, IW, or ALMOPT-AIS

Overview: This procedure allows changing an NPC's line format type, the NPC IW (insertion word), and the AIS alarm status. The insertion word is sent on unassigned (not-connected) channels and all channels when the NPC is removed from service to indicate these conditions to the far-end equipment. To change the IW, the NPC type specification must be reentered in the command. Whenever the NPC type is changed, all programmable alarm thresholds revert to default values and may also have to be changed.

1. Enter **RMV::NPC <npc No.>[,INCL]!** to remove the NPC from service.

   Where:

   <npc No.> = NPC number, either extended (for example, [0]001) or hierarchical (for example, 01101).

   INCL = Optional, to allow removal when NPC carries special service circuits.

2. Familiarize yourself with the commands:

   - If TYPE or IW:
     CHG::NPC <npc No.>,TYPE mnxyz[,IW X'pq]!
   - If ALMOPT AIS:
     CHG::NPC <npc No.>[-<range>][,TYPE mnxyz]
     [,ALMOPT,AIS {INFO|MJ|MN}]!

   Where:

   mnxyz = Desired NPC type given by appropriate designation (mn =DE for enhanced DS1 digroup, =TE for DS1 embedded in DS3 signal) and "xyz" specification for type per Tables 3-55 and 3-56.

   <range> = Optional, the last NPC of continuous range of NPCs.

   IW X'pq = Insertion word given as hexadecimal code; each digit specifies 4 bits. Typical IW codes are: 7F (default for types DE and DS) and 18 (for type DE, Digital Data System). Not selectable for clear-DS1 which uses AIS signal.

   ALMOPT field = Allows changing the option for receipt of AIS (alarm indication signal) to INFO (information), MJ (major alarm), or MN (minor alarm).

3. Consider the following background information:
   - — Zero code suppression inserts 1s for adequate line drive as opposed to B8ZS for unrestricted data patterns for multiplexers (the far-end multiplexer removes B8ZS code).
   - — The DMI interface for digital PBXs uses both A and B signaling and 64 kb/s clear channel; it cannot be used with DDS where word 24 is needed.
4. Enter the command(s) for the desired change(s). The NPC type must be included in the command to change the IW (insertion word), but need not be entered to change just the AIS alarm option.
   - ■ If the command is denied, find the reason for the denial and perform corrective action to obtain command completion (*Command Denials* has explanations of denial codes).
5. Check completion message to verify changes.
6. Enter **`RST::NPC <npc No.>!`** to restore NPC to service.

Table 3-55. Type DE NPC Options

Option	DE
X	Multiframe Format
0	Unassigned
1	D4 Bank Format
2	Extended Super Frame - Voice
3	Extended Super Frame - Data
4	DDS, T1DM Word 24
5-8	Unassigned
9	No Framing, Clear-DS1
Y	**Zero Suppression**
0	Zero Code Suppression
1	No Zero Code Suppression
2	Bipolar with 8 Zero Substitution
3	ZBTSI with TG186 and ESF Format
4	DMI with ZCS
5	DMI with no ZCS
6	DMI with B8ZS
7-9	Unassigned
Z	**Channel Counting**
0	D4 Bank/Sequential
1	D2 Bank
2	D1D Bank
3	Unassigned
4	Unassigned
5-8	Unassigned
9	No Channels, Clear-DS1

Table 3-56. Type TE (DS3 Component) NPC Options

Option	Type TE
X	**Multiframe Format**
0	Unassigned
1	D4 Bank
2	Extended Super Frame - Voice
3	Extended Super Frame - Data
4	DDS T1DM Word 24
5-8	Unassigned
9	No Framing, Clear-DS1
Y	**Zero Suppression**
0	Zero Code Suppression
1	No Zero Code Suppression
2	Unassigned
3	Unassigned
4	DMI with ZCS
5	DMI with no ZCS
6	Unassigned
7-9	Unassigned
Z	**Channel Counting**
0	D4 Bank/Sequential
1	D2 Bank
2	D1D Bank
3-8	Unassigned
9	No Channels, Clear-DS1

Table 3-57. Type DA NPC Options

Option	Type DA
X	**Multiframe Format**
0	Unassigned
1	D4 bank
2	Extended Super Frame - Voice
3	Extended Super Frame - Data
4	DDST (T1DM - R bit connection via channel 24)
5-7	Unassigned
8	Ericsson Cellular format
9	Unassigned
Y	**Line and signaling format**
0	Zero Code Suppression (ZCS)
1*	No Zero Code Suppression (NZCS)
2*	Bipolar with 8 zero substitution (B8ZS)
3	Unassigned
4	DMI with ZCS
5	DMI with NZCS
6	DMI with B8ZS
7-9	Unassigned
	* Only options 1 and 2 are applicable to DA-type clear-DS1 NPC.
Z	**Channel numbering format**
0	D4 Bank
1	D2 Bank
2	D1D Bank
3-8	Unassigned
9	No Channels, Clear-DS1

NOTE:
DMI signaling cannot be specified in the **y** field if the **x** field is 4 (DDST framing).

Table 3-58. Type DS NPC Options

Option	Type DS
X	**Multiframe Format**
0	Unassigned
1	D4 Bank
2	Extended Super Frame - Voice
3-5	Unassigned
6	SLC 96 carrier Fs
7	SLC 5 carrier ESF with data link
8-9	Unassigned
Y	**Line and signaling format**
0	ZCS
1	NZCS
2	B8ZS
3-9	Unassigned
Z	**Counting sequence format**
0	SLC 96 carrier Mode III D4
1	SLC 96 carrier Mode III D1D
2	SLC 96 carrier Mode I D1D
3	SLC Series 5 carrier D4
4-9	Unassigned

For DS-type NPCs only, all cross-connects must be disconnected before the NPC's type can be changed because the NPC must be deleted from the RT in order to change the NPC types.

Table 3-59. Type TA NPC Options

Option	Type TA
X	**Multiframe Format**
0	Unassigned
1	D4 Bank
2	Extended Super Frame - Voice
3	Extended Super Frame - Data
4	DDST
5-7	Unassigned
8	Ericsson Cellular format
9	Unassigned
Y	**Line and signaling format**
0	ZCS
1*	NZCS
2-3	Unassigned
4	DMI with ZCS
5	DMI with NZCS
6-9	Unassigned
	* Only option 1 is applicable to TA-type clear-DS1 NPCs.
Z	**Channel numbering format**
0	D4 Bank
1	D2 Bank
2	D1D Bank
3-8	Unassigned
9	No Channels, Clear-DS1

NOTE:
DMI signaling cannot be specified in the **y** field if the **x** field is 4 (DDST framing).

Change Alarm Threshold

Overview: The command in this procedure is used to change alarm thresholds for any or all the facility parameters for type DE/TE/DS and type PB/PC NPCs. The combined parameters for types DE and PB are: ERS (errored seconds), SERS (severely errored seconds), DM (degraded minutes), US (unavailable seconds), BER (bit error rate), COFA (change of frame alignment) and slips. For type DE/TE/DS NPCs, three options can be selected for each associated parameter. For the type PB/PC NPC, three options can be selected for each associated parameter and each alarm class (maintenance information, deferred, or prompt). Command options allow changing the thresholds for only the subject NPC or all NPCs of the same type. To change alarm thresholds, the identifiers for the parameters (any one or all) are listed along with the desired threshold option for each. The threshold values must be previously established using the CHG SETOP command (refer to *Set Optional Alarm Threshold in Data Base*).

1. Familiarize yourself with command as follows and parameter identifiers given in Table 3-60:

```
CHG::{NPC <npc No.>|TYPE mnxyz},OPTS(rr/l,ss/m ...,tt/n)!
```

Where:

NPC or TYPE field = Selects number of NPCs to be changed: NPC given as extended (for example, [0]001), hierarchical (for example, 01101), or all NPCs with the same type specification (mnxyz).

rr/l,ss/m = Listing of any of the associated alarm types (01 through 10 and 31 through 40) per Table 3-60 and predefined number (0 through 3 or 0 through b) per Table 3-61 which selects alarm threshold. Monitoring of a parameter can be disabled by entering a "c" for the alarm threshold.

2. See the following example of the command in which new major alarm options are being selected for ERS and SLIPS.

   EXAMPLE: **CHG::NPC 012,OPTS(01/1,03/2)!**

3. Obtain or determine information needed for command. You can enter **UTL::QRY,OPT[,{TYPE mn|ALL}],NPCS!** to see the actual option values that have been established in the data base for all the NPCs.

4. Enter command with required information.

   - If the command is denied, find the reason for the denial and perform corrective action to obtain command completion (*Command Denials* has explanations of denial codes).

5. Check the output message to confirm that the information was entered correctly.

Table 3-60. Alarm Parameters (DE/TE/DS/DA/TA Type NPCs)

Type (rr,ss,tt)	Meaning
01	Type DE/TE/DS SLIPs, Major Alarm
02	Type DE/TE/DS SLIPs, Minor Alarm
03	Type DE/TE/DS BER, Major Alarm
04	Type DE/TE/DS BER, Minor Alarm
05	Type DE/TE/DS ERS
06	Type DE/TE/DS SERS
07	Type DE/TE/DS COFA, Major Alarm
08	Type DE/TE/DS COFA, Minor Alarm
09	Type DS SANE
10	Type DS SAFE
41	Type DA/TA Near-end Path CV, Daily
42	Type DA/TA Near-end Path ES, Daily
43	Type DA/TA Near-end Path SES, Daily
44	Type DA/TA Near-end SEFS, Daily
45	Type DA/TA Near-end CSS, Daily
46	Type DA/TA Near-end US, Daily
47	Type DA/TA Near-end Line CV, Daily
48	Type DA/TA Near-End Line ES, Daily
49	Type DA/TA Near-end Line SES, Daily
50	Type DA/TA Far-end Path CV, Daily
51	Type DA/TA Far-end Path ES, Daily
52	Type DA/TA Far-end Path SES, Daily
53	Type DA/TA Far-end SEFS, Daily
54	Type DA/TA Far-end CSS, Daily
55	Type DA/TA Far-end US, Daily
56	Type DA/TA Far-end Line ES, Daily
57	Type DA/TA Near-end Path CV, 15 Min.
58	Type DA/TA Near-end Path ES, 15 Min.
59	Type DA/TA Near-end Path SES, 15 Min.
60	Type DA/TA Near-end SEFS, 15 Min.
61	Type DA/TA Near-end CSS, 15 Min.
62	Type DA/TA Near-end US, 15 Min.
63	Type DA/TA Near-end Line CV, 15 Min.
64	Type DA/TA Near-End Line ES, 15 Min.
65	Type DA/TA Near-end Line SES, 15 Min.
66	Type DA/TA Far-end Path CV, 15 Min.
67	Type DA/TA Far-end Path ES, 15 Min.
68	Type DA/TA Far-end Path SES, 15 Min.
69	Type DA/TA Far-end SEFS, 15 Min.
70	Type DA/TA Far-end CSS, 15 Min.
71	Type DA/TA Far-end US, 15 Min.
72	Type DA/TA Far-end Line ES, 15 Min.

Table 3-61. DS1 Option Selection

Option (l,m,n)	Meaning
0	Default Value
1	First Option Value (set1)
2	Second Option Value (set2)
3	Third Option Value (set3)

Change Subrate ECLOC

Overview: Error correction is provided by the MJU or SRM circuit pack. Error correction should be assigned to the circuit pack with the most free space (an office with mostly two-point circuits would normally set ECLOC to the MJU circuit pack).

1. Enter **`CHG:[FRM xy,SEQ ww]:ECLOC,TYPE {MJU|SRM}!`**

   Where:
   xy = Double-digit number assigned to the frame when it is placed in service. If command is issued to a remote frame, the frame number **must** be entered.

   ww = Identifying double-digit number assigned to the command (arbitrarily chosen by the operator). If the command is being issued to a remote frame, the sequence number **must** be entered.

   - If the command is denied, find the reason for the denial and perform corrective action to obtain command completion (*Command Denials* has explanations of denial codes).

   NOTE:
   If the DNY message first line ends with {INERR|SYNTAX}2LN MSG, enter the command again. The input command has an error in it. The second line of the DNY message contains two equal signs (= =). The information within the equal signs is not acceptable.

TS0 (Time Slot 0)

Query or Change TS0 Bit Monitoring

Overview: This procedure contains both the commands to display the spare bits in TS0 (time slot 0) which are monitored and to set/change the monitoring. Once initialized, the DACS II monitors the bits for a change of state and issues an information message when a change occurs. This monitoring does not interfere with the signal framing at which time the TS0 bits are used to send the framing word. The normal state (0 or 1) of the monitored bits must have been previously set by the **`CHG TS0`** command. When a change of state occurs, the DACS II issues a TS0 R NPC message. If bits 3, 4 or 5, was assigned an alarm meaning when the NPC was grown, it will generate AR01 MISC PBA messages when the state changes. Those bits which were assigned when the NPC was grown cannot be selected for monitoring in this procedure.

1. What procedure do you want to perform?
   - If you want to see which bits are currently being monitored, continue with Step **2**.
   - If you want to change the TS0 monitoring, proceed to Step **4**.

2. Enter the command to retrieve the monitoring as follows:
   `UTL:[FRM xy,SEQ ww]:QRY,TS0M,NPC <npc No.>[-<range>]!`

   Where:

   xy = Optional, DACS II frame number (00 through ZZ).

   ww = Command sequence number (00 through 49).

   <npc No.> = NPC number, either extended (for example, [0]001) or hierarchical (for example, 01101).

   <range> = Optional, last NPC of continuous range of NPCs.

3. Read the bit monitoring of TS0 bits designated abcdefgh as follows: 0 for no monitoring and 1 for monitoring. This information appears under the TS0M caption line in the message. Table 3-62 identifies bits abcdefgh.

   NOTE:
   The defaults are 00000000 (for all types except TRANSMIC 1G) and 00111111 (for TRANSMIC 1G).

4. To change the monitoring, enter the command as follows:
   `CHG:[FRM xy,SEQ ww]:NPC <npc No.>[-<range>],TS0M abcdefgh!`

   Where: abcdefgh = Represents 8 TS0 bits per Table 3-62. Make entry for each bit as follows: 0 for no monitoring, 1 for monitoring, and dash (-) for no change. A dash or the value assigned during the NPC growth procedure must be entered for bits 3, 4 and 5 if these bits were assigned alarm meanings.

   - If the command was denied, find the reason for denial and perform corrective action to obtain command completion (*Command Denials* has explanations of denial codes).

5. Check the OLD and NEW fields in the output message to verify that the information was entered correctly.

Table 3-62. TS0 Bit Meanings

Variable	Meaning
a and b	International Bit (Si) in Frame and Not Frame Words (Only frames 13 and 15 with CRC enabled)
c	Not Selectable - Remote Alarm Indication
defgh	National Bits (b4 through b8)

Facilities

Establish DS1 Facility (without *SLC* Carrier)

Check Far-End Installation, Make DSX-1 Connections, and Remove Loops

1. Verify that far-end terminal equipment has been equipped and tested and verify that digital line has been established and tested.
2. Verify that far-end voice terminal has been optioned for looped timing (from DACS II) or external timing from office clock.
3. Use office records to determine the DACS II and DSX-1 jack appearances to be cross-connected.
4. Insert dummy plugs (258 plugs or 800-series DSX cord plugs) in the **MON** jacks of the two sets of jacks to be cross-connected. This should light the **TL** lamps and help locate the position from behind the bay.
   - If the **TL** lamp for each jack set is lighted, proceed to Step **6**.
   - If the **TL** lamp is not lighted, continue with Step **5**.
5. With VOM, check for 48 "" across the **TL** lamp which is not lighted.
   - If 48 "" lamp.
   - If 48 "" fuse at top of DSX-bay and **TL** lamp per Figure 3-19.
6. Review the following guidelines on running cross-connections: Leave at least 8 inches of slack on short runs. Dress wires through fanout at bottom of panel. Run wires in horizontal or vertical troughs (top and bottom troughs for interbay) and remember the 85-foot limit.
7. Which type DSX-bay do you have?
   - If **BACK PANEL X-CONN FIELD**, continue with Step **8.**
   - If **FRONT PANEL (800-SERIES)**, proceed to Step **9.**

8. Make cross-connections between subject jack sets per Figure 3-20 using Y1-type wire (see Note). Proceed to Step **10.**

   NOTE:
   Only one size DSX-panel is shown in Figure 3-20, but combinations with different size panels and different jack types are likely to occur. Fortunately, only the orientation of the pins will differ in these cases; the pin numbers will be the same.

9. Make wire-wrap connections between jack sets per Figure 3-21 using five conductors of the cross-connect wire.

10. Remove one of the dummy plugs.

    - If both **TL** lamps remain lighted, remove other dummy plug.

      Response: Both lights will go off.

    - If both **TL** lamps do not remain lighted, make corrections to wiring using Figures 3-19, 3-20, and 3-21 or reference drawings.

11. Record relay rack or other jack set identification on DSX-panel designation strip.

12. At DSX-1 bay, remove line feed signal and termination on line side jacks and remove looping cords from DACS II side jacks.

13. Verify that facility alarms clear on added NPCs after alarm time-out period (approximately 15 seconds).

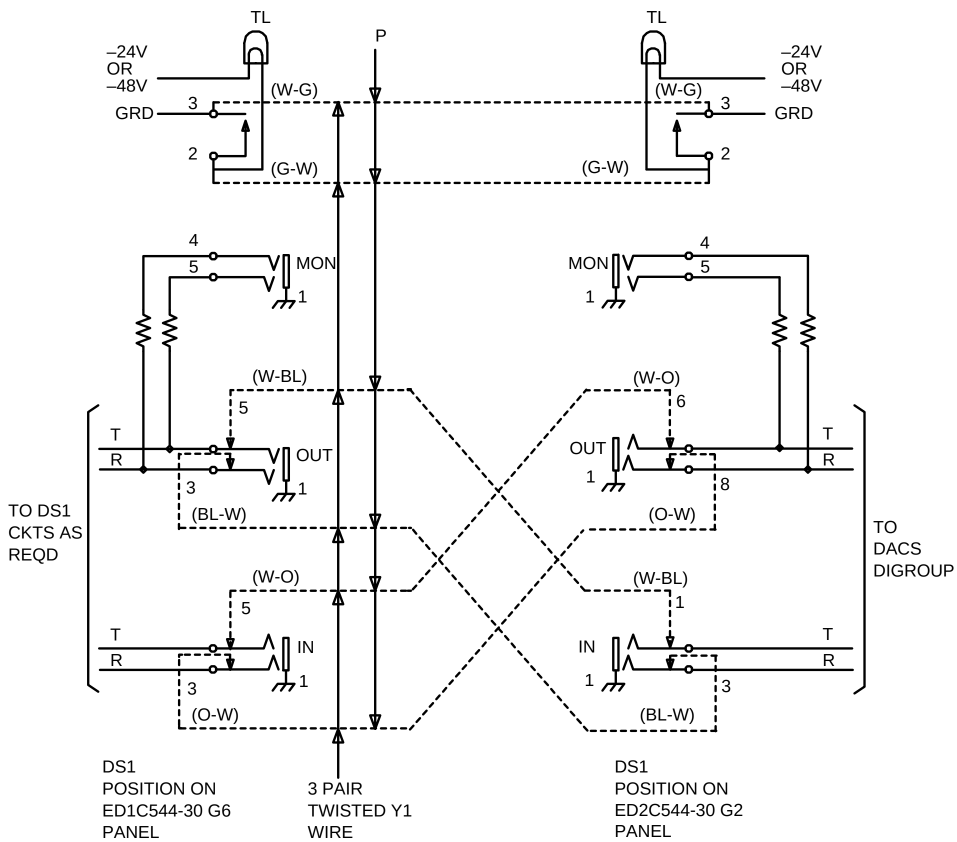


Figure 3-19. Cross-Connect Schematic

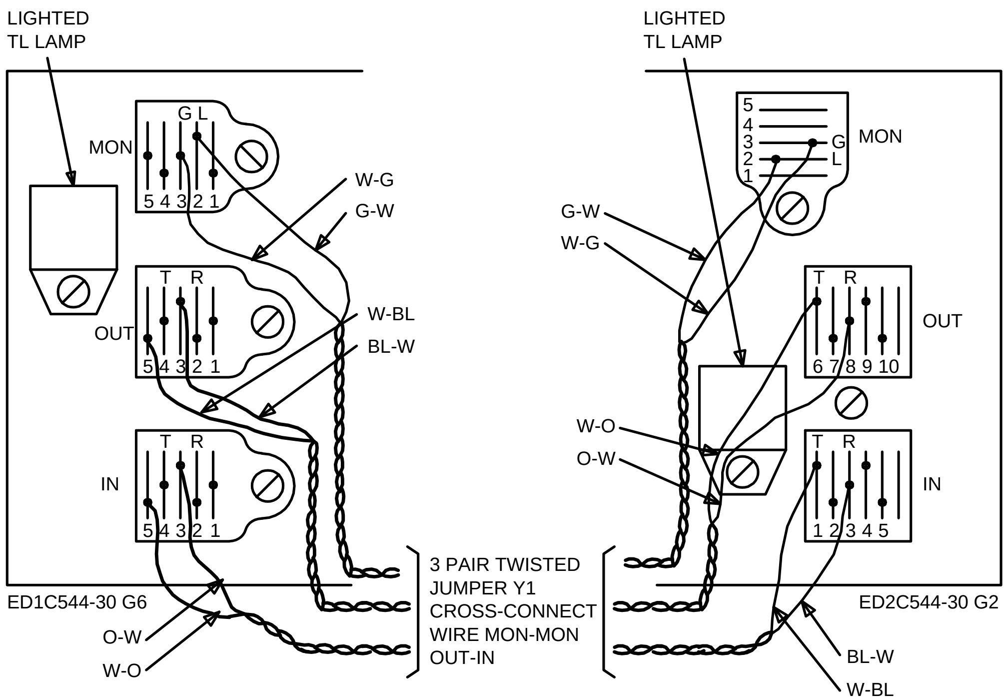


Figure 3-20. Rear View of 3-Inch Panel

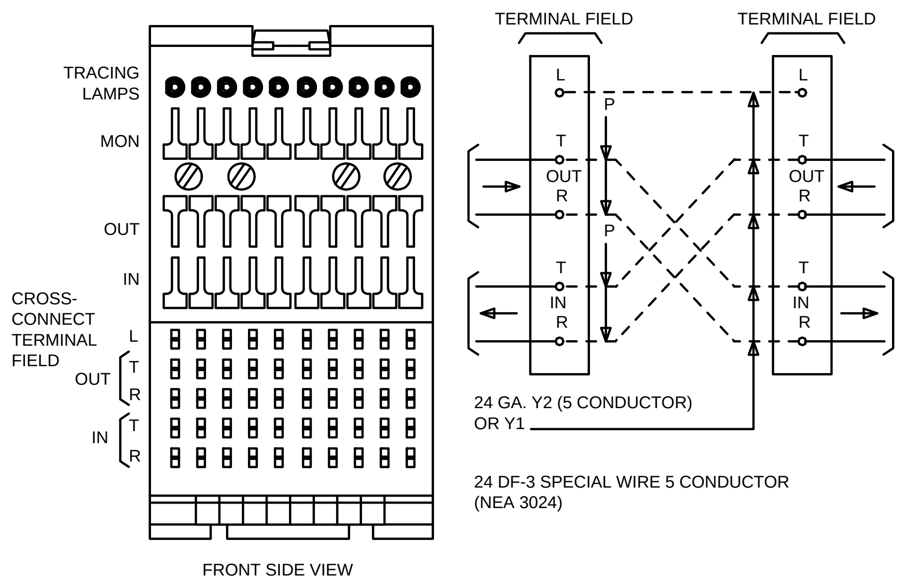


Figure 3-21. 800-Series DSX Details

Perform End-to-End Alarm Tests

Overview: In this test, the receive line signal is interrupted to cause a local alarm (CGA) at the DACS II and to send a remote alarm signal to the other end. The alarms clear after a time-out period when the alarm condition is removed. As a final test, the receive signal is interrupted at the other end to check the local and remote alarm responses in the other direction.

1. Contact the far-end office to arrange for the test.
2. At DSX-1 jacks, place a dummy plug (or loose cord end) into the **OUT** jack of digital line coming to the DACS II.
3. Press **ACO** button on DACS II status panel.
   - If the MJ (major) alarm is registered on status panel and by AR01, MISC ALM output message, proceed to Step **6.**
   - If neither alarm indication occurs, verify that the dummy plug is installed in the correct jack and that the alarm is not appearing on another facility due to a wiring error, proceed to Step **4**.

4. If neither indication occurred and there is no connection problem, install cord (loop) between IN and OUT jacks for the DACS II and wait for alarm to clear. Then enter **`RMV::NPC <npc No.>[,INCL]!`**, replace NPC pack, enter **`RST::NPC <npc No.>!`**, and remove looping cord.

   Where:

   <npc No.> = NPC number, either extended (for example, [0]001) or hierarchical (for example, 01101)

   INCL = Optional, to remove NPC with special services (CUS or RDC).

5. If status panel indication does not occur, check status panel lamp test. If lamp is good, enter **`RMV::MC!`**, replace the MTC pack, and reset the DACS II at the status panel by holding **RESET ENABLE** to **ON** and momentarily pressing the **RESET** button.

6. If far end has a Y remote alarm indication, proceed to Step **8.**

   - If far end does not have a remote alarm indication, have far end check that alarm is not appearing on another facility. If it does occur elsewhere, have far end correct wiring error.

7. If no alarm occurs at far end, proceed as follows for type of far-end equipment. For voice terminal, have far end perform looped alarm test per documentation. For DACS II, have far end replace NPC per method in Step **4**.

8. Remove dummy plug installed at beginning of this test.

   Response: The alarms will clear after the time-out period of approximately 20 seconds.

9. Have far end place the terminal in a local alarm condition either by inserting a plug into the line jack or by disconnecting or failing the receive unit at the voice terminal.

10. If local alarm is obtained at far end and if Y remote alarm is received at near-end DACS II, continue with Step **11.**

    - Perform corrective action for the particular alarm not occurring as outlined for the first direction of testing in this procedure.

11. Have far end remove local alarm condition and verify that the alarms clear after the time-out period of approximately 20 seconds.

Check Facility Status and Perform End-to-End Tone Tests

1. Enter **UTL::QRY,STATE,NPC <npc No.>[-<range>]!**

   Where:

   <npc No.> = NPC number, either extended (for example, [0]001) or hierarchical (for example, 01101)

   <range> = Optional for facility NPCs, to name last NPC of range.

2. Which type NPC are you querying?

   - If **TYPE DE or TE**, read the meaning of the NPC type options from Tables 3-63 and 3-64 (for DS3U) and continue with Step **3**.
   - If **TYPE MB, MJ, or SR**, proceed to Step **6**.

3. Notice the not-connected code IW. Typical values are:
   7F (unassigned channel code, default), FF (all 1s), and 18 for Digital Data System.
4. Read the status and facility error counts from the fields of the output message using Table 3-65.
5. If any NPC type, IW, or alarm thresholds must be changed, refer to the appropriate procedure (*Change NPC Type, IW, or ALMOPT-AIS* or *Change Alarm Threshold*) to make changes. The procedure to check facility status has been completed.
6. Read the NPC types as follows: type MB100 is for the digital multipoint bridge, type MJ100 is for multipoint junction unit for subrate data, and type SR100 is for subrate multiplexer.
7. Look for "1s" under the out-of-service, failed, and pested headings; a zero means the condition does not exist and a 1 means it does exist. The conditions of the NPCs on both sides of the DSPU are given.
8. If channel tests are to be performed on facility channels, notify test personnel that the circuit can be tested.

Table 3-63. Type DE NPC Options

Option	DE	IU
X	**Multiframe Format**	**Multiframe Format**
0	Unassigned	Unassigned
1	D4 Bank Format	IU D4 Bank Format
2	Extended Super Frame - Voice	IU ESF Format
3	Extended Super Frame - Data	Unassigned
4	DDS, T1DM Word 24	IU T1DM Format
5-8	Unassigned	Unassigned
9	No Framing, Clear-DS1	Unassigned
Y	**Zero Suppression**	**Zero Suppression**
0	Zero Code Suppression	Same as DE
1	No Zero Code Suppression	Same as DE
2	Bipolar with 8 Zero Substitution	Same as DE
3	ZBTSI with TG186 and ESF Format	Unassigned
4	DMI with ZCS	Unassigned
5	DMI with no ZCS	Unassigned
6	DMI with B8ZS	Unassigned
7-9	Unassigned	Unassigned
Z	**Channel Counting**	**Channel Counting**
0	D4 Bank/Sequential	Same as DE
1	D2 Bank	Same as DE
2	D1D Bank	Same as DE
3	Unassigned	Unassigned
4	Unassigned	Unassigned
5-8	Unassigned	Unassigned
9	No Channels, Clear-DS1	Unassigned

Table 3-64. Type TE NPC Options

Option	Type TE	Type TI
X	**Multiframe Format**	**Multiframe Format**
0	Unassigned	Unassigned
1	D4 Bank	Interface Unit, D4-Bank
2	Extended Super Frame - Voice	Interface Unit, ESF
3	Extended Super Frame - Data	Unassigned
4	DDS T1DM Word 24	Interface Unit, T1DM
5-8	Unassigned	Unassigned
9	No Framing, Clear-DS1	Unassigned
Y	**Zero Suppression**	**Zero Suppression**
0	Zero Code Suppression	Same as TE
1	No Zero Code Suppression	Same as TE
2	Unassigned	Unassigned
3	Unassigned	Unassigned
4	DMI with ZCS	Unassigned
5	DMI with no ZCS	Unassigned
6	Unassigned	Unassigned
7-9	Unassigned	Unassigned
Z	**Channel Counting**	**Channel Counting**
0	D4 Bank/Sequential	Same as TE
1	D2 Bank	Same as TE
2	D1D Bank	Same as TE
3-8	Unassigned	Unassigned
9	No Channels, Clear-DS1	Unassigned

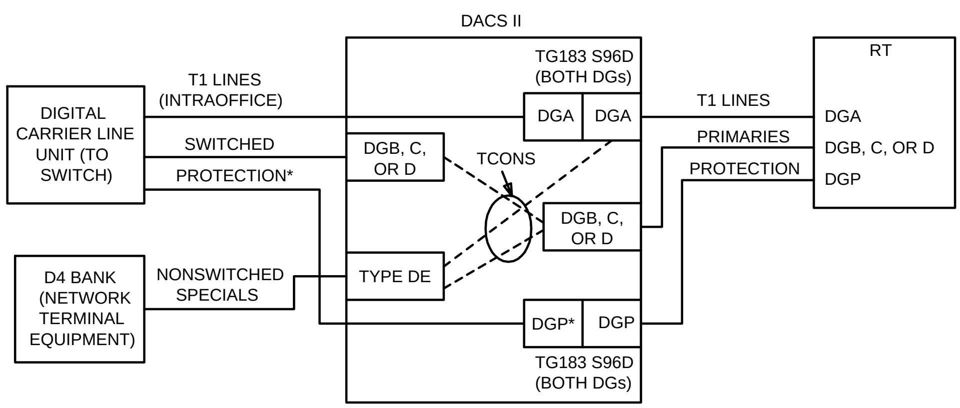
Table 3-65. NPC Status Keywords (Type TE, DE)

Keyword	Meaning	Output Information
OOS/FAIL/ PEST	Out-of-Service/ Failed/Pested	1 = NPC out-of-service/failed/pested
CGA	Carrier Group Alarm	R = red alarm, Y=yellow alarm, b=both red and yellow, A = AIS (blue signal), 1 = CGA, or 0 = no CGA
OOF	Out-of-Frame	Count = 0-65535
SLIP	Carrier Slips	Count = 0-65535, THRESHOLDS = major and minor alarm, OPTIONS = 0-3 for major and minor
BER	Bit Error Rate	Alarm status-MJ, MN, CL (no alarm), THRESHOLDS = major and minor (power of 10, -3 or -6), OPTIONS = 0-3 for major and minor alarms
ERS	Errored Seconds	Count = 0-65535, THRESHOLDS = 1-900 for 15-min and 1-65535 for 24-hr, OPTIONS = 0-3 for thresholds
SERS	Severely Errored Seconds	Count = 0-65535, THRESHOLDS = 1-900 for 15-min and 1-65535 for 24-hr, OPTIONS = 0-3 for thresholds
COFA	Change of Frame Alignment	Count = 0-65535, THRESHOLDS = major and minor alarms OPTIONS = 0-3 for major and minor thresholds
CRC	Cyclic Redundancy	Count = 0-65535
BPV	Bipolar Violation	Count = 0-65535
FRER	Frame Bit Error	Count = 0-65535
FS	Failed Seconds	Count = 0-65535
ESF	Extd Superframe	Count = 0-65535
LFVR	Line Format	Count = 0-65535

Establish *SLC* Carrier Systems

Establish *SLC* 96 Carrier System Mode I or *SLC* Series 5 Carrier System FPB (Feature Package B)

NOTE:
In this procedure, you will be equipping the NPC slots for the lines going to the RT, the DCLU, and the nonswitched voice terminal. If protection switching is provided, the NPCs for the protection line are also equipped. There is no protection line between the DCLU and DACS II. See Figure 3-22.



* PROTECTION LINE BETWEEN DACS II AND DCLU FOR RELEASES 3 AND 4.0 ONLY

Figure 3-22. Mode I Configuration

NOTE:
If any command in this procedure is denied, find the reason for the denial and perform corrective action to obtain command completion (*Command Denials* has explanations of denial codes).

1. Verify the NPCs have been grown per specifications below. If NPCs have not been grown refer to *Install circuit packs and Grow IFTU2 NPC (with SLC Carrier.*

   — For RT Line, specify Type DS and line format (ZCS option required).

   — For DCLU Line, specify Type DS and line format required for DCLU.

   — For voice terminal line (TG80, TG80B, TG183), specify Type DE and line format.

2. Verify that the RT has been loop tested and verify that the digital line has been established and tested.

   NOTE:
   If fault locate levels for single-ended testing from the office must be recorded, they can be obtained after the protection line is established in this procedure.

3. Use the specifications listed below to correlate the NPC(s) with the digroups at both the remote terminal and the DCLU. Enter **`ADD::{RT|DL} ffff,MD g[g][,DGA aaa][,DGB bbb][,DGC ccc][,DGD ddd][,DGP ppp][,{sss|NDL|RTF}]!`**.

   — If all the NPCs for the primary digroups of the RT or DCLU are ready for assignment, you can enter the NPC numbers at one time in the DGA through DGD fields of the ADD command. Otherwise, only use the digroup fields for the NPCs to be added. If the protection facility is going to be established, use the DGP field to enter the associated NPC.

   — For *SLC* 96 carrier, determine whether the NDL option is needed to disable the data link in digroup A, and determine if a miscellaneous alarm must be specified instead of the default power minor alarm.

   — The same ID number must be used for both RT and DCLU in *SLC* 96 Mode I and *SLC* Series 5 FPB.

   — For *SLC* Series 5 carrier, different RT IDs must be used for two banks on the same RT shelf to avoid or prevent problems in RT data base. Do not assign both the ‘‘blue’’ and ‘‘white’’ banks with the same ID.

Where:

RT|DL	=	Selects either remote terminal (RT) or DCLU (DL) as the type of connecting equipment. The DCLU does not have a DGP.
ffff	=	RT or DCLU identifier.
g	=	Mode: 1 for *SLC* 96 Mode I and *SLC* Series 5 FPB.
aaa,bbb,ccc, and ddd	=	NPC numbers to be assigned to digroups A, B, C, and D.
ppp	=	NPC number to be assigned to protection facility if provided.
sss	=	For *SLC* 96 digroup A to specify power or miscellaneous alarm as follows: PMN (power-minor alarm, default if single RT is used at the site) or PMJ (power-major alarm) or MMJ or MMN for major or minor miscellaneous alarm.
NDL	=	Optional, for *SLC* 96 carrier to disable use of data link with digroup A.
RTF	=	Optional, for *SLC* Series 5 digroup A to assign retrofit status to the system which prevents the DACS II from overwriting (clearing) the RT channel provisioning. The RTF status must be changed after the channel provisioning is loaded into the DACS II to allow DACS II auditing.

4. Check output message to verify correct entry of information.
5. If you want to familiarize yourself with the query to list the NPC to RT association, enter **`UTL::QRY,SCDG,NPC <npc No.>!`** for one of the NPCs.
6. At DSX-1 bay, make wiring cross-connections (*Make DSX-1 Connections*) between line jacks (to RT, DCLU, and D-bank) and NPC jacks. If used, looping cords (at DSX-1 and far end) should not be removed until Step **10**.

7. Enter **`RST::NPC <npc No.>[-<range>]!`** to restore NPC(s) for the lines to the RT and DCLU.

   Where:
   <npc No.> = NPC number, either extended (for example, [0]001) or hierarchical (for example, 01101).
   <range> = Optional, to name the final NPC when it is desired to restore a continuous range ofIFTU2-NPCs.

   NOTE:
   The restore operation causes diagnostics to be run on the NPCs and changes the NPC status to in-service.

   NOTE:
   If consecutive NPCs are used for the digroups, all of them can be restored in single range command. Otherwise, the NPCs for DGA can be restored in one command and those for DGP can be restored in one command.

8. Verify that the DCLU has been equipped and tested.
9. Enter TCON commands to connect lines for digroups A through D through DACS II to the DCLU. Refer to *Cross-Connections and Disconnections*.
10. When the DCLU and RT are ready for end-to-end facility tests, assist as required by removing DSX-1 bay looping cords.
11. Do the following steps to test the protection switching:

    a. Enter **`SW::NPC <npc No.>,PSW[,INCL]!`** to initiate the protection switch.

       Where: INCL = Needed to switch DGA.

       NOTE:
       There will be an SC ALM MN message indicating the switch has occurred.

       NOTE:
       If DGA is switched, the protection line will register timing slips because it derives timing from DGA. These slips must be cleared by entering **`UTL::CLR,NPC <npc No.>,PARAMS!`**.

b. Verify that CGA message is not received on line which has been switched onto protection. The RT will have an **ACU MN** and a **LINE ON PROT** indication on the subject LIU.

c. Enter **`UTL::QRY,STATE,SCDG,NPC <npc No.>!`**

Where: <npc No.> = The same NPC number.

d. Observe the following in the query output message:

— Presence of SWMR (for manual switch) under the switched digroup; the other digroups will be in the NORM (normal state) or INHB (inhibited).

— Presence of MNNE (minor alarm near end) for the ALST (alarm state) under the switched digroup.

e. If the listed protection switch indications were obtained, enter **`SW::NPC <npc No.>,USW[,INCL]!`** to terminate the protection switch.

- If the protection switch indications were not obtained, proceed to Step **11g**.

f. Enter **`UTL::QRY,STATE,SCDG,NPC <npc No.>!`**. Observe that NORM (for switch normal) appears for PLSW (protection line switching) for the digroup. The procedure to test protection switching has been completed.

NOTE:
There will also be an SC ALM IDLD message showing that the near-end minor alarm has cleared.

g. Notice whether there is an SC ALM MJ message for digroup A which would indicate that the *SLC* Carrier System data link is inoperative. The data link must have been enabled when the ADD RT was entered.

h. At DACS II, enter commands to remove both NPCs on the dual digroup card, replace the card, and enter commands to restore the NPCs. If the trouble persists, have tester at RT replace the LIU (line interface unit) pack and other packs that would affect transmission.

12. If you want to check the status of any facility at DACS II, enter **`UTL::QRY,STATE,NPC <npc No.>!`**

    Where: <npc No.> = NPC for the facility.

13. If initial levels for single-ended fault locating must be recorded, one line can be put up on protection (using SW PSW command) and fault locate test set can be used at the DSX-1 in the DACS II office (*Operate SLC Carrier System Protection Switch or Line Loopback*).
14. Verify that D Bank or other voice terminal in the office (for nonswitched special circuits) has been installed and loop tested.
15. Verify that the NPC for the same voice terminal has been installed and grown.
16. Enter **`RST:: NPC <npc No.>[-<range>]!`** to restore the NPC for the same voice terminal.
17. Remove line signal loops at the DSX-1 jacks. Facility alarms will clear after alarm time-out period of approximately 15 seconds.
18. If alarm test with office channel bank is required, perform end-to-end alarm test with voice terminal (see *Perform End-to-End Alarm Tests*).
19. If information is available for the connection of the special service channels through the DACS II, enter the TCON commands for those channels (refer to *Cross-Connections and Disconnections*).
20. If channel tests are to be performed on facility channels, notify circuit test personnel that the circuit can be tested.
21. If timing SLIPs have not been cleared on the protection line, enter **`UTL::CLR,NPC <npc No.>,PARAMS!`** for the protection digroup.
22. Update office records with facility information and notify circuit provisioning center of completion.

Establish *SLC* 96 Carrier System Mode III

Overview: In this procedure, you will be equipping the NPC slots for the lines going to the RT and the office terminal. If protection switching is provided, the NPCs for the protection line are also equipped. See Figure 3-23.

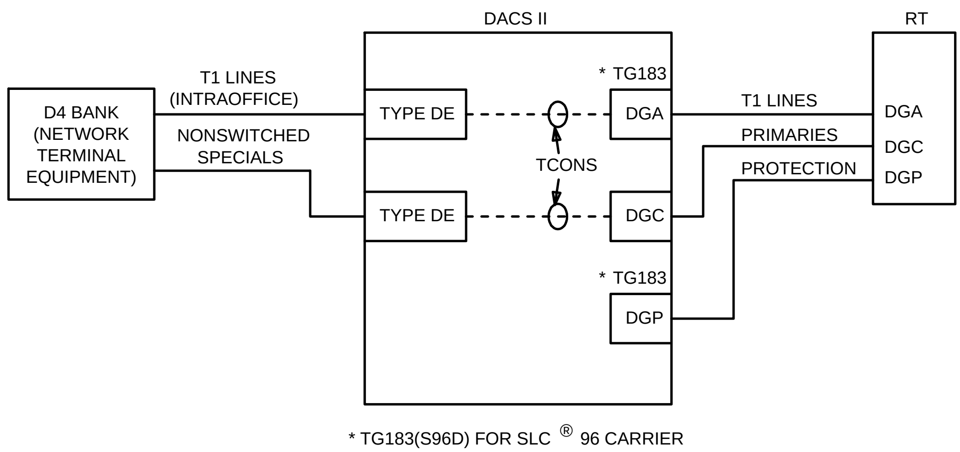


Figure 3-23. Mode III Configuration

NOTE:
If any command in this procedure is denied, find the reason for the denial and perform corrective action to obtain command completion (*Command Denials* has explanations of denial codes).

1. Verify the NPCs have been grown per specifications below. If NPCs have not been grown, refer to *Install circuit packs and Grow IFTU2 NPC (with SLC Carrier)*.
   - — For lines going to the RT, specify Type DS and line format (ZCS option required for *SLC* 96 carrier).
   - — For lines going to office equipment, specify Type DE and line format required for connecting equipment.

2. Verify that the RT has been loop tested and verify that the digital line has been established and tested.

   NOTE:
   If fault locate levels for single-ended testing must be recorded, they can be obtained after the protection line is established in this procedure.

3. Correlate the NPC(s) with the digroups at the remote terminal using the specifications listed below. Enter
   `ADD::RT ffff,MD g[g][,DGA aaa][,DGC ccc][,DGP ppp][,{sss|NDL}]!`.

   — If all the NPCs for the primary digroups of the RT are ready for assignment, you can enter the NPC numbers at one time in the DGA through DGC fields of the ADD command. Otherwise, only use the digroup fields for the NPCs to be added. If the protection facility is going to be established, use the DGP field to enter the associated NPC.

   — Determine whether the NDL option is needed to disable the data link in digroup A, and determine if a miscellaneous alarm must be specified instead of the default power minor alarm.

   — *SLC* 96 Mode III only supports digroups A, C, and P.

   Where:

RT	=	Remote terminal (RT)
ffff	=	RT identifier
g	=	3 for *SLC* 96 Mode III
aaa,ccc	=	NPC numbers to be assigned to digroups A, and C
ppp	=	NPC number to be assigned to protection facility if provided
sss	=	For *SLC* 96 digroup A to specify power or miscellaneous alarm as follows: PMN (power-minor alarm, default if single RT is used at the site) or PMJ (power-major alarm) or MMJ or MMN for major or minor miscellaneous alarm
NDL	=	Optional, for *SLC* 96 carrier to disable use of data link with digroup A.

4. Check output message to verify correct entry of information.

5. If you want to familiarize yourself with the query to list the NPC to RT association, enter **`UTL::QRY,SCDG,NPC <npc No.>!`** for one of the NPCs.

6. At DSX-1 bay, make wiring cross-connections (*Make DSX-1 Connections*) between line jacks (to RT and office D-bank) and NPC jacks. If used, looping cords (at DSX-1 and far end) should not be removed until Step **8**.

7. Enter **`RST::NPC <npc No.>[-<range>]!`** to restore NPC(s) for the lines to the RT.

   Where:
   <npc No.> = NPC number, either extended (for example, [0]001) or hierarchical (for example, 01101)
   <range> = Optional, to name the final NPC when it is desired to restore a continuous range of IFTU2-NPCs.

   NOTE:
   The restore operation causes diagnostics to be run on the NPCs and changes the NPC status to in-service.

   NOTE:
   If lines are already connected through DSX-1, **remove digroups in sequence** (DGP, DGA, then others) to cause switching and to simulate service cutover.

8. For lines going to the RT, remove line signal loops (if provided) and verify alarm indications using the following steps.

   NOTE:
   The loops are removed systematically (DGP, DGA, then others) to control alarm indications and to cause switch to protection. This sequence would also be used for cutover of in-service facilities.

   a. Contact the far-end office to arrange for the test.

   b. If protection switching is provided for the facilities to the RT, have tester remove looping card (at RT) from **TST** jack of **PROT LIU** and watch for **MN** alarm on **ACU** and **FAIL** and **PROT** indications on LIU. At DSX-1 bay, remove line feed signal going toward the RT and remove the looping cord on the DACS II side.

      - If protection switching is not provided, proceed to Step **8d**.

      NOTE:
      Until digroup A is connected through, the DACS II will register SLIPs because the RT is trying to get timing from digroup A.

c. If ACU MN clears at RT after looping cord is removed, continue with Step **8d**.

- If ACU MN does not clear at the RT after looping cord is removed, find and correct wiring problem between the equipment and cable pairs at either end. Check whether alarm conditions have changed on another facility to determine if cable pairs have been wired to wrong equipment. After trouble is cleared, repeat the test procedure.

d. At RT, have tester remove looping card from **LIU A TST** jack and monitor alarm indications.

e. At DSX-1 bay, remove signal looping cord from the facility going to RT digroup A. Also remove any line feed signal and termination applied on the line-side jacks.

Response: The DACS II may show a CGA ...Y CLF message on the facility because of the signal interruption.

f. If the following indications occur at the RT and then clear (after approximately 20 seconds), proceed to Step **9**.

— With protection: **MN** at ACU; **RCV LINE FAIL** and **LINE ON PROT** at LIU A

— Without protection: **MJ, A, FE** at ACU; **RCV** at TRU A; and **RCV LINE FAIL** at LIU A

- If the indications do not occur at the RT, continue with Step **8g**.

g. If the protection switch did not operate but alarms occurred as with no switching, verify that the ADD RT command was entered with data link enabled and that switching is not inhibited at the RT. Continue with procedure to check cabling for each digroup; the protection switching will be tested in Step **10**.

h. If the alarms do not occur or occur on the wrong facility, find and correct wiring problem between the equipment and cable pairs at either end. After trouble is cleared, repeat from Step **8a**.

i. Repeat Step **8** for digroup C.

j. Enter **`UTL::CLR,NPC <npc No.>,PARAMS!`** for protection line to clear timing slips.

9. If alarm test with office channel bank is required, perform end-to-end alarm test (see *Perform End-to-End Alarm Tests*).

10. Test the protection switching using the following steps:

    a. Enter **`SW::NPC <npc No.>,PSW[,INCL]!`** to initiate the protection switch.

       Where: INCL = Needed to switch DGA.

       NOTE:
       There will be an SC ALM MN message indicating the switch has occurred.

       NOTE:
       If DGA is switched, the protection line will register timing slips because it derives timing from DGA. These slips must be cleared by entering **`UTL::CLR,NPC <npc No.>,PARAMS!`**.

    b. Verify that CGA message is not received on line which has been switched onto protection. The RT will have an **ACU MN** and a **LINE ON PROT** indication on the subject LIU.

    c. Enter **`UTL::QRY,STATE,SCDG,NPC <npc No.>!`**

       Where: <npc No.> = The same NPC number.

    d. Observe the following in the query output message:

       — Presence of SWMR (for manual switch) under the switched digroup; the other digroups will be in the NORM (normal state) or INHB (inhibited)

       — Presence of MNNE (minor alarm near end) for the ALST (alarm state) under the switched digroup

    e. If the listed protection switch indications were obtained, enter **`SW::NPC <npc No.>,USW[,INCL]!`** to terminate the protection switch.

       ■ If the protection switch indications were not obtained, proceed to Step **10g**.

    f. Enter **`UTL::QRY,STATE,SCDG,NPC <npc No.>!`**. Observe that NORM (for switch normal) appears for PLSW (protection line switching) for the digroup. Proceed to Step **11**.

       NOTE:
       There will also be an SC ALM IDLD message showing that the near-end minor alarm has cleared.

g. Notice whether there is an SC ALM MJ message for digroup A which would indicate that the *SLC* Carrier System data link is inoperative. The data link must have been enabled when the ADD RT was entered.

h. At DACS II, enter commands to remove both NPCs on the dual digroup card, replace the card, and enter commands to restore the NPCs. If the trouble persists, have tester at RT replace the LIU pack and other packs that would affect transmission.

11. Test the power/miscellaneous alarm sent from the RT using the following steps.

   a. Arrange to have tester at RT send alarms.

   NOTE:
   If there is only one RT at the remote site, the power MN (PMN) or power MJ (PMJ) alarm will be sent in the miscellaneous alarm field of the data link. If there are two RTs at the site, the power alarm is sent for the first RT and a miscellaneous alarm (for example, door open) can be sent for the second RT. For RT huts with several RTs, the miscellaneous alarms can signal hazards (fire, water, gas), but only the power and door-open conditions are checked here.

   b. Have tester turn off the AC power supply. This will not interrupt service because of the backup battery supply.

   CAUTION:
   DO NOT turn off the AC power supply unless backup battery supply is known to be functioning or service will be interrupted.

   - If SC ALM PMN/PMJ message is received at the DACS II, have tester at RT turn on AC power.
   - If the PMN alarm is not received, the power sensing circuit at the RT is suspect since the data link of DGA has already been used for protection switching tests. However, if there is an MJ alarm on DGA or if protection switching has not been tested, either the NPC at DACS II or the DGA pack(s) at the RT can be causing trouble.

   c. If there are two RTs at the remote site, continue with Step **11d.**

   - If there are not two RTs at the remote site, proceed to Step **12**.

d. Have tester activate door alarm switch that is normally disabled when the RT site is entered.

- If SC ALM MMN or MMJ message is received from second RT, proceed to Step **11**.
- If the MMN or MMJ alarm is not received, enter **`UTL::QRY,STATE,SCDG,{NPC <npc No.>|RT ffff}!`** for the system.

e. Look for MMN or MMJ in the field that follows the mode (MD) field.

- If PMN appears, enter **`CHG::RT ffff,sss!`** to the change the alarm definition.
- If PMN does not appear and the miscellaneous alarm was defined, the RT door-open circuit is suspect.

  Where:

  ffff = Bank identification number of connecting RT for which the alarm meaning is to be changed.

  sss = Required new meaning given by one of the following:
  PMN for power minor alarm (default and required for one RT at site),
  PMJ for power major alarm,
  MMJ for miscellaneous major alarm, or
  MMN for miscellaneous minor alarm.

NOTE:
The power or miscellaneous alarm is carried over the data link on DGA; so, the NDL (no data link) must not have been used when the ADD DGA command was entered. The miscellaneous alarm indicates flooding, fire, or gas at the RT site. This alarm can be used for the second RT bank at the site; the power alarm is used for the first RT bank.

f. Deactivate the door alarms.

12. If you want to check the status of any facility at DACS II, enter **`UTL::QRY,STATE,NPC <npc No.>!`**

    Where: <npc No.> = NPC for the facility.

13. If initial levels for single-ended fault locating must be recorded, one line can be put up on protection (using SW PSW command), the far end looped back, and then the fault-locate test set used at the DSX-1 bay (see *Operate SLC Carrier System Protection Switch or Line Loopback*).
14. Verify that D Bank or other voice terminal in the office (for nonswitched special circuits) has been installed and loop tested.
15. Verify that the NPC for the same voice terminal has been installed and grown.
16. Enter **`RST::NPC <npc No.>[-<range>]!`** to restore the NPC for the same voice terminal.
17. Remove line signal loops at the DSX-1 jacks. Facility alarms will clear after alarm time-out period of approximately 15 seconds.
18. If alarm test with office channel bank is required, perform end-to-end alarm test with voice terminal (see *Perform End-to-End Alarm Tests*).
19. If information is available, enter TCON commands to connect channels through DACS II. Refer to *Cross-Connections and Disconnections*

    NOTE:
    If information for circuits is not available, all 24 digroup channels can be connected through to enable preliminary channel tests.

20. If channel tests are to be performed on facility channels, notify circuit test personnel that the circuit can be tested.
21. If timing SLIPs have not been cleared on the protection line, enter **`UTL::CLR,NPC <npc No.>,PARAMS!`** for the protection digroup.
22. Update office records with facility information and notify circuit provisioning center of completion.

Establish New *SLC* Series 5 Carrier System Feature Package C (FPC)

Overview: In this procedure, you will be equipping the NPC slots for the lines going to the RT and the nonswitched voice terminal. If protection switching is provided, the NPCs for the protection line are also equipped. See Figure 3-24.

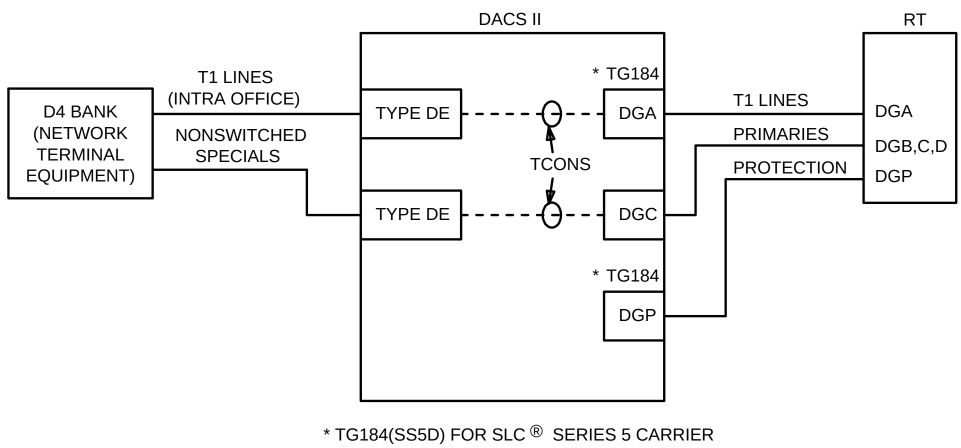


Figure 3-24. Mode C Configuration

NOTE:
If any command in this procedure is denied, find the reason for the denial and perform corrective action to obtain command completion (*Command Denials* has explanations of denial codes).

1. Verify the NPCs have been grown per specifications below. If NPCs have not been grown, refer to *Install circuit packs and Grow IFTU2 NPC (with SLC Carrier)*.
   - — For RT Line, specify TYPE DS and line format.
   - — For line going to office equipment, specify TYPE DE and line format required for connecting equipment.

2. Verify that the RT has been loop tested, that the looping cards are installed, and verify that the digital line has been established and tested.

   NOTE:
   If fault locate levels for single-ended testing must be recorded, they can be obtained after the protection line is established in this procedure.

3. If establishing new facility, use the specifications listed below to correlate the NPC(s) with the digroups at the remote terminal.
   Enter **`ADD::RT ffff,MD g[g][,DGA aaa][,DGB bbb][,DGC ccc][,DGD ddd][,DGP ppp]!`**.

   — If all the NPCs for the primary digroups of the RT are ready for assignment, you can enter the NPC numbers at one time in the DGA through DGD fields of the ADD command. Otherwise, only use the digroup fields for the NPCs to be added. If the protection facility is going to be established, use the DGP field to enter the associated NPC.

   — Digroup pairs (A and B) and (C and D) must be added together in the same command(s) because they are associated in the RT controller. If the restoral of the mate to a pair is delayed, a COMP MN alarm will occur.

   — Different RT IDs must be used for two banks on the same RT shelf to avoid problems in RT data base. Do not assign both the ‘‘blue’’ and ‘‘white’’ banks with the same ID.

   Where:
   RT ffff = Remote terminal (RT) identifier.
   g = Mode: C for Series 5 FPC.
   aaa-ddd = NPC numbers to be assigned to digroups A, B, C, and D.
   ppp = NPC number to be assigned to protection facility if provided.

4. Check output message to verify correct entry of information.

5. If you want to familiarize yourself with the query to list the NPC to RT association, enter **`UTL::QRY,SCDG,NPC <npc No.>!`** for one of the NPCs.

6. At DSX-1 bay, make wiring cross-connections (see *Make DSX-1 Connections*) between line jacks (to RT and office voice terminal) and NPC jacks. If used, looping cords (at DACS II and far end) should not be removed until Step **8**.

7. Enter **`RST::NPC <npc No.>[-<range>]!`** to restore NPC(s) for the lines to the RT.

   Where:

   <npc No.> = NPC number, either extended (for example, [0]001) or hierarchical (for example, 01101).

   <range> = Optional, to name the final NPC when it is desired to restore a continuous range of IFTU2-NPCs.

   NOTE:
   The restore operation causes diagnostics to be run on the NPCs and changes the NPC status to in-service.

   NOTE:
   If lines are already connected through DSX-1, restore digroups in sequence (DGP, DGA, then others) to cause switching and to simulate service cutover.

   NOTE:
   Digroup pairs (A and B) and (C and D) must be restored one after another to prevent COMP MN RT alarm.

8. For lines going to the RT, remove line signal looping cards (if provided) and verify alarm indications.

   NOTE:
   The loops are removed sequentially (DGP, DGA, then others) to control alarm indications and to cause switch to protection. This sequence would also be used for cutover of in-service facilities.

9. If alarm test with office channel bank is required, perform end-to-end alarm test (see *Perform End-to-End Alarm Tests*).

10. Do the following steps to test the protection switching:

    a. Enter **`SW::NPC <npc No.>,PSW[,INCL]!`** to initiate the protection switch.

       Where: INCL = Needed to switch DGA.

       NOTE:
       There will be an SC ALM MN message indicating the switch has occurred.

       NOTE:
       If DGA is switched, the protection line will register timing slips because it derives timing from DGA. These slips must be cleared by entering
       `UTL::CLR,NPC <npc No.>,PARAMS!`.

    b. Verify that CGA message is not received on line which has been switched onto protection. The RT will have an **ACU MN** and a **LINE ON PROT** indication on the subject LIU.

    c. Enter **`UTL::QRY,STATE,SCDG,NPC <npc No.>!`**

       Where: <npc No.> = The same NPC number.

    d. Observe the following in the query output message:

       — Presence of SWMR (for manual switch) under the switched digroup; the other digroups will be in the NORM (normal state) or INHB (inhibited).

       — Presence of MNNE (minor alarm near end) for the ALST (alarm state) under the switched digroup.

    e. If the listed protection switch indications were obtained, enter **`SW::NPC <npc No.>,USW[,INCL]!`** to terminate the protection switch.

       ■ If the protection switch indications were not obtained, proceed to Step **10g**.

    f. Enter **`UTL::QRY,STATE,SCDG,NPC <npc No.>!`**.
       Observe that NORM (for switch normal) appears for PLSW (protection line switching) for the digroup. Proceed to Step **11**.

       NOTE:
       There will also be an SC ALM IDLD message showing that the near-end minor alarm has cleared.

g. Notice whether there is an SC ALM MJ message for digroup A which would indicate that the *SLC* carrier data link is inoperative. The data link must have been enabled when the ADD RT was entered (see Step **3**.

h. At DACS II, enter commands to remove both NPCs on the dual digroup card, replace the card, and enter commands to restore the NPCs. If the trouble persists, have tester at RT replace the LIU pack and other packs that would affect transmission.

11. Test power/miscellaneous alarm sent from the RT using the following steps:

    a. Arrange to have tester at RT send alarms.

    b. Have tester turn off the AC power supply. This will not interrupt service because of the backup battery supply.

    CAUTION:
    DO NOT turn off the AC power supply unless the backup battery supply is known to be functioning or service will be interrupted.

    NOTE:
    There will be a 4-minute delay after the AC power supply is turned off before the SC ALM PMN message is received.

    - If SC ALM PMN message is received at the DACS II, have tester at RT turn on the AC power.

      NOTE:
      Wait 4 minutes after turning on the AC power before proceeding to Step **11c**.

    - If SC ALM PMN is not received, proceed to Step **11e**.

    c. If there are two RTs at the remote site, have the tester activate MISC switch 1.

    - If there are not two RTs at the remote site, proceed to Step **12**.

d. If MISC 1 or MISC 2 message is received from the second RT, then proceed to Step **12**.

- If MISC 1 or MISC 2 message is not received, continue with Step **11e**.

e. If the PMN alarm was not received, the power sensing circuit at the RT is suspect since the data link of DGA has already been used for protection switching test. However, if there is an MJ alarm on DGA or if protection switching has not been tested, either the NPC at DACS II or the DGA pack(s) at the RT can be causing trouble.

f. Deactivate the MISC 1 or MISC 2 alarm.

12. If you want to check the status of any facility at DACS II, enter **`UTL::QRY,STATE,NPC <npc No.>!`**

    Where: <npc No.> = NPC for the facility.

13. If initial levels for single-ended fault locating must be recorded, one line can be put up on protection (using SW PSW command), the far end looped back, and then the fault locate test set used at the DSX-1 bay (see *Operate SLC Carrier system Protection Switch or Line Loopback*).

14. Verify that D Bank or other voice terminal in the office has been installed and loop tested.

15. Verify that the NPC for the same voice terminal has been installed and grown.

16. Enter **`RST::NPC <npc No.>[-<range>]!`** to restore the NPC for the same voice terminal.

17. Remove line signal loops at the DSX-1 jacks. Facility alarms will clear after alarm timeout period of approximately 15 seconds.

18. If alarm test with office channel bank is required, perform end-to-end alarm test with voice terminal (see *Perform End-to-End Alarm Tests*).

19. If information is available for the connection of the channels through the DACS II, enter the TCON commands for those channels (refer to *Cross-Connections and Disconnections*).

    NOTE:
    If information for circuits is not available, all 24 digroup channels can be connected through to enable preliminary channel tests.

20. If channel tests are to be performed on facility channels, notify circuit test personnel that the circuit can be tested.

21. If an administrative link has not been conditioned for modified Snider protocol to use the CIU (craft interface unit) at the DACS II, enter **`ADD::LINK j[,ALM k],PTCOL M[,INIT]!`**

    Where:

    j = Physical link number (1 through 6)

    M = Modified Snider

    k = Alarm class; k = 2 for major alarm for hardware failure, or k = 1 for minor alarm (default)

    INIT = Optional, to initialize all parameters to default values except for those parameters entered in command.

    NOTE:
    If denial COND 04 is received, it means that the link is out-of-service and must be restored (**`RST::LINK j!`**) before the ADD command can be done.

22. Enter **`RMV::LINK j!`** to remove the link from service.

23. Connect the CIU to the same administrative link and apply CIU power. Refer to the CIU User's Guide (select Code 500-206) for CIU operating instructions.

24. Enter **`RST::LINK j!`** to restore the link to service.

25. Enter LOAD or COPY commands at the CIU for the RT channel unit provisioning information to be loaded or copied into the DACS II data base.

    NOTE:
    Be sure to include all the provisioning from the office records because whatever is omitted will be deleted from the RT data base when the DACS II assumes control of end-to-end auditing.

26. If timing SLIPs have not been cleared on the protection line, enter **`UTL::CLR,NPC <npc No.>,PARAMS!`** for the protection digroup.

27. Update office records with facility information and notify circuit provisioning center of completion.

Establish Retrofit *SLC* Series 5 Carrier System Feature Package C (FPC)

NOTE:
In this procedure, you will be equipping the NPC slots for the lines going to the RT and to the office terminal. If protection switching is provided, the NPC for the protection line to the RT is also equipped. See Figure 3-25.

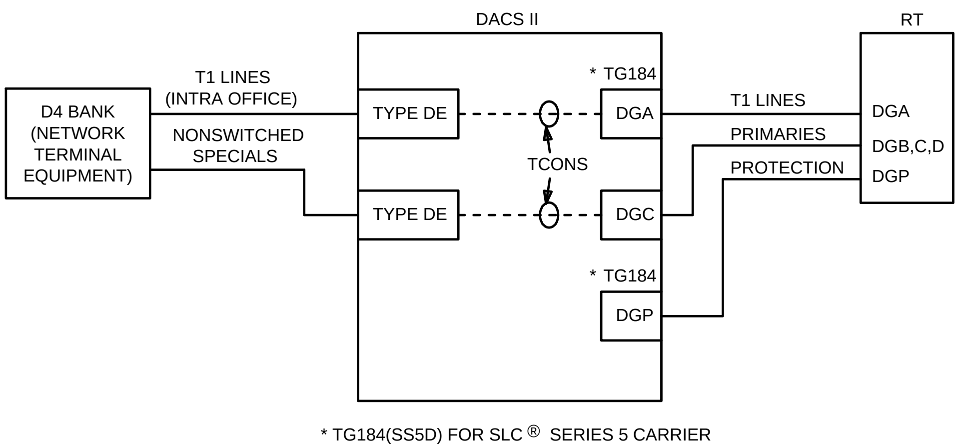


Figure 3-25. Mode C Configuration

NOTE:
If any command in this procedure is denied, find the reason for the denial and perform corrective action to obtain command completion (*Command Denials* has explanations of denial codes).

1. Verify the NPCs have been grown per specifications below. If NPCs have not been grown refer to *Install circuit packs and Grow IFTU2 NPC (with SLC Carrier)*.
   - For lines going to the RT, specify Type DS and line format.
   - For lines going to office equipment, specify Type DE and line format required for connecting equipment.

2. Enter the ADD command, using the specifications listed below, to correlate the NPC(s) with the digroups at the far-end remote terminal.
   `ADD::RT ffff,MD g[g][,DGA aaa]`
   `[,DGB bbb][,DGC ccc][,DGD ddd][,DGP ppp],RTF!`
   - If all the NPCs for the primary digroups of the RT are ready for assignment, you can enter the NPC numbers at one time in the DGA through DGD fields of the ADD command. Otherwise, only use the digroup fields for the NPCs to be added. If the protection facility is going to be established, use the DGP field to enter the associated NPC.
   - Digroup pairs (A and B) and (C and D) must be added together in the same commands(s) because they are associated in the RT controller. If the restoral of the mate to a pair is delayed, a COMP MN alarm will occur.
   - Different RT IDs must be used for two banks on the same RT shelf to avoid problems in RT data base. Do not assign both the "blue" and "white" banks with the same ID.

   Where:

RT	=	Selects the remote terminal as the type of connecting equipment
ffff	=	RT identifier
g	=	C for *SLC* Series 5 FPC.
aaa-ddd	=	NPC numbers to be assigned to digroups A, B, C, and D
ppp	=	NPC number to be assigned to protection facility if provided
RTF	=	For *SLC* Series 5 carrier digroup A to assign retrofit status to the system which prevents the DACS II from overwriting (clearing) the RT channel provisioning. The RTF status must be changed after the channel provisioning is loaded into the DACS II to allow DACS II auditing.

3. Check output message to verify correct entry of information.

4. If you want to familiarize yourself with the query to list the NPC to RT association, enter **`UTL::QRY,SCDG,NPC <npc No.>!`** for one of the NPCs.

5. Enter **RST::NPC <npc No.>[-<range>]!** to restore NPC(s) for the lines to the RT.

   NOTE:
   The restore operation causes diagnostics to be run on the NPCs and changes the NPC status to in-service.

   NOTE:
   Digroup pairs (A and B and C and D) must be restored one after another to prevent COMP MN RT alarm.

   CAUTION:
   A service interruption can occur if the correct DSX-1 jack is not used. Be sure the correct DSX-1 is being used before doing Steps **6** through **9**.

6. In preparation for cutover, enter commands to cross-connect lines from Series 5 RTs to office equipment. Refer to *Cross-Connections and Disconnections*.
7. At DSX-1, patch incoming signals from RTs and office equipment to DACS II NPC jacks. Connect to incoming signal at MON jacks so as not to interrupt service.
8. At DSX-1 bay, perform patching for service cutover using sequence that prevents loss of service.
9. At DSX-1, make wiring cross-connections to connect the RT and office equipment lines to the DACS II and then remove the patches using the method that prevents interrupting service.
10. If an administrative link has not been conditioned for modified Snider protocol to use the CIU at the DACS II, enter
    ADD::LINK j[,ALM k],PTCOL M[,INIT]!

    Where:
    - j = Physical link number (1 through 6)
    - M = Modified Snider
    - k = Alarm class; k = 2 for major alarm for hardware failure, or k = 1 for minor alarm (default)
    - INIT = Optional, to initialize all parameters to default values except for those parameters entered in command.

    NOTE:
    If denial COND 04 is received, it means that the link is out-of-service and must be restored (**RST::LINK j!**) before the ADD command can be done.

11. Enter **RMV::LINK j!** to remove the link from service.
12. Connect the CIU to the same administrative link and apply CIU power. Refer to the CIU User's Guide (select Code 500-206) for CIU operating instructions.
13. Enter **RST::LINK j!** to restore the link to service.
14. Enter LOAD or COPY commands at the CIU for the RT channel unit provisioning information into the DACS II data base.

    NOTE:
    Be sure to include all the provisioning from the office records because whatever is omitted will be deleted from the RT data base when the DACS II assumes control of end-to-end auditing.

15. Enter **CHG::RT ffff,RTF!** to remove the retrofit designation from the system and to initiate DACS II control and auditing.

    Where: RTF = Changes the status of the RT bank from retrofit to nonretrofit.

16. Check the output message to verify that correct information was entered. If power/miscellaneous option was changed, notice that DGA appears in the output because the alarm is conveyed over the data link on DGA.
17. If timing SLIPS have not been cleared on the protection line, enter **UTL::CLR,NPC <npc No.>,PARAMS!** for the protection digroup.
18. Update office records with facility information and notify circuit provisioning center of completion.

Make DSX-1 Connections

1. Use office records to determine the DACS II and DSX-1 jack appearances to be cross-connected.
2. Insert dummy plugs (258 plugs or 800-series DSX cord plugs) in the **MON** jacks of the two sets of jacks to be cross-connected. This should light the **TL** lamps and help locate the position from behind the bay.
   - If the **TL** lamp for each jack set is lighted, proceed to Step **4.**
   - If the **TL** lamp for each jack set is not lighted, continue with Step **3**.
3. With VOM check for 48 volts across the **TL** lamp which is not lighted.
   - If 48 volts is present, replace the **TL** lamp.
   - If 48 volts is not present, clear trouble in wiring between fuse at top of DSX-bay and **TL** lamp per Figure 3-26.
4. Review the following guidelines on running cross-connections. Leave at least 8 inches of slack on short runs. Dress wires through fanout at bottom of panel. Run wires in horizontal or vertical troughs (top and bottom troughs for interbay) and remember the 85-foot limit.
5. Which type DSX-bay do you have?
   - If **BACK PANEL X-CONN FIELD**, continue with Step **6.**
   - If **FRONT PANEL (800-SERIES)**, proceed to Step **7.**
6. Make cross-connections between subject jack sets per Figure 3-27 using Y1-type wire. See note. Proceed to Step **8.**

   NOTE:
   Only one size DSX-panel is shown in Figure 3-27, but combinations with different size panels and different jack types are likely to occur. Fortunately, only the orientation of the pins will differ in these cases; the pin numbers will be the same.

7. Make wire-wrap connections between jack sets per Figure 3-28 using five conductors of the cross-connect wire.

8. Remove one of the dummy plugs.
   - If both **TL** lamps have remained lighted, remove other dummy plug.

     Response: Both lights will go off.
   - If both lamps have not remained lighted, make corrections to wiring using Figures 3-26, 3-27, and 3-28 or reference drawings.
9. Record relay rack or other jack set identification on DSX-panel designation strip.

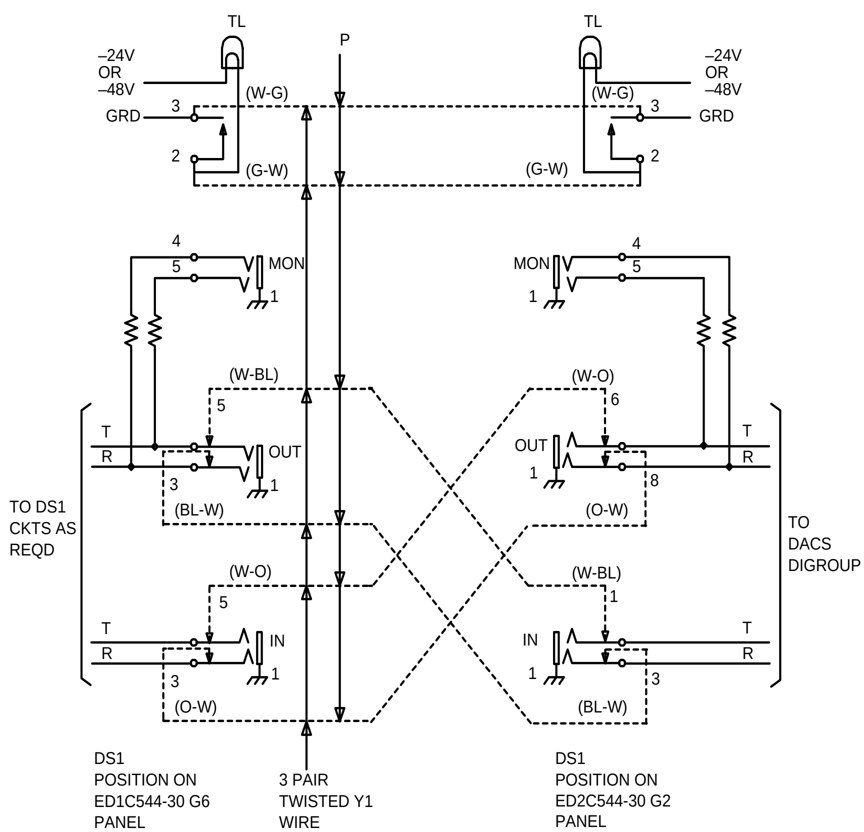


Figure 3-26. Cross-Connect Schematic

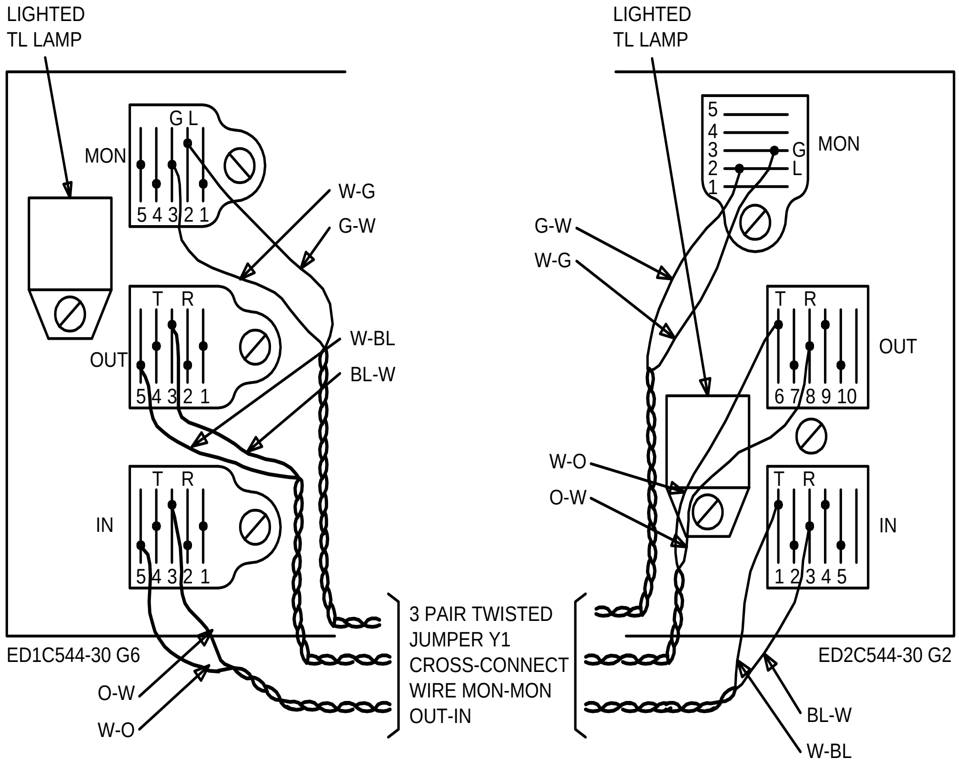


Figure 3-27. Rear View of 3-Inch Panel

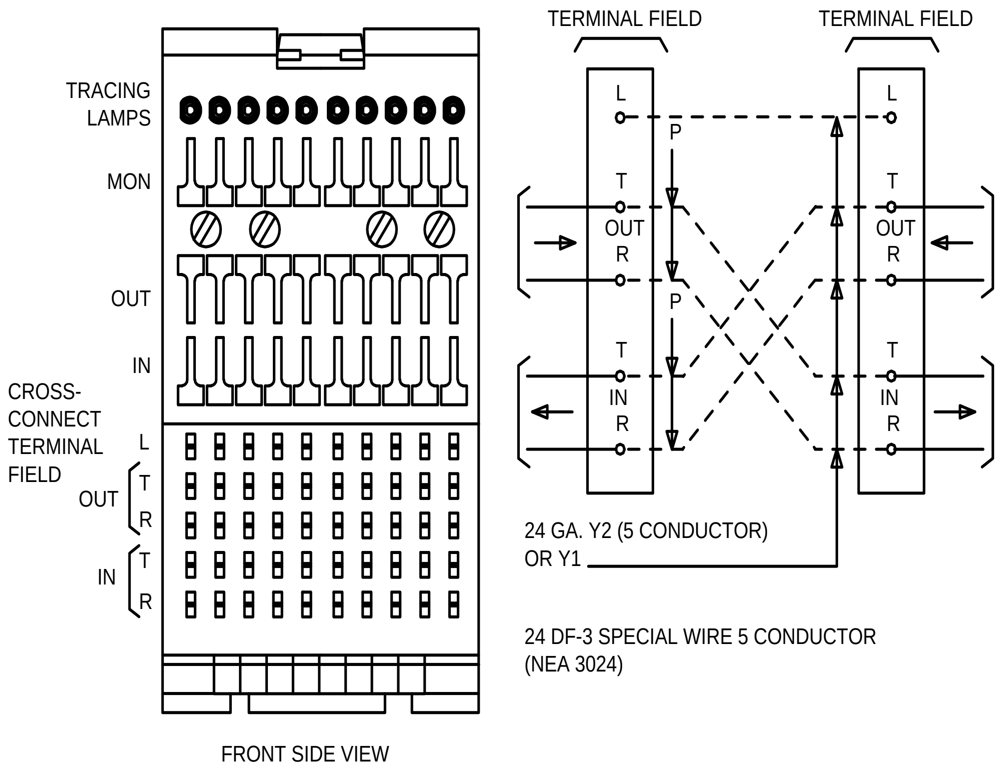


Figure 3-28. 800-Series DSX Details

Reinitialize the CIU for Use (*SLC* Series 5 Carrier)

Overview: This procedure is used to reconnect the CIU if the test set was disconnected during use or was disconnected by DACS II, because the DACS II main controller was reset. Either of these situations causes the CIU to perform self diagnostics, and, if the diagnostics fail, the CIU must be reinitialized before it can be used again. Refer to the CIU User's Guide (Select Code 500-206) for CIU operating instructions.

1. Turn off the CIU power switch.
2. At DACS II, enter command to remove the administrative link for the CIU from service as follows: **`RMV::LINK j[mm]!`**.
3. If CIU is not connected to link, connect it and turn on CIU power.
4. At DACS II, enter command to restore CIU link to service as follows: **`RST::LINK j!`**.
   - If the diagnostics on the CIU passed, the procedure to load/copy the CIU for *SLC* carrier has been completed.
   - If the diagnostic fails, repeat the procedure.
   - If the diagnostic fails a second time, enter the command to query the link to verify that the link protocol for the CIU is M as follows: **`UTL::QRY,STR,LINK j!`**. If protocol is correct, contact technical consultant to clear trouble.

Change *SLC* Carrier System

Add Protection Switching (Existing System)

Overview: In this procedure, you will be equipping the DACS II for a protection line going to the RT to the office switching equipment (for *SLC* 96 carrier Mode I or *SLC* Series 5 carrier). The NPC card for this protection line is always installed in the same DACS II facility unit (IFTU2) as the cards for the primary lines.

1. Enter **`GRTH:FRM xy,SEQ ww:NPC <npc No.>[-range], TYPE DSxyz[,OPTS(rr/l,ss/m. . .,tt/n)][,IW X'pq]!`** to grow the NPC for protection line as type DS with line format specification and any alarm threshold options.

   Where:

xy	=	DACS II frame number (00 through ZZ).
ww	=	Command sequence number (00 through 49).
<npc No.>	=	NPC number, either extended (for example, 0001) or hierarchical (for example, 01101).
<range>	=	Last NPC in a continuous range.
xyz	=	DS1 line format and channel counting options per Table 3-66.
rr/l,tt/n	=	Optional to select any one or all alarm types (01 through 10) per Table 3-67 and previously defined options (1, 2, or 3). Shelf alarms are not selectable for *SLC* Series 5 carrier.
IW X'pq	=	Optional to specify HEX code for IW pattern either pq = FF for all 1s pattern, or pq = 7F for unassigned channel code (default value).

2. Install the circuit pack(s) for the NPC slot(s) assigned to the protection line as follows: use TG183 S96D card for *SLC* 96 carrier and Series 5 FPB, and use TG184 SS5D card for *SLC* Series 5 carrier FPC.

   NOTE:
   For Mode I, the NPCs going to DGA at the RT and DCLU must be on the same dual card. There is no protection line between the DCLU and DACS II.

3. Verify that the digital line has been established and tested. Verify that patching cords are placed at the DSX-1 bay to loop back signal to the DACS II NPC.

Table 3-66. Format and Channel Options

Option	Meaning
X	**Multiframe Format**
0	Unassigned
1	D4 bank
2	ESF (extended superframe) - voice
3	Unassigned
4	Unassigned
5	Unassigned
6	*SLC*® 96 carrier Fs format
7	*SLC* Series 5 ESF with data link
8,9	Unassigned
Y	**Zero Code Suppression**
0	ZCS (zero code suppression
1	NZCS (no zero code suppression)
2	B8ZS (bipolar with 8 zero substitution)
3-9	Unassigned
Z	**Channel Counting Sequence**
0	*SLC* 96 carrier Mode III, D4 bank sequence
1	*SLC* 96 carrier Mode III, D1D bank sequence
2	*SLC* 96 carrier Mode I, D1D bank sequence
3	*SLC* Series 5 carrier, D4 bank sequence
4-9	Unassigned

Table 3-67. Alarm Options

Option (rr)	Parameter	Range	Default
01	SLIP major	000* to 255	255
02	SLIP minor	000* to 255	4
03	Bit error rate major	10^{-6} to 10^{-4}	10^{-4}
04	Bit error rate minor	10^{-6} to 10^{-4}	10^{-4}
05	Errored seconds	00001 to 65535	864
06	Severe errored seconds	001 to 255	225
07	Change of frame alignment, major	001 to 511	511
08	Change of frame alignment, minor	001 to 255	17
09	Shelf alarm, near end	00000 to 65535	00000
10	Shelf alarm, far end	00000 to 65535	00000

* Setting the SLIP threshold to zero suppresses the alarm.

4. Enter **`ADD::{RT|DL} ffff,MD g[g][DGP ppp][,{sss|NDL|RTF}]!`** to correlate protection line NPC(s) with other NPCs going to RT. If the data link was not enabled when digroup A was added, the DLT command must be entered (see *Delete Digroup Designations*) for DGA followed by the ADD command for DGA and DATA Link in DGA.

   Where:

RT|DL	=	Selects either RT for remote terminal or DL for DCLU as the type of connecting equipment.
ffff	=	RT or DCLU identifier.
g	=	Mode: 1 for *SLC* 96 carrier Mode I; 3 for *SLC* 96 carrier Mode III; 1 for *SLC* Series 5 carrier FPB; C for *SLC* Series 5 carrier FPC.
aaa,bbb,ccc,ddd	=	NPC numbers to be assigned to digroups; A, B, C, and D.
ppp	=	NPC number to be assigned to protection facility if provided.
sss	=	For *SLC* 96 carrier digroup A to specify power or miscellaneous alarm as follows: PMN (power-minor alarm, default if single RT is used at the site) or PMJ (power-major alarm) or MMJ or MMN for major or minor miscellaneous alarm.
NDL	=	Optional, for *SLC* 96 carrier to disable use of data link with digroup A.
RTF	=	Optional, for *SLC* Series 5 carrier digroup A to assign retrofit status to the system which prevents the DACS II from overwriting (clearing) the RT channel provisioning. The RTF status must be changed after the channel provisioning is loaded into the DACS II to allow DACS II auditing.

5. Enter **`UTL::QRY,STATE,SCDG,NPC <npc No.>!`** for the protection line NPC to see the NPCs associated with the other RT digroups.

6. At DSX-1 bay, make cross-connections between line jacks and DACS II NPC jacks.

7. Enter **`RST:[FRM xy,SEQ ww]:NPC <npc No.>[-<range]!`** to restore the NPC(s).

   NOTE:
   The restore operation causes diagnostics to be run on the NPCs and changes the status to in-service.

   NOTE:
   When the NPCs for DGP of *SLC* 96 carrier Mode I are restored, the DACS II automatically duplicates the cross-connection of the locally-switched channels between the RT and DCLU for DGA.

8. Have tester at RT remove looping card at LIU P TSTS jack and watch the ACU MN alarm indications. This ACU MN alarm should occur and then clear approximately 15 seconds after the next step is completed.
9. At DSX-1 bay, remove line feed signal and termination on line side jacks and remove any looping cords from DACS II side jacks.
10. If you want to check the status of the facility, enter **`UTL::QRY,STATE,NPC <npc No.>!`**.

    Where: <npc No.> = The NPC for the protection line.

11. Enter **`SW::NPC <npc No.>,PSW[,INCL]!`** at DACS II to verify data link communications and protection switching.

    Where: INCL = Optional, needed to switch DGA.

12. If protection switching of any digroups B, C, or D is to be denied, enter **`SW::{NPC <npc No.>|RT ffff,DG x|DL ffff,DG x},INH!`** using one of the identifiers (NPC, RT, or DL) for the digroups.

Retrofit *SLC* Mode I, 5:5 to 5:4

Overview: This procedure is used to convert a *SLC* 96 carrier Mode I, 5:5 protection configuration to a 5:4 protection configuration. There is no protection line from the DACS II and the DCLU; the only protection line will be between the DACS II and the RT. The 5:5 protection provided for earlier generics (protection was provided between the RT, DACS II and the DCLU) is replaced by the *SLC* 96 carrier Mode I, 5:4 pass-through protection. With a 5:4 configuration, the Mode I can have up to 5 DS1 lines (4 service and 1 optional protection) on the RT interface and up to 4 service DS1 lines on the DCLU interface.

CAUTION:
To ensure no service outage occurs, it is recommended that all failures on primary (for example, A, B, C, D) be cleared and the digroups restored so that all digroups P of Mode I can be freed from protecting any primary.

NOTE:
This procedure is a 2-step process where all 5:5 protection systems must be manually converted to 4:4 systems prior to the 5:4 retrofit (this must be done before the generic upgrade).

1. What conversion do you want to perform?
   - If CONVERT 5:5 to 5:4, go to Step **2**.
   - If CONVERT 4:4 to 5:4, go to Step **7**.

2. If DGP is in service to the DCLU, enter `RMV::NPC <npc No.>!` to remove the NPC from service.

   Where: <npc No.> = NPC number, either extended (for example, 0001) or hierarchical (for example, 01101).

3. If DGP is in service to the RT, enter `RMV::NPC <npc No.>!` to remove the NPC from service.

   Where: <npc No.> = NPC number for DGP going to the RT.

4. Enter `DLT::DL ffff,DGP ppp!` to delete the DGP for the DCLU.
5. Enter `DLT::RT ffff,DGP ppp!` to delete the DGP for the RT.
6. Enter `DGRTH::NPC <npc No.>!`

   Where: <npc No.> = NPC for DGP going to the DCLU.

7. Enter `ADD::RT ffff,MD 1,DGP ppp!` to add the DGP to the RT.

NOTE:
The mate of the RT DGP is now reserved and registered to carry M-field message exchange between DCLU and the RT through the DACS II. The reservation will be done automatically by the software when the ADD command of RT DGP is issued.

8. Enter **`RST::NPC <npc No.>!`** to restore the DGP to the RT.

   Where: <npc No.> = NPC number for DGP going to the RT.

9. Reload the old software release and perform the entire retrofit procedure again.

Delete Digroup Designations

Overview: The DLT (delete) command removes the correlation from the DACS II data base in order to make a change; the NPC must be out-of-service to use the DLT command.

1. Enter **`RMV::NPC <npc No.>[,INCL]!`** to remove NPCs that are to be deleted.

   Where:

   <npc No.> = NPC number either extended (for example, 0001) or hierarchical (for example, 01101)

   INCL = Optional, needed to remove an NPC with special circuits.

   NOTE:
   INCL is required to remove DGA because DGA carries the communications data link.

2. If all four NPCs going to the RT or DCLU are to be reassigned, you can enter those NPCs at one time in the DGA through DGD fields of the DLT command; otherwise, only use the involved digroup fields.

   NOTE:
   For *SLC* Series 5 carrier, digroup pairs (A and B) and (C and D) must be deleted together in command(s) because they are associated in the RT controller.

3. Enter the DLT command as follows: **`DLT::{RT|DL} ffff[,DGA aaa][,DGB bbb][,DGC ccc][,DGD ddd][,DGP ppp]!`**.

   NOTE:
   The DCLU (DL) does not have a DGP.

   Where:

   RT|DL = Selects either RT for remote terminal or DL for DCLU as the type of connecting equipment

   ffff = RT or DL identifier

   aaa-ddd, ppp = NPC numbers to be assigned to digroups.

   - If the command is denied, find the reason for denial and perform corrective action to obtain command completion (*Command Denials* has explanations of denial codes).

4. Check the output message to verify correct entry of information.

Change Far-End Bank Identifier

1. Enter **`CHG::{RT|DL} ffff,TO gggg!`**

   Where:

   ffff = Bank identification number which is to be changed

   gggg = New bank identification number. For Series 5 carrier, different RT IDs must be assigned to banks on the same RT shelf to avoid problems in the RT data base.

   - If the command is denied, find the reason for denial and perform corrective action to obtain command completion (*Command Denials* has explanations for denial codes).

2. Check the output message to verify that correct information was entered.

Change Series 5 Retrofit Designation

1. Enter **`CHG::RT ffff,RTF!`** to change the status of the *SLC* Series 5 RT bank from retrofit to nonretrofit.

   Where: ffff = RT bank identification number.

   - If the command is denied, find the reason for denial and perform corrective action to obtain command completion (*Command Denials* has explanations for denial codes).

2. Check the output message to verify that correct information was entered.

Change Power/Miscellaneous Alarm Designation

1. Consider the following concerning the power/miscellaneous alarm option which only applies to *SLC* 96 carrier:
   - — The power or miscellaneous alarm is carried over the data link on DGA; so, the NDL (no data link) must not have been used when the ADD DGA command was entered.
   - — The miscellaneous alarm indicates an open door, flooding, fire, or gas at the RT site. This alarm can be used for the second RT bank at the site; the power alarm is used for the first RT bank.

2. Enter **`CHG::RT ffff,sss!`** to change the power/miscellaneous alarm for *SLC* 96 carrier.

   Where:
   ffff = Bank identification number of connecting RT for which the alarm meaning is to be changed.
   sss = Required new meaning given by one of the following: PMN for power minor alarm (default and required for one RT at site), PMJ for power major alarm, MMJ for miscellaneous major alarm, or MMN for miscellaneous minor alarm.

   - If the command is denied, find the reason for denial and perform corrective action to obtain command completion (*Command Denials* has explanations for denial codes).

3. Check the output message to verify that correct information was entered.

Operate *SLC* Carrier System Protection Switch or Line Loopback

Overview: Switching to the protection line occurs automatically if one of the primary lines fails and can be initiated by entry of commands at the DACS II. For *SLC* 96 Mode III and *SLC* Series 5 carrier, protection switching is done at the DACS II and the RT. There is no protection line between DACS II and the DCLU; the protection switching occurs at the DACS II and the RT. The switching is accomplished at the DACS II by automatic cross-connections between the primary and protection line channels. Line loopbacks can be produced on command at the DACS II or connecting RT to allow trouble isolation. To prevent interruption of service, the loopbacks can only be operated if: (1) there are no cross-connections on the digroup, (2) protection switching is operated for the digroup, or (3) the digroup is already failed and protection switching is not available.

1. Which activity do you need to accomplish?
   - If **Operate/Change Protection Switching Only**, then do Step **2**.
   - If **Initiate Loopback**, then do Steps **2** and **3**.
   - If **Change Loopback State**, then go to Step **3**.

2. Enter command to change switch state as required:
   `SW::{NPC <npc No.>|{RT|DL} ffff,DGx},`
   `{PSW|USW|ALW|INH}[,INCL][,FRC]!`.
   - If COMPL message is received, proceed to Step **4**.
   - If the command is denied, find the reason for denial and perform corrective action to obtain command completion (*Command Denials* has explanations of denial codes).

   Where:

<npc No.>	=	NPC number, either extended (for example, [0]001) or hierarchical (for example, 01101).
ffff,DGx	=	RT or DL identifier (ffff) and digroup at RT (x = A, B, C, D).
PSW	=	Keyword to initiate switch to protection line.
USW	=	To unswitch the protection line.
ALW	=	To allow automatic switching on digroup.
INH	=	To inhibit automatic switching on digroup. Keywords INCL and FRC may also be required in the command.
FRC	=	Required to inhibit (INH) failed digroup from switching (when switch becomes available). Also required with INCL to inhibit (INH) protection of DGA in *SLC* Series 5 carrier.
INCL	=	Required to effect protection switching on digroup A (DGA).

3. Enter command with appropriate keyword to initiate loopback as follows: **TTST::{RT|DL} ffff,{DGA|DGB|DGC|DGD|DGP},LLB, {TO|FROM},{INI|TRM|ALW|INH}!**.

   Where:

ffff	=	RT identification or DCLU identification if DL is selected for loopback toward DCLU for *SLC* 96 Mode I.
DG_	=	Selects the digroup for loopback. The DCLU does not have a DGP.
TO/FROM	=	Requests loopback to be sent (TO - sends request to RT; FROM - sent from RT) either toward the far end (TO, default) or from far end (FROM).
INI	=	To initiate loopback. Not valid with FROM keyword.
ALW	=	To reverse previous inhibit and allow loopback request.
INH	=	To inhibit loopback request.
TRM	=	To terminate existing loopback. Not valid with FROM keyword.

   NOTE:
   If initiating loopback in DGA, manually switch DGA to protection.

   - If the command is denied, find the reason for denial and perform corrective action to obtain command completion (*Command Denials* has explanations of denial codes).

4. Enter **UTL::QRY,STATE,SCDG,{NPC <npc No.>|RT ffff|ALL}!** with the required identifier or for all RTs. The output is in the form of a grid with the digroups on the horizontal axis and the PLSW (protection line switch), LLB (line loopback), and ALST (alarm) along the vertical axis. Read the PLSW or LLB status using Table 3-68.

5. Read the ALST column as follows: the status component is either MN (minor) or MJ (major) and the location is NE (near end), FE (far end), or CL (carrier line).

6. Use original command with appropriate keyword to return switch or loopback to normal (USW or NORM keyword) after testing is completed.

Table 3-68. Keyword Meanings

Keyword	Meaning
SWMR	Manual protection switch
SWAR	Automatic protection switch
INHB	Protection switch inhibited
NORM	Protection switch is in normal, standby state
FRTA	Loopback action coming from RT/DL active
FRTI	Loopback action coming from RT/DL inhibited
TRTA	Loopback action going toward RT/DL active
TRTI	Loopback action going toward RT/DL inhibited
NORM	Loopback is in normal, inactive state

Establish DS3 Facility

Check Far-End Installation, Make DSX-3 Connections, Check DS3 Line Status

1. Verify that far-end DS3 equipment has been equipped and tested and that the DS3 line has also been established and tested.
2. At the DSX-3 bay, make wiring cross-connections over to DACS II.
3. Enter **`UTL::QRY,STATE,UNIT [q]q,DS3 c[-d]!`** to check DS3 line status for unit and DS3 number (or range) in unit.
4. Remove any looping cards at the DSX-3 bay and verify that DS3 line alarms clear (ALM IDLD messages received).

   NOTE:
   The DS3 MMFGs should already be restored to service as per *Install circuit packs, Grow and Restore DS3U*.

Test DS3U and HDS3U Protection Switching

1. Enter command to initiate the MMFG protection switch as follows:
   SW::UNIT [q]q,MMFG c,TOPRTN[,FRC]!.

   Where:

   [q]q = Unit number (1 through 16)

   c = MMFG number (1 through 6) to be switched

   FRC = Optional, to force switch even if protection connected to another service MMFG must be released.

   NOTE:
   The switch can also be initiated by pulling a service MXR/EMXR/HMXR pack or entering the MMFG remove command as follows:
   RMV::UNIT [q]q,MMFG c!.

2. Notice the SW ...COMPL message and verify that ALM message is not received on line which has been switched onto protection.
3. Enter **UTL::QRY,PSTATE,UNIT [q]q!** to see the overall protection state for the unit.
4. Observe the following in the query output message:
   - — The message is divided into the top half for the FLI status and the bottom half for the MMFG status.
   - — In the FLI portion, the maintenance status and then the protection are listed for both the service and protection FLIs.
   - — In the MMFG portion, there are 7 MMFG groupings; the leftmost is for the protection MMFG and the others are for MMFGs 1 through 6. Each grouping consists of the following:
     - The first item is the MXR/HMXR maintenance status.
     - (If DS3U only) The second item is the EMIU maintenance status.
     - The next item is the protection status.
     - The last item details the availability of switching (if MMFG switching was requested).

5. Refer to Table 3-69 to interpret the maintenance and protection status keywords. All the possible codes are consolidated in the table; not all the codes apply to each DS3/HDS3 circuit pack.
6. Enter **UTL::QRY,STATE,UNIT [q]q,DS3 c!** for same unit and MMFG (c = MMFG No.) to obtain PSTATE summary.
7. Enter command for manual switchback as follows: **SW::UNIT [q]q,MMFG c,TOSRVC!** for the MMFG that was switched.

   NOTE:
   If switch was initiated by pulling a pack or removing the MMFG, do the reverse operation (install, restore) here to cause switchback.

8. If you want to compare the status to the switched status, enter **UTL::QRY,PSTATE,UNIT [q]q!** and read status as before.
9. If you want to test the FLI switching, enter **SW::UNIT [q]q,FLI,TOPRTN!** and, after the completion, enter **UTL::QRY,PSTATE,UNIT [q]q!** to read the status as before.
10. Enter **SW::UNIT [q]q,FLI,TOSRVC!** to switch back the FLI.

Table 3-69. Maintenance and Protection Keywords

Keyword	Meaning
Maintenance Status	
IS	In-Service
ISF	In-Service, but Failed and Pested
OOS	Out-Of-Service
UEQD	Unequipped
Protection Status	
SLT	Protection MMFG/FLI Selected
USLT	Protection MMFG/FLI Unselected
SALW	MMFG Is Carrying Service and Switching Is Allowed
SINH	MMFG Is Carrying Service and Switching Is Inhibited
MPALW	Manual Protection Switch Active and Auto Switchback Allowed
APALW	Auto Protection Switch Active and Auto Switchback Allowed
MPINH	Manual Protection Switch Active and Auto Switchback Inhibited
APINH	Auto Protection Switch Active and Auto Switchback Inhibited
(dashes)	Service MMFG Not Equipped
Protection Availability	
AVL	Available for Switching
NVL	Not Available for Switching
(dashes)	MMFG Not Selected for Service

Check Far-End Cross-Connection, Loop DS1 Signals, and Check DS1 Status

1. If far-end equipment for component DS1 facilities has been tested and is ready for connection, have far-end tester make wiring cross-connections at DSX-1.
2. If far-end equipment for component DS1 facilities is not ready for connection, have far-end tester connect looping cords at muldem jacks of DSX-1.
3. If you want to use the DACS II to check the status of the component DS1, enter **`UTL::QRY,STATE,NPC <npc No.>!`** for the NPC.

Subrate (ECCN/CCN to DSPU) Connection

Establish Subrate Channel

Overview: This command connects a channel or a range of channels in a digroup to the subrate feature. Parity channels may also be established. The following types of subrate channel can be established:

- DS0B channel capable of multiplexing 5, 10, or 20 subrate customers
- DS0B channel capable of multiplexing 5, 10, or 20 subrate customers and parity error correction
- 56 kb/s channel with parity channel error correction (also referred to as 56 kb/s dataport)
- DS0A channel with subrate dataport error correction
- DS0A channel without error correction.

1. Familiarize yourself with the following commands. The commands shown in the parentheses are DACS/SRDC equivalent commands.

   For DS0A:
   ```
   SECH:[FRM xy,SEQ ww]:TO <npc No.>ddd[-eee],DS0A rr[,SEC]!
   ```
   ```
   (SECH:[FRM xy,SEQ ww]:TO <npc No.>ddd[-eee],RATE rr,DP!)
   ```

   For DS0B:
   ```
   SECH:[FRM xy,SEQ ww]:TO <npc No.>ddd[-eee],DS0B nn
   [,PCH[ppp]]!
   ```
   ```
   (SECH:[FRM xy,SEQ ww]:TO <npc No.>ddd[-eee],RATE rr
   [,DP,PCH[ppp]]!)
   ```

   For 56 kb/s:
   ```
   SECH:[FRM xy,SEQ ww]:TO <npc No.>ddd[-eee],DS0A 56
   [,PCH ppp]!
   ```
   ```
   (SECH:[FRM xy,SEQ ww]:TO <npc No.>ddd[-eee],RATE 56!)
   ```
   ```
   (SECH:[FRM xy,SEQ ww]:TO <npc No.>ddd[-eee],RATE 56
   [,DP,PCH[ppp]]!)
   ```

Where:

xy = DACS II frame number (00 through ZZ).

ww = Command sequence number (00 through 49).

<npc No.> = NPC number, either extended (for example, [0]001) or hierarchical (for example, 01101). The additional NPCs on the DS3 are identified by suffix, A through H.

ddd = First channel number within the digroup

eee = Last numbered channel in a range of channels The eee is eliminated in a single channel command and is not allowed when a parity channel is associated with a channel being addressed by the command (the command will be denied).

rr = Channel rate (24, 48, 96 = 2.4, 4.8, 9.6 kb/s, respectively).

nn = Number of DS0B subrate customer channels (5, 10, or 20).

ppp = Parity channel number. If the parity number (ppp) is not specified, the parity channel is assigned as ddd + 1.

2. Enter the appropriate command with the required information.

   - If the command is denied, find the reason for the denial and perform corrective action to obtain command completion (*Command Denials* has explanations of denial codes).

     NOTE:
     If the command is denied with the first line ending with **{INERR|SYNTAX} 2LN MSG**, the input command had an error in it, and the two equal signs (**= =**) in the denial message show where the problem occurred. Reenter the command.

3. Check completion message to verify changes.

4. To familiarize yourself with the query that shows subrate established channels, enter
   `UTL::QRY,SECH,TO <npc No.>ddd[-eee][-<range>jjj[-kkk]]!`

Change Established Subrate Channel

Overview: This command moves a subrate established channel and all associated subrate cross-connections from an existing digroup and channel to a new digroup and channel.

1. Familiarize yourself with the following command:

   CHG:FRM xy,SEQ ww:SECH,OLD <npc No.1>ddd[-eee], NEW <npc No.2>jjj[-kkk][,PCH [ppp][,DCC]]!

   Where:

xy	=	DACS II frame number (00 through ZZ).
ww	=	Command sequence number (00 through 49).
<npc No.1>	=	OLD NPC number, either extended (for example, [0]001) or hierarchical (for example, 01101). The additional NPCs on the DS3 are identified by suffix, A through H.
ddd,jjj	=	First channel in a continuous range.
eee,kkk	=	Last channel in a range. The eee, or kkk is eliminated in a single channel command and is not allowed when a parity channel is associated with a channel being addressed by the command.
<npc No.2>	=	NEW NPC number, either extended (for example, [0]001) or hierarchical (for example, 01101). The additional NPCs on the DS3 are identified by suffix, A through H.
ppp	=	Indicates the number of the parity channel to be associated with the new data channel.

2. Enter the appropriate command with the required information.

   - If the command is denied, find the reason for the denial and perform corrective action to obtain command completion (*Command Denials* has explanations of denial codes).

     NOTE:
     If the command is denied with the first line ending with **{INERR|SYNTAX} 2LN MSG**, the input command had an error in it, and the two equal signs (**= =**) in the denial message show where the problem occurred. Go to Step **1** and reenter the command.

3. Check completion message to verify changes.

4. To familiarize yourself with the query that shows subrate established channels, enter
   UTL::QRY,SECH,TO <npc No.>ddd[-eee][-<range>jjj[-kkk]]!

Disestablish Subrate Channel

Overview: This procedure disestablishes a channel or a range of channels associated with a group from use by the subrate feature. Associated parity channels are also disestablished. There is an option to insert the UMC control code into the disestablished channel(s) toward the digroup facility.

1. Enter **`SDCH:[FRM xy,SEQ ww]:TO <npc No.>ddd[-eee][,PCH [ppp]][,DCC]!`**

   Where:

   xy = The double-digit number assigned to the frame when it is placed in service. If the command is being issued to a remote frame, the frame number **must** be entered.

   ww = Identifying double-digit number assigned to the command (arbitrarily chosen by the operator). If issued to a remote frame, the sequence number **must** be entered.

   <npc No.> = NPC number, either extended (for example, 0001) or hierarchical (for example, 01101).

   ddd = Channel number within the digroup for a single channel of the number of the lowest numbered channel in a range of channels.

   eee = Last channel in a range of channels, not allowed when a parity channel is associated with a channel being addressed by the command.

   PCH = Indicates parity channel associated with channel being addressed. Downward compatibility with the equivalent DACS II/subrate command. The command will disestablish the parity channel (associated with ddd channel) with or without PCH included in the command.

   ppp = Number of the parity channel. For downward compatibility only, the command will perform the same with or without ppp.

   DCC = Causes the DCC UMC control code to be inserted in the disestablished channel(s) toward the digroup facility.

2. Enter the appropriate command with the required information.

3. Check completion message to verify changes.

   - If the command is denied, find the reason for the denial and perform corrective action to obtain command completion (*Command Denials* has explanations of denial codes). If denial message states the channel is connected to a test port, refer to *Remove and Degrow Equipment*.

     NOTE:
     If the command is denied with the first line ending with **`{INERR|SYNTAX} 2LN MSG`**, the input command had an error in it, and the two equal signs (**`= =`**) in the denial message show where the problem occurred. Reenter the command.

Links

Check Link Connections

1. If data sets (such as 202T) are required for remote connections or for equipment more than 50 feet (RS-232C specification) or 2,000 feet (RS-449 specification, 1200 baud) away, verify that data sets have been installed. Data set specifications are given with the information notes in SD-96662-01.
2. Connect data link cable (for example, M25B) to the TTY connector for the link (behind DACS II main controller). No adapter is required for RS-449 format, but ED-2C646-30 adapters are required for RS-232C format as follows:
   - — Use a G1 (group 1) or G14 adapter for any interface via data sets (asynchronous or synchronous).
   - — Use a G2 or G15 adapter for a direct TTY or CRT terminal (without data sets), or for connecting to a SCAT. To establish communication between the SCAT an the DACS II Administration Link, do the following:
     1. Provision one of the DACS II synchronous administration links for Modified Synder Protocol and restore the link into service.
     2. Load the SCAT software into the PC and configure the software to direct the interface through the PC's serial interface.
     3. Connect a standard PS-232 cable to the PC's serial port.
     4. Connect the opposite end of the RS-232 cable to a DACS II ED2C646-30 G2 (25 pin to 37 pin) adaptor.
     5. Connect the G2 adaptor to the selected DACS II administration link.
   - — Use a G3 or G8 adapter for local operations systems such as SARTS (Switched Access Remote Test System) or TABS (telemetry asynchronous block serial) protocol link (asynchronous 4-wire – data only without data sets).
   - — Use a G9 adapter for a link to CIU (craft interface unit) for *SLC*® Series 5 carrier. This is for an asynchronous link.

NOTE:
The G1 and G2 adapters interoperate with RS232C per EIA Pub. 12 and give maximum receiver margin and minimum pulse distortion. The G14 and G15 adapters contain termination and biasing networks to detect disconnected or unpowered RS232C equipment. The G1 and G2 adapters are recommended for use in normal installations where the equipment remains powered up.

3. Links that are in service but not in use are autonomously removed and restored with SOFT ERR hardware messages. To avoid this output, links that are not in use should be manually removed from service.

Initialize, Set Type and Rate Characteristics

Overview: This procedure is used to prepare DACS II links for connections. There are six links available for connection of terminal equipment and operations systems. With the ECI (TM736C), links 5 and 6 are synchronous links using X.25 protocol (through level 3) at rates up to 9.6 kb/s. The HECI (high-speed, TM762) extends the rate up to 56 kb/s. Up to 16 virtual circuits can be established on each synchronous link. The characteristics of each link can be changed from the defaults provided by DACS II using the ADD commands herein. The ECI or HECI is required for TABS (telemetry asynchronous block serial) links.

1. What type of link is being established?
   - If **ASYNCHRONOUS**, continue with Step **2.**
   - If **TABS**, proceed to Step **3.**
   - If **SYNCHRONOUS**, proceed to Step **4.**

2. Enter the appropriate command to initialize link or make changes:
   `ADD::LINK j,PTCOL S[,BAUD bb][,ALM k][,BS e]`
   `[,ENQ q][,XON x][,INIT]!`

   or **`ADD::LINK j,PTCOL M[,ALM k][,INIT]!`**. Proceed to Step **8.**

   Where:

   j = Physical link number (1 through 6)

   S|M = Asynchronous Snider (S) protocol or Modified (M) Snider for *SLC* Series 5 Carrier System; only one of the 6 links can be set for modified Snider

   bb = Baud rate; 03, 06, 12, 24, 48, or 96 for rate of 300, 600, 1200, 2400, 4800, or 9600; default is 1200

   k = Alarm class; k = 2 for major alarm for link hardware failure, or k = 1 for minor alarm (default)

   e = Backspace; e = 1 for backspace indicated by underscore or e = 0 to actually move cursor backward for backspace (default)

   ENQ q = To enable/disable ENQ/ACK acknowledgment protocol to match terminal requirement; q = 0 to disable or q = 1 to enable (default).

   XON x = To allow use of CTRL s and CTRL q commands to temporarily stop and start long output messages; x = 0 to disable (default) or x = 1 to enable. [See Note]

   INIT = Optional, to initialize all parameters to default values except for those parameters entered in command.

NOTE:
If the output on a Snider link provisioned with the XON feature is suppressed by a DTE sending an XOFF character, the link is periodically removed from service by the error recovery.

3. Enter the following commands to make required settings:

   ADD::LINK j,PTCOL T,BAUD bb!

   ADD::LINK j,APPL {ASCS|ASCD|PM}[,L2AD aa][,POLL ttt]!

   Where:

j	=	Physical link number (3 or 4)
T	=	TABS protocol
bb	=	Baud rate (24 for 2400)
ASCS, ASCD, or PM	=	Selects application as follows: alarm surveillance and control summary or detailed, or performance monitoring.
ttt	=	Optional, to specify polling time as follows: 001 through 255 for ASCS or ASCD applications.
aa	=	Optional, to specify Layer 2 address (00 through 31).

4. To initialize the link or change alarm class, enter
   ADD::LINK j,PTCOL X[,ALM k][,INIT]!

   Where:

j	=	Physical link number (5 or 6)
PTCOL X	=	X.25 synchronous link protocol
k	=	Alarm class; 2 for major alarm for link hardware failure or 1 for minor alarm (default)
INIT	=	Optional, to initialize all parameters to default values except for those parameters entered in the command.

5. Enter **UTL::QRY,STR,LINK j[mm]!** to see the existing (or default) link parameter values (see Table 3-70). The link must be removed from service to change parameters. See Figure 3-29.

6. To enter different **data layer** values, list the subject parameter followed by the value (for example, K-5). Enter the command as follows:
   ADD::LINK j[mm][,<param> <value>,...][,FRMAD {A|B}]!

   Where:

j	=	Physical link number (5 or 6)
mm	=	Permanent virtual circuit (01 through 16) on same link
<param> <value>	=	**Data layer** parameter (K, T1, T3, N2) and value obtained from associated portion of Table 3-70.
FRMAD {A|B}	=	Frame address in X.25 layer; default is A.

7. To enter different **packet layer** values, list the subject parameter followed by the value (for example, R20-nn) and use commas to separate parameter entries. Enter the command as follows:

   `ADD::LINK j[mm][,<param> <value>,...]\`
   `[,VC(ppss,gghh)][,DBIT v]!`

   Where:

j	=	Physical link number (5 or 6)
mm	=	Permanent virtual circuit (01 through 16) on same link
<param>	=	One of the **packet layer** parameters of Table 3-70 for which different values are to be specified; identified by designation (for example, T20)
<value>	=	Value of named parameter
ppss	=	Number of virtual circuits (01 through 16) for permanent (pp) and switched (ss) VCs; defaults are pp = 08 and ss = 08
gghh	=	Virtual circuit groups (00 through 15) for above ranges; defaults are gg = 00 and hh = 00.
v	=	X.25 d-bit setting (0 or 1); 0 is default. 0 = off (unset) (acknowledgement done from local DTE) 1 = on (set) (acknowledgement done from remote DTE)

8. If denial COND 04 (link out-of-service) is received, enter **`RST::LINK j!`** and reenter the ADD command. Denial 03 means that the link must first be removed from service to change parameters.

   Where: j = Link number.

9. Verify that any administrative terminal to be connected to the link is set to the following major characteristics: full duplex, 7/8-bit ASCII, even parity, answerback (if ENQ/ACK protocol is used) and same baud rate as the link. Complete terminal specifications are found in the information notes of SD-96658-01.

10. If you are restoring the link to service, enter **`RST::LINK j!`**.

Table 3-70. Synchronous Link Level Parameters

Parameter Designation	Meaning	Value Range	Default
Data Layer Values			
N2	Frame Transmission Attempts	2 through 16	7
K	Window Size	1 through 7	7
T1	Acknowledgment Timer	2 through 20 seconds	3
T3	Idle Channel Timer	4 through 120 seconds	26
Packet Layer Values			
W	Window Size	1 through 7	2
P	Packet Size	128 through 512 octets	128
R20	Restart Retries	1 through 10	1
R22	Reset Retries	1 through 3	1
R23	Clear Retries	1 through 10	1
R25	Data Retransmissions	0 through 3	0
T20	Restart Timer	10 through 180 seconds	180
T22	Reset Timer	10 through 180 seconds	180
T23	Clear Timer	10 through 180 seconds	180
T25	Data Acknowledgment Timer	10 through 200 seconds	200
T26	Interrupt Confirmation Timer	10 through 180 seconds	180

Note: The following timers are not supported by DACS II:

T2 - Built-in to the XPC-MC 68605 chip of the ECI, time is 0.3 seconds and cannot be changed with the software.

T4 - Inactive link timer.

T21 - Call request response timer for SVCs.

ASYNCHRONOUS

M...UTL QRY STR LINK j PTCOL S 2LN MSG:
STATUS bb e k q m p x hh COMPL

SYNCHRONOUS

PACKET LAYER FORMAT

M...UTL QRY STR LINK j[mm]PTCOL X 4 LN MSG:
STATUS bb e k m p hh
LNKL <X.25 LINK LAYER parameters> <frame addressing>
PKTL <X.25 PACKET LAYER parameters> <VC ranges (ppss)> <VC grps (gghh)>

LINK LAYER FORMAT

M...UTL QRY STR LINK j PTCOL X 4 LN MSG:
STATUS bb e k m FFFF hh
LNKL <X.25 LINK LAYER parameters> <frame addressing>
PKTL T20 R20 <VC ranges> <VC groups>

PTCOL = link protocol (Snider/X.25)

<X.25 Link Layer Parameters>
k T1 T3 N2

<X.25 Packet Layer Parameters>
T20 R20
W P T20 T22 T23 T25 T26 R20 R22 R23 R25 (for Virtual Circuit, e.g., 501)

STATUS:

e = 0 for true backspace or 1 for underscore backspace or dash (—) for synchronous. link (no backspace option).
m = 0 (idle), 1 (input message), or 2 (output message)
bb = Baud rate (03, 06, 12, 24, 48, or 96) or 00 for synchronous link (baud not detectable)
FFFF = For X.25 links, when a specific virtual circuit number is NOT entered, the protocol field is 4 HEX characters (16 bits of information), each bit representing a specific virtual circuit. Each HEX character can contain a value from 0 - F. All zeros indicates all 16 virtual circuits are active. All ones indicates all 16 virtual circuits are not active.
hh = 03 (hardware in-service) or 04 (hardware out-of-service)
k = 1 (link alarm defined as minor) or 2 (defined as major)
q = ENQ/ACK protocol 0 disabled, 1 enabled (default)
x = XON/XOFF protocol 0 disabled (default), 1 enabled.
ppss = Number of permanent and switched virtual circuits (00-16)
gghh = Permanent and switched virtual circuit groups (00-15)

Figure 3-29. Link Status Register

Change Input Command Priority, Link Language, NPC Addressing, and Output Message Screening

Consider the following information and then refer to *Administration* for the appropriate procedure to make the necessary changes:

— **Input Command Priority** Commands from a single active link go into a queue and are executed in the order issued. Commands from different links go into separate waiting queues, and the *input command priorities* from these links control the order of execution; priority level 1 commands first, then priority 2, then priority 3. Commands from different links with the same priority are executed alternately. To prevent long waits for all lower priority commands, those that have been waiting in the queue for 2 minutes will be executed while higher priority commands that require more processing, like diagnose SMEM, are underway. Until set otherwise, the system processes all user commands as level 3 by default, and all system administrator commands as level 1. By setting the priority of the command groups on all LINKS to zero (excluded), the administrator can establish the use of the login mode because each user will have to log in to access the command set defined for that USER.

— **Link Language** DACS II Snider and X.25 links will operate in either PDS or MML message languages. Unless previously changed, the message language for the links and users will default to what is defined in the software load. If you want to use a different message language during your login session, you can change the message language for your user id. For example, if the link defaults to PDS but you work in MML, the link will switch to MML when you log in.

— **NPC Numbering Scheme** DACS II Snider and X.25 links will operate in one of the following NPC addressing schemes:

Extended - This scheme uses 3 digits to number the NPCs consecutively (for example, **041**). It can only be used on systems of three bays or less.

4-Digit Extended - This scheme uses 4 digits to number the NPCs consecutively (for example, **1041**). The extra digit allows the system to accommodate additional bays.

Hierarchical - This scheme uses a 5 digit number (**uvmnp**). It assigns a number to each NPC according to the unit number (**uv**), module or group number (**m**), and the NPC number within the module (**np**).

Unless previously changed, NPC addressing for the links and users will default to what is defined in the software load. If you want to use a different addressing scheme during your login session, you can change the scheme for your user id. For example, if the link defaults to *extended* but you work in *hierarchical*, the link will switch to hierarchical when you log in. Ensure that the addressing scheme for the link is allowable as defined in the configuration file.

— **Output Message Screening** Output message screening allows you to block groups of messages or include messages associated with other links. Any user can change his/her own message screening.

Unless previously changed, output message screening for the links and users will default to what is defined in the software load. If you want to use a different screening option during your login session, you can change the option for your user id. For example, if the link defaults to option 2 but your user id is set to option 5, the link will switch to option 5 when you log in.

Test Access

4

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Test Access

4

Establish NPC Test Ports and Groups

Establish Test Access Facility

Check Connecting Equipment and Make DSX-1 Cross-Connections

1. Verify that connecting equipment (D4 bank or digital test) has been tested.
2. Use office records to determine the DACS II and DSX-1 jack appearances to be cross-connected.
3. Insert dummy plugs (258 plugs or 800-series DSX cord plugs) in the MON jacks of the two sets of jacks to be cross-connected. This should light the TL lamps and help locate the position from behind the bay.
4. If the TL lamp for each jack set does not light, check for 48 volts with VOM across the TL lamp which is not lighted.
   - If 48 volts is present, replace the TL lamp.
   - If 48 volts is not present, clear trouble in wiring between fuse at top of DSX-bay and TL lamp per Figure 4-1.
5. Review the following guidelines for running cross-connections: Leave at least 8 inches of slack on short runs. Dress wires through fanout at bottom of panel. Run wires in horizontal or vertical troughs (top and bottom troughs for interbay) and remember the 85-foot limit.
6. With the BACK PANEL X-CONN FIELD DSX-bay, make cross-connections between subject jack sets per Figure 4-2 using Y1-type wire.

7. With the FRONT PANEL (800-SERIES) DSX-bay, make wire-wrap connections between jack sets per Figure 4-3 using five conductors of the cross-connect wire.

   NOTE:
   Only one size DSX-panel is shown in Figure 4-2, but combinations with different size panels and different jack types are likely to occur. Fortunately, only the orientation of the pins will differ in these cases; the pin numbers will be the same.

8. Remove one of the dummy plugs.

   - If both TL lamps remain lighted, remove other dummy plug.

     Response: Both lights will go off.

   - If both TL lamps remain unlighted, make corrections to wiring using Figures 4-1, 4-2, and 4-3 or reference drawings.

9. Record relay rack or other jack set identification on DSX-panel designation strip.

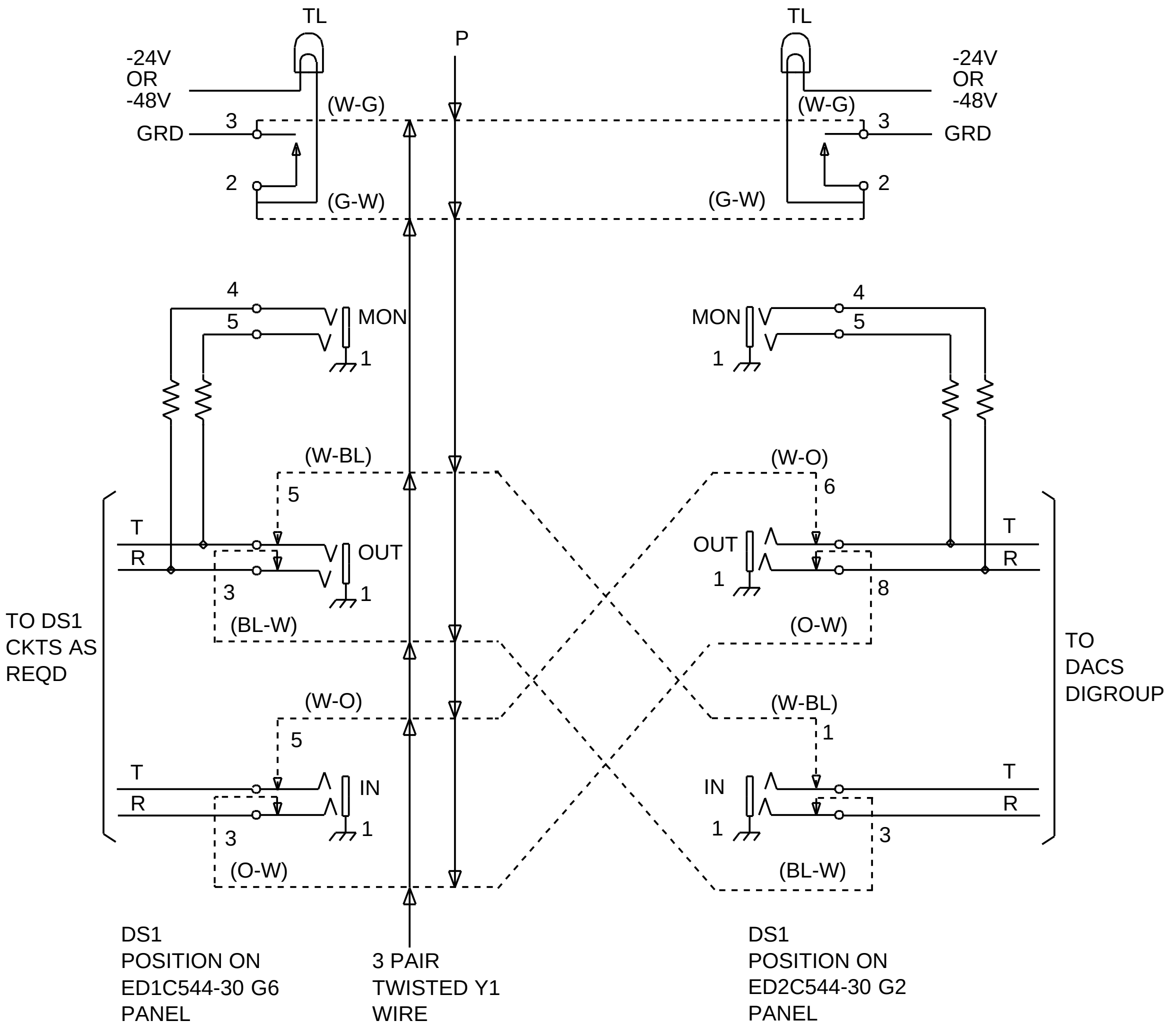

Figure 4-1. Cross-Connect Schematic

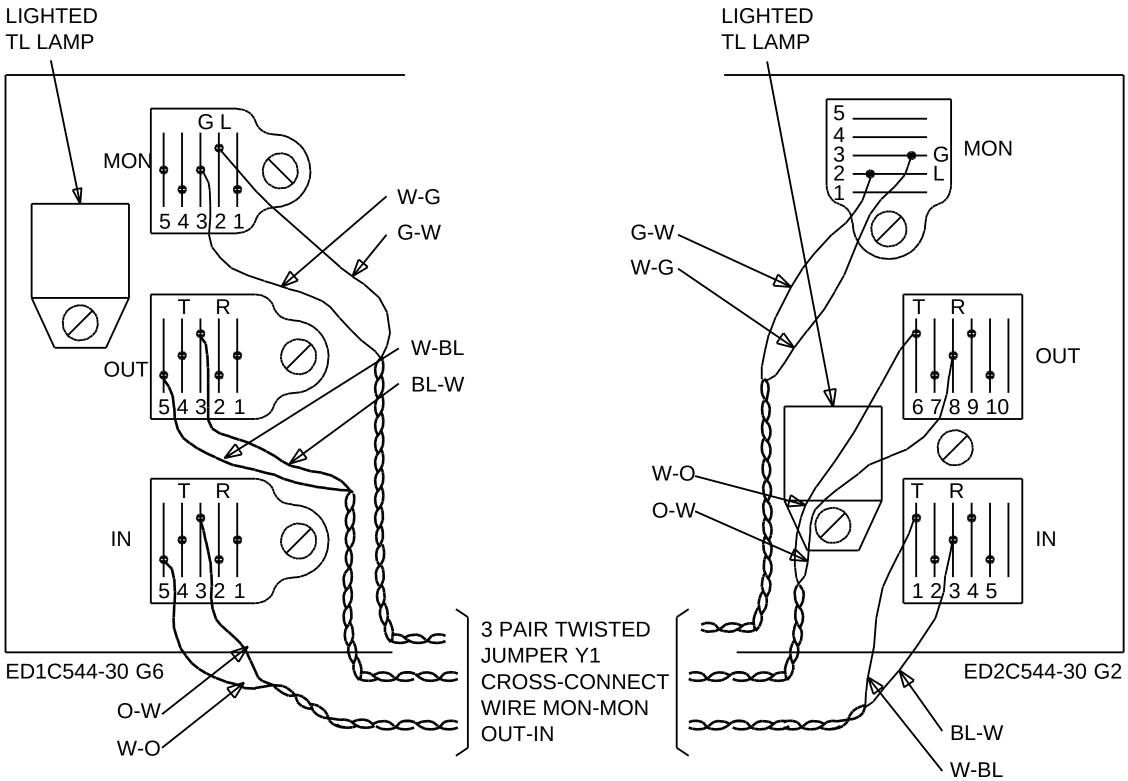

Figure 4-2. Rear View of 3-Inch Panel

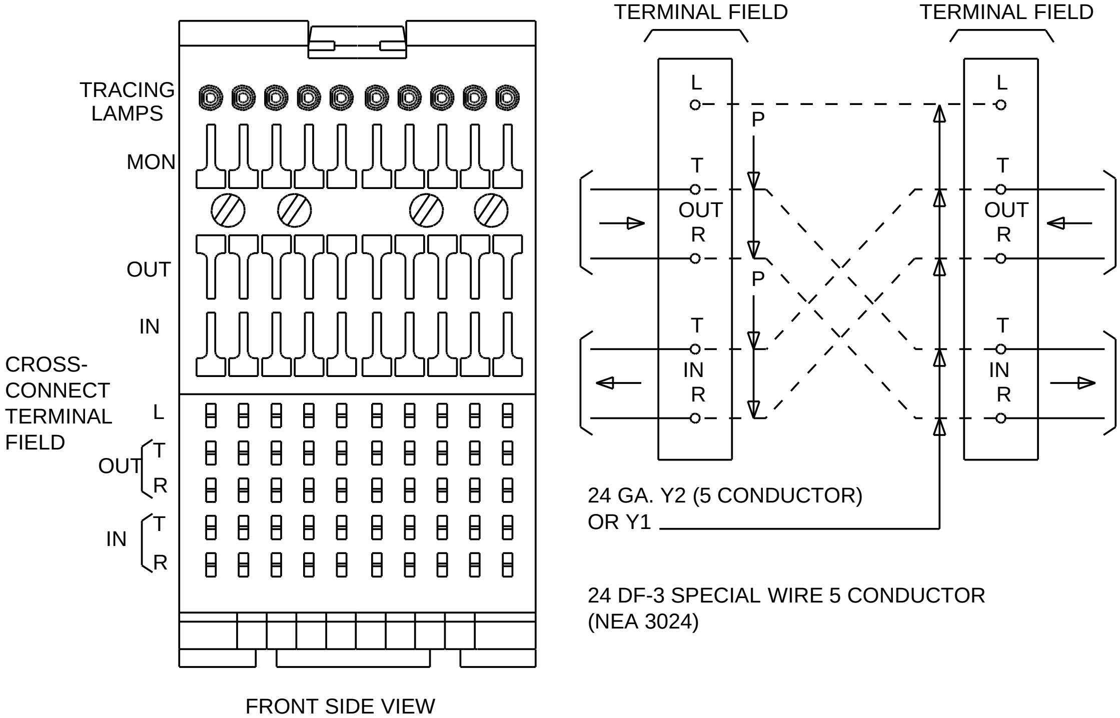

Figure 4-3. 800-Series DSX Details

Install Plug-Ins, Grow and Restore NPC to Function as NPCTP or NPCTG

Overview: This procedure defines the operating characteristics of the NPC in the data base. When the NPC is subsequently restored to service, it will be provisioned per the growth specification. Included in the specification are: DS1 line and channel formats, facility alarm thresholds, and the channel insertion word. The DS1 line formats are given by the TYPE specification; TYPE DE100 is the default. If used, alarm threshold options must already be defined in the data base.

1. Install TG80 or TG80B dual digroup card for two testport NPCs.
2. Before you enter the command, familiarize yourself with command as follows:
   GRTH::NPC <npc No.>[-<range>][,TYPE DExyz]
   [,OPTS(rr/l,ss/m,tt/n,...)]!

   Where:

<npc No.>	=	NPC number, either extended (for example, [0]001) or hierarchical (for example, 01101).
<range>	=	Optional, last NPC of continuous range of NPCs.
xyz	=	Line and channel format specification; DE100 (default).
OPTS(rr/l,ss/m,tt/n,...)	=	Optional, to list any or all alarm types (01 through 08) per Table 4-1 and predefined number (0 through 3) per Table 4-2 which sets alarm threshold.

3. Enter command with required information.

   EXAMPLE: **GRTH::NPC 012,TYPE DE100,OPTS (01/1,03/2,07/2)!**

   - If command is denied, find the reason for denial and perform corrective action to obtain command completion (*Command Denials* has explanations of denial codes).

4. Check output message to verify type and option selections.
5. Enter **`RST:[FRM xy,SEQ ww]:NPC <npc No.>[-<range>]!`**

   Where:

   xy = DACS II frame number (00 through ZZ).

   ww = Command sequence number (00 through 49).

   <npc No.> = NPC number, either extended (for example, [0]001) or hierarchical (for example, 01101).

   <range> = Optional, to name the final NPC when it is desired to restore a continuous range of FTU-NPCs.

   - If command is denied, find the reason for denial and perform corrective action to obtain command completion (*Command Denials* has explanations of denial codes).

Table 4-1. Alarm Parameters

Type (rr,ss,tt,...)	Meaning
01	SLIPs, Major Alarm
02	SLIPs, Minor Alarm
03	BER (bit error rate), Major Alarm
04	BER, Minor Alarm
05	ERS (errored seconds) T1DM and ESF Formats
06	SERS (severely errored seconds)
07	COFA (change of frame alignment), Major Alarm
08	COFA, Minor Alarm

Table 4-2. DS1 Option Selection

Option (l,m,n)	Meaning
0	Default Value
1	First Option Value (set1)
2	Second Option Value (set2)
3	Third Option Value (set3)

Designate NPC as NPCTP

1. Enter : **`GRTH::NPC <npc No.>,NPCTP n!`**
   Where: n = 1 through 8.
2. Notice the associated TPs that can now be grown.

Designate NPC as NPCTG

1. Enter : **`GRTH::NPC <npc No.>,NPCTG rrr!`**
   Where: rrr = 1 through 400.

Grow Test Ports

Overview: This procedure is used to grow test ports on a TAD (test access digroup). These TADs are given a NPCTP designation in the data base by the entry of a GRTH NPCTP command. Up to eight NPCs can be so designated on the frame, providing up to 96 test ports, 12 on each TAD. As each test port is grown, two more channels from the NPC are assigned a test port number. During subsequent test access, the channels of the test port are cross-connected to the channel under test. Splitting access is achieved by having two channels per test port.

1. Consider the following information concerning the variables used in the command:
   - The trunk conditioning (tc) is programmed signaling and a message insertion word that is sent on the connecting carrier channel during a carrier failure.
   - The <tc> specification is used when static "tc" is needed for an analog test system (SARTS/RTS-5A in the USA); otherwise, the "tc" will be dynamic (that is, match what was specified for the cross-connection).
   - Twelve test ports are available on each designated NPCTP and up to eight NPCTPs can be designated. The test port numbering is kk = 01-12 on NPCTP 1, 13-24 on NPCTP 2, 25-36 on NPCTP 3, 37-48 on NPCTP 4, 49-60 on NPCTP 5, 61-72 on NPCTP 6, 72-84 on NPCTP 7, and 85-96 on NPCTP 8.
   - If trunk conditioning is required for static test ports, see the format of the "tc" field.

2. Enter **`GRTH:[FRM xy,SEQ ww]:TP kk[,<tc>]!`**

   Where:
   xy = DACS II frame number (00 through ZZ)
   ww = Command sequence number (00 through 49)
   kk = Test port number (01 through 96) on test access digroup
   tc = Optional, used for Static Trunk Conditioning.

   - If command is denied, find the reason for denial and perform corrective action to obtain command completion (*Command Denials* has explanations of denial codes).

Grow Test Groups

Overview: This procedure is used to grow test groups (TGs) on a TAD (test access digroup). These TADs are given a NPCTG designation in the data base by the entry of a GRTH NPCTG command. Up to 400 test groups can be established. Each test group consists of two Nx64 Kbit/s bundles for testing both directions, where N is the width of the bundles and may be from 1 to 24. The bundles, called east and west, can be on separate NPCs or on the same NPC, if bandwidth permits. During subsequent test access, the channels of the test group are cross-connected to the channels under test.

1. Consider the following information concerning the variables used in the command:

   — The trunk conditioning (tc) is programmed signaling and a message insertion word that is sent on the connecting carrier channel during a carrier failure.

   — The <tc> specification is used when static "tc" is needed for an analog test system (SARTS/RTS-5A in the USA) when testing unmapped channel(s). Otherwise, the "tc" will be dynamic (that is, match what was specified for the cross-connection).

   — Each test group consists of two equal ranges having a width of up to 24 channels, for DS1. The two ranges may belong to two NPCTGs, or the same NPCTG but not overlapping.

2. Enter
   **GRTH::TG mmm,NPCTG (rrr,eee[-fff];\
   sss,www[-xxx])[,<tc>]!**

   Where:

mmm	=	Test group number
rrr	=	NPCTG number
eee[-fff]	=	[Range of] channels of east bundle on NPCTG rrr
sss	=	NPCTG number
www[-xxx]	=	[Range of] channels of west bundle on NPCTG sss
tc	=	Optional, used for Static Trunk Conditioning.

   - If command is denied, find the reason for denial and perform corrective action to obtain command completion (*Command Denials* has explanations of denial codes).

Establish Test Connection

DS0 Circuits

Connect Hubbed Testport(s) to Local DACS II

Overview: The HUB command in this procedure is used at a DACS II frame which serves as the interface between a mechanized test system and the other DACS II frames in the complex. The HUB command connects a pair of test port channels from the interface (concentrator DACS II frame) to test port channels on one of the other frames in the complex.

1. To establish a test port-to-test port connection, enter

   `TTST:[FRM xy,SEQ ww]:HUB,<tc>,TO <npc No.>jjj,TP kk!`

   Where:

   xy = DACS II frame number (00 through ZZ).

   ww = Command sequence number (00 through 49).

   <npc No.> = NPC number on concentrator frame that terminates line to other frame. Can be either extended (for example, [0]001) or hierarchical (for example, 01101).

   jjj = Lower channel of pair going to test port group on another frame. The connecting test port group NPC must be the same type.

   kk = Testport number (01 through 96) on concentrator DACS II.

   <tc> = Trunk conditioning. This field should not be specified for a 2.048 Mb/s Test Port unless the NPC termination specified in the command belongs to a 1.544 Mb/s circuit.

   NOTE:
   If both terminations are 2.048 Mb/s type framing, <tc> will default to 16-state signaling with all ones and an insertion word of all ones.

   - If the command is denied, find the reason for denial and perform corrective action to obtain command completion (*Command Denials* has explanations of denial codes).

2. Check completion message for additional information. The presence of T or P in the first explanation line of the output message indicates a facility failure on that side or on the test port (P) NPC; zeros in the CGA field indicate no such failure.

3. To release a test port-to-test port connection, enter

   `TTST:[FRM xy,SEQ ww]:TPR,TP kk[,OOS]!`

Where:
OOS = Optional, to allow releasing connection when any of the involved NPCs are out-of-service.

Looping Back a Test Port

DACS II provides a loopback test access command to loop back the two channels of a specified Test Port. Looping back a Test Port is useful for testing the connection between the DACS II Test Port and the external test equipment. When a loopback test access command is executed, each of the two 64 kbit/s channels of the Test Port is individually looped back on itself so that the signal received from the facility side is returned to the facility.

The loopback is released using a Test Port release command.

To loop back a DS0 Test Port, enter the following command:

`TTST::LPD,TP kk[,<tc>]`

Where:

LPD = Looped

TP = Test Port

kk = Test Port number (01 through 96) to loop back.

tc = Trunk Conditioning. The need to specify a value depends on the type of Test Port that is being looped back.

Trunk conditioning must be specified in this command only when looping back a dynamic Test Port. If it is not specified for a dynamic Test Port, the command will be denied. A dynamic Test Port is defined as a Test Port in which trunk conditioning was not specified when the Test Port was provisioned.

Although it is not required, trunk conditioning may be specified in this command to loop a static Test Port. A static Test Port is defined as a Test Port in which trunk conditioning was specified when the Test Port was provisioned. If trunk conditioning is specified in this command, it will be used. If it is not specified for a static Test Port in this command, the Test Port’s trunk conditioning value will be used.

Connect Testport in Monitor Mode and Split Circuit

Overview: This procedure gives the command and considerations for establishing test access to a 64 Kbit/s channel. This initial access is a bridged connection to allow monitoring the circuit for service before it is split for testing. In a DS1 2.048-Mb/s Interface gateway environment, either a DS1 NPC or a type PB/PC NPC can be used as the test access NPC. In either case, the test access NPC performs the necessary signal conversions to allow testing either side of the Gateway circuit. To test signaling with a type PB/PC NPC, the test access NPC must be provisioned for CAS (odd-numbered x value in growth specification). Generally, DACS II test access adopts the characteristics of the accessed circuit, but, for unmapped terminations, there is a trunk conditioning option and a NAM option (for Gateway) in the command.

1. Enter **`UTL::QRY,TPS!`** to see which test ports are grown and available (TPR alongside test port number in output message).

2. Familiarize yourself with the monitor command as follows:

   `TTST:[FRM xy,SEQ ww]:MON,TO <npc No.>jjj[,<tc>],TP kk[,NAM]!`

   Where:

xy	=	DACS II frame number (00 through ZZ).
ww	=	Command sequence number (00 through 49).
<npc No.>	=	NPC number of termination to be tested. Conference legs must be accessed by entering one of the FTU/DS3U legs in the command. For 1-way circuits, the TO-side entered in the OCON must be entered here.
jjj	=	Channel to be accessed; can be part of cross-connected circuit or unmapped termination.
tc	=	Allows entering <tc> for test access to unmapped termination; if not entered, the <tc> of GRTH TP command will be used for access to unmapped termination.
kk	=	Testport number (01 through 96).
NAM	=	Optional for gateway to disable A-law to μ-law signal conversion at test access NPC. Needed to test digital data circuits (where there is no encoding) at unmapped terminations.

   - If the command is denied, find the reason for denial and perform corrective action to obtain command completion (*Command Denials* has explanations of denial codes).

3. If you need to know the test access channel numbers associated with the test port numbers, refer to Table 4-3.

Table 4-3. Test Access Channels

Test Access Port	DS1 Channel		Type PB Channel	
	From	To	From	To
01,13,25,37,49,61,73,85	1	2	5	6
02,14,26,38,50,62,74,86	3	4	7	8
03,15,27,39,51,63,75,87	5	6	9	10
04,16,28,40,52,64,76,88	7	8	11	12
05,17,29,41,53,65,77,89	9	10	13	14
06,18,30,42,54,66,78,90	11	12	16	17
07,19,31,43,55,67,79,91	13	14	18	19
08,20,32,44,56,68,80,92	15	16	20	21
09,21,33,45,57,69,81,93	17	18	22	23
10,22,34,46,58,70,82,94	19	20	24	25
11,23,35,47,59,71,83,95	21	22	26	27
12,24,36,48,60,72,84,96	23	24	28	29

4. If you are going to use the <tc> field in the command, consider the following:
   — When a mapped circuit is accessed, whatever <tc> is entered here will be overwritten by the <tc> of the mapped circuit.
   — When an unmapped circuit is accessed, whatever <tc> is entered here will overwrite the <tc> that was specified in the GRTH TP command.
   — Access to an unmapped circuit will be denied if the <tc> is not entered here or was not entered in the GRTH TP command.
5. Enter the command with the required information. For 1-way circuits, the TO side entered in the OCON must be entered here.
   ■ If the CONN ...COMPL message is not received, find the reason for denial and perform corrective action to obtain command completion (*Command Denials* has explanations of denial codes)..
6. Note the meanings of the following possible output message keywords:
   — Signaling (SG) type field - T for transparent, R for robbed bit, and C for CAS.
   — The next three positions are for primary block alarms, either the alarmed side (F, T, or P for test port NPC) or 0s for no alarms.
   — The next field is the termination state of the circuit, either the terminated side (F, T, or Both) or R (released/not terminated).
   — RDC indicates red, special service circuit.
   — CUS indicates customer control of channel.
   — ONEWAY indicates one-way circuit accessed.
7. To split the circuit for transmission or signaling tests, enter:

   `TTST::SPL,TP kk!`

   ■ If the command is denied, find the reason for denial and perform corrective action to obtain command completion (*Command Denials* has explanations of denial codes).
8. At this point, you can run tests from the local test panel or test position.

Change Circuit Termination State (TLA/TLR)

1. Enter the command listed under TERMINATION STATE in Figure 4-4 to make desired changes. Command options allow changing the state of all the bridge terminations or all except the one named in the NOT field.

   NOTE:
   The termination state or TLP (transmission level point) of a conference bridge circuit cannot be changed using the command in Figure 4-4 if the T or F side was previously designated as NTR (no transmit) in TLA command.

2. Enter the command listed under CONFERENCE BRIDGE PARAMETERS in Figure 4-4 to enter given parameters.

   NOTE:
   To make a change, the DMB bridge side of the conference must be entered in the <npc No.2> field of the command.

3. Check completion message for required changes; note the NEW STATE field in the message. The presence of RNG in the termination change message indicates that the states in the range of circuits changed may differ. The RDC/CUS word will occur if special service circuits were changed.

TERMINATION STATE:

```
CHG::FROM <npc No.1>ddd[-eee],TO <npc No.2>jjj[-kkk]
[,NOT <npc No.>vvv],TLA/TLR F/T/B/L/G/A[,INCL]!
```

```
TTST::TLA/TLR F/T/B/L/G/A[,NOT <npc No.>vvv],TP kk!
```

CONFERENCE BRIDGE PARAMETERS:

```
CHG::FROM <npc No.1>ddd,TO <npc No.2>jjj[,TLP(snn,smm)]
[,NG nn][,ES ee][,INCL]!
```

EXPLANATION OF VARIABLES:

<npc No.1>	=	NPC number on FROM side, either extended (for example, [0]001) or hierarchical (for example, 01101).
<npc No.2>	=	NPC number, see <npc No.1>.
-ddd/-jjj	=	Channel number on NPC.
-eee/-kkk	=	Optional, last channel of range.
TLA or TLR	=	Desired state, TLA (terminated) or TLR (released) on circuit as follows: F (FROM-Side) T (TO-Side) B (Both) G (all legs toward bridge) L (all legs toward facilities) A (all legs in both directions) also see "NOT <npc No.>vvv" below.
NOT <npc No.>vvv	=	For bridge only, to specify one leg that is NOT to be changed with all others.
TP kk	=	Test port number (01-48).
INCL	=	Optional, needed if channel in command is red special service circuit.
TLP (snn,smm)	=	Signal level adjustment, "snn" is the input level and "smm" is output level; s = the sign (+ or -). Range for both is -9.0 to +8.8 in 0.2 dB steps (entered as whole No. -90 to +88).
NG nn	=	Noise Guard Adjustment in dB (00, 06, 12, or 18).
ES ee	=	Echo Suppression in dB (00, 06, 12, or 18).

Figure 4-4. Change Commands

Release Test Port

1. When testing is completed, release test access by entering,
   `TTST::TPR,TP kk!`.
   - If the command is denied, find the reason for denial and perform corrective action to obtain command completion (*Command Denials* has explanations of denial codes).

Clear-DS1 Signals

Establish/Change Clear-DS1 Test Access

1. Familiarize yourself with the different test access modes described in Table 4-4 and illustrated in Figures 4-5 through 4-15 as referenced. See *Establish Loopback on Facility Access Digroup* for loopback.

Table 4-4. Clear-DS1 Test Access Modes

Mode	Meaning	Illustration
MONE	Monitor Equip (E) End of Idle Port or Cross-Connection	Figure 4-5
MONF	Monitor Fac (F) End of Idle Port or Cross-Connection	Figure 4-6
MONEF	Monitor Both Ends	Figure 4-7
SPLTA	Splits E-to-F Connection To Test E-to-F Direction	Figure 4-8
SPLTB	Splits F-to-E Connection To Test F-to-E Direction	Figure 4-9
SPLTAB	Splits both A and B signals of a two-way test session	Figure 4-10
SPLTE	Splits E-to-F Connection To Test E End	Figure 4-11
SPLTF	Splits F-to-E Connection To Test F End	Figure 4-12
SPLTEF	Splits Both Directions To Test E and F Ends	Figure 4-13
LOOPE	Loops E End and Monitors Signal; on 2-Way Circuit, F End Is Disconnected	Figure 4-14
LOOPF	Loops F End and Monitors Signal; on 2-Way Circuit, E End Is Disconnected	Figure 4-15

2. To establish connection, enter the command as follows with the appropriate connection mode:

   CTST:[FRM xy,SEQ ww]:<tmode>,FAD <npc No.1>[,<npc No.2>], FROM <npc No.3>[,TO <npc No.4>][,AIS][,INCL]!

   Where:

xy	=	DACS II frame number (00 through ZZ).
ww	=	Command sequence number (00 through 49).
<tmode>	=	Test mode; see Table 4-4.
<npc No.1>	=	NPC number of FAD; NPC of pair for MONEF, SPLTAB, or SPLTEF. Can be either extended (for example, [0]001) or hierarchical (for example, 01101).
<npc No.2>	=	Optional, second NPC number of FAD pair.
<npc No.3>	=	Reference NPC, E-end NPC or backbone of BCON.
<npc No.4>	=	Optional, to name different F-end NPC of broadcast circuit; if omitted, existing F-end or full tributary will supply.
AIS	=	Optional, to select AIS termination signal sent on disconnected side of split circuit; not valid for unmapped termination. QRSS may be a future offering.
INCL	=	Optional, to test special service or customer controlled circuit. Required for all modes, except monitor modes.

3. To change the test access mode, modes MONEF, SPLTEF, and SPLTAB each require two FADs and can only be changed from one to the other.

   **CTST:[FRM xy,SEQ ww]:<tmode>,FAD <npc No.1>\
   [,<npc No.2>][,AIS][,INCL]!**

   Where:

<npc No.>	=	NPC number of FAD
<tmode>	=	Test mode; see Table 4-4.

   - If command is denied, find the reason for denial and perform corrective action to obtain command completion (*Command Denials* has explanations of denial codes).

4. To familiarize yourself with the connection query, enter the following using the FAD for the <npc No.>.

   UTL::QRY,TO <npc No.>!

5. To familiarize yourself with all current test ports (TADs and FADs), enter the following. **UTL::QRY,TPS**

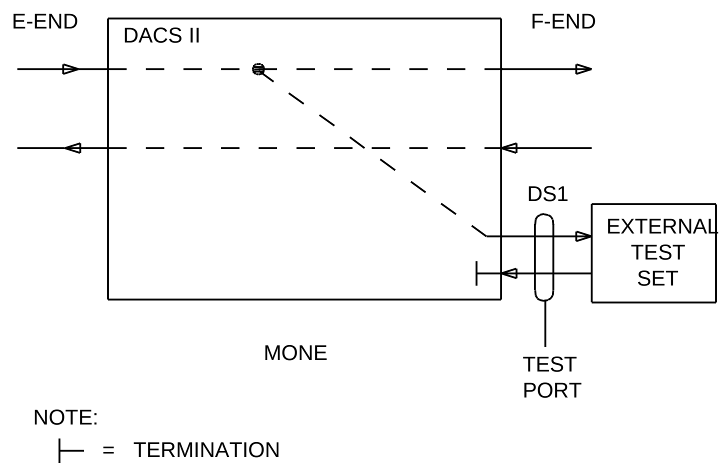

Figure 4-5. MONE Mode

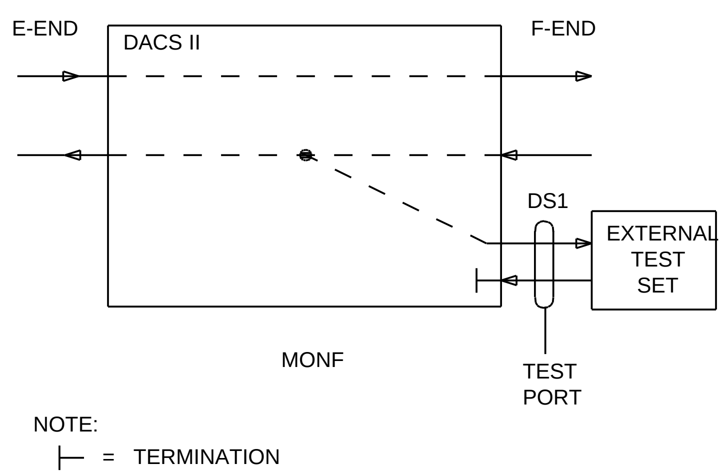

Figure 4-6. MONF Mode

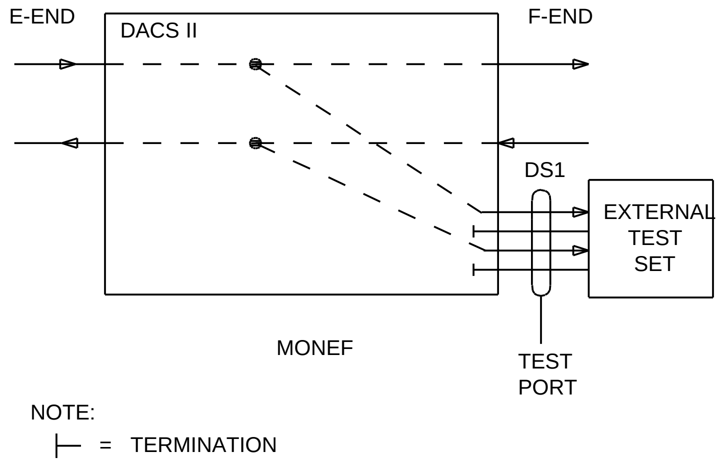

Figure 4-7. MONEF Mode

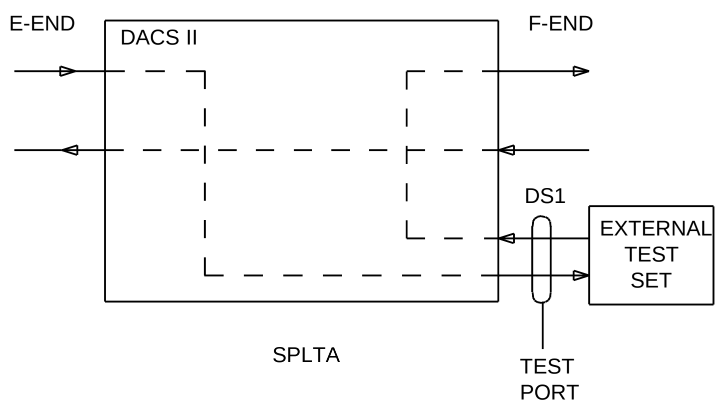

Figure 4-8. SPLTA Mode

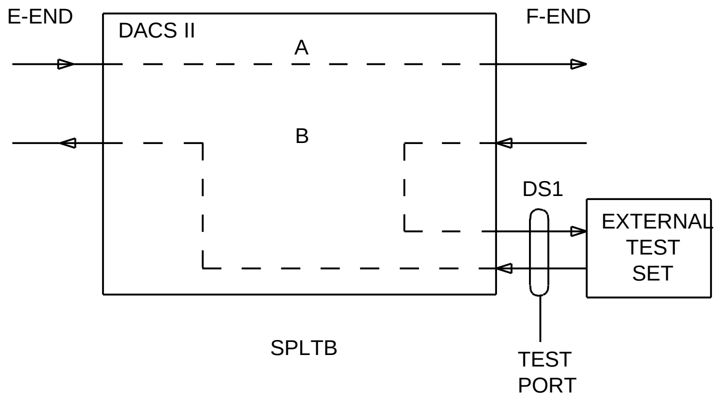

Figure 4-9. SPLTB Mode

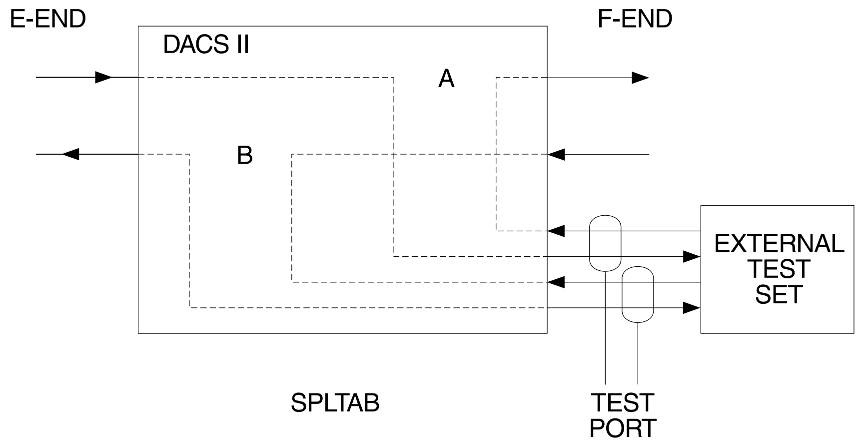

Figure 4-10. SPLTAB Mode

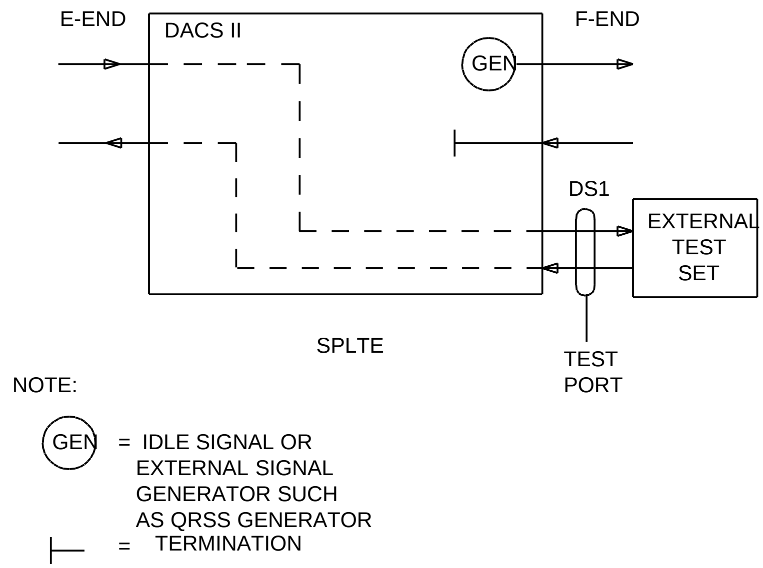

Figure 4-11. SPLTE Mode

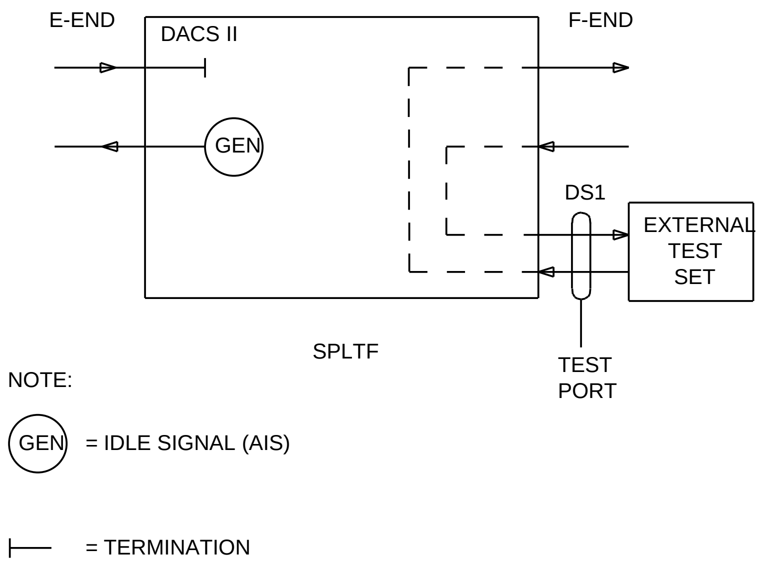

Figure 4-12. SPLTF Mode

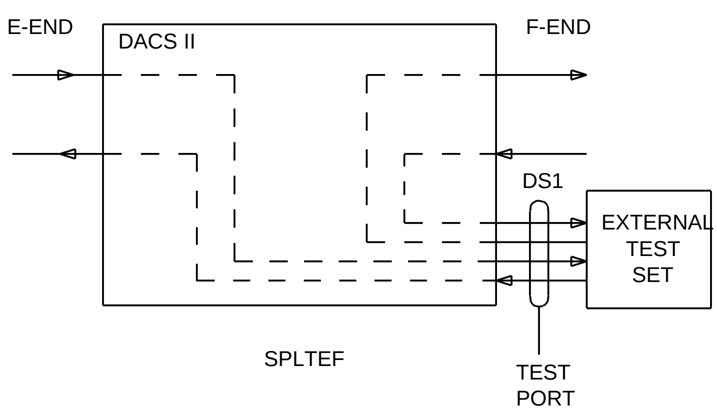

Figure 4-13. SPLTEF Mode

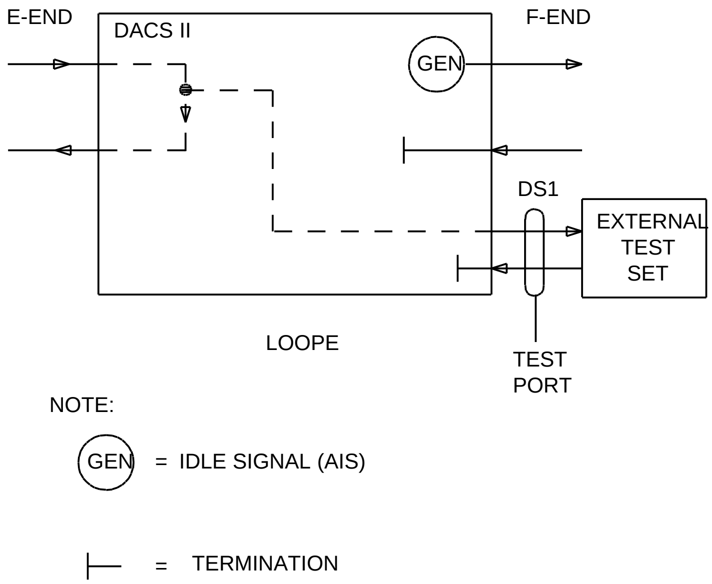

Figure 4-14. LOOPE Mode

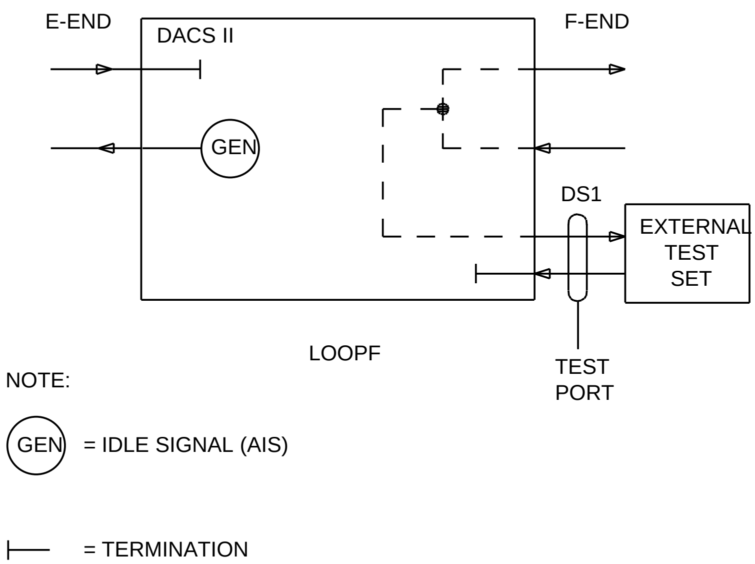

Figure 4-15. LOOPF Mode

Change Non-channelized Circuit Termination State

1. Familiarize yourself with the termination and termination signal selections in Table 4-5.

Table 4-5. Terminations and Signals

Termination	Meaning
NORM	Normal data of the cross-connection.
TERM	Terminate side with default termination signal (AIS).

2. Consider the following restrictions on making changes:
   - — E-end mode cannot be changed for test session in any of the following modes: SPLTF, SPLTEF, or LOOPF.
   - — F-end mode cannot be changed for test session in any of the following modes: SPLTE, SPLTEF, or LOOPE.
   - — E-end mode cannot be changed on a 1-way circuit under test.

3. Enter following command with the appropriate fields and modes from Table 4-5 to make the required changes:
   CTST:[FRM xy,SEQ ww]:FAD <npc No.1>[,<npc No.1B>]
   {[,EMODE y][,FMODE y]}[,INCL]!

   Where:

   xy = DACS II frame number (00 through ZZ).
   ww = Command sequence number (00 through 49).
   <npc No.1> = NPC number for FAD; with bidirectional access, two NPCs can be entered. Can be either extended (for example, [0]001) or hierarchical (for example, 01101).
   EMODE y = Optional, to select termination mode (y) from Table 4-5 for E-end NPC.
   FMODE y = Optional, to select termination mode (y) from Table 4-5 for F-end NPC.
   INCL = Optional. Used to make changes to special service or customer controlled circuit.

   - If command is denied, find the reason for denial and perform corrective action to obtain command completion (*Command Denials* has explanations of denial codes).

Establish Clear-DS1 Hub Connection

1. Enter the following command to establish the hub connection:

   CTST:[FRM xy,SEQ ww]:HUB,FAD <npc No.1>,TO <npc No.2>[,INCL]!

   Where:

   xy = DACS II frame number (00 through ZZ).

   ww = Command sequence number (00 through 49).

   <npc No.1> = NPC number of facility access digroup, either extended (for example, [0]001) or hierarchical (for example, 01101).

   <npc No.2> = NPC number of TO-side NPC connected to remote FAD.

   INCL = Optional. Used if one or more of the NPCs is marked a special service or customer controlled circuit.

   - If command is denied, find the reason for denial and perform corrective action to obtain command completion (*Command Denials* has explanations of denial codes).

Establish Loopback on Facility Access Digroup

1. Enter the following command to establish the loopback connection:

   CTST:[FRM xy,SEQ ww]:LPBKT,FAD <npc No.>[,INCL]!

   Where:

   xy = DACS II frame number (00 through ZZ).

   ww = Command sequence number (00 through 49).

   <npc No.> = NPC number of subject facility access digroup, either extended (for example, [0]001) or hierarchical (for example, 01101).

   INCL = Optional. Used if one or more of the NPCs is marked as special service or customer controlled circuit.

   - If command is denied, find the reason for denial and perform corrective action to obtain command completion (*Command Denials* has explanations of denial codes).

NOTE:
While looped, the termination signal is looped to the facility access digroup.

Release Test Access

1. If you want to see the test access connection and characteristics of the FAD, enter **`UTL::QRY,TO <npc No.>!`**

   Where: <npc No.> = NPC number of facility access digroup.

2. At this point, you can run tests using the external test set connected to the facility access digroup.

3. When testing is completed, enter the following message to release test access.
   `CTST::TNR,{FAD <npc No.>|ALL}[,OOS]!`

Subrate DS0A or DS0B Circuits

Access Two-Point Circuit in Monitor Mode

Overview: This section covers changing a specified test port channel to the monitor mode for a subrate circuit (data transmission in the tested circuit is not interrupted). Although primarily for 2-point circuits, it can be used to access the facility ends of a multipoint circuit (on MJU).

1. To change a specified test port channel to the monitor mode for a subrate circuit, enter:

   STST:FRM xy,SEQ ww:MON[,TO <npc No.>ddd[/ff]],TP kk!

   Where:

   xy = Double-digit number assigned to the frame when it is placed in service. If the command is issued to a remote frame, the frame number must be entered.

   ww = Identifying double-digit number assigned to the command (arbitrarily chosen by the operator). If the command is being issued to remote frame, the sequence number must be entered.

   <npc No.> = TO NPC number, either extended (for example, [0]001) or hierarchical (for example, 01101).

   ddd = TO channel number within the digroup.

   ff = TO customer number.

   kk = Test port channel number (01 through 96).

   - If command is denied, find the reason for denial and perform corrective action to obtain command completion (*Command Denials* has explanations of denial codes).

NOTE:
The external facility termination is connected to the TO test port channel. The external facility termination can be part of a two-point circuit, the master leg, or the branch termination of a multipoint circuit.

Access Multipoint Circuit in Monitor Mode

Overview: This command allows accessing a subrate multipoint circuit in the monitor mode with a test port (data transmission in the tested circuit is not interrupted).

1. Which part of the circuit do you need to access?
   - If branch of MJU, continue with Step **2**.
   - If control leg of MJU, proceed to Step **3**.

2. For test access to a branch of an MJU, enter

   `STST:FRM xy,SEQ ww:MON,TO <npc No.>ddd[/ff], MJU ssss,BRi,TP kk!`.

   The TO test port channel faces MJU ssss; the FROM test port channel faces the external facility termination for the specified branch or control leg port of the MJU cascaded from the specified branch (i) of MJU ssss.

   Where:

xy	=	DACS II frame number (00 - ZZ) If the command is issued to a remote frame, the frame number must be entered.
ww	=	Command sequence number (01 - 49) If the command is issued to remote frame, the sequence number must be entered.
<npc No.>	=	TO NPC number, either extended (for example, [0]001) or hierarchical (for example, 01101).
ddd	=	channel number within the TO-side digroup.
ff	=	TO-side customer number.
kk	=	Test port channel number (01 through 96).
ssss	=	MJU identification number addressed by this command (1 through 9999).
i	=	Branch number of MJU ssss (1 through 4).

   - If command is denied, find the reason for denial and perform corrective action to obtain command completion (*Command Denials* has explanations of denial codes).

3. For test access to a control leg of an MJU, enter

   STST:FRM xy:SEQ ww:MON,TO <npc No.>ddd[/ff], MJU ssss,TP kk!.

   The TO test port channel faces the MJU; the FROM test port channel faces the external facility termination for MJU 1 or toward the branch from which MJU ssss is cascaded if MJU ssss is greater than 1.

   Where:

xy	=	Double-digit number assigned to the frame when it is placed in service. If the command is issued to a remote frame, the frame number must be entered.
ww	=	Identifying double-digit number assigned to the command (arbitrarily chosen by the operator). If the command is being issued to remote frame, the sequence number must be entered.
<npc No.>	=	TO NPC number, either extended (for example, [0]001) or hierarchical (for example, 01101).
ddd	=	TO channel number within the digroup.
ff	=	TO customer number. Optional when channel is a DS0A.
kk	=	Test port channel number (01 through 96).
ssss	=	MJU identification number addressed by this command (1 through 9999).

   - If command is denied, find the reason for denial and perform corrective action to obtain command completion (*Command Denials* has explanations of denial codes).

Access Multipoint Circuit in Split Mode

Overview: This section explains the method of accessing a subrate multipoint circuit directly in the split testing mode with a test port; the circuit cannot be in the test port monitor mode. Data transmission in the tested circuit is not interrupted.

1. Which part of circuit do you need to access?
   - If control leg of MJU, continue with Step **2**.
   - If branch of MJU, proceed to Step **3**.

2. For test access to a CONTROL LEG, enter

   `STST:FRM xy,SEQ ww:SPL,TO <npc No.>ddd[/ff],MJU ssss,TP kk!`.

   The TO test port channel faces the MJU; the FROM test port channel faces the external facility termination for MJU 1 or toward the branch from which MJU ssss is cascaded if MJU ssss is greater than 1.

   Where:

   xy = Double-digit number assigned to the frame when it is placed in service. If the command is issued to a remote frame, the frame number must be entered.

   ww = Identifying double-digit number assigned to the command (arbitrarily chosen by the operator). If the command is being issued to remote frame, the sequence number must be entered.

   <npc No.> = TO NPC number, either extended (for example, [0]001) or hierarchical (for example, 01101).

   ddd = TO channel number within the digroup.

   ff = TO customer number.

   kk = Test port channel number (01 through 96).

   ssss = MJU identification number addressed by this command (1 through 9999).

   - If command is denied, find the reason for denial and perform corrective action to obtain command completion (*Command Denials* has explanations of denial codes).

3. For test access to a BRANCH, enter

   STST:FRM xy,SEQ ww:SPL,TO <npc No.>ddd[/ff],MJU ssss,BRi,TP kk!

   The TO test port channel faces MJU ssss; the FROM test port channel faces the external facility termination for the specified branch or control leg port of the MJU cascaded from the specified branch (i) of MJU ssss.

   Where:

xy	=	Double-digit number assigned to the frame when it is placed in service. If the command is issued to a remote frame, the frame number must be entered.
ww	=	Identifying double-digit number assigned to the command (arbitrarily chosen by the operator). If the command is being issued to remote frame, the sequence number must be entered.
<npc No.>	=	TO NPC number, either extended (for example, [0]001) or hierarchical (for example, 01101).
ddd	=	TO channel number within the digroup.
ff	=	TO customer number.
kk	=	Test port channel number (01 through 96).
ssss	=	MJU identification number addressed by this command (1 through 9999).
i	=	Branch number of MJU ssss (1 through 4).

   - If command is denied, find the reason for denial and perform corrective action to obtain command completion (*Command Denials* has explanations of denial codes).

Change Access to Split Mode

NOTE:
Split test access to an entire multiplexed DS0B channel (rather than a single DS0B customer) can only be done by first monitoring the channel and then splitting it by use of this command without a digroup and channel number.

1. To change a specified test port channel to the split mode for a subrate circuit, enter

   STST:FRM xy,SEQ ww:SPL[,TO <npc No.>ddd[/ff]],TP kk!

   Where:

   xy = Double-digit number assigned to the frame when it is placed in service. If the command is issued to a remote frame, the frame number must be entered.

   ww = Identifying double-digit number assigned to the command (arbitrarily chosen by the operator). If the command is being issued to remote frame, the sequence number must be entered.

   <npc No.> = TO NPC number, either extended (for example, [0]001) or hierarchical (for example, 01101).

   ddd = TO channel number within the digroup.

   ff = TO customer number.

   kk = Test port channel number (01 through 96).

   - If command is denied, find the reason for denial and perform corrective action to obtain command completion (*Command Denials* has explanations of denial codes).

Change Terminate and Leave Test Access

1. To change the terminate and leave state of the subrate circuit under test on the specified test port channel, enter

   `STST:FRM xy,SEQ ww:{TLA|TLR} m,TP kk!`

   NOTE:
   The TO side is defined as the side of the circuit connected to the even numbered test port channel, and the FROM side is connected to the odd numbered test port channel.

   Where:

   xy = Double-digit number assigned to the frame when it is placed in service. If the command is issued to a remote frame, the frame number must be entered.

   ww = Identifying double-digit number assigned to the command (arbitrarily chosen by the operator). If the command is being issued to remote frame, the sequence number must be entered.

   kk = Test port channel number (01 through 96).

   m = From, to, or both (F, T, or B).

   - If command is denied, find the reason for denial and perform corrective action to obtain command completion (*Command Denials* has explanations of denial codes).

Release Subrate Specific Test Port Channel

1. Enter the following command to release a subrate circuit from test access on the specified test port channel and restore the circuit to normal. If the circuit was terminated either before or during test access, it will retain the termination state upon release.

   STST:FRM xy,SEQ ww:TPR,TP kk!

   Where:
   xy = Double-digit number assigned to the frame when it is placed in service. If the command is issued to a remote frame, the frame number must be entered.
   ww = Identifying double-digit number assigned to the command (arbitrarily chosen by the operator). If the command is being issued to remote frame, the sequence number must be entered.
   kk = Test port channel number (01 through 96).

   - If command is denied, find the reason for denial and perform corrective action to obtain command completion (*Command Denials* has explanations of denial codes).

Release Groups of Subrate Testports

NOTE:
This command will release all test port channels connected to the subrate circuits that were initiated by this link ("ALL" keyword) or all test port channels connected to subrate channels regardless of which administrative link initiated the test access ("LINK" keyword).

1. To release all test port channels from test access connected to subrate channels initiated by this administrative link or by all administrative links, enter

   STST:FRM xy,SEQ ww:TPR,{ALL|LINKS}!

   Where:
   xy = Double-digit number assigned to the frame when it is placed in service. If the command is issued to a remote frame, the frame number must be entered.
   ww = Identifying double-digit number assigned to the command (arbitrarily chosen by the operator). If the command is being issued to remote frame, the sequence number must be entered.

   - If command is denied, find the reason for denial and perform corrective action to obtain command completion (*Command Denials* has explanations of denial codes).

Establish Test Group Connection (Nx64 Kbit/s)

Connect Test Group in Monitor Mode and Split Circuit

Overview: This procedure gives the command and considerations for establishing test access to a range of 64 Kbit/s channels. This initial access is a bridged connection to allow monitoring the circuit for service before it is split for testing. Generally, DACS II test access adopts the characteristics of the accessed circuit, but, for unmapped terminations, there is a trunk conditioning option in the command.

1. Enter **`UTL::QRY, TGS mmm[-nnn]!`** to see information on a TG or a range of TGs. For each TG queried, the NPCTG/NPC number and starting channel number for the east and west bundles are provided along with the TG width and mode.

   Due to the potentially large number of NPCTGs and TGs, enter **`UTL::QRY,NPCTG rrr[-sss]!`** to query an NPCTG or a range of NPCTGs.

2. Familiarize yourself with the monitor command as follows:

   `TTST::MON,TO <npc No.> (jjj[-kkk][,lll,...])[,<tc>],TG mmm!`

   Where:

mmm	=	Test group number
<npc No.>	=	NPC number of termination to be tested. Conference legs must be accessed by entering one of the FTU/DS3U legs in the command. For 1-way circuits, the TO-side entered in the OCON must be entered here.
jjj,kkk,lll	=	List or range of channels (Number of channels must match width of TG)
tc	=	Allows entering <tc> for test access to unmapped termination; if not entered, the <tc> of GRTH TG command will be used for access to unmapped termination.

   - If the command is denied, find the reason for denial and perform corrective action to obtain command completion (*Command Denials* has explanations of denial codes).

3. If you are going to use the <tc> field in the command, consider the following:

   — When a mapped circuit is accessed, whatever <tc> is entered here will be overwritten by the <tc> of the mapped circuit.

   — When an unmapped circuit is accessed, whatever <tc> is entered here will overwrite the <tc> that was specified in the GRTH TG command.

   — Access to an unmapped circuit will be denied if the <tc> is not entered here and was not entered in the GRTH TG command.

4. Enter the command with the required information. For 1-way circuits, the TO side entered in the OCON must be entered here.

   ■ If the CONN ...COMPL message is not received, find the reason for denial and perform corrective action to obtain command completion (*Command Denials* has explanations of denial codes)..

5. Note the meanings of the following possible output message keywords:

   — Signaling (SG) type field - T for transparent, R for robbed bit, and C for CAS.

   — The next three positions are for carrier group alarms, either the alarmed side (F, T, or P for test group NPC) or 0s for no alarms.

   — The next field is the termination state of the circuit, either the terminated side (F, T, or Both) or R (released/not terminated).

   — RDC indicates red, special service circuit.

   — CUS indicates customer control of channel.

   — ONEWAY indicates one-way circuit accessed.

   — BCAST indicates BCON circuit accessed.

   — UMPD indicates unmapped circuit accessed.

6. To split the circuit for transmission or signaling tests, enter:

   `TTST::SPL,TG mmm!`

   NOTE:
   If the TG is connected to an unmapped Nx64 Kbit/s termination, this command connects both directions of the unmapped termination to the TG's west bundle.

   - If the command is denied, find the reason for denial and perform corrective action to obtain command completion (*Command Denials* has explanations of denial codes).

7. At this point, you can run tests from the local test panel or test position.
8. To change the mode of a TG currently in split mode to monitor mode, enter **`TTST::MON,TG mmm!`**

Change Circuit Termination State (TLA/TLR)

Overview: This procedure gives the commands for modifying the terminate and leave active (TLA) and terminate and leave released (TLR) states of one or both ends of a Nx64 Kbit/s cross-connection associated with a TG. In the terminated state, the normal transmitted data on the circuit is replaced by the signal pattern according to the circuit's trunk conditioning code, as specified when the cross-connection was set up. In the released state, a terminated circuit is released and normal data transmission is restored in the specified transmission.

NOTE:
The Nx64 Kbit/s circuit must be a mapped one-way or two-way circuit currently under monitor or split test modes, and unterminated to modify the TLA states or terminated to modify the TLR states.

1. To modify the terminate and leave active states, enter:

   `TTST::TLA {F|T|B},TG mmm!`

   mmm = TG number

   F|T|B = Direction of circuit to be terminated:
   F = terminated toward the FROM side
   T = terminated toward the TO side
   B = BOTH sides are terminated

2. To modify the terminate and leave release states, enter:

   `TTST::TLR {F|T|B},TG mmm!`

   mmm = TG number

   F|T|B = Direction of circuit to be released:
   F = released toward the FROM side
   T = released toward the TO side
   B = BOTH sides are released

Connect Test Group in HUB Mode

Overview: This procedure gives the command to set up an Nx64 Kbit/s HUB test access connection via a TG, to a Nx64 Kbit/s TO termination consisting of two Nx64 Kbit/s bundles connected to the TG's east and west bundles. The number of channels in each bundle is the same as the TG's width; and the starting channels are indicated by the TO termination.

1. Enter **`TTST::HUB,TO (uvmnpddd,wxkqrjjj),TG mmm[,<tc>]!`**

   Where:

   uvmnp = 1st TO NPC number

   wxkqr = 2nd TO NPC number

   ddd = Starting channel number of 1st TO NPC

   jjj = Starting channel number of 2nd TO NPC

Connect Test Group in LOOPED Mode

DACS II provides a loopback test access command to place both bundles of a test-access group (TG) in the looped mode.

The loopback is released using a Test Port release command.

To loop back a bundles of a TG, enter the following command:

`TTST::LPD,TG mmm[,<tc>]`

Where:

`LPD` = Looped

`TG` = Test Group

`mmm` = Test Group number (001 through 400) to loop back.

`tc` = Trunk Conditioning. If the static trunk conditioning was not furnished in the growth TG command, it must be dynamically specified in this command or the test access will be denied. A dynamic tc will override any static tc.

Release and Degrow Test Group

Overview: This procedure gives the commands to release one or a range of currently active TGs, degrow a TG, and degrow an NPCTG. When a TG is released, any circuit under test is restored to its normal, terminated, or unmapped state.

1. If testing is complete, release the test group(s) by entering:

   TTST::TGR,TG mmm[-nnn][,OOS]!

   The OOS keyword must be used if any NPC involved is out of service. This TG is now available to test other circuits or may be degrown.

2. To degrow a TG or a range of TGs, enter:

   DGRTH::TG mmm[-nnn]!

   If the range mmm-nnn includes some undesignated TG numbers, these numbers will be skipped. The output message will indicate degrown and skipped TGs appropriately.

3. To degrow an NPCTG, enter:

   DGRTH::NPC <npc No.>,NPCTG rrr[,TGR]!

   It is required that all TGs associated with this NPCTG be released before the NPCTG can be degrown. If TGR is specified, all active TGs will be released and degrown before the NPCTG is degrown; and any out-of-service (OOS) condition will be bypassed (i.e., TG will be released as if the OOS keyword was entered above).

Remove and Degrow Equipment

5

Contents

5 Remove and Degrow Equipment

Remove and Degrow NPC

Overview: This procedure gives the commands to remove NPC(s) (network processing circuit) from service and to degrow the NPC(s) from the data base. After removing a pack from service, the pack can be removed from the frame. After degrowing a pack or group, it can be regrown with different specifications.

1. To list all plug-ins enter:
   `UTL::QRY,EQD,NPCS[,UNIT [q]q]!` and after response enter
   `UTL::QRY,OOS[,UNIT [q]q]!`.

   Where: [q]q = Unit number (1 through 16).

   NOTE:
   If XON option is selected for link, you can use CTRL-s and CTRL-q to stop and start the output.

2. Check the output messages to determine which NPC packs are grown and still in-service. The presence of the CP (circuit pack) number itself or the presence of a "1" in the listing indicates that the condition (equipped, out-of-service) exists.

3. See CAUTION. Enter
   `RMV::NPC <npc No.>[-<range>][,SIDE s][,INCL]!`

   CAUTION:
   Any NPC with cross-connections should only be removed if warranted by trouble clearing because service on all channels of the NPC will be interrupted.

   Where:

<npc No.>	=	NPC number, either extended (for example, [0]001) or hierarchical (for example, 01101).
<range>	=	Use only for FTU (facility terminating unit).
SIDE s	=	Use for DSPU (digital signal processing unit) NPC.
INCL	=	Use if special service CONNs exist.

   NOTE:
   When the NPC is removed from service, no plug-in or facility alarms will be registered and a predefined insertion word will be sent out on all channels if the plug-in is in the frame.

   NOTE:
   To expedite degrowing DSPU NPCs, the degrow NPC command removes both NPC sides from service and degrows the NPC; the RMV command is not used.

4. If the NPC is going to be degrown, continue with Step **5**.
   - If not, this procedure is completed.

5. Enter **UTL::QRY,CMAP <npc No.>[-<range>]!**

   Where:

   <npc No.> = NPC number, either extended (for example, [0]001) or hierarchical (for example, 01101).

   <range> = Optional; to specify last NPC of continuous range.

   - If there are any cross-connections on the NPCs, refer to *Cross-Connections and Disconnections* to disconnect the DS0 channels or clear-DS1s and then continue with this procedure.
   - If there are any test access cross-connections, enter **TTST::TPR,TP kk[,OOS]!** for test access to make disconnections.

6. If NPC was used for subrate data connections, enter **UTL::QRY,SECH,TO <npc No.>ddd[-eee]!** to see if any channels are established to subrate.

   - If any channels are established to subrate, refer to *Provisioning* to disestablish the channels and then continue with this procedure.

7. If subject NPC is the test port digroup (NPCTP designation), enter **DGRTH::NPC <npc No.>,NPCTP n[,TPR]!** to remove the TP designation (TPR word releases and degrows any test ports).

8. Enter **DGRTH::NPC <npc No.>[-<range>]!**.

   - If the command is denied, find the reason for the denial and perform corrective action to obtain command completion (*Command Denials* has explanations of denial codes).

Remove and Degrow IFTU/FTU

Overview: This procedure gives the commands to remove IFTU (integrated facility terminating unit) or FTU (facility terminating unit) plug-ins from service and to degrow the unit. After removing a pack from service, the pack can be removed from the frame. After degrowing a pack or group, it can be regrown with different specifications. To expedite degrowing a unit, the associated ETSIs (expanded time slot interchangers), or CCBs (cross-connect buffers) and TSIs (time slot interchangers) are automatically degrown with the unit UC (unit controller). There are also commands to remove all the ETSIs or TSIs per side to expedite troubleshooting.

1. To list all plug-ins enter:

   `UTL::QRY,EQD[,UNIT [q]q]!` and after response enter
   `UTL::QRY,OOS[,COMMON][,UNIT [q]q]!`.

   Where: [q]q = Unit number (1 through 16).

   NOTE:
   There are two options on these commands to restrict the extent of the queries; these are [UNIT [q]q] to specify a particular unit and [,COMMON] to specify no NPCs.

   NOTE:
   If XON option is selected for link, you can use CTRL-s and CTRL-q to stop and start the output.

2. Check the output messages to determine which UNIT packs are grown and still in-service. The presence of the CP number itself or the presence of a "1" in the listing indicates that the condition (equipped, out-of-service) exists.

3. Consider the following comments relating to removing service and degrowth:

   — When unit packs are removed from service and the unit UC is degrown, the associated and ETSIs, or CCBs and TSIs, will **automatically** be removed and degrown (disconnected). This occurs only if the associated packs are not supporting cross-connections or other packs (subentities).

4. Enter the following commands to remove the UNIT.

   RMV::UNIT [q]q,FC sb! (See Note 1.)

   RMV::UNIT [q]q,FTMI d!

   RMV::UNIT [q]q,UC! (See Note 2.)

   Where:
   [q]q = Unit number (1-16)
   sb = side and format converter (FC) number (1-4)
   d = FTMI (facility terminating module interface) number (1-4).

   NOTE 1:
   If the FTMI is to be degrown, this command does not need to be entered because FCs on both sides will be removed with FTMI degrowth command.

   NOTE 2:
   If the FTMI is to be degrown, do not enter this command now because the unit UC must be in-service to use other commands. This command will be entered after the FTMI is degrown in the next step.

   - If the command is denied, find the reason for the denial and perform corrective action to obtain command completion (*Command Denials* has explanations of denial codes).

5. If the UNIT is to be degrown, enter the following commands. The DGRTH FTMI command will have to be entered for each FTMI (1-4) that is grown.

   DGRTH::UNIT [q]q,FTMI d!
   RMV::UNIT [q]q,UC!
   DGRTH::UNIT [q]q!

   NOTE:
   The ETSIs, or CCBs and TSIs on both sides of the unit will be removed and degrown when the unit is degrown.

   - If the command is denied, find the reason for the denial and perform corrective action to obtain command completion (*Command Denials* has explanations of denial codes).

Remove and Degrow DSPU

Overview: This procedure gives the commands to remove DSPU (digital signal processing unit) plug-ins from service and to degrow the unit. After removing a pack from service, the pack can be removed from the frame. After degrowing a pack or group, it can be regrown with different specifications. To expedite degrowing a unit, the associated ETSIs, or CCBs and TSIs, are automatically degrown with the unit UC. There are also commands to remove all the ETSIs or TSIs per side to expedite troubleshooting.

1. To list all plug-ins enter:

   `UTL::QRY,EQD[,UNIT [q]q]!` and after response enter **`UTL::QRY,OOS[,COMMON][,UNIT [q]q]!`**.

   Where: [q]q = Unit number (1 through 16).

   NOTE:
   There are two options on these commands to restrict the extent of the queries; these are [UNIT [q]q] to specify a particular unit and [,COMMON] to specify no NPCs.

   NOTE:
   If XON option is selected for link, you can use CTRL-s and CTRL-q to stop and start the output.

2. Check the output messages to determine which UNIT packs are grown and still in-service. The presence of the CP number itself or the presence of a "1" in the listing indicates that the condition (equipped, out-of-service) exists.

3. Consider the following comments relating to removing service and degrowth:

   — When a pack in a duplicated circuit group is removed on the active side, service will automatically switch over to the other side (if in-service).

   — To expedite degrowing DSPU NPCs, the degrow NPC command removes both NPC sides from service and degrows the NPC; the RMV command is not used.

4. Enter the following commands to remove the DSPU.

   RMV::UNIT [q]q,DSPI!

   RMV::UNIT [q]q,UC!

   Where: [q]q = Unit number (1-16)

5. If the UNIT is to be degrown, enter the following command.

   DGRTH::UNIT [q]q!

   NOTE:
   The ETSIs, or CCBs and TSIs on both sides of the unit will be degrown when the unit is degrown.

   - If the command is denied, find the reason for the denial and perform corrective action to obtain command completion (*Command Denials* has explanations of denial codes).

Remove and Degrow ECCN/CCN

Overview: This procedure gives the commands to remove ECCN (expanded cross-connect network) or CCN (cross-connect network) plug-ins. The ECCN/CCN plug-ins are degrown when the units are degrown. After removing a pack from service, the pack can be removed from the frame. After degrowing a pack or group, it can be regrown with different specifications. This is the main reason for degrowing a unit, and, to expedite this, the associated ETSIs or CCB and TSIs are automatically degrown with the unit UC. There are also commands to remove all the ETSIs or TSIs per side to expedite troubleshooting.

1. Enter **`UTL::QRY,EQD!`** and after response enter **`UTL::QRY,OOS[,COMMON][,UNIT [q]q]!`**.

   Where: [q]q = Unit number (1 through 16).

   NOTE:
   There are two options on these commands to restrict the extent of the queries; these are [UNIT [q]q] to specify a particular unit and [,COMMON] to specify no NPCs.

   NOTE:
   If XON option is selected for link, you can use CTRL-s and CTRL-q to stop and start the output.

2. Check the output messages to determine which ECCN/CCN packs are grown and still in-service. The presence of a "1" or the presence of the CP number itself in the listing indicates that the condition (equipped, out-of-service) exists.

3. Consider the following comments relating to removing service and degrowth:

   — Allowable active-side removals are: ETSIs if no involved TCON (two-way cross-connect) maps; CCI if no associated ETSIs in-service; and FC if no associated NPCs in-service.

   — When a pack in a duplicated circuit group is removed on the active side, service will automatically switch over to the other side (if in-service).

   — Service cannot be removed from the remaining side if there are any in-service NPCs.

   — When unit packs are removed from service and the unit UC is degrown, the DS3U FMTs (formatters) and the ETSI will **automatically** be removed and degrown (disconnected). This occurs only if the associated packs are not supporting cross-connections or other packs (subentities).

4. Enter the following command to remove ECCN or CCN plug-ins (see Note).

   NOTE:
   When UNIT is to be degrown, the ETSI (or CCB and TSIs) on both sides will be removed.

   For ECCN:

   `RMV::ETSIS,ECCN s,ALL!` (for all ETSIs on Side s)
   `RMV::ETSI sqq!` (for individual ETSI)
   `RMV::CCI s!`

   Where: qq = Unit Number 1 through 16.

   For CCN:

   `RMV::TSIS,CCN s,ALL!` (for all TSIs on Side s)
   `RMV::CCB sf!`
   `RMV::CCNI s!`
   `RMV::TSI sft!`

   Where:
   s = Side 0 or 1
   f = CCB number 1 through 6
   sft = TSI number consisting of sides (0 or 1) FROM unit (1 through 6) and TO unit (1 through 6); for example, TSI 013 is on Side 0 and receives data FROM unit 1 and connects TO unit 3.

   NOTE:
   A major alarm will be registered after the ECCN/CCN side has been out of service for more than two minutes.

5. Enter the following commands to degrow the UNIT.

   `DGRTH::UNIT [q]q!`

   Where: [q]q = Unit number 1 through 16.

   NOTE:
   The ETSI (or CCB and TSIs) and the FMTs on both sides of the unit will be removed and degrown when the unit is degrown.

   - If the command is denied, find the reason for the denial and perform corrective action to obtain command completion (*Command Denials* has explanations of denial codes).

Remove and Degrow DS3U or HDS3U

Overview: This procedure gives the commands to remove DS3U or HDS3U plug-ins from service and to degrow the unit. After removing a pack from service, the pack can be removed from the frame. After degrowing a pack or group, it can be regrown with different specifications. This is the main reason for degrowing a unit, and, to expedite this, the associated ETSIs or CCB and TSIs are automatically degrown with the unit UC. There are also commands to remove all the ETSIs or TSIs per side to expedite troubleshooting.

CAUTION:
Performing this procedure incorrectly can interrupt service. Familiarize yourself with the procedure and commands before beginning and perform each step of the procedure in the order given.

1. Enter **`UTL::QRY,EQD!`** and after response enter **`UTL::QRY,OOS[,COMMON][,UNIT [q]q]!`**.

   Where: [q]q = Unit number (1 through 16).

   NOTE:
   There are two options on these commands to restrict the extent of the queries; these are [UNIT [q]q] to specify a particular unit and [,COMMON] to specify no NPCs.

   NOTE:
   If XON option is selected for link, you can use CTRL-s and CTRL-q to stop and start the output.

2. Check the output messages to determine which DS3U unit packs are grown and still in-service. The presence of a "1" or the presence of the CP number itself in the listing indicates that the condition (equipped, out-of-service) exists.

3. Consider the following comments relating to removing service and degrowth:

   — When unit packs are removed from service and the unit UC is degrown, the associated DS3U FMTs (or HDS3U HFMTs) and ETSI or CCB and TSIs will **automatically** be removed and degrown (disconnected). This occurs only if the associated packs are not supporting cross-connections or other packs (subentities).

   — For DS3 unit, the FRC keyword for the RMV MMFG (MIU-MXR function group) command forces the removal without protection switching (or switchback if MMFG P). The removal would normally be denied if switching did not occur. The FRC must be used to remove more than one MMFG at a time.

   — For DS3 unit, an unprotected FLI can only be removed when all the following are true: no service MXR is grown, the protection MXR (multiplexer) is not grown, and protection MIU (multiple interface unit) is out-of-service.

4. Enter the following commands to remove the DS3U or HDS3U unit.

NOTE:
If you are going to degrow equipment and there are no service cross-connections on the DS3, the FRC and INCL keywords can be used to remove all NPCs on the MMFG. You can also remove a range of MMFGs to expedite unit degrowth.

If you need to remove the FMT (HFMT) only (that is, not degrowing the DS3U (HDS3U) in which case, the FMT (HFMT) will automatically be removed), enter
`RMV::UNIT [q]q,FMT s!`

`RMV::UNIT [q]q,MMFG c[-d][,FRC,INCL]!`
`RMV::UNIT [q]q,MMFG P!`
`RMV::UNIT [q]q,MIU P!` (if equipped)

Where:
[q]q = Unit number (1-16)
c = (1-6)
s = Side 0 or 1
FRC = forces remove without switching to remove multiple MMFGs or with INCL keyword
INCL = removes all NPCs on MXR.

If you need to specifically remove only the FLI or unit UC, enter
`RMV::UNIT [q]q,FLI k!` where: k = S, P (See Note.)
`RMV::UNIT [q]q,UC!` (See Note.)

NOTE:
If the unit is to be degrown, the remove FLI and remove unit UC commands should be entered with the degrowth commands. The unit UC must be in-service to use commands in degrowth portion.

- If the command is denied, find the reason for the denial and perform corrective action to obtain command completion (*Command Denials* has explanations of denial codes).

5. If the UNIT is to be degrown, enter the following commands.

DGRTH::NPC <npc No.>[-<range>]!

DGRTH::UNIT [q]q,MIU c[-d]! (if equipped)

DGRTH::UNIT [q]q,MXR c[-d]!

NOTE:
MXR P (protection) will automatically be degrown when the DS3U is degrown.

DGRTH::UNIT [q]q,MIU P!

RMV::UNIT [q]q,FLI k! where: k = S, P

RMV::UNIT [q]q,UC!

DGRTH::UNIT [q]q!

NOTE:
The ETSI (or CCB and TSIs) and the FMTs on both sides of the unit will be removed and degrown when the unit is degrown. The FLI S and FLI P and MXR P will also be automatically degrown.

- If the command is denied, find the reason for the denial and perform corrective action to obtain command completion (*Command Denials* has explanations of denial codes).

Cross-Connections and Disconnections

6

Contents

Contents

Cross-Connections and Disconnections

6

Cross-Connect, Change or Disconnect DS0 (Including *SLC*® Carrier)

Cross-Connect, Change, Disconnect DS0 Signals

Two-Point, Two-Way Circuit or One-Way Circuit

1. Familiarize yourself with the commands. The FROM and TO side assignments serve as references for 1-way connections (OCONs) and for test access.

   Two-Way:

   ```
   {TCON|TCNT}:[FRM xy,SEQ ww]:FROM <npc No.1>ddd[-eee],
   TO <npc No.2>jjj[-kkk],<tc>[,RDC][,CUS|INCL][,AIS][,PRIOUT]!
   ```

   One-Way:

   ```
   {OCON|OCNT}:[FRM xy,SEQ ww]:FROM <npc No.1>ddd[-eee],
   TO <npc No.2>jjj[-kkk],<tc>[,RDC][,CUS|INCL][,AIS][,PRIOUT]!
   ```

2. Obtain information needed for command from circuit layout information; see Figure 6-1 for construction of TC field. Four dashes must be entered for the FROM-side in the TC field of a one-way command.

3. Enter cross-connect command. If command line runs over line length for your screen, you can break the line with a backslash and continue the command on the next line.

   Where:

TCON, TCNT	=	TCON is for 2-way, TCNT is for 2-way terminated,
OCON, OCNT	=	OCON is for 1-way, and OCNT is for 1-way terminated.
xy	=	DACS II frame number (00 through ZZ)
ww	=	Command sequence number (00 through 49)
<npc No.1>	=	NPC number of one side (FROM), either extended (for example, [0]001)) or hierarchical (for example, 01101).
<range>	=	Last NPC in a range. For *SLC* carrier, always specify digroup A NPC (see Note 1).
ddd	=	Channel number: 01 through 24 or 01 through 96 for *SL*C Carrier NPCs (see Table 6-1). See Notes 2 and 3.
eee	=	Optional; last channel of range to be connected.
<npc No.2>	=	NPC number of other side (TO); see <npc No.1>.
jjj	=	Channel number (01 through 24).
kkk	=	Optional; last channel of range to be connected.
<tc>	=	Trunk conditioning per circuit layout card; see Figure 6-1.
RDC	=	Optional; to designate red special service circuit.
CUS	=	Optional; to designate customer controlled channels.
INCL	=	Optional; to remove previous CUS channel designation.
AIS	=	Optional; for 24-channel range connection to supply all 1s signal downstream when incoming CGA is received.
PRIOUT	=	Optional; to give priority to associated output message by placing it on the top of the output message queue.

   - If the command is denied, find the reason for denial and perform corrective action to obtain command completion (*Command Denials* gives the explanation of the denial codes).

Table 6-1. Channel Numbers

Type NPC	Channels
DE	01-24
SLC® 96 carrier Mode I & *SLC* Series 5 carrier	01-24 25-48 (DGA Virtual Channels for DGB) 49-72 (DGA Virtual Channels for DGC) 73-96 (DGA Virtual Channels for DGD)
SLC 96 carrier Mode III	Odd Channels 01-47 Odd Channels 49-95 (DGA Virtual Channels for DGC)
DMB	01-85

NOTE 1:
Channel Numbering - The channel numbers for four digroups at the RT are numbered 01 through 96; the channels at the DACS II are numbered the same and are all considered to be on digroup A NPC. In *SLC* 96 carrier Mode III where only two digroups and odd channels are involved at the RT, the same odd-numbered channels are used at both ends and the channels are considered to be all on digroup A.

NOTE 2:
Mode I - Only channels from the associated RT (same ID) can be cross-connected to a given DCLU. Furthermore, the same channel numbers must be used in both the FROM and TO sides of the command to connect the RT to the DCLU. Channels left vacant by removal of nonswitched specials are not used (no channel packing).

Mode III - Only odd channels corresponding to RT single channels are used.

NOTE 3:
The FDL (facility data link) of the ESF (extended superframe) signal can be cross-connected as channel 00.

4. Familiarize yourself with connection query outputs:

   - Enter **`UTL::QRY,TO ,<npc No.>jjj[-kkk]!`** to obtain the other end of a connection and to see trunk conditioning for DGA and *SLC* carrier channel numbers.

     Where:

<npc No.2> = NPC number of termination; for *SLC* Carrier System, use NPC for DGA.

jjj = Channel number of circuit; for *SLC* carrier channel, use *SLC* carrier channel number on DGA (Table 6-1).

kkk = Optional, last channel of a range of channels on DGA.

- For all connections on NPC, enter
  `UTL::QRY,CMAP <npc No.>!`

  Where: <npc No.> = NPC number; for *SLC* Carrier System, actual RT digroup number (not DGA virtual).

- For all NPCs associated with RT, enter **`UTL::QRY,RTMAP ffff!`** where ffff is RT bank ID.

NOTE:
For *SLC* 96 carrier, the digroup and channel for the QRY TO (or QRY FROM) in Step 4 can be either digroup A and the virtual channel or actual RT digroup and *SLC* carrier channel number.

NOTE:
An asterisk appears alongside OCONs in the CMAP/RTMAP to identify one-way circuits. If *000000 appears, the QRY FROM for OCON circuits can be used to see connection.

5. For 1-way circuits, you can query the connection (if any) in the other direction of the same NPC by entering
   `UTL::QRY,FROM <npc No.>ddd!`

16-STATE SIGNALING (ESF FORMAT):	**NO SIGNALING/TRANSPARENT:**
Hexadecimal: TC(X'rs,X'tu),IW X'nn	TRSP[,IW X'nn]
Binary: TC(efghijkl,mnopqrst),{IW X'nn / TRB}	TRSP,{MUX / TRB}

X'rs = Hex word for 8-bit pattern to be sent on FROM side

rs = binary abcdabcd

X'tu = Hex word for 8-bit pattern to be sent on TO side

tu = binary abcdabcd

4-STATE SIGNALING (BITS ab):

Binary: TC(ijkl,mnop),{IW X'nn / TRB / MUX}

ijkl = Binary word for 4-bit pattern to be sent on FROM side

The ij is for the first 2.5 seconds; kl is for the remaining time.

mnop = Binary word for 4-bit pattern to be sent on TO side

mn is for the first 2.5 seconds; op is for the remaining time.

Figure 6-1. Trunk Conditioning Formats

Two-Point Gateway Circuit

Overview: This section deals with 1-way or 2-way cross-connections between channels of PBCs (primary block circuits). These channels will either be assembled using CAS (channel associated signaling) or NSA (nonsignaling associated) mode. The 32 time slots in the 2.048-Mb/s signal are normally referred to by telephone channel number in the DACS II commands. With this numbering, channels 00 through 15 correspond to the like-numbered time slots and channels 16 through 30 correspond to time slot 17 through 31. DACS II channel 31 corresponds to time slot 16 which carries signaling in the CAS mode.

1. Before you enter the command, familiarize yourself with the command fields and variations which follow. The order of entering the channel terminations in the command is only meaningful for 1-way circuits, test access, and <tc> and SC command fields.

   Two-Way:
   ```
   {TCON|TCNT}::FROM <npc No.1>ddd[-eee],TO <npc No.2>jjj
   [-kkk],<tc>[,SC(abcd,abcd)][,NAM][,RDC][,{CUS|INCL}][,PRIOUT]!
   ```

   One-Way:
   ```
   {OCON|OCNT}::FROM <npc No.1>ddd[-eee],TO <npc No.2>jjj
   [-kkk],<tc>[,SC(----,abcd)][,NAM][,RDC][,{CUS|INCL}][,PRIOUT]!
   ```

2. If you are going to enter a channel range connection, consider the following:

   — For 2.048-Mb/s Interface and CAS mode, the range is any continuous group of 30 channels or less (01 through 30). CAS channels 00 and 31 (TS16) and NSA channel 00 are not allowed in range connection.

   — For 2.048-Mb/s Interface and NSA mode, the range is any continuous group of 31 channels or less (01 through 31).

   — For connection to DS1, the range is any continuous group of 24 channels or less. These will fall into the 01 through 24 range on the DS1 side and 01 through 30/31 range on the 2.048-Mb/s Interface side.

3. If you need information on the TC (trunk conditioning) field, see Part A of Figure 6-2 and consider the following:

   — The FROM and TO sides of the TC field correspond to the FROM and TO terminations entered in the command. With the 16-state TC format (for connection to type DE1yz NPC), bits abcd must be entered with ab=cd (for example, hex 5 = 0101) on both the DS1 and 2.048-Mb/s Interface sides.

   — If one or both sides are transparent (no signaling), the TRSP,IW X'pq form must be used. The signaling pattern given by X'D is automatically sent on the CAS side.

   — If specific <tc> is entered for 1-way circuits, dashes must be entered for the FROM side; for example, TC(X'--,X'FF).

   — In a gateway application, when E1 channels are connected to T1 channels, the following rules apply to the transmittal of the Insertion Word (IW) towards the facility. If the Insertion Word needs to be transmitted towards the facility as a result of consequent action, then the Insertion Word transmitted by the T1 NPC towards its transmission facility is the Insertion Word specified in this command; however, the Insertion Word transmitted by the E1 NPC towards its facility is always X'FF.

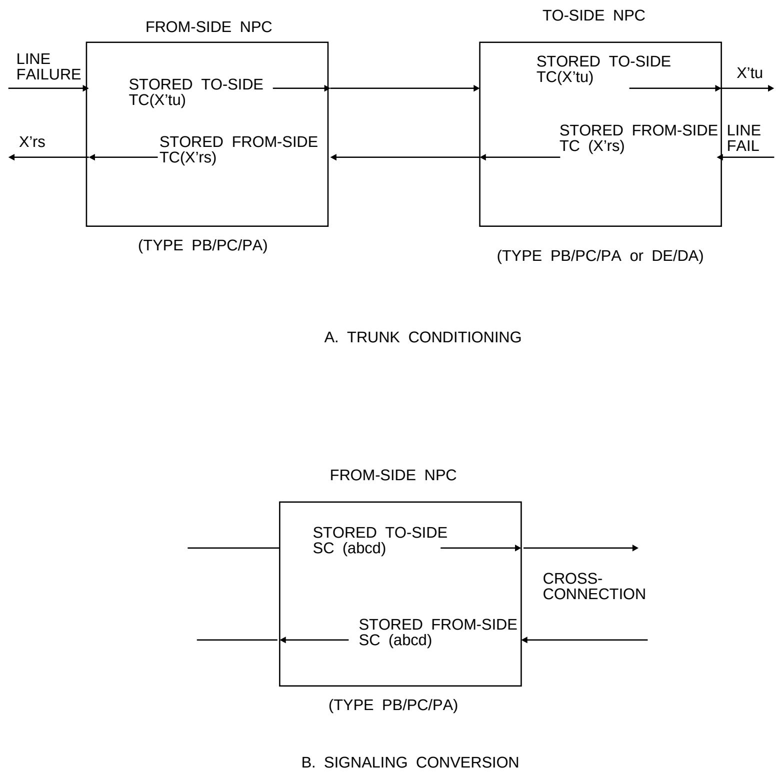

Figure 6-2. Trunk Conditioning and Signaling Conversion Diagrams

4. If you need information on the SC (signaling conversion) field, see Part B of Figure 6-2 and consider the following:
   - — The FROM and TO sides of the SC field correspond to the FROM and TO terminations entered in the command.
   - — The defaults for the <sc> field are: PP01 (Type DE1 NPC), PPPP (Type DE2 or DE3 NPC), and 1101 (with TRSP <tc>).

5. Enter the appropriate command for type of circuit required:

   Two-Way:

```
{TCON|TCNT}::FROM <npc No.1>ddd[-eee],TO <npc No.2>jjj
[-kkk],<tc>[,SC(abcd,abcd)][,NAM][,RDC][,{CUS|INCL}][,PRIOUT]!
```

   One-Way:

```
{OCON|OCNT}::FROM <npc No.1>ddd[-eee],TO <npc No.2>jjj
[-kkk],<tc>[,SC(----,abcd)][,NAM][,RDC][,{CUS|INCL}][,PRIOUT]!
```

   Where:

   TCON,TCNT = TCON for 2-way or TCNT for 2-way terminated.

OCON,OCNT = OCON for 1-way or OCNT for 1-way terminated.

<npc No.1> = NPC number of one side (FROM), either extended (for example, [0]001) or hierarchical (for example, 01101).

ddd = Channel number; 01 through 24 (00 is data link) for DS1 NPC, 01 through 30/31 (00 is TS0) for type PB/PC NPC.

eee = Optional, to give the last channel of continuous range of channels to be connected.

<npc No.2> = NPC number of other side (TO); see <npc No.1>.

jjj = Channel number; 01 through 24 (00 is data link) for DS1 NPC, 01 through 30/31 (00 is TS0) for type PB/PC NPC.

kkk = Optional, to give the last channel of same width range as other side.

<tc> = Trunk conditioning; required for DS1 channel connection (gateway). See Figure 6-2.

SC(abcd,abcd) = Optional, dictates the use of signaling bits (abcd) in TS16 on the FROM and TO sides. The possibilities for the bits are: 0, 1, P (for pass through), and V (inverted).

NAM = Only used for digital data (no analog encoding) to disable A-law (2.048-Mb/s Interface) to μ-law encoding conversions.

RDC = Optional, designates special service.

CUS = Optional, customer controlled circuit.

INCL = To remove previous CUS channel designation.

PRIOUT = Optional; to give priority to associated output message by placing it on the top of the output message queue.

- If command is denied, find the reason for denial and perform corrective action to obtain command completion (*Command Denials* has explanations of denial codes).

6. Familiarize yourself with connection query outputs:

- To obtain the other end of a connection and to see trunk conditioning, enter:

  UTL::QRY,TO ,<npc No.>jjj[-kkk]!

  Where:

  <npc No.2> = NPC number and channel number of specific termination.

  kkk = Optional, last channel of a range of channel terminations.

- For all connections on NPC, enter:

  UTL::QRY,CMAP <npc No.>!

Where: <npc No.> = NPC number of one side of the connection.

NOTE:
An asterisk appears alongside OCONs in the CMAP/RTMAP to identify one-way circuits. If *000000 appears, the QRY FROM for OCON circuits can be used to see connection.

- For 1-way circuits, you can query the connection (if any) in the other direction of the same NPC by entering **`UTL::QRY,FROM <npc No.>ddd!`**.

Two-Way Multipoint Circuit

Overview: This section covers both symmetrical and broadcast multipoint configurations that are set up using the DSPU (DMB-type) NPC or virtual NPC. The virtual NPCs are 961 and 962 (99101 and 99102) for non-CEF frames, and [9]961 through [9]966 (99101 through 99106) for CEF frames. For broadcast circuits, the common leg or BBL (backbone leg) is established using the LEG,BBL combination of command keywords and each tributary is connected using the LEG,BRD combination of keywords. For a symmetrical (SYM) bridge, each leg is connected to the DMB bridge using the LEG,SYM combination of keywords. The FTU termination connected to a bridge is called a LEG. The DACS II conferencing provides μ-law companding for DS1 signals; for gateway, the type-PB/PC NPC makes the needed signal conversions.

1. See Figure 6-3 for models of multipoint circuits produced by DMB NPCs. See Figure 6-4 for multipoint circuits produced by specifying virtual NPCs.

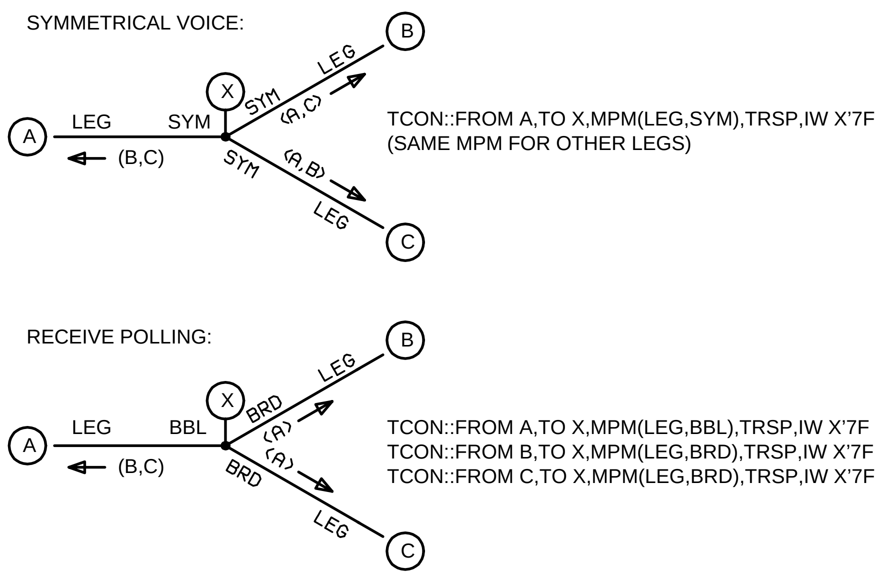

Figure 6-3. DMB Circuit Configurations

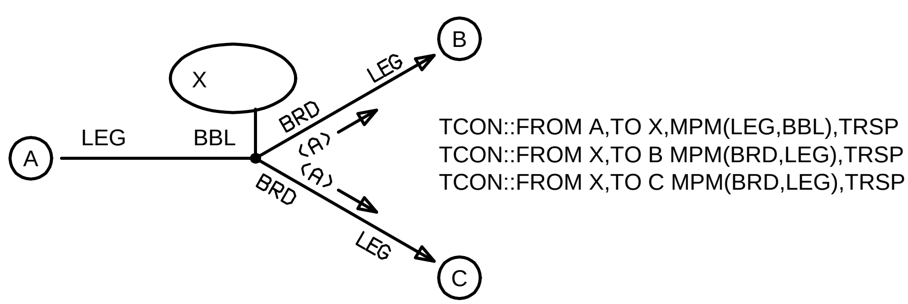

Figure 6-4. Virtual NPC Broadcast

2. Study the following command and obtain needed information:

   TCON|TCNT:[FRM xy,SEQ ww]:FROM <npc No.1>ddd[-eee], TO <npc No.2>jjj[-kkk],MPM(fmd,tmd),<tc>[,NAM][,NTR m] [,RDC][,{CUS|INCL}][,PRIOUT]!

   Where:

   xy = DACS II frame number (00 through ZZ)

   ww = Command sequence number (00 through 49)

   TCON,TCNT = TCON is for 2-way, TCNT is for 2-way terminated.

   <npc No.1> = NPC number for FROM side. See Table 6-2. For *SLC*® 96 carrier leg, always specify digroup A NPC and channel per Table 6-3.

   ddd/jjj = Conference number if bridging end or channel number if facility leg end.

   <npc No.2> = NPC number for TO side; see <npc No. 1>.

   eee/kkk = Optional, last channel of continuous range to be connected.

   <tc> = The same trunk conditioning does not have to be entered for each leg/tributary, but each must contain TRSP word.

   NAM = No A-law to μ-law

   The A-law to μ-law and μ-law to A-law code translators on the E1 type NPC are disabled. This keyword is valid in the following types of cross-connects:

   Multipoint:

   E1 to E1: Multipoint cross-connects have A-law to μ-law and μ-law to A-law set as a default. This conversion is performed on pure E1 multipoint connections in case a DS1 leg is ever added to the broadcast connection. The **NAM** keyword is used to disable the conversions. It may be desirable to disable conversions in a pure E1 multipoint cross-connect since such a connection has more quantization noise than a pure E1 two-point cross- connect. This is due to the back to back A-law to μ-law and μ-law to A-law conversions which are taking place.

   E1 to DS1 or DS1 to E1: Same explanation as E1 to E1.

   DS1 to DS1: Not applicable.

   fmd,tmd = Designators for FROM and TO side modes (See Table 6-2). Enter appropriate one for each side: SYM for DMB end of symmetrical, BBL for backbone, bridge end;

BRD for nonbackbone, bridge end; or LEG for FTU NPC end. This field determines the direction of data flow of broadcast circuit.

NTR m = Optional, shuts off transmission toward FROM (m=F) or TO (m=T) side.

RDC or CUS = Optional, designates red special service (RDC) or customer control (CUS).

INCL = Optional, removes previous channel CUS designation.

PRIOUT = Optional; to give priority to associated output message by placing it on the top of the output message queue.

Table 6-2. Multipoint NPC and Channel Numbers

Command Field	Leg-End NPC	Bridge-End DMB NPC	Bridge-End Virtual NPC
<npc No.>	Any facility NPC	DMB NPC (Type MB)	961,962 (or [9]961 - [9]966)
Channel No. (ddd/jjj)	01 - 24 (01 - 96 for *SLC* Carrier)	01 - 85	001 - 500
Mode (fmd,tmd)	LEG	SYM,BBL,BRD	BBL,BRD

Table 6-3. Channel Numbers

Type NPC	Channels
DE	01-24
SLC® 96 carrier Mode I & *SLC* Series 5 carrier	01-24 25-48 (DGA Virtual Channels for DGB) 49-72 (DGA Virtual Channels for DGC) 73-96 (DGA Virtual Channels for DGD)
SLC 96 carrier Mode III	Odd Channels 01-47 Odd Channels 49-95 (DGA Virtual Channels for DGC)
DMB	01-85

3. Enter cross-connect command for segment of multipoint circuit. See Figure 6-5 for construction of <tc>.

   - If command is denied, find the reason for denial and perform corrective action to obtain command completion (*Command Denials* has explanations of denial codes).

NOTE:
If command line runs over line length for your screen, you can break the line with a backslash and continue the command on the next line.

NOTE:
The DACS II conferencing provides μ-law companding for DS1 signals; for gateway, the type-PB/PC NPC makes the needed signal conversions unless a data conference (no encoding) is specified by the NAM keyword. The first 2.048-Mb/s Interface connection determines the conference type (μ-law or data).

```
<tc> = TRSP[,IW X'nn]
<tc> = TRSP{MUX/TRB}
<tc> = TRSP,IW X'nn[n]
       (Default = TRSP,IW X'FF)
```

Figure 6-5. Construction of TRSP Trunk Conditioning

4. Repeat the procedure to connect remaining segments to the bridge; the same trunk conditioning and any special service designations must be entered for each segment.

   NOTE:
   If NOBBL appears in completion message, it indicates that the broadcast backbone connection has not yet been entered.

5. To see all the conference legs, enter

   `UTL::QRY,TO <npc No.>ddd!`

   Where: <npc No.> = NPC number of bridging (DMB) or virtual NPC
   ddd = Conference or channel number.

   NOTE:
   Notice that the NTR directions in the output are in terms of what was entered for the TO-side in the query.

Broadcast Circuit

Overview: This section presents the BCON commands for establishing broadcast circuits through the cross-connect network. Up to eight tributaries can be connected to the broadcast leg at one time by listing them in the TOX field of the command. Unless the looped or no return keywords are used, the DACS II will designate the first tributary that is entered as the full tributary which is the only one that returns transmission to the broadcast leg. This return path can be subsequently changed using the CHG SWCH command.

1. Familiarize yourself with the commands as follows:

   Multiple tributaries (up to 8):

   ```
   BCON:[FRM xy,SEQ ww]:FROM <npc No.1>ddd-eee,TOX
   (<npc No.2>jjj, <npc No.3>nnn,<npc No.4>ppp),<tc>[,<sc>]
   [,NAM][,{NTR|LPD|CONV}][,RDC][,{CUS|INCL}]!
   ```

   Single Tributary:

   ```
   BCON:[FRM xy,Seq ww]:FROM <npc No.1>ddd -eee, TO <npc
   No.2>jjj-kkk, <tc>[,<sc>][NAM][,{NTR|LPD|CONV}][,RDC]
   [,{CUS|INCL}]!
   ```

   Where:

xy	=	DACS II frame number (00 through ZZ)
ww	=	Command sequence number (00 through 49)
<npc No.1>	=	Broadcast NPC number, either extended (for example [0]001) or hierarchical (for example, 01101).
ddd-eee	=	Range of channels to be broadcast (for example, 01 through 24).
TOX	=	Up to 8 tributaries can be connected to the broadcast leg at one time.
jjj/nnn/ppp	=	First channel on tributary that is to be connected to; the channel range is set by broadcast leg. For *SLC* carrier channel numbers, see Table 6-4.
<npc No.2>	=	NPC number of first tributary; see <npc No.1>.
<npc No.3>	=	NPC number of second tributary; see <npc No.1>.
<npc No.4>	=	NPC number of third tributary; see <npc No.1>.
<tc>	=	Trunk conditioning; can be either the TC format (signaling) or TRSP,IW X'mn format. Different values can be used on legs, but same type format required.
<sc>	=	Optional for gateway to dictate the use of signaling bits (abcd) on FROM and TO sides. The general form is "SC(abcd,abcd)" and the values are: 0, 1, P (pass through), and V (inverted).

NAM = No A-law to μ-law

The A-law to μ-law and μ-law to A-law code translators on the E1 type NPC are disabled. This keyword is valid in the following types of cross-connects:

Multipoint:

E1 to E1: Multipoint cross-connects have A-law to μ-law and μ-law to A-law set as a default. This conversion is performed on pure E1 multipoint connections in case a DS1 leg is ever added to the broadcast connection. The **NAM** keyword is used to disable the conversions. It may be desirable to disable conversions in a pure E1 multipoint cross-connect since such a connection has more quantization noise than a pure E1 two-point cross-connect. This is due to the back to back A-law to μ-law and μ-law to A-law conversions which are taking place.

E1 to DS1 or DS1 to E1: Same explanation as E1 to E1.

DS1 to DS1: Not applicable.

NTR,LPD or CONV = Optional, to designate no return transmission (NTR), to loop the broadcast (LPD), or to convert (CONV) existing 2-way, 2-point connection to BCON.

RDC = Optional, to designate red special service.

CUS = Optional, to designate customer control service.

INCL = Needed to remove CUS or special service.

Table 6-4. Channel Numbers

Type NPC	Channels
DE	01-24
SLC® 96 carrier Mode I & *SLC* Series 5 carrier	01-24 25-48 (DGA Virtual Channels for DGB) 49-72 (DGA Virtual Channels for DGC) 73-96 (DGA Virtual Channels for DGD)
SLC 96 carrier Mode III	Odd Channels 01-47 Odd Channels 49-95 (DGA Virtual Channels for DGC)
DMB	01-85

2. Enter the command with the required information.
   - If command is denied, find the reason for denial and perform corrective action to obtain command completion (*Command Denials* has explanations of denial codes).

NOTE:
If the command runs over line length for your screen, you can break the line with a backslash and continue the command on the second line.

3. Repeat this procedure if additional tributaries must be added to complete the broadcast circuit.

One-Way Multipoint Circuit

Overview: This section explains a method to establish one-way broadcast circuits using the OCON MPM command and virtual NPC [9]961 through [9]966 (or 99101 through 99106). To build such a circuit, you establish the backbone leg to the virtual NPC using the LEG,BBL combination of command keywords and connect each tributary to the backbone using the BRD,LEG combination of keywords. The FTU termination is always called a LEG. A range of channels can be broadcast using the channel range option for the backbone leg; this range is specified once and applies to the entire circuit. The broadcast circuit formed in the virtual NPC cannot be connected to another bridge circuit (concatenated) for further fanout.

1. See Figure 6-6 for a model of the pure broadcast network produced by specifying the first virtual NPC (9961). The commands are only examples.

2. Study the following command and obtain needed information,

```
OCON:[FRM xy,SEQ ww]:FROM <npc No.1>ddd[-eee],\
TO <npc No.2>jjj[-kkk],MPM(fmd,tmd),<tc>[,NAM][,RDC]\
[,{CUS|INCL}][,PRIOUT]!
```

Where:

xy	=	DACS II frame number (00 through ZZ)
ww	=	Command sequence number (00 through 49)
<npc No.1>	=	NPC number for FROM side. For bridging end, use virtual NPC. For leg end, use facility NPC.
ddd/jjj	=	Conference number (001 through 500) if bridging end or channel number if facility leg end. The channel numbers run from 01 through 24 for DS1 NPCs and for *SLC* carrier leg, specify digroup A NPC and channel per Table 6-5.
eee/kkk	=	Optional, last channel of continuous range to be connected.
<npc No.2>	=	TO-side identification; <npc No. 1>.
fmd,tmd	=	Designators for the FROM- and TO-side modes; use BBL for bridge end of backbone, BRD for bridge end of tributary, and LEG for FTU NPC end.
<tc>	=	Trunk conditioning. If entered, does not have to be same for each leg, but TRSP,IW X’nn form must be used.

NAM = No A-law to μ-law

The A-law to μ-law and μ-law to A-law code translators on the E1 type NPC are disabled. This keyword is valid in the following types of cross-connects:

Multipoint:

E1 to E1: Multipoint cross-connects have A-law to μ-law and μ-law to A-law set as a default. This conversion is performed on pure E1 multipoint connections in case a DS1 leg is ever added to the broadcast connection. The **NAM** keyword is used to disable the conversions. It may be desirable to disable conversions in a pure E1 multipoint cross-connect since such a connection has more quantization noise than a pure E1 two-point cross- connect. This is due to the back to back A-law to μ-law and μ-law to A-law conversions which are taking place.

E1 to DS1 or DS1 to E1: Same explanation as E1 to E1.

DS1 to DS1: Not applicable.

RDC = Optional, designates special service.

CUS = Optional, designates customer control circuit.

INCL = Optional, removes previous CUS channel designation.

PRIOUT = Optional; to give priority to associated output message by placing it on the top of the output message queue.

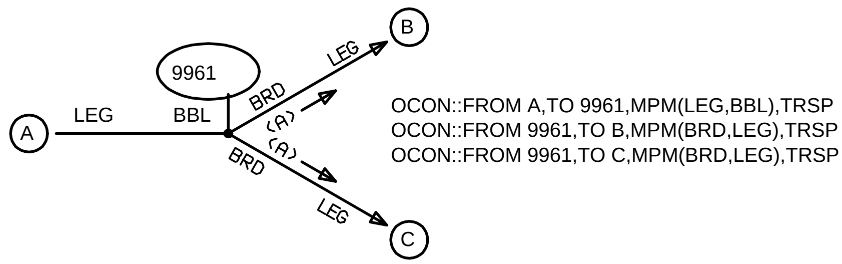

Figure 6-6. Virtual NPC Broadcast

Table 6-5. Channel Numbers

Type NPC	**Channels**
DE	01-24
SLC® 96 carrier Mode I & *SLC* Series 5 carrier	01-24 25-48 (DGA Virtual Channels for DGB) 49-72 (DGA Virtual Channels for DGC) 73-96 (DGA Virtual Channels for DGD)
SLC 96 carrier Mode III	Odd Channels 01-47 Odd Channels 49-95 (DGA Virtual Channels for DGC)
DMB	01-85

3. Enter cross-connect command for segment of multipoint circuit. See Figure 6-7 for construction of TC-field.
   - If command is denied, find the reason for denial and perform corrective action to obtain command completion (*Command Denials* has explanations of denial codes).

NOTE:
OCNT can be substituted for OCON in the command to provide preservice terminated state.

NOTE:
If command line runs over line length for your screen, you can break the line with a backslash and continue the command on the next line.

NOTE:
If NOBBL appears in completion message, it indicates that the broadcast backbone connection has not yet been entered.

<tc> = TRSP[,IW X'nn]
<tc> = TRSP{MUX/TRB}

Figure 6-7. Construction of TRSP Trunk Conditioning

4. Repeat the procedure to connect remaining segments to the bridge.
5. To see all conference legs, enter:

   `UTL::QRY,TO <npc No.>ddd!`

   Where: <npc No.>ddd = NPC number of virtual NPC and "ddd" is conference number.

Change Termination (TLA/TLR) or Conference Bridge Parameters

1. To change the termination state, enter the command listed under TERMINATION STATE in Figure 6-8 to make desired changes. Command options allow changing the state of all the bridge terminations or all except the one named in the NOT field.
   - If command is denied, find the reason for denial and perform corrective action to obtain command completion (*Command Denials* has explanations of denial codes).

   NOTE:
   The termination state or TLP (transmission level point) of a conference bridge circuit cannot be changed using the command in Figure 6-8 if the T or F side was previously designated as NTR (no transmit) in TLA command.

2. To change to conference bridge parameters, enter the command listed under CONFERENCE BRIDGE PARAMETERS in Figure 6-8.

   NOTE:
   To make a change, the DMB bridge side of the conference must be entered in the <npc No.2> field of the command.

3. Check completion message for required changes; note the NEW STATE field in the message. The presence of RNG in the termination change message indicates that the states in the range of circuits changed may differ. The RDC/CUS word will occur if special service circuits were changed.

TERMINATION STATE:

```
CHG::FROM <npc No.1>ddd[-eee],TO <npc No.2>jjj[-kkk]
[,NOT <npc No.>vvv],TLA/TLR F/T/B/L/G/A[,INCL]!
```

```
TTST::TLA/TLR F/T/B/L/G/A[,NOT <npc No.>vvv],TP kk!
```

CONFERENCE BRIDGE PARAMETERS:

```
CHG::FROM <npc No.1>ddd,TO <npc No.2>jjj[,TLP(snn,smm)]
[,NG nn][,ES ee][,INCL]!
```

EXPLANATION OF VARIABLES:

<npc No.1>	=	NPC number on FROM side, either extended (for example, [0]001) or hierarchical (for example, 01101).
<npc No.2>	=	NPC number, see <npc No.1>.
-ddd/-jjj	=	Channel number on NPC.
-eee/-kkk	=	Optional, last channel of range.
TLA or TLR	=	Desired state, TLA (terminated) or TLR (released) on circuit as follows: F (FROM-Side) T (TO-Side) B (Both) G (all legs toward bridge) L (all legs toward facilities) A (all legs in both directions) also see "NOT <npc No.>vvv" below.
NOT <npc No.>vvv	=	For bridge only, to specify one leg that is NOT to be changed with all others.
TP kk	=	Test port number (01-48).
INCL	=	Optional, needed if channel in command is red special service circuit.
TLP (snn,smm)	=	Signal level adjustment, "snn" is the input level and "smm" is output level; s = the sign (+ or -). Range for both is -9.0 to +8.8 in 0.2 dB steps (entered as whole No. -90 to +88).
NG nn	=	Noise Guard Adjustment in dB (00, 06, 12, or 18).
ES ee	=	Echo Suppression in dB (00, 06, 12, or 18).

Figure 6-8. Change Commands

Disconnect Cross-Connected Circuit

1. Familiarize yourself with the disconnect circuit commands as follows:

```
{TDIS|ODIS}:[FRM xy,SEQ ww]:FROM <npc No.1>ddd[-eee],
TO <npc No.2>jjj[-kkk][,CONV][,INCL][,OOS][,DCC][,PRIOUT]!
BDIS:[FRM xy,SEQ ww]:FROM <npc No.1>ddd-eee,
TOX (<npc No.3>nnn,...)[,CONV][,OOS][,INCL]!
```

Where:

TDIS,ODIS	=	TDIS to disconnect TCON or ODIS to disconnect OCON.
BDIS	=	BDIS to disconnect broadcast (BCON) circuit.
xy	=	DACS II frame number (00 through ZZ).
ww	=	Command sequence number (00 through 49).
<npc No.1>	=	NPC number on one side (FROM); either extended (for example, [0]001) or hierarchical
ddd	=	Channel number : 1 through 24 for DE-type, 1-96 for DS-type; 1 through 85 for MB-type; 1-ddd for VI-type NPC). For *SLC* carrier channels, see Table 6-6.
eee	=	Optional, to name last channel of range.
<npc No.2>	=	NPC number on other side (TO); see FROM side.
jjj[-kkk]	=	Channel number or optional range of channels on NPC.
<npc No.3>nnn	=	NPC number and first channel on other (up to 8 total) tributaries to be disconnected.
CONV	=	Optional for BDIS only; entered with next-to-last disconnection to convert the remaining circuit to 2-way TCON circuit.
INCL	=	Optional, to allow disconnect of circuit with RDC or CUS designation. The CUS stays with the circuit and NPC and requires use of INCL when reassigned.
OOS	=	Optional, to disconnect circuits when NPC is out-of-service.
DCC	=	Optional, to retain previous connection <tc> code instead of NPC not-connected code; not for broadcast.
PRIOUT	=	Optional; to give priority to associated output message by placing it on the top of the output message queue.

Table 6-6. Channel Numbers

Type NPC	Channels
DE	01-24
SLC® 96 carrier Mode I & *SLC* Series 5 carrier	01-24 25-48 (DGA Virtual Channels for DGB) 49-72 (DGA Virtual Channels for DGC) 73-96 (DGA Virtual Channels for DGD)
SLC 96 carrier Mode III	Odd Channels 01-47 Odd Channels 49-95 (DGA Virtual Channels for DGC)
DMB	01-85

2. If you are going to use the BDIS command, consider the following comments:
   - — To disconnect up to eight tributaries at one time, add a listing of the NPCs in the form "<npc No.3>nnn,<npc No.4>ttt..." where each NPC and the first channel of range is listed with commas. The optional listing goes in the field after the "<npc No.2>jjj" in the command.
   - — When using individual BDIS commands for each tributary, the full tributary (one with return path) must be disconnected last.
   - — The CONV option causes the broadcast side and final tributary to be connected as a 2-way circuit.
   - — When using the range and CONV options, the one tributary not included in the range becomes part of the 2-way circuit.

— If you need to check for RDC or CUS channel designations, enter one of the following commands:

For specific channel(s):

`UTL::QRY,MARK <npc No.>ddd[-eee]!`

For NPC numbers:

`UTL::QRY,MARK <npc No.>[-<range>]!`.

— Enter the appropriate disconnect command. For one-way circuits, the sides must be entered like the OCON or NOMTH (no match) denial will result; you may need to use **`UTL::QRY,FROM <npc No.>ddd!`** to find the sides of a 1-way connection.

NOTE:
If CUS appears in the completion message, it indicates that the CUS designation remains with the circuit and NPC until INCL keyword is used in subsequent cross-connect or remove command.

- If command is denied, find the reason for denial and perform corrective action to obtain command completion (*Command Denials* has explanations of denial codes).

— If a multipoint circuit (conference or broadcast) was disconnected, check the output message for additional information given as follows: MPDIS indicates that bridge has been fully disconnected; NOBBL indicates that there is no backbone leg now; and BRDIS indicates that the BCON has been fully disconnected, last tributary disconnected.

NOTE:
If CUS appears in the completion message, it indicates that the CUS designation remains with the circuit and NPC until INCL keyword is used in subsequent cross-connect or remove command.

— If additional legs of a multipoint circuit must be disconnected, repeat the procedure as needed.

Move Facility End Points

Overview: This procedure presents the ACON (alternate cross-connect) command. This command moves the facility end points of existing cross-connection(s) from the original facility NPCs to other facility NPCs. These facility end points can be the facility legs of DMBs, but the old and new DMBs must be the same type. This function is accomplished by overwrite operations in the ECCN and does not cause any more than a hit on the moved circuit (10 ms maximum per moved circuit). One application of this command is for equipment cutover where connections must be moved from existing facility terminations to new facility terminations. Disconnecting the old endpoints is included in the command function; so no disconnect command must be entered.

CAUTION:
Performing this procedure incorrectly can interrupt service. Familiarize yourself with the procedure and commands before beginning and perform each step of the procedure in the order given.

1. If you do not know whether the NPCs and unit equipment are in-service and not failed or pested, enter:

   `UTL::QRY,ALL,UNIT [q]q!` for the unit(s).

   NOTE:
   The out-of-service, failed, and pested conditions are indicated by the presence of 1s in those columns for each pack. Unequipped packs are indicated by dashes.

2. See Figures 6-9 and 6-10 for two examples of ACON commands showing the connections after the commands execute.

```
NPC C   ----------   NPC A
(FAC)                (FAC)

NPC D   ----------   NPC B
(FAC)                (FAC)
```

```
ACON::OLD <npc D>ddd,NEW <npc A>jjj!
```

```
NPC C        -----   NPC A
(FAC)       |        (FAC)
            |
NPC D        -----   NPC B
(FAC)                (FAC)
```

Figure 6-9. Facility-to-Facility Move

```
NPC C    ----------    NPC A
(DMB)                  (FAC)
```

```
TCON::FROM <npc D>-ddd,TO <npc B>jjj,MPM(LEG,SYM),TRSP!
```

```
NPC D    ----------    NPC B
(FAC)                  (DMB)
```

```
ACON::OLD <npc D>ddd,NEW <npc A>jjj!
```

```
NPC C        -----    NPC A
(DMB)       |         (FAC)
            |
NPC D        -----    NPC B
(FAC)                 (DMB)
```

Figure 6-10. Facility Leg-to-DMB Move

3. Examine the following command restrictions:
   - — All the involved NPCs must have in-service (and not failed or pested) status.
   - — The new NPC channel can be currently mapped to a 2-way, 2-point circuit or unmapped.
   - — None of the involved NPCs can be: type PB or PC, *SLC*® carrier type DS, interface unit types IU or TI, or clear-DS1 types (xyz = 9-9).
   - — The TC (trunk conditioning) of the circuit to be moved must be appropriate for the new circuit. A cross-connection with robbed-bit signaling for the D4 bank line format is not appropriate for NPCs grown with the T1DM line format.

4. To move a facility leg to a different DMB using the alternate cross-connection, establish a temporary facility leg connection to the new desired DMB which will be used as the new facility termination in the ACON command.

5. Enter the command with the required termination information as follows:

   ACON:[FRM xy,SEQ ww]:OLD <npc No.1>ddd[-eee],
   NEW <npc No.2>jjj[-kkk][,INCL]!

   Where:

xy	=	Optional, DACS II frame number (00 through ZZ).
ww	=	Optional, command sequence number (00 through 49).
<npc No.1>	=	NPC number of existing type DE or TE termination that is to be moved. Either extended for (example [0]001) or hierarchical (for example, 01101), can be used.
ddd-eee	=	Optional, for range of channels on virtual NPC broadcast circuit to be moved to 2-point, 2-way circuit.
<npc No.2>	=	NPC number of new desired DE or TE termination.
-kkk	=	Optional, for range of channels on new NPC to be connected from old virtual NPC broadcast circuits.
INCL	=	Optional, to override special service designation of existing circuit to allow the move operation.

   - ■ If the ACON ...DNY message is received, find the meaning of the COND cc DNY code from Table 6-7 and perform corrective action to obtain command completion.

6. Check ACON completion message to verify circuit changes.

7. Repeat the procedure as needed to complete required changes.

Table 6-7. Condition Codes

Code	Explanation
01	Invalid range for NPC type.
10	NPC out-of-service or failed.
11	NPC not grown.
12	Active ECCN side out-of-service, failed, or pested.
13	Unit not grown, not in-service, or failed.
15	FTMI not grown, not in-service, or failed.
16	FC not grown, not in-service, or failed.
18	DSPI not equipped or not in-service.
1A	DS3 FLI not grown, not in-service, or failed.
1B	DS3 MXR not grown, MMFG not in-service, or failed.
1C	DS3 FMT not grown, not in-service, or failed.
1D	DS3 MIU not grown, MMFG not in-service, or failed.
1E	Customer control or special service (red) circuit; use command INCL keyword.
21	Invalid trunk conditioning.
32	Termination is currently connected in test access configuration.
33	Termination is assigned as test port.
62	Invalid channel number.
70	Invalid NPC type.
80	Conference size does not agree with what is in the data base.
BA	Inactive side NPC is out-of-service or inactive.
DF	Channel range mismatch.
E0	ETSI not grown, not in-service, or failed.
EC	Channel 00 (facility data link) not allowed.
ED	OLD termination is not currently cross-connected.
EF	Invalid circuit type.
F0	Ranges not allowed for circuit type.
F4	Same terminations entered for OLD and NEW parts.
F5	First channel of conference does not match input.
F6	Leg type mismatch.
F7	Invalid parity channel.
F8	Same parity channel.

Cross-Connect or Disconnect Clear-DS1

Cross-Connect Clear-DS1 Signals

Two-Point, Two-Way or One-Way Circuit

Overview: This procedure presents the commands to connect full bandwidth DS1s (with no framing or channels). For full bandwidth connections, the NPCs on both sides must be grown as clear-DS1 types.

1. Familiarize yourself with the commands shown below. The FROM and TO side assignments serve as references for 1-way connections (OCONs) and for test access.

```
{TCON|TCNT}:[FRM xy,SEQ ww]:FROM <npc No.1>,TO <npc No.2>
[,RDC][,CUS|INCL][,PRIOUT]!
```

```
{OCON|OCNT}:[FRM xy,SEQ ww]:FROM <npc No.1>,TO <npc No.2>
[,RDC][,CUS|INCL][,PRIOUT]!
```

Where:

TCON, TCNT, OCON, or OCNT	=	TCON is for 2-way, TCNT is for 2-way terminated, OCON is for 1-way, and OCNT is for 1-way terminated.
xy	=	DACS II frame number (00 through ZZ)
ww	=	Command sequence number (00 through 49)
<npc No.1>	=	NPC number of one side (FROM), either extended (for example, [0]001)) or hierarchical (for example, 01101).
<npc No.2>	=	NPC number of other side (TO); see <npc No.1>.
RDC	=	Optional; to designate red special service circuit.
CUS	=	Optional; to designate customer controlled channels.
INCL	=	Optional; to remove previous CUS channel designation.
PRIOUT	=	Optional; to give priority to associated output message by placing it on the top of the output message queue.

2. Obtain information needed for command from circuit layout information.

3. Enter cross-connect command. If command line runs over line length for your screen, you can break the line with a backslash and continue the command on the next line.

   - If command is denied, find the reason for denial and perform corrective action to obtain command completion (*Command Denials* has explanations of denial codes).

Broadcast Circuit

Overview: This section shows the BCON commands for establishing broadcast circuits through the cross-connect network. Up to eight tributaries can be connected to the broadcast leg at one time by listing them in the TOX field of the command. Unless the looped or no return keywords are used, the DACS II will designate the first tributary that is entered as the full tributary which is the only one that returns transmission to the broadcast leg. This return path can be subsequently changed using the CHG SWCH command.

1. Familiarize yourself with the commands as follows:

   Multiple Tributaries (up to 8):

   ```
   BCON:[FRM xy,SEQ ww]:FROM <npc No.1>,TOX (<npc No.2>,
   <npc No.3>, <npc No.4> ...),[,{NTR|LPD|CONV}][,RDC]
   [,{CUS|INCL}]!
   ```

   Single Tributary:

   ```
   BCON:[FRM xy,SEQ ww]:FROM <npc No.1>,TO (<npc No.2>,
   <npc No.3>, <npc No.4> ...),[,{NTR|LPD|CONV}][,RDC]
   [,{CUS|INCL}]!
   ```

   Where:

<npc No.1>	=	Broadcast NPC number, either extended (for for example [0]001) or hierarchical (for example, 01101).
<npc No.2>	=	NPC number of first tributary; see <npc No.1>.
<npc No.3>	=	NPC number of second tributary; see <npc No.1>.
<npc No.4>	=	NPC number of third tributary; see <npc No.1>.
NTR,LPD or CONV	=	Optional, to designate no return transmission (NTR), to loop the broadcast (LPD), or to convert (CONV) existing 2-way, 2-point connection to BCON.
RDC	=	Optional, to designate red special service.
CUS	=	Optional, to designate customer control service.
INCL	=	Needed to remove CUS or special service.

2. Enter the command with the required information.

   - If command is denied, find the reason for denial and perform corrective action to obtain command completion (*Command Denials* has explanations of denial codes).

   NOTE:
   If the command runs over length for your screen, you can break the line with a backslash and continue the command on the second line.

3. Repeat this procedure to include all tributaries in the broadcast circuit.

Disconnect Cross-Connected Circuit

1. Familiarize yourself with the commands as follows:

   For Clear-Channel DS1s:

   {TDIS|ODIS}:[FRM xy,SEQ ww]:FROM <npc No.1>,TO <npc No.2>, [,CONV][,INCL][,OOS][,DCC][,PRIOUT]!

   BDIS:[FRM xy,SEQ ww]:FROM <npc No.1>,TOX (<npc No.3>,...) [,CONV][,OOS][,INCL]!

   Where:

TDIS,ODIS	=	TDIS to disconnect TCON or ODIS to disconnect OCON.
BDIS	=	BDIS to disconnect broadcast circuit.
xy	=	DACS II frame number (00 through ZZ).
ww	=	Command sequence number (00 through 49).
<npc No.1>	=	NPC number on one side (FROM); either extended (for example, [0]001) or hierarchical (for example, 01101).
<npc No.2>	=	NPC number on other side (TO); see FROM side.
<npc No.3>	=	NPC number and first channel on other (up to 8 total) tributaries to be disconnected.
CONV	=	Optional for BDIS only; entered with next-to-last disconnection to convert the remaining circuit to 2-way TCON circuit.
INCL	=	Optional, to allow disconnect of circuit with RDC or CUS designation. The CUS stays with the circuit and NPC and requires use of INCL when reassigned.
OOS	=	Optional, to disconnect circuits when NPC is out-of-service.
DCC	=	Optional, to retain previous connection <tc> code instead of NPC not-connected code; not for broadcast.
PRIOUT	=	Optional; to give priority to associated output message by placing it on the top of the output message queue.

2. If you are going to use the BDIS command, consider the following comments:

   — To disconnect up to eight tributaries at one time, add a listing of the NPCs in the form "<npc No.3>,<npc No.4>..." where each NPC and the first channel of range is listed with commas. The optional listing goes in the field after the "<npc No.2>" in the command.

   — When using individual BDIS commands for each tributary, the full tributary (one with return path) must be disconnected last.

   — The CONV option causes the broadcast side and final tributary to be connected as a 2-way circuit.

— When using the range and CONV options, the one tributary not included in the range becomes part of the TO side of a 2-way circuit.

3. If you need to check for RDC or CUS designations, enter the following commands:

   `UTL::QRY,MARK <npc No.>[-<range>]!`

4. Enter the appropriate disconnect command from Step 1.

   - If command is denied, find the reason for denial and perform corrective action to obtain command completion (*Command Denials* has explanations of denial codes).

> **NOTE:**
> For one-way circuits, the sides must be entered like the OCON or NOMTH (no match) denial will result; you may need to use **`UTL::QRY,FROM <npc No.>ddd!`**

5. If a multipoint circuit (conference or broadcast) was disconnected, check the output message for additional information given as follows: MPDIS indicates that bridge has been fully disconnected; NOBBL indicates that there is no backbone leg now; and BRDIS indicates that the BCON has been fully disconnected, last tributary disconnected.

> **NOTE:**
> If CUS appears in the completion message, it indicates that the CUS designation remains with the circuit and NPC until INCL keyword is used in subsequent cross-connect or remove command.

6. If additional legs of a multipoint circuit must be disconnected, repeat the procedure as needed.

Cross-Connect, Change, Disconnect Subrate

Cross-Connect Two-Point Circuit

1. Familiarize yourself with the commands in Step **2** and see Figure 6-11 which is an example showing channels established to the subrate and a subrate cross-connection.

   NOTE:
   To establish a loopback connection, the same numbers must be entered for the FROM and TO sides; loopback is not allowed with the SCNT command. The terminated connection sends the UMC (unassigned multiplexer code) on both sides of the connection as a preservice or testing condition.

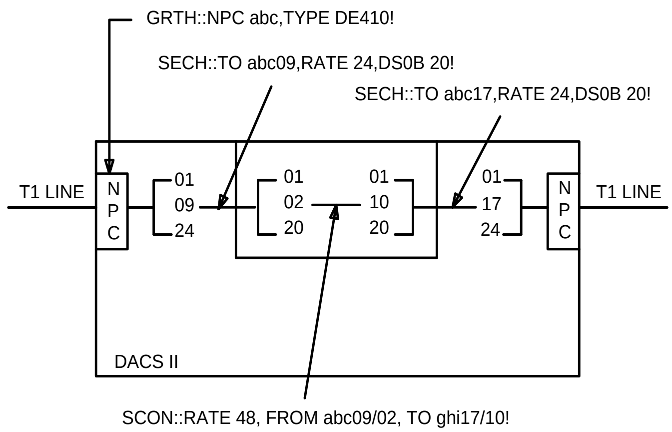

Figure 6-11. Subrate Two-Point Cross-Connection

2. Enter the appropriate command. Although not shown, channel ranges (-eee, -kkk) are allowed for channels established to subrate as DS0A.

   Normal Connection:

   SCON:[FRM xy,SEQ ww]:RATE rr[,TPT],FROM <npc No.1>ddd [/ff[-mm]],TO <npc No.2>jjj[/ll[-nn]]!

   Terminated Connection:

   SCNT:[FRM xy,SEQ ww]:RATE rr[,TPT],FROM <npc No.1>ddd [/ff],TO <npc No.2>jjj[/ll]!

   Where:

   xy = DACS II frame number (00 through ZZ). If the command is issued to a remote frame, the frame number is required,

   ww = Command sequence number (00 through 49). If the command is issued to a remote frame, the sequence number is required,

   <npc No.1> = FROM NPC number, either extended (for example, [0]001) or hierarchical (for example, 01101).

   <npc No.2> = TO NPC number, either extended (for example, [0]001) or hierarchical (for example, 01101).

   rr = The cross-connect circuit rate 24, 48, 96, or 56 (for 2.4, 4.8, 9.6, or 56 kb/s). This rate must be equal to or lower than the rates of the customer signals.

   TPT = Two-Point (optional). Retained only for DACS/SRDC compatibility.

   ddd = FROM channel number within the digroup.

   ff = The FROM customer number; optional for DS0A channel. See Table 6-8.

   mm = Optional, for last customer number in a continuous range of DS0B customers.

   jjj = The TO channel number within the digroup (being addressed by the command).

   ll = The TO customer number; optional for DS0A channel. See Table 6-8.

   nn = Optional, for last customer number in a continuous range of DS0B customers.

   - If the command is denied, find the reason for the SUBRATE denial in the output message and perform corrective action to obtain command completion (*Command Denials* has explanations for denial codes).

3. To familiarize yourself with query command, enter the following command for the NPC and channel(s): **`UTL::QRY,SCON,CH,TO <npc No.>ddd[-eee]!`**.
4. To see which subrate plug-in is used for the cross-connection, enter **`UTL::QRY,SRHDW,TO <npc No.>ddd/ff!`**.

Table 6-8. Subrate Customer Numbers

Rate	DS0A Numbers (Note 1)	DS0B Customer Numbers (Note 2)
2.4	01	01 through 20
4.8	01	01 through 10
9.6	01	01 through 05
56	01	01

Notes:

1. Range of channels allowed with DS0A
2. Range of customers allowed with DS0B

Connect Multipoint Circuit (with DSPU)

1. Familiarize yourself with the commands in Step **2** and see Table 6-9 for a summary of the command fields. Figure 6-12 is an example showing channels established to the subrate and tandem MJU connections.

Table 6-9. Command Field Summary

Field	Explanation
MPTM field	Multipoint master - NPC, channel, optional customer connected to the control leg of MJU 1. MJU 1 is always the first MJU in a tandem connection; the MPTM is used to identify the circuit.
MJU ssss	Multipoint junction unit being addressed (1-9999).
MA(tttt,u)	Master leg. Specifies MJU-to-MJU connection. Gives preceding MJU that MJU sss control leg connects to (tttt) and which branch it connects to on MJU tttt.
branch	External facility channel connected to MJU ssss. One of four branches on addressed MJU.

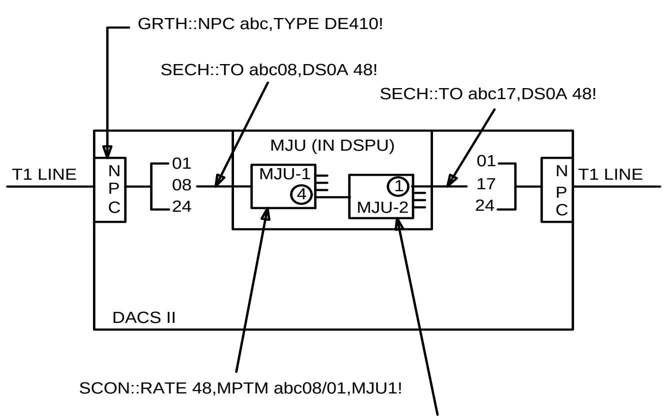

Figure 6-12. Subrate Multipoint Cross-Connection

2. Enter the appropriate command.

```
{SCON|SCNT}:[FRM xy,SEQ ww]:[RATE rr,]MPTM <npc No.>ddd
[/ff], MJU ssss [,MA(tttt,u)][,<branch>][,<branch>]
[,<branch>][,<branch>]!
```

NOTE:
The involved channels from the facility control leg and any branches must already be established to the subrate equipment.

Where:

xy	=	DACS II frame number (00-ZZ) If the command is issued to a remote frame, the frame number must be entered.
ww	=	Command sequence number (01-49). If the command is being issued to remote frame, the sequence number must be entered.
{SCON|SCNT}	=	Command verb. Selects type of connection, either normal two-way subrate or two-way, terminated in which unassigned multiplexer channel (UMC) is sent towards the upstream and downstream branches. If there are no branches, the command will be denied.
<npc No.>	=	NPC number of multipoint master (control leg of MJU 1), either extended (for example, [0]001) or hierarchical (for example, 01101).
ddd	=	Channel number within the NPC digroup.
ff	=	Customer number; see Table 6-10. Optional for DS0A channel (if used with DS0A, it must be 01).
rr	=	The cross-connect circuit rate 24, 48, 96, or 56 (2.4, 4.8, 9.6, or 56 kb/s); optional for DS0A. This rate must be equal to or lower than the rates of any connecting leg or branch customer rate.
ssss	=	MJU number (1-9999) of MJU being addressed.
MA (ttt,u)	=	Optional, used for tandem MJU connection. The tttt is the MJU number (1-9998) of the preceding MJU, and u is the branch on that MJU which connects to the control leg MJU sss.
<branch>	=	Optional, to connect branch of MJU sss. Each branch consists of **`BRi <npc>jjj[/ll]`** which are given by the following definitions.
BRi	=	Branch number (1 through 4) on MJU ssss.
<npc No.>	=	NPC number of facility termination of branch.
jjj	=	Channel number within the digroup.
ll	=	Customer number; see Table 6-10. Optional for DS0A channel (if used with a DS0A, it must be 01).

- If the command is denied, find the reason for the subrate denial in the output message and perform corrective action to obtain command completion. *Command Denials* has explanations of condition codes.

3. To see the subrate plug-in used for the connection, enter
`UTL::QRY,SRHDW,TO <npc No.>ddd/ff!`

Table 6-10. Subrate Customer Numbers

Rate	DS0A Numbers (Note 1)	DS0B Customer Numbers (Note 2)
2.4	01	01 through 20
4.8	01	01 through 10
9.6	01	01 through 05
56	01	01

Notes:

1. Range of channels allowed with DS0A
2. Range of customers allowed with DS0B

Connect 19.2-kb/s Multipoint Circuit (with External MJU Shelf)

1. Check circuit records to see which channels will be connected to the MJU control and branch legs.

   NOTE:
   To use the external 19.2-kb/s MJU, DS0B customer signals must already be multiplexed into adjacent 9.6-kb/s subrate customer positions of a DS0 channel. This customer signal can then be cross-connected to the control leg of the MJU for bridging to the branches. Other MJUs can be connected in tandem to the first for additional bridging.

2. See Table 6-11 for the channel assignment in the DS1 signal going to the MJU plug-in. The MJU circuits are configured by using DS0 cross-connect commands to access the MJU control leg and branches.

   NOTE:
   Each MJU plug-in connects to the DACS II by a DS1 line and contains the circuitry for four MJUs; these MJU circuits are accessed by the channel assignment in the DS1 signal. Up to 12 MJUs (for 12 DS1s) can be mounted on an MJU shelf.

Table 6-11. External MJU Channel Assignment

Channel	MJU Function	Channel	MJU Function
1	MJU 1 Control Leg	13	MJU 3 Control leg
2	MJU 1 Branch 1	14	MJU 3 Branch 1
3	MJU 1 Branch 2	15	MJU 3 Branch 2
4	MJU 1 Branch 3	16	MJU 3 Branch 3
5	MJU 1 Branch 4	17	MJU 3 Branch 4
6	Unused	18	Unused
7	MJU 2 Control Leg	19	MJU 4 Control leg
8	MJU 2 Branch 1	20	MJU 4 Branch 1
9	MJU 2 Branch 2	21	MJU 4 Branch 2
10	MJU 2 Branch 3	22	MJU 4 Branch 3
11	MJU 2 Branch 4	23	MJU 4 Branch 4
12	Unused	24	T1DM Framing

3. Which type 19.2-kb/s signals are being connected to MJU shelf?

NOTE:
With a DS0A signal on the channel, the channel is connected to the channels in the DS1 going to the MJU plug-in using TCON commands. With DS0B signals multiplexed on the channel, the channel from the customer facility and the channels from the MJU plug-in must be established to the DACS II DSPU. Once established (refer to *Provisioning*), the subrate customer signals are cross-connected using SCON commands.

- If DS0A (single customer), continue with Step **4**.
- If DS0B (multiple customers), proceed to Step **6**.

DS0A Customer Signal (Continue Here)

4. Enter the appropriate commands to connect facility channels to the appropriate channels going to the MJU plug-in. See Table 6-11 for MJU channel assignments.

Normal Connection:

```
SCON:[FRM xy,SEQ ww]:FROM <npc No.1>ddd,
TO <npc No.2>jjj,<tc>,RDC!
```

Terminated Connection:

```
SCNT:[FRM xy,SEQ ww]:FROM <npc No.1>ddd,
TO <npc No.2>jjj,<tc>,RDC!
```

NOTE:
The terminated connection sends a UMC (unassigned multiplexer code) toward the facilities for testing or to hold the circuit in a preservice condition.

Where:

xy	=	DACS II frame number (00 through ZZ). If the command is issued to a remote frame, the frame number is required,
ww	=	Command sequence number (00 through 49). If the command is issued to a remote frame, the sequence number is required,
<npc No.1>	=	NPC number for FROM side, either extended (for example, [0]001) or hierarchical (for example, 01101). The side assignments serve as references for test access connections.
<npc No.2>	=	NPC number for TO side. See <npc No.1>.

ddd = Channel number within the FROM digroup.

jjj = Channel number within the TO digroup.

<tc> = Trunk conditioning to be sent on connecting channels if carrier to NPC fails. **TRSP,MUX** recommended.

RDC = Optional, to designate red special service circuit.

- If the command is denied, find the reason for the denial and perform corrective action to obtain command completion (*Command Denials* gives the explanations of the denial codes).

5. Check completion message to verify correct entries.

DS0B Customer Signals (Continue Here)

6. Enter the appropriate command to connect the customer signals (established to DSPU) to channels from the MJU (established to DSPU). See Table 6-11 for MJU channel assignment.

Normal Connection:

SCON:FRM xy,SEQ ww:RATE rr[,TPT],FROM <npc No.1>ddd [/ff[-mm]],TO <npc No.2>jjj[/ll[-nn]]!

Terminated Connection:

SCNT:FRM xy,SEQ ww:RATE rr[,TPT],FROM <npc No.1>ddd [/ff[-mm]],TO <npc No.2>jjj[/ll]!

NOTE:
The terminated connection sends a UMC (unassigned multiplexer code) on the channels for testing or to hold the circuit in a preservice condition.

Where:

xy = DACS II frame number (00 through ZZ). If the command is issued to a remote frame, the frame number is required,

ww = Command sequence number (00 through 49). If the command is issued to a remote frame, the sequence number is required,

<npc No.1> = FROM NPC number, either extended (for example, [0]001) or hierarchical (for example, 01101).

<npc No.2> = TO NPC number.

rr = The cross-connect circuit rate 96, or 56 (for 9.6, or 56 kb/s). This rate must be equal to or lower than the rates of the customer signals.

TPT = Two-Point (optional). Retained only for DACS/SRDC compatibility.

ddd = FROM channel number within the digroup.

ff = The FROM customer number; see Table 6-12.

mm = Optional, for last customer number in a continuous range of DS0B customers.

jjj = The TO channel number within the digroup (being addressed by the command).

ll = The TO customer number; see Table 6-12.

nn = Optional, for last customer number in a continuous range of DS0B customers.

- If the command is denied, find the reason for the SUBRATE denial in the output message and perform corrective action to obtain command completion (*Command Denials* gives the explanations of condition codes).

7. Check completion message to verify correct entries.

Table 6-12. Subrate Customer Numbers

Rate	DS0A Numbers (Note 1)	DS0B Customer Numbers (Note 2)
9.6	01	01 through 05
56	01	01

Notes:

1. Range of channels allowed with DS0A

2. Range of customers allowed with DS0B

Change Two-Point Terminate and Leave State

1. To request a change in the termination status of a cross-connected circuit (or range of circuits), enter the following command:

   CHG::FROM [s]abcddd[-eee],TO [t]ghijjj[-kkk] [,NOT] [u]rstvvv],{TLA|TLR} {F|T|B|L|G|A}[,INCL]

   Where;

FROM	=	From
TO	=	To
[s]abc	=	The 3 or 4-digit nonhierarchical FROM NPC number.
[t]ghi	=	The 3 or 4-digit nonhierarchical TO NPC number.
[u]rst	=	The 3 or 4-digit nonhierarchical NPC number not affected by this.
ddd	=	FROM channel number.
jjj	=	TO channel number.
eee	=	FROM channel number denoting the end of a range.
kkk	=	TO channel number denoting the end of a range.
vvv	=	Channel number not affected by this command.
TLA	=	Terminate and leave activate.

TLR = Terminate and leave release. The direction of transmission to be terminated or released is given by the letter following the request:

F Towards the FROM direction
T Towards the TO direction
B Towards both terminations
L Towards the facilities (multipoint connection only)
G Towards the bridge (multipoint connection only)
A Towards the facilities and the bridge (multipoint only)

INCL = Inclusive. To change the parameters on a channel or range of channels including one or more channels marked as a Red Circuit, use the INCL keyword.

NOT = Not. The NPC is not not affected by this command.

2. If COMPL message is received, check completion message to verify changes.

   - If the command is denied, find the reason for the denial and perform corrective action to obtain command completion (*Command Denials* has explanations of denial codes).

Change Multipoint Terminate and Leave State

1. To change the terminate and leave state of the control leg or branch associated with the addressed MJU in a subrate multipoint circuit, enter

   CHG:[FRM xy,SEQ ww]:{TLA|TLR} m,TO <npc No.>ddd[/ff], MJU ssss[,BRi]!

   NOTE:
   The TO and BR fields control how the terminate and leave is applied. When BR is not used, the TO side faces the control leg downstream, and the FROM side faces upstream to the external facility termination or branch of cascaded MJU (for MJU other than 0001). When BR is used (for MJU other than 0001), the TO faces upstream to the branch of the specified MJU, and the FROM faces downstream to another MJU or facility termination.

   Where:

   xy = Double-digit number assigned to the frame when it is placed in service. If the command is issued to a remote frame, the frame number must be entered.

   ww = Identifying double-digit number assigned to the command (arbitrarily chosen by the operator). If the command is being issued to remote frame, the sequence number must be entered.

   <npc No.> = TO NPC number of the master leg, either extended (for example, [0]001) or hierarchical (for example, 01101).

   ddd = TO channel number within the digroup.

   ff = TO customer number. Optional when channel is DS0A.

   ssss = MJU identification number addressed by this command (1 through 9999).

   i = Optional, to change state of branch (1 through 4) on MJU ssss.

   m = Direction of terminate and leave change (F, T, B).

   - If command is denied, find the reason for denial and perform corrective action to obtain command completion (*Command Denials* has explanations of denial codes).

2. Check completion message to verify changes.

Change Multipoint Master

1. If you want to see the whole multipoint circuit first, enter the following command using the multipoint master for the NPC and channel:
   `UTL::QRY,SCON,TO <npc No.>ddd/ff!`
2. To change the external facility termination associated with the multipoint control leg of a subrate multipoint circuit from an existing digroup and channel to a new digroup and channel, enter:

   `CHG:[FRM xy,SEQ ww]:SCON,OLD <npc No.1>ddd[/ff],NEW <npc No.2>jjj[/ll],MPTM!`

   Where:

   xy = Double-digit number assigned to the frame when it is placed in service. If the command is issued to a remote frame, the frame number must be entered.

   ww = Identifying double-digit number assigned to the command (arbitrarily chosen by the operator). If the command is being issued to remote frame, the sequence number must be entered.

   ddd = channel number within the digroup of the old control leg external facility termination.

   ff = Customer number. Optional when channel is a DS0A.

   <npc No.1> = NPC number (of the old control leg), either extended (for example, [0]001) or hierarchical (for example, 01101)

   <npc No.2> = NPC number (of the new control leg)

   jjj = Channel number within the digroup of the new control leg external facility termination.

   ll = Customer number and is optional when channel is a DS0A.

   - If the command is denied, find the reason for the denial and perform corrective action to obtain command completion (*Command Denials* has explanations of denial codes).

   NOTE:
   All branches are left with their existing external and internal connections. The external facility termination associated with the original connections is left established to the subrate feature with a UMC (unassigned multiplexer channel) code inserted towards the old facility.

3. Check completion message to verify changes.

Disconnect Two-Point Circuit

1. To disconnect a subrate circuit in both directions, enter:

   `SDIS:[FRM xy,SEQ ww]:FROM <npc No.1>ddd[/ff], TO <npc No.2>jjj[/ll]!`

   Where:

   xy = Double-digit number assigned to the frame when it is placed in service. If the command is issued to a remote frame, the frame number must be entered.

   ww = Identifying double-digit number assigned to the command (arbitrarily chosen by the operator). If the command is being issued to remote frame, the sequence number must be entered.

   ff = TO customer number.

   <npc No.1> = FROM NPC number, either extended (for example, [0]001) or hierarchical (for example, 01101).

   ddd = FROM channel number within the digroup (being addressed by the command).

   <npc No.2> = TO NPC number

   jjj = TO channel number within the digroup (being addressed by the command).

   ll = TO customer number (optional for DS0A channel).

   - If the command is denied, find the reason for the denial and perform corrective action to obtain command completion (*Command Denials* has explanations of denial codes).

   NOTE:
   The FROM and TO designations enable the addressing of a direction of transmission in a subrate circuit (subrate is connected as a two-way circuit). FROM or TO can be either external facility for any subrate command. The association of FROM or TO to an external facility is valid only for the command it is being used in. The next time you use the same command and external facilities, FROM or TO can be specified as the other external facility.

2. Check completion message to verify changes.

Disconnect Multipoint Branch

NOTE:
The MJU remains connected to the circuit. The command can disconnect up to four branches of one MJU at one time.

1. To disconnect multipoint branch circuits in both directions, enter:

```
SDIS:[FRM xy,SEQ ww]:MPTM <npc No.>ddd[/ff],MJU ssss,
<branch> [,<branch>][,<branch>][,<branch>]!
```

Where:

xy = DACS II frame number (00 through ZZ)
ww = Command sequence number (00 through 49)

<npc No.> = Multipoint master (MJU 1) NPC number, either extended (for example, [0]001) or hierarchical (for example, 01101)

ddd = Channel number within the digroup of the multipoint master (MJU 1).

ff = TO customer number.

ssss = MJU identification number addressed by this command (1 through 9999).

<branch> = Branch to be disconnected. Each branch consists of **`BRi <npc No.>jjj[/ll]`** which is explained by the following definitions:

BRi = Branch number of MJU ssss (1 through 4).

<npc No.> = NPC number of the branch

jjj = Channel number within the digroup (<npc No.>).

ll = Customer number. Optional for DS0A channel (if used with a DS0A, it must be 01).

- If command is denied, find the reason for denial and perform corrective action to obtain command completion (*Command Denials* has explanations of denial codes).

2. Check completion message to verify changes.

Disconnect Multipoint Master

NOTE:
MJU ssss and up to a total of 20 additional MJUs cascaded from MJU ssss can be deleted by this command.

1. To delete MJU(s) and disconnect customers in both directions, enter:

   `SDIS:[FRM xy,SEQ ww]:MPTM <npc No.>ddd[/ff], MJU ssss[,ALL]!`

   Where:

   xy = DACS II frame number (00 through ZZ)
   ww = Command sequence number (00 through 49)

   <npc No.> = NPC number of multipoint master for the circuit, either extended (for example, [0]001) or hierarchical (for example, 01101)

   ddd = Channel number on multipoint master.

   ff = Customer number on multipoint master.

   ssss = Identification number (1 through 9999) of MJU to be deleted. If multiple MJUs are to be deleted, MJU ssss identifies the MJU at which to start the deletion.

   ALL = Optional, to delete cascaded MJUs (up to 20). If the ALL keyword is omitted, only MJU ssss will be deleted provided no branches are connected to that MJU.

   - If command is denied, find the reason for denial and perform corrective action to obtain command completion (*Command Denials* has explanations of denial codes).

2. Check completion message to verify changes.

Re-Direct Cross-Connections

Re-Direct DS0 Signals

The DS0 "roll" capability allows cross-connected DS0 signals to be redirected onto other (unmapped) DS0 channels with minimal service interruption. Of the three steps in the *roll* process (bridge, roll, and cut), minimum service interrupts only occur during the *roll* step. The DS0 signal being redirected can be part of a circuit of any type. The following four types of cross-connections can be redirected:

- Two point (one-way, two-way)
- Broadcast
- DMB (BBL and BRD legs)
- Subrate
- Virtual

NOTE:
The ROLL procedure will re-direct ALL cross-connections associated with the DS0 signal being rolled.

NOTE:
The ROLL command enables you to redirect one DS0 or a range of contiguous mapped DS0s within a DS1 signal.

NOTE:
Circuits under test/testports cannot be re-directed.

The following procedure is for redirecting DS0 signals.

1. Bridge the DS0 signals using the command:

   SW::BCAST,OLD <npc No.1>ddd[-eee],NEW <npc No.2>jjj[-kkk],[INCL]!

   Where:

<npc No.1>	=	Old NPC number. Can be either extended (for example, [0]001) or hierarchical (for example, 01101).
ddd, jjj	=	Channel numbers for the beginning of a channel range.
eee, kkk	=	Optional, channel numbers for the end of a channel range.

<npc No.2> = New NPC number. (See <npc No.1>.)
INCL = Optional, used to force bridging of RDC or CUS channels

2. Redirect the DS0 signal using the command:

```
SW::ROLL,OLD <npc No.1>ddd[-eee],NEW <npc
No.2>jjj[-kkk]\
[,INCL][,FRC][,OOS]!
```

Where:

<npc No.1> = Old NPC number. Can be either extended (for example, [0]001) or hierarchical (for example, 01101).
ddd, jjj = Channel numbers for the beginning of a channel range.
eee, kkk = Optional, channel numbers for the end of a channel range.
<npc No.2> = New NPC number. (See <npc No.1>.)
INCL = Optional, used to force roll of RDC or CUS channels (required for subrate).
FRC = Optional, used to force a roll **TO** an NPC which is in CGA.
OOS = Optional, used to force a roll **FROM** an NPC which is OOS.

NOTE:
The size of the range on the OLD and NEW NPC must match, but the starting channel numbers do not have to be identical. A range can not break up the channels in a BCON or virtual circuit (i.e., all the channels of a BCON leg must be within the channel range of the ROLL command).

NOTE:
If the OLD NPC contains a 24-channel cross-connect with the AIS option, the ROLL command must have a 24-channel range.

3. Disconnect the bridged circuits using the following command:

   NOTE:
   The *disconnect* step may also be referred to as *cut*.

   ```
   SW::DISC <npc No.1>ddd[-eee][,OOS]!
   ```

   Where:

<npc No.1>	=	Old NPC number. Can be either extended (for example, [0]001) or hierarchical (for example, 01101).
ddd	=	Channel numbers for the beginning of channel range.
eee	=	Optional, channel numbers for the end of channel range.
OOS	=	Optional, used to disconnect an NPC that is OOS.

4. Verify that the redirection of DS0 signals has been successful using the following commands:

   ```
   UTL::QRY,ROLL,DS0,{NPC <npc No.1>[-<range>] | ALL
   [,UNIT [q]q]}!
   UTL::QRY,CMAP!
   ```

Re-Direct DS1 Signals

The DS1 *roll* capability allows for redirection of all channels from an incoming facility from one DS1 port to another. The following two types of DS1 signals can be redirected:

- Channelized DS1
- Clear DS1

Each channel within a channelized DS1 can be of the following circuit types:

- Two-point (one-way or two-way)
- Virtual conference
- Broadcast circuit
- DMB leg
- Subrate channel

A clear DS1 can be of the following circuit types:

- Two-point (one-way or two-way)
- Broadcast circuit

NOTE:
The ROLL command enables one DS0 or a range of contiguous mapped DS0s within a DS1 signal to be re-directed.

NOTE:
Circuits under test/testports cannot be re-directed.

Network Element

The following procedure is for redirecting DS1 signals to a network element:

1. Bridge the DS1 signals using the command:

```
SW::BCAST,OLD <npc No.1>,NEW <npc No.2>,[INCL]!
```

Where:

<npc No.1> = Old NPC number. Can be either extended (for example, [0]001) or hierarchical (for example, 01101).

<npc No.2> = New NPC number. (See <npc No.1>.)

INCL = Optional, used to force bridging of RDC or CUS channels.

2. Redirect the DS1 signal using the command:

```
SW::ROLL,OLD <npc No.1>,NEW <npc No.2>\
[,TWAY][,INCL][,FRC][,OOS]!
```

Where:

<npc No.1> = Old NPC number. Can be either extended (for example, [0]001) or hierarchical (for example, 01101).

<npc No.2> = New NPC number. (See <npc No.1>.)

TWAY = Optional, used for a two-way roll (bridge and roll combined).

INCL = Optional, used to force roll of RDC or CUS channels.

FRC = Optional, used to force a roll **TO** an NPC which is in CGA.

OOS = Optional, used to force a roll **FROM** an NPC which is OOS.

3. Remove the bridged circuits using the following command:

   NOTE:
   The *disconnect* step may also be referred to as *cut*.

   ```
   SW::DISC <npc No.1>[,OOS]!
   ```

   Where:

<npc No.1>	=	Old NPC number. Can be either extended (for example, [0]001) or hierarchical (for example, 01101).
OOS	=	Optional, used to disconnect an NPC that is OOS.

4. Verify that the redirection of DS1 signals has been successful using the following commands:

   ```
   UTL::QRY,ROLL,DS1,{NPC <npc No.1>[-<range>] | ALL
   [,UNIT [q]q]}!
   UTL::QRY,CMAP!
   ```

Non-Network Element

If a spare facility is not available to perform a coordinated roll with another network element, you can redirect an entire traffic carrying DS1 signal from an NPC on one digroup card to an NPC on another digroup card using the DSX-1 patch panel. This capability allows replacement or upgrade of a service carrying digroup card with minimal service interruption.

The following procedure is for redirecting a DS1 signal using the DSX-1 patch panel.

1. Patch the bridging repeater from the incoming facility monitor jack to <npc No.2>.

2. Provision the alternate NPC using the following commands:

   ```
   COPY::NPC <npc No.1>,TO <npc No.2>[-<range>]!
   RST::NPC <npc No.2>[-<range>]!
   ```

   Where:

<npc No.1>	=	Source NPC number. Can be either extended (for example, [0]001) or hierarchical (for example, 01101).
<npc No.2>	=	Destination NPC number. (See <npc No.1>.)
<range>	=	Optional, NPC range. (See <npc No.1>.)

3. Redirect the DS1 signal using the following command:

   SW::ROLL,OLD <npc No.1>,NEW <npc No.2>
   [,TWAY][,INCL][,FRC][,OOS]!

   Where:

<npc No.1>	=	Old NPC number. Can be either extended (for example, [0]001) or hierarchical (for example, 01101).
<npc No.2>	=	New NPC number. (See <npc No.1>.)
TWAY	=	Optional, used for two-way roll (bridge and roll combined).
INCL	=	Optional, used to force roll of RDC or CUS channels.
FRC	=	Optional, used to force roll **TO** an NPC that is in CGA.
OOS	=	Optional, used to force roll **FROM** an NPC that is OOS.

4. Patch <npc No.2> XMIT to facility input.
5. Remove <npc No.1> from service so it’s digroup card can be removed without alarming using the following command:

   RMV::NPC <npc No.1>[-<range>][,SIDE s][,INCL]!

Where:

<npc No.1>	=	Old NPC number. Can be either extended (for example, [0]001) or hierarchical (for example, 01101).
<range>	=	Optional, NPC range. (See <npc No.1>.)
SIDE s	=	Optional, side of duplicated DSPU circuit to be removed; s = 0 or 1.
INCL	=	Optional, used to remove RDC or CUS channels (required for subrate).

6. Insert terminator plug into <npc No.1> facility OUT jack.
7. Replace the digroup card and remove the terminator plug from <npc No.1> jack.

8. Restore <npc No.1> to service using the following command:

```
RST::NPC <npc No.1>[-<range>][,SIDE s]!
```

Where:

<npc No.1> = Old NPC number. Can be either extended (for example, [0]001) or hierarchical (for example, 01101).

<range> = Optional, NPC range. (See <npc No.1>.)

SIDE s = Optional, side of duplicated DSPU circuit to be restored; s = 0 or 1.

9. Redirect service back to the original NPC using the following command:

```
SW::ROLL,OLD <npc No.2>,NEW <npc No.1>\
[,TWAY][,INCL][,FRC][,OOS]!
```

Where:

<npc No.2> = Old NPC number. Can be either extended (for example, [0]001) or hierarchical (for example, 01101).

<npc No.1> = New NPC number. (See <npc No.2>.)

TWAY = Optional, used for two-way roll (bridge and roll combined).

INCL = Optional, used to force roll of RDC or CUS channels.

FRC = Optional, used to force roll **TO** an NPC that is in CGA.

OOS = Optional, used to force roll **FROM** an NPC that is OOS.

10. Disconnect <npc No.2> using the following command:

```
SW::DISC <npc No.2>[,OOS]!
```

Where:

<npc No.2> = NPC number. Can be either extended (for example, [0]001) or hierarchical (for example, 01101).

OOS = Optional, used to disconnect an NPC that is OOS.

11. Remove <npc No.2> from service using the following command:

    ```
    RMV::NPC <npc No.2>[-<range>][,SIDE s][,INCL]!
    ```

    Where:

<npc No.2>	=	NPC number. Can be either extended (for example, [0]001) or hierarchical (for example, 01101).
<range>	=	Optional, NPC range. (See <npc No.2>.)
SIDE s	=	Optional, side of duplicated DSPU circuit to be removed; s = 0 or 1.
INCL	=	Optional, used to remove RDC or CUS channels (required for subrate).

12. Remove the bridging repeater.

Administration

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Administrator Functions

Add/Delete User

Overview: This procedure contains the commands for the frame administration tasks of adding or deleting users. Command execution priority levels for the user are established during link provisioning. Generally, priority level 1 commands are processed before level 2 commands, and level 2 commands, before level 3. However, if lower priority commands such as queries are received from a user while a higher priority command which requires more processing (for example, DGN SMEM) is underway, the easily completed commands will be executed first. Until set otherwise, all user commands are processed as level 3 by default, and all system administrator commands are processed as level 1. Prioritizing also allows excluding commands from the user. Screening allows blocking groups of messages or including messages associated with other links.

NOTE:
You must be logged in as frame administrator (user DAX) to perform these tasks.

NOTE:
After a user is added to the data base, the user can log in on any designated in-service link.

1. Which system administration activity are you going to perform?
   - If **ADD NEW USER**, then continue with Step **2.**
   - If **DELETE USER/LINK**, then proceed to Step **7.**

2. Note the following considerations concerning the assignment of initial user passwords. A password must have 6 characters: 2 must be alphabetic and 1 must be a number (except for temporary password for new user, any special character can be used instead of a number).

3. Enter the appropriate command to add the user:

   Asynchronous Link:

   To add a new user on an asynchronous link, enter:

   `ADD:[FRM xy,SEQ ww]:USER <user id>,NEW!`

   Where: <user id> = User identification of 2 to 8 alphabetic characters.

   When **`PASSWD`** prompt is received, enter a temporary password. Reenter as instructed; the password will not be echoed.

   Synchronous Link:

   To add a new user on a synchronous link, enter:

   `ADD:[FRM xy,SEQ ww]:USER <user id>,PASSWD <pswd>,NEW!`

   Where: <pswd> = Temporary password for user.

4. Familiarize yourself with the command groupings and RMON option per Table 7-1 and with the output message screening options (1 through 5) per Table 7-2. Option 2 is the default setting.
   - If the output screening options need to be changed for the link, continue with Step **5**.
   - If the output screening options do not need to be changed, check the output message to verify that the correct information was entered. Notify the user that he/she can now log in and change the temporary password to a personal one. You have completed the procedure to add a user.
   - If the command is denied, find the reason for the denial and perform corrective action to obtain command completion (*Command Denials* has explanations of denial codes).

Table 7-1. Command Groupings

a (Circuit PROV)	b (EQPT PROV)	c (MTCE)	d (Test Access)	e (Monitor)	f (Common)
XCONs	GRTH	RMV	TTST	AUD	CHG
XCNTs	DGRTH	RST	STST	UTL	ED
XDISs	ADD	DGN	—	—	EXC
SW	DLT	CFR	—	—	ACT
CONF	—	—	—	—	ADD
SECH	—	—	—	—	DLT
SDCH	—	—	—	—	—
SCON	—	—	—	—	—
SCNT	—	—	—	—	—
SDIS	—	—	—	—	—

X represents cross-connect types — TCON, OCON, BCON.

Restricted Maintenance (RMON Option)

RST::SMEM,CLR!
UTL::BOOT,FRAME!
UTL::BMTR,FROM SMEM,TO PMEM[,EXCT]!

Table 7-2. Screening Options

Screening Option (n)	Definition
1	Only the responses to inputs entered on that particular link and by that user are output.
2	The responses to inputs entered on that particular link and by that user are output as well as all autonomous messages (default).
3	Responses to input messages on that particular link and by that user are output as well as responses from specified groups of action verbs from other links. The selection of message groups is made using the GR (a, b, c, d, e, f) field in the screening command.
4	Responses to input messages on that particular link and by that user, responses from specified groups of action verbs from other links (see above), and autonomous messages are output.
5	All responses to all input messages on all links are output as well as all autonomous messages.

5. Enter the following command:

```
CHG:[FRM xy,SEQ ww]:{USER <user id>|LINK j[mm]},
SCR n[,GR(a,b,c,d,e,f)][,{MCOFF|MCON}]!
```

Where:

USER/LINK = Selects either user or link identification. Include <user id> (2 to 8 alphabetic characters) for USER option or include link No. (1 through 6) and virtual circuit (01 through 16) for synchronous link.

n = Screening option 1 through 5 per Table 7-2.

GR = Optional; field used with SCR 3 or 4 to specify the command groups; enter a "1" for each group in Table 7-1 to be enabled and a "0" for each group to be disabled.

MCOFF|MCON = Optional to disable (MCOFF) component command completion messages or to enable (MCON) completion outputs again. DNY messages cannot be disabled.

- If the command is denied, find the reason for the denial and perform corrective action to obtain command completion (*Command Denials* has explanations of denial codes).

6. Check the output message to verify that the correct information was entered. Notify the user that he/she can now log in and change the temporary password to a personal one. You have completed the procedure to add a user.

7. From office records, determine the user identification for the user to be deleted. If needed, enter the following to determine if the user owns any macros and/or maps:

   `UTL::QRY,{MACRO|MAP},ATTR[,{USER <user id>|ALL}]!`

   Where: <user id> = User identification (2 to 8 alphabetic characters).

   NOTE:
   Any macro or map files that the user has must also be removed before the user can be deleted from the system (see *Delete Alternate Map From System* and *Delete Macro From System*).

8. Enter **`DLT:[FRM xy,SEQ ww]:USER <user id>!`** to prevent user identified by **`id`** (2 to 8 alphabetic characters) from having login access to the frame. Check the output message to verify that the correct information was entered.

   - If the command is denied, find the reason for the denial and perform corrective action to obtain command completion (*Command Denials* has explanations of denial codes).

Recover User DAX Password Recovery Procedure

Perform the following procedure to recover the original (default) user DAX password:

1. Locate and obtain the DACS II ‘‘PASSWORD RECOVERY CARD (Version 1)’’.

   NOTE:
   This card is a unique 1.8 Mb flash card that contains just enough information to move the default password to RAM memory.

2. If SMEM is in service—
   Enter the following command:

   RMV::SMEM

3. At the frame—
   Place the ESD grounding strap on your wrist and physically remove the SMEM card from the CPU2. Figure 7-1 shows the memory card locations on the CPU2 circuit pack.

4. Insert the PASSWORD RECOVERY CARD into the SMEM slot.

5. At the DACS II terminal—
   Enter the following command to move the default password into the frame’s RAM memory.

   UTL::RCY,PASSWD!

6. Enter the following command

   RMV::SMEM

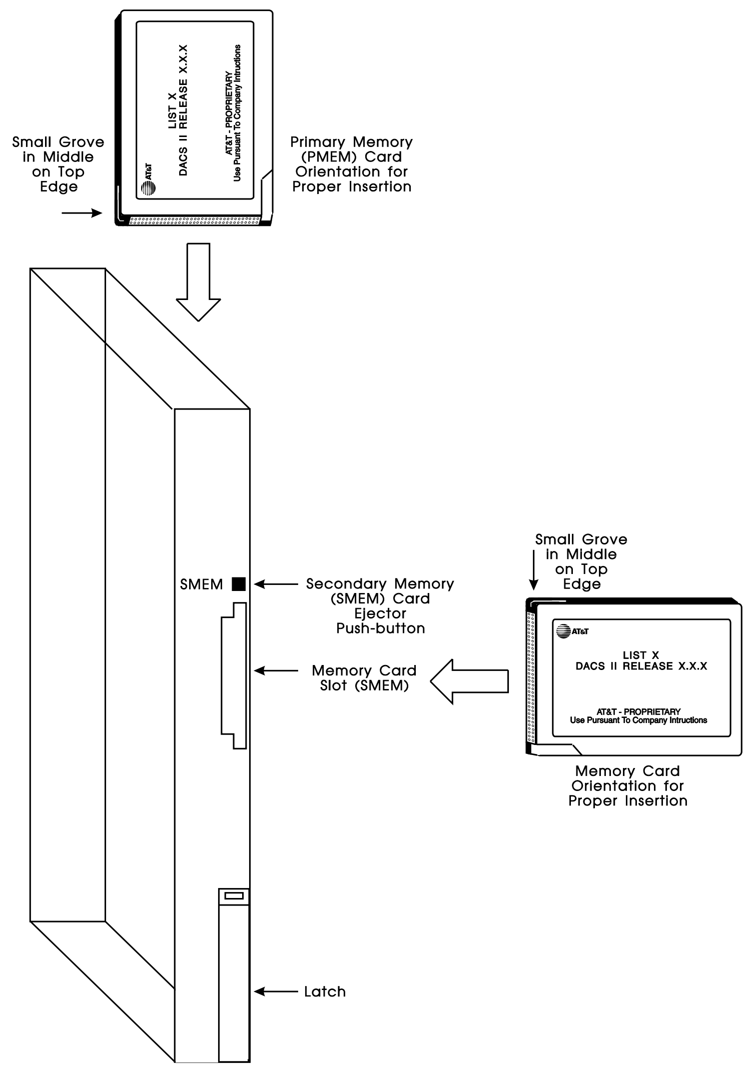

Figure 7-1. Memory Card Locations on CPU2

7. At the frame—
   After the command completes successfully—
   Place the ESD grounding strap on your wrist and remove the PASSWORD RECOVERY CARD.

8. Reinsert the SMEM card (removed earlier) into the SMEM slot and enter the following command:

   RST::SMEM,BKGRND

9. Return the PASSWORD RECOVERY CARD to it's proper location.
10. At this point—
    You can change the default password to the desired password or leave the default in and have the administrator (or responsible person) change it.

Reinstate a User That Has Forgotten the Password

To reinstate a user that has forgotten the password, do the following:

1. Assign a temporary password by entering the appropriate command:

   Asynchronous Links (Snider Protocol):

   `ADD:[FRM xy,SEQ ww]:USER <user id>!`.

   Message prompts will instruct you to enter the temporary password.

   Synchronous Links (X.25 Protocol):

   `ADD:[FRM xy,SEQ ww]:USER <user id>[,PASSWD <pswd>]!`.

   Where: <pswd> = Only for synchronous links, to enter temporary password in the command. Passwords must have 6 characters: 2 are alphabetic and 1 is a number or special character.

   <user id> = User Identification (2 to 8 alphabetic characters).

   - If the command is denied, find the reason for the denial and perform corrective action to obtain command completion (*Command Denials* has explanations of denial codes).

2. After assigning the temporary password, the user can assign his/her personal password.

Log Off Other User

NOTE:
To forcibly log off another user, you must be logged in as the frame administrator and logged in on a different link.

1. Enter the following command to log off the system:

   `LOGOFF:[FRM xy,SEQ ww]:{USER <id>|LINK <link No.>}!`

Where: xy	=	DACS II frame number (00 through ZZ).
ww	=	Command sequence number (00 through 49).
USER/LINK	=	Selects whether user ID or link number will be specified. Only the frame administrator can use the LINK option to log off a user from another link.
<user id>	=	User identification (2 to 8 alphabetic characters)
<link No.>	=	Physical link number (1 through 6) and virtual circuit (mm = 01 through 16) for synchronous link.

   - If the command is denied, find the reason for the denial and perform corrective action to obtain command completion (*Command Denials* has explanations of denial codes).

NOTE:
When trying to log off other users, DACS II does security level checking first. If you are not logged in as frame administrator, you will get a "D7 cannot execute priviledged command" denial message.

Change Input Command Priority and Restricted Maintenance Option

Overview: This procedure describes how to change input command priorities for the user or the link. Commands from a single active link go into a queue and are executed in the order issued. Commands from different links go into separate waiting queues, and the *input command priorities* from these links control the order of execution: priority level 1 commands first, then priority 2, then priority 3. Commands with the same priority from different links are executed alternately. To prevent long waits for all lower priority commands, those that have been waiting in the queue for 2 minutes will be executed while higher priority commands that require more processing, like diagnose SMEM, are underway. Until set otherwise, the system processes all user commands as level 3 by default, and all system administrator commands as level 1. By setting the priority of the command groups on all LINKS to zero (excluded), the administrator can establish the use of the login mode because each user will have to log in to access the command set defined for that USER.

When the *restricted maintenance* option is enabled, a link or a specified user can execute the commands listed under *Restricted Maintenance* in Table 7-3.

1. To see the present parameters for any or all links or users, enter the following command and read the **LEV** numbers and the restricted maintenance option from the output:

   UTL::QRY,SCR,{LINK j[mm][-p[nn]]|USER <user id>|LINKS|USERS}!.

   — To read the priority level (LEV) for different commands, relate the level — 0 (excluded group), 1 (lowest), 3 (highest), given after LEV word in the output message to the command groups per Table 7-3.

   — The restricted maintenance option (RMON/RMOFF) determines whether the user has permission to use commands in that category.

2. Enter the following command to change input command priorities and/or the restricted maintenance option:

   ADD:[FRM xy,SEQ ww]:{USER <user id>|LINK j[mm][,INCL]},
   [LEV(a,b,c,d,e,f)][,{RMON|RMOFF}]!

Where:

xy	=	DACS II frame number (00 through ZZ).
ww	=	Command sequence number (00 through 49).
USER|LINK	=	Selects whether user or link identification will be used in command.
<user id>	=	User identification (2 to 8 alphabetic characters).
j[mm]	=	Physical link number (1 through 6) and virtual circuit (mm = 01 through 16) for synchronous link (links 5 and 6).
p[nn]	=	Range of links or synchronous virtual circuits.
INCL	=	Optional, for links 5 and 6. Specifies that all provisioning data (including RLK) of the command is applied to all virtual circuits; an individual virtual circuit (mm) cannot be entered when INCL is used.
LEV Field	=	To change the priority of the six command groupings shown in Table 7-3; enter priority level 0 (excluded), 1 (highest), 2, or 3 (lowest) for all command groups in Table 7-3.
{RMON|RMOFF}	=	Restricted Maintenance Option **RMON** allows the use of the commands listed under *Restricted Maintenance* in Table 7-3. **RMOFF** disallows the use of these commands.

- If the command is denied, find the reason for the denial and perform corrective action to obtain command completion (*Command Denials* has explanations of denial codes).

Table 7-3. Command Groupings

a (Circuit PROV)	b (EQPT PROV)	c (MTCE)	d (Test Access)	e (Monitor)	f (Common)
XCONs	GRTH	RMV	TTST	AUD	CHG
XCNTs	DGRTH	RST	STST	UTL	ED
XDISs	ADD	DGN	—	—	EXC
SW	DLT	CFR	—	—	ACT
CONF	—	—	—	—	ADD
SECH	—	—	—	—	DLT
SDCH	—	—	—	—	—
SCON	—	—	—	—	—
SCNT	—	—	—	—	—
SDIS	—	—	—	—	—

X represents cross-connect types — TCON, OCON, BCON.

Restricted Maintenance (RMON Option)

RST::SMEM,CLR!
UTL::BOOT,FRAME!
UTL::BMTR,FROM SMEM,TO PMEM[,EXCT]!

Change Message Language

Overview: DACS II Snider and X.25 links will operate in either PDS or MML message languages. Unless previously changed, the message language for the links and users will default to what is defined in the software load. If you want to use a different message language during your login session, you can change the message language for your user id. For example, if the link defaults to PDS but you work in MML, the link will switch to MML when you log in.

This procedure describes how to change the following:

— The message language of the link

— The message language for a user.

1. To see the present parameters for any or all links or users, enter the following command and read the **LANG** type from the output:

   UTL::QRY,SCR,{LINK j[mm][-p[nn]]|USER <user id>|LINKS|USERS}!.

2. Enter one of the following commands for the appropriate language change:

   Change Message Language of the Link:

   ADD:[FRM xy,SEQ ww]:{LINK j[mm][,INCL]},LANG {P|M|T}!

   Change Message Language for a Specific User:

   ADD:[FRM xy,SEQ ww]:{USER <user id>|ALL},LANG {P|M|T}!

   - If the command is denied, find the reason for the denial and perform corrective action to obtain command completion (*Command Denials* has explanations of denial codes).

xy	=	DACS II frame number (00 through ZZ).
ww	=	Command sequence number (00 through 49).
<user id>	=	User identification (2 to 8 alphabetic characters).
j[mm]	=	Physical link number (1 through 6) and virtual circuit (mm = 01 through 16) for synchronous link (links 5 and 6).
INCL	=	Optional, for links 5 and 6. Specifies that all provisioning data (including RLK) of the command is applied to all virtual circuits; an individual virtual circuit (mm) cannot be entered when INCL is used.
p[nn]	=	Range of links or synchronous virtual circuits.
LANG {P|M|T}	=	To change link language as follows: P for PDS, M for MML, or T for TABS (Telemetry Async Block Serial)

Change NPC Addressing

Overview: DACS II Snider and X.25 links will operate in one of the following NPC addressing schemes:

— **Extended**. This scheme uses 3 digits to number the NPCs consecutively (for example, **041**). It can only be used on systems of three bays or less.

— **4-Digit Extended**. This scheme uses 4 digits to number the NPCs consecutively (for example, **1041**). The extra digit allows the system to accommodate additional bays.

— **Hierarchical**. This scheme uses a 5-digit number (**uvmnp**). It assigns a number to each NPC according to the unit number (**uv**), module or group number (**m**), and the NPC number within the module (**np**).

Unless previously changed, NPC addressing for the links and users will default to what is defined in the software load. If you want to use a different addressing scheme during your login session, you can change the scheme for your user id. For example, if the link defaults to *extended* but you work in *hierarchical*, the link will switch to hierarchical when you log in. Ensure that the link addressing scheme is allowable as defined in the configuration file.

This procedure describes how to change the following:

— The NPC addressing of the link

— The NPC addressing for a user.

1. To see the present parameters for any or all links or users, enter the following command and read the **NPCAD** type from the output:

   UTL::QRY,SCR,{LINK j[mm][-p[nn]]|USER <user id>|LINKS|USERS}!.

2. Enter one of the following commands for the appropriate NPC addressing change:

   Change NPC Addressing of the Link:

   ADD:[FRM xy,SEQ ww]:{LINK j[mm][,INCL]|ALL},
   NPCAD {E|X|H}!

   Change NPC Addressing for a Specific User:

   ADD:[FRM xy,SEQ ww]:{USER <user id>|ALL},
   NPCAD {E|X|H}!

   Where:

   xy = DACS II frame number (00 through ZZ).

   ww = Command sequence number (00 through 49).

   ALL = Optional, for links 5 and 6. Specifies that the NPCAD option applies to all users, links and virtual circuits.

INCL = Optional, for links 5 and 6. Specifies that all provisioning data (including RLK) of the command is applied to all virtual circuits; an individual virtual circuit (mm) cannot be entered when INCL is used.

<user id> = User identification (2 to 8 alphabetic characters).

j[mm] = Physical link number (1 through 6) and virtual circuit (mm = 01 through 16) for synchronous link (links 5 and 6).

p[nn] = Range of links or synchronous virtual circuits.

NPCAD {E|X|H} = NPC addressing scheme, either E (default) for extended (for example, 001), X for 4-digit extended, or H for hierarchical (for example, 01101).

- If the command is denied, find the reason for the denial and perform corrective action to obtain command completion (*Command Denials* has explanations of denial codes).

Change Output Message Screening

Overview: Output message screening allows you to block groups of messages or include messages associated with other links. Any user can change his/her own message screening.

Unless previously changed, output message screening for the links and users will default to what is defined in the software load. If you want to use a different screening option during your login session, you can change the option for your user id. For example, if the link defaults to option 2 but your user id is set to option 5, the link will switch to option 5 when you log in.

This procedure describes how to change the following:

— The output message screen option of the link

— The output message screen option for a user.

1. To see the present parameters for any or all links or users, enter the following command and read the **SCR** field from the output:

   UTL::QRY,SCR,{LINK j[mm][-p[nn]]|USER <user id>|LINKS|USERS}!.

2. Enter one of the following commands for the appropriate output message screening option change:

   Change Message Screening Option of the Link:

   CHG:[FRM xy,SEQ ww]:LINK j[mm],
   SCR n[,GR(a,b,c,d,e,f)][,{MCOFF|MCON}]!

Change Message Screening Option for a Specific User:

```
CHG:[FRM xy,SEQ ww]:USER <user id>,
SCR n[,GR(a,b,c,d,e,f)][,{MCOFF|MCON}]!
```

Where:

xy	=	DACS II frame number (00 through ZZ).
ww	=	Command sequence number (00 through 49).
<user id>	=	User identification (2 to 8 alphabetic characters).
j[mm]	=	Physical link number (1 through 6) and virtual circuit (mm = 01 through 16) for synchronous link (links 5 and 6).
n	=	Screening option 1 through 5 from Table 7-4.
GR	=	Optional field used with SCR 3 or 4 to specify the command groups; enter a **1** for each group in Table 7-5 to be enabled and a **0** for each group to be disabled.
MCOFF|MCON	=	Optional, to disable (MCOFF) intermediate completion outputs of macro commands or to enable completion outputs again (MCON - default for users). DNY messages are not disabled.

- If the command is denied, find the reason for the denial and perform corrective action to obtain command completion (*Command Denials* has explanations of denial codes).

Table 7-4. Screening Options

Screening Option (n)	Definition
1	Only the responses to inputs entered on that particular link and by that user are output.
2	The responses to inputs entered on that particular link and by that user are output as well as all autonomous messages (default).
3	Responses to input messages on that particular link and by that user are output as well as responses from specified groups of action verbs from other links. The selection of message groups is made using the GR (a, b, c, d, e, f) field in the screening command.
4	Responses to input messages on that particular link and by that user, responses from specified groups of action verbs from other links (see above), and autonomous messages are output.
5	All responses to all input messages on all links are output as well as all autonomous messages.

Table 7-5. Command Groupings

a (Circuit PROV)	b (EQPT PROV)	c (MTCE)	d (Test Access)	e (Monitor)	f (Common)
XCONs	GRTH	RMV	TTST	AUD	CHG
XCNTs	DGRTH	RST	STST	UTL	ED
XDISs	ADD	DGN	—	—	EXC
SW	DLT	CFR	—	—	ACT
CONF	—	—	—	—	ADD
SECH	—	—	—	—	DLT
SDCH	—	—	—	—	—
SCON	—	—	—	—	—
SCNT	—	—	—	—	—
SDIS	—	—	—	—	—

X represents cross-connect types — TCON, OCON, BCON.

Restricted Maintenance (RMON Option)

RST::SMEM,CLR!
UTL::BOOT,FRAME!
UTL::BMTR,FROM SMEM,TO PMEM[,EXCT]!

Change User's Macro/Map Storage Space

Overview: This procedure gives the commands to check and change the user's current macro/map storage space.

1. If you want to check the current storage space assigned to user, either for macro files or alternate maps, enter:

   `UTL::QRY,{MACRO|MAP},SPACE,{USER <user id>|ALL}!`

   Where: <user id> = User identification (2 to 8 alphabetic characters).

   NOTE:
   The space for macros and alternate maps applies to all users; that is, if set at 20 percent, then no user can use over 20 percent of space.

2. To change the space allotted to all the users, enter:

   `CHG::{MACRO|MAP},SPACE nnn!`

   Where: nnn = Percentage (000 through 100) of the total storage space which is available for distribution to users.

   - If the command is denied, find the reason for the denial and perform corrective action to obtain command completion (*Command Denials* has explanations of denial codes).

Change Link Removal Permission Option

Overview: The System Administrator can give both links and a specific user id permission to remove links from service. The administrator can also inhibit both links and specific users from removing links from service. Unless previously changed, link removal permission for both links and users will default to allow link removal. If the administrator wants to either allow or inhibit a specific user's link removal permission during their login session, the permission can be changed for that user id. For example, if the link defaults to allow link removal permission but the administrator does not want a specific user to have removal permission, the link will be inhibited when the user logs in.

This procedure describes how to change the following:

— The link removal permission of the link

— The link removal permission for a user.

1. To see the present parameters for any or all links or users, enter the following command and read the **RLK** type from the output:

   UTL::QRY,SCR,{LINK j[mm][-p[nn]]|USER <user id>|LINKS|USERS}!.

2. Enter one of the following commands for the appropriate link removal permission change:

   Change Link Removal Permission of the Link:

   ADD:[FRM xy,SEQ ww]:{LINK j[mm][,INCL]},RLK {A|I}!

   Change Link Removal Permission for a Specific User:

   ADD:[FRM xy,SEQ ww]:{USER <user id>|ALL},RLK {A|I}!

   - If the command is denied, find the reason for the denial and perform corrective action to obtain command completion (*Command Denials* has explanations of denial codes).

Where: xy	=	DACS II frame number (00 through ZZ).
ww	=	Command sequence number (00 through 49).
<user id>	=	User identification (2 to 8 alphabetical characters).
j[mm]	=	Physical link number (1 through 6) and virtual circuit (mm = 01 through 16) for synchronous link (links 5 and 6).
p[nn]	=	Range of links or synchronous virtual circuits.
INCL	=	Optional, for links 5 and 6. Specifies that all provisioning data (including RLK) of the command is applied to all virtual circuits; an individual virtual circuit (mm) cannot be entered when INCL is used.
RLK {A|I}	=	To specify whether users (other than user DAX) and links (for nonlogin mode) are permitted to remove links from service. **A** is to allow and **I** is to inhibit removal.

Feature Package Upgrade

Overview: This section describes how to upgrade your current software generic to another feature package within the same generic. Follow both procedures in this section in order.

Preparation for Feature Package Upgrade

1. Verify that there are currently no alarms on the DACS II frame being upgraded by observing the status panel on the frame.

   NOTE:
   If alarms do exists, verify that the alarms are NOT equipment alarms. If equipment alarms do exist, they must be cleared before proceeding with this procedure. Facility alarms, such as CGAs, are acceptable.

2. On the DACS II frame being upgraded, verify the feature package that is currently running with the following command:

   `UTL::QRY,FPKG!`

3. Compare the features listed on the new flash card being used to upgrade the DACS II frame with the output of step 2. The new flash card must contain all of the features that are included in the package currently running, and may contain additional features.

   NOTE:
   If the new flash card does not contain all of the features currently running on the DACS II frame, do not proceed with this procedure. Contact your Account Representative for the proper feature packages.

4. If you have completed steps 1 through 3 successfully, complete the procedure in the next section, *Feature Package Upgrade Procedure.*

Feature Package Upgrade Procedure

NOTE:
Before upgrading the feature package within the same generic, complete the procedure in the previous section, *Preparation for Feature Package Upgrade.*

1. Login as a user with Restricted Maintenance (RMON) privileges, such as User DAX.

2. Place the DACS II frame into maintenance condition by entering the following command:

   RST::MC,MCOND!

3. If a flash card is currently installed in the SMEM slot of the TM778 CPU2 circuit pack, remove the flash card from service be entering the following command:

   RMV::SMEM!

4. Physically remove the SMEM card from the slot and install the new flash card with the new features into the SMEM slot.

5. Restore the new flash card into service by entering the following command:

   RST::SMEM!

6. Transfer the new executables to the PMEM by entering the following command:

   UTL::BMTR,FROM SMEM,TO PMEM,EXCT!

   Answer YES when prompted. Wait for the command to complete before continuing.

   NOTE:
   The transfer will take approximately 5 minutes to complete. If the command is denied, find the reason for the denial and perform corrective action to obtain command completion. (*Command Denials* has explanations of denial codes.)

7. Verify that the executables transferred correctly by entering the following command:

   UTL::QRY,MEMSTAT!

   NOTE:
   The FPKG values in the output of the MEMSTAT command will be identical for both the PMEM and SMEM.

8. Remove the flash card from service by entering the following command:

   RMV::SMEM!

9. Physically remove the new flash card from the SMEM slot and install the old flash card into the SMEM slot.

10. Restore the old flash card into service by entering the following command: **RST::SMEM!**

11. Transfer the new executables onto the old flash card by entering the following command:

    `UTL::BMTR,FROM PMEM,TO SMEM,EXCT!`

    NOTE:
    The transfer will begin immediately and take approximately 5 minutes to complete. If you observe an "Are you sure" response from the frame, answer NO because you are performing an incorrect transfer. Re-enter the **`UTL::BMTR`** command again, exactly as shown above.

12. Verify that the executables transferred correctly by entering the following command:

    `UTL::QRY,MEMSTAT!`

    NOTE:
    The FPKG values in the output of the **`MEMSTAT`** command will be identical for both the PMEM and SMEM.

13. On the status panel, hold the **RESET ENABLE** switch to **ON** and momentarily press the **RESET** button.

    NOTE:
    Reset may take up to 30 minutes.

    - If the system returns **`COMPLD...`** with error explanation, refer to *Trouble Identification* in Volume II.
    - If the reset stops, refer to *Trouble Identification* in Volume II.

14. Verify that the upgrade was successful by entering the following command:

    `UTL::QRY,FPKG!`

15. You have successfully completed the feature package upgrade procedure.

Log-On/Log-Off

Log In to the System

Overview: This section provides the commands and explanation to enable a user to log on the frame and to log off the frame after a work session.

Each DACS II link can operate in two modes:

— **Login Security Mode.** This mode requires you to log in to the system with a *user id* and *passwd* before entering a specified set of commands. The frame administrator controls the specific commands that you can enter before you initially log on the system. He/she also sets the priority the system uses to execute your commands (or command groups). The administrator also sets other login characteristics such as output message screening, link language, and NPC numbering scheme. You will also be given a temporary password to use on your initial login. You should change your temporary password to a personal password (using the criteria below) during the initial login session.

— **Nonlogin Mode.** This mode allows anyone to use a specified command set assigned to the link *without logging in*. The link is automatically in this mode when not in the *Login Security Mode*. The frame administrator specifies the command set that can be used when operating in this mode.

If this is your initial login, review the following information about selecting a personal password that you can easily remember:

— A password must contain six to eight characters, at least two of which must be letters and one a number. Think of one that is meaningful to you and can be remembered without writing it down.

— To be effective, passwords should not be shared.

— You can change your passwords when desired. If you forget your password, the frame administrator can enable you to log on by assigning you another temporary password.

1. Enter the following command to log in to the system:

   LOGIN:[FRM xy,SEQ ww]:USER <user id>[,PASSWD <pswd>]!

   Where: xy = DACS II frame number (00 through ZZ)
   ww = Command sequence number (00 through 49)
   <user id> = User identification (2 to 8 alphabetic characters)
   <pswd> = Required for synchronous link to enter password. For asynchronous link, the login routine will prompt you for your password.

   - If the command is denied, find the reason for the denial and perform corrective action to obtain command completion (*Command Denials* has explanations of denial codes).

2. If you want to see who is currently logged on, enter:

   UTL::QRY,LOG[,ALL]!.

   The ALL option allows the frame administrator to see all users on the frame.

Log Off the System

1. Enter the following command to log off the system:

   LOGOFF:[FRM xy,SEQ ww]:{USER <id>|LINK <link No.>}!

   Where: xy = DACS II frame number (00 through ZZ).
   ww = Command sequence number (00 through 49).
   USER/LINK = Selects whether user ID or link number will be specified. Only the frame administrator can use the LINK option to log off a user from another link.
   <user id> = User identification (2 to 8 alphabetic characters)
   <link No.> = Physical link number (1 through 6) and virtual circuit (mm = 01 through 16) for synchronous link.

   - If the command is denied, find the reason for the denial and perform corrective action to obtain command completion (*Command Denials* has explanations of denial codes).

NOTE:
To forcibly log off another user, you must be logged in as the frame administrator and logged in on a different link. When trying to log off other users, DACS II does security level checking first. If you are not logged in as frame administrator, you will get a "D7 cannot execute priviledged command" denial message.

Change Password

Overview: This procedure shows how users can change their passwords. When changing your password over a synchronous link, you can enter both the old and new passwords in the command; whereas, when changing your password over an asynchronous link, you must initiate a change routine and enter the old and new passwords when prompted.

1. After determining the type of link you are connected to, enter one of the following commands to change the password on that link:

   Synchronous Link (X.25 Protocol):

   If you are on a synchronous link (X.25 protocol), enter:

   `CHG:[FRM xy,SEQ ww]:`
   `PASSWD,OLD <old pswd>,NEW <new pswd>!`

   giving the old and new passwords in the command.

   Asynchronous Link (Snider Protocol):

   If you are on an asynchronous link (Snider protocol), enter:

   `CHG:[FRM xy,SEQ ww]:PASSWD!`

   and respond to system prompts to enter old and new passwords.

2. If the command does not complete (**`CHG LGN ...COMPL`** message received), find the reason for the denial and perform corrective action to obtain command completion (*Command Denials* has explanations of denial codes).

Alternate Maps

the alternate map feature provides a way to quickly change customer cross-connections on the DACS II. the alternate map itself is a software file containing 2-way, 2-point cross-connections – TCONS only (do not use OCONS, BCONS, and TCNTS). When you activate an alternate map, the system simultaneously implements all the cross-connections defined by the map. This saves typing and speeds up the connections for quicker service switching.

The PIC option of the ED CRET MAP command allows you to make an alternate map by "taking a picture" of a defined group or set of the cross-connections that are currently active on the frame without entering each individual cross-connect command into the map.

Create Alternate Map

Overview: This procedure demonstrates how to create an alternate map.

NOTE:
Only users with USER IDs who access the system via a login can use the alternate map feature.

1. If you want to check link message screening to determine whether it needs to be changed temporarily to reduce interruption during the session, enter the following command and read the screening (SCR) option:

   ```
   UTL::QRY,SCR,{LINK j[mm]|USER <user id>}!
   ```

   USER|LINK = Selects whether user or link identification will be used in command

   <user id> = User identification (2 to 8 alphabetic characters)

   j[mm] = Physical link number (1 through 6) and virtual circuit (mm = 01 through 16) for synchronous link.

   - If you want to change output screening, see *Change Output Message Screening* and enter the CHG SCR command.

2. Decide on a name for the alternate map. It can have up to seven alphanumeric characters, the first of which must be a letter; all letters must be capitalized.

3. Enter the following command to begin the alternate map session:

   ED::MAP <name>!

   Where: <name> = Name of new alternate map, consisting of up to seven alphanumeric characters starting with a letter.

   - If the command is denied, find the reason for the denial and perform corrective action to obtain command completion (*Command Denials* has explanations of denial codes).

4. Enter TCON commands. You will receive an OK acknowledgment for each allowable entry. See Figure 7-2 for an example of map construction.

   - If NOT ALLOWED is received, the command is not allowed as an entry in an alternate map.

NOTE:
If you recognize an input error, you can delete the line (explained later) and enter another TCON. Similarly, if an error is indicated by the condition code after you end the session, you can open the file for editing and then delete and add TCONs.

NOTE:
When editing an existing map, you will not see previous entries.

```
ED::MAP NEWMAP!
TCON::FROM 00101,TO 00201,TRSP!
TCON::FROM 00301,TO 00401,TRSP!
TCON::FROM 00501-24,TO 00601-24,TRSP!
END!
```

Figure 7-2. Example of Alternate Map

5. To terminate the create session, enter **`END`**. To abort the creation of the map, enter **`QTEND`**.
   - If you do not receive a COND 00 response to the END command, study the conflicting TCON messages that accompany the completion message to determine what changes are needed and refer to *Edit an Existing Alternate/Reference Map* to make changes. The terminations for those TCONs may already be involved in other connections.
   - If you want to see the contents of the alternate map, enter the appropriate command:

     For TCONs:
     `UTL::QRY,LIST,MAP <name>!`

     For NPCs:
     `UTL::QRY,NPC,MAP <name>!`.

Create Alternate Map Using the Picture Option

Overview: This procedure demonstrates how to create an alternate map using the picture option. To use the picture option, you must first create a *reference map*. This reference map identifies which of the active cross-connections on the frame are to be reproduced (pictured). These cross-connections are defined by using the ADD NPC command to list the NPCs in the reference map. After creating your reference map, create the new alternate map using the ED CRET MAP command with the PIC option.

NOTE:
Only users with USER IDs who access the system via a login can use the alternate map feature.

1. If you want to check link message screening to determine whether it needs to be changed temporarily to reduce interruption during the session, enter the following command and read the screening (SCR) option:

   `UTL::QRY,SCR,{LINK j[mm]|USER <user id>}!`

USER|LINK	=	Selects whether user or link identification will be used in command
<user id>	=	User identification (2 to 8 alphabetic characters)
j[mm]	=	Physical link number (1 through 6) and virtual circuit (mm = 01 through 16) for synchronous link.

   - If you want to change output screening, see *Change Output Message Screening* and enter the CHG SCR command.

2. Decide on a name for the reference map. It can have up to seven alphanumeric characters, the first of which must be a letter; all letters must be capitalized.

3. Enter the following command to begin the reference map creation session:

   `ED::MAP <name>!`

   Where: <name> = Name of new reference map, consisting of up to seven alphanumeric characters starting with a letter.

   - If the command is denied, find the reason for the denial and perform corrective action to obtain command completion (*Command Denials* has explanations of denial codes).

4. Enter the NPCs into the reference map using the following command:

   `ADD::NPC {<listing>|<range>}!`

   Where: <listing>|<range> = Listing is a listing of up to 10 NPCs separated by commas and the range is a continuous range of NPCs shown with a dash.

   See Figure 7-3 for an example of map construction. When ''OK'' is received, enter the next component command (if any).

   NOTE:
   If you recognize an input error, you can delete the line (explained later) and enter another ADD NPC command. Similarly, if an error is indicated by the condition code after you end the session, you can open the file for editing and then delete and add ADD NPC command.

```
ED::MAP NEWMAP!
ADD::NPC 007-012!
END!
```

Figure 7-3. Example of a Reference Map

5. To terminate the create session, enter **`END`**. To abort the creation of the reference map, enter **`QTEND`**.

   - If you do not receive a COND 00 response to the END command, study the conflicting ADD NPC commands that accompany the completion message to determine what changes are needed and refer to the ED MAP portion of this procedure to make changes. The NPC for the other side of the connection may not have been added.

6. Enter the following command to create the new alternate map from the reference map:

   `ED::CRET,MAP <new name>,PIC <refmap>!`.

   - If the command is denied, find the reason for the denial and perform corrective action to obtain command completion (*Command Denials* has explanations of denial codes).
   - If the system returns **COMPL with no conditions**, the new map contains all circuits that are currently in place in the system for the NPCs in the reference map.
   - If the system returns **COMPL with condition**, some of the circuits could not be included in the new map (for example, could be multipoint).

7. If you want to see the contents of the alternate map, enter the appropriate command:

   For TCONs:

   `UTL::QRY,LIST,MAP <name>!`

   For NPCs:

   `UTL::QRY,NPC,MAP <name>!`.

   NOTE:
   Once the new map is created, it can be changed as described in *Edit an Existing Alternate/Reference Map*. The picture feature only picks up cross-connections defined by the reference map that are currently on the frame. It does not simply copy what is in the reference map. If you want two copies (one to keep unchanged and one to modify), you will have to use the picture option twice to create two different new maps.

Edit an Existing Alternate/Reference Map

Overview: This procedure demonstrates how to edit an existing alternate map or reference map.

NOTE:
Only users with USER IDs who access the system via a login can use the alternate map feature. User DAX can edit the maps owned by other users.

NOTE:
When editing an existing map, you will not see the previous entries. To view the contents of a map, use the command **`UTL::QRY,LIST,MAP <name>!`**, where <name> is the name of the map.

1. If you want to check link message screening to determine whether it needs to be changed temporarily to reduce interruption during the session, enter the following command and read the screening (SCR) option:

   UTL::QRY,SCR,{LINK j[mm]|USER <user id>}!

   USER|LINK = Selects whether user or link identification will be used in command
   <user id> = User identification (2 to 8 alphabetic characters)
   j[mm] = Physical link number (1 through 6) and virtual circuit (mm = 01 through 16) for synchronous link.

   - If you want to change output screening, see *Change Output Message Screening* and enter the CHG SCR command.

2. Enter the following command to begin the editing session:

   ED::MAP <name>!

   Where: <name> = Name of map to be edited; the map must already exist (must have been created).

   - If the command is denied, find the reason for the denial and perform corrective action to obtain command completion (*Command Denials* has explanations of denial codes).

3. Use the following items to change the alternate map as required:

   — **Add New Cross-Connections**. Enter the complete TCON commands (which are appended to the map).

   — **Remove Cross-Connections**. Enter the following to remove TCONs from an alternate map:

   TCON::FROM <npc No.1>ddd[-eee],TO <npc No.2>jjj[-kkk],DEL!.

   Where:

   <npc No.1> = NPC number on the FROM side of connection to be deleted.
   <npc No.2> = NPC number on the TO side of connection to be deleted.
   ddd/jjj = Channel number.
   eee/kkk = Optional, last channel number in a range of channels.

   — **Add NPCs to Reference Map**. Enter the following command to add NPCs to a reference map:

   ADD::NPC {<listing>|<range>}!

— **Remove NPCs from a Reference Map**. Enter the following command to remove NPCs from a reference map:

`DLT::NPC {<listing>|<range>}!`

Where: <listing or range> = Listing is a listing of up to 10 NPCs separated by commas and the range is a continuous range of NPCs shown with a dash.

NOTE:
Only NPCs that were explicitly added via the ADD NPC can be deleted via the DLT NPC. If the subject map is currently active on the frame, the changes will not be implemented in the network until the map is activated again.

4. To terminate the edit session, either enter **`END`** to write the changes into the map or enter **`QTEND`** to disregard all the changes and quit the edit mode. The QTEND occurs automatically if the link fails or if you are forced off the system.

   - If you do not receive a COND 00 response to the END command, study the conflicting TCON messages that accompany the completion message to determine what changes are needed. The terminations for those TCONs may already be involved in other connections or the NPC for the other side of the connection may not have been added.
   - Enter the appropriate command to see the contents of the alternate map:

     For TCONs:
     `UTL::QRY,LIST,MAP <name>!`

     For NPCs:
     `UTL::QRY,NPC,MAP <name>!`.

Activate Alternate Map Package

Overview: This procedure is used to activate an alternate map. The alternate map is a set of 2-way, 2-point cross-connections that are quickly implemented when the map is activated. Activating the alternate map will not affect the existing cross-connections that are not involved in the alternate map. However, activating the new map will overwrite the cross-connection of all involved terminations.

To make sure that only the cross-connections listed in the alternate map are established on the involved NPCs you can activate the map with the CLR option. This option causes the system to disconnect existing connections on the involved NPCs before making the cross-connections listed in the map.

CAUTION:
Performing this procedure incorrectly can interrupt service.
Perform each step of the procedure in the order given. Also, read all supplementary information (such as Notes) before executing commands.

1. Enter the following command if you want to see the contents of the alternate map first:

   UTL::QRY,LIST,MAP <name>[,USER <user id>]!

   or enter the following to list NPCs:

   UTL::QRY,NPC,MAP <name>[,USER <user id>]!

   Where:

   <name> = Map name

   <user id> = Optional, to allow frame administrator to see another user's (given by user ID) map.

2. Enter the following command to activate the map (see note before using the CLR option):

   ACT::MAP <name>[,CLR][,INCL]!

   Where:

   <name> = Alternate map name

   CLR = Optional, to cause all connections associated with the NPCs of the named map to be disconnected before the map is implemented (see Note)

   INCL = Optional, to overwrite CUS or RDS circuits along with the other connections.

   NOTE:
   Note the following considerations concerning the CLR option for the activate map command:

   — The CLR (and the map itself) only affects 2-way, 2-point cross-connections (TCONs); other types of connections will not be disconnected.

   — Care should be taken with the CLR option because it will cause all cross-connections on NPCs involved in the alternate map to be disconnected. Connections on NPCs not involved in the alternate map will not be affected (the whole frame will not be cleared).

- If the command is denied, find the reason for the denial and perform corrective action to obtain command completion (*Command Denials* has explanations of denial codes).
- If the system returns a nonzero COND code in the completion message, a connection other than a 2-way type cross-connection exists on the involved NPCs, and this connection was not cleared. The named NPC is the first one that contains such connections.

3. Watch for DNY messages while the map is being executed. You can reenter the denied connections using the cross-connect command. After the cause of the denial is found, you can edit the alternate map to correct the cross-connections for the next time the map is activated.
4. Enter the following command to see the alternate map connections for the involved NPCs:

   `UTL::QRY,CMAP <npc No.>[-<range>]!`

   Where:

   <npc No.> = NPC number, either extended (for example, [0]001) or hierarchical (for example, 01101).

   <range> = Optional, last NPC of a continuous range.

Enter Command to Query User Map Information

Overview: This procedure shows how to retrieve alternate map information from the system.

1. Enter the appropriate command for the information you are looking for:
   - **Filename List and Execution Attributes:**

     `UTL::QRY,MAP,ATTR[,{USER <user id>|ALL|MAPNM <name>}]!`
   - **Contents of the Map**:

     `UTL::QRY,LIST,MAP <name>[,USER <user id>]!`
   - **Listing of NPCs in the Map**:

     `UTL::QRY,NPC,MAP <name>[,USER <user id>]!`
   - **Allotted Map File Storage Space**:

     `UTL::QRY,MAP,SPACE[,{USER <user id>|ALL|SYSTEM}]!`.

   Where:

   <user id> = User identification (2 to 8 alphabetic characters).

   <name> = Name of the map file.

ALL = Allows the frame administrator to see all files on the frame.

- If the command is denied, find the reason for the denial and perform corrective action to obtain command completion (*Command Denials* has explanations of denial codes).

Delete Alternate Map from System

Overview: This procedure gives the command to delete an alternate map package from the system. If you have already activated the alternate map, the delete command will not disconnect the component connection; it only removes the map name and definition. Only the system administrator can delete maps created by other users. Users can only delete their packages; the command will not affect a map with the same name that belongs to another user.

1. Enter the following command if you want to examine the alternate map before deleting:

   UTL::QRY,LIST,MAP <name>[,USER <user id>]!

   Where:

   <name> = Name of the map file

   <user id> = Optional, to allow frame administrator to address other users (given by user ID) package.

2. Enter the following command to delete the file:

   DLT::MAP <name>[,USER <user id>]!

   - If the command is denied, find the reason for the denial and perform corrective action to obtain command completion (*Command Denials* has explanations of denial codes).

Macros

A *macro* is a package of component commands that are executed in sequence when the macro command is executed. they save typing time because you can execute the same macro time and again. Also, the frame administrator can create public macros for the benefit of all users.

You can also create *universal* macros. With the use of universal macros, the same macro can be used to perform similar jobs on different equipment without changing the macro itself. Universal macros use variables in the component commands within the macro. You then specify the values of the variables within the command that executes the macro.

the system executes each component command within the macro according to its priority compared to commands from other users.

Create/Edit Macro

Overview: This procedure demonstrates how to create a macro and how to edit a macro.

NOTE:
You must use login access to the frame to create or edit a macro because the ownership of the macro is established by user ID.

1. If you want to check link message screening to determine whether it needs to be changed temporarily to reduce interruption during the session, enter the following command and read the screening (SCR) option:

   UTL::QRY,SCR,{LINK j[mm]|USER <user id>}!

   USER|LINK = Selects whether user or link identification will be used in command

   <user id> = User identification (2 to 8 alphabetic characters)

   j[mm] = Physical link number (1 through 6) and virtual circuit (mm = 01 through 16) for synchronous link.

   - If you want to change output screening, see *Change Output Message Screening*. Users can change their own message screening. Messages entered during the macro session do not appear on other links.
   - If you want to change message language, see *Change Message Language*.

- If you want to change NPC addressing, see *Change NPC Addressing*.

2. If you are editing an existing macro, go to Step **4**.
3. Decide on a name for the macro using the following rules:
   - — Names can have up to seven alphanumeric characters, the first of which must be a letter.
   - — All letters must be capitalized.
   - — For *public-use* macros, the first letter must be an upper-case "P". (Only the frame administrator—user DAX—can create a public macro.)
4. Enter the following command to begin creating or editing a macro:

   `ED::MACRO <name>!`

   where: <name> is the macro name.

   NOTE:
   Before editing the macro, wait for the message giving the number of lines; with large macros (around 8,000 lines), entries can be lost while the DACS II is verifying the number of existing lines.

   - If the command is denied, find the reason for the denial and perform corrective action to obtain command completion (*Command Denials* has explanations of denial codes).

5. Use the following *macro package editing commands* to create or modify your macro package. See Example 1 at the end of this procedure for help. Example 2 shows how to create a *universal macro*. (For new macros, you can simply enter the required command lines.)
   - — **APPEND Command**. This command allows you to "append" new lines *after* the line specified. When beginning a new macro, append after line 0.

     `APPEND::<line number>!`
   - — **DELETE Command**. This command allows you to delete the line specified.

     `DELETE::<line number>!`

     NOTE:
     After deleting a line, the remaining line numbers after the deleted line will change. For example, if you have 5 lines and delete line 4, line 5 will become line 4. Use the **`LIST`** command to see the contents of macro.

— **MOVE Command.** This command allows you to move a line (or group of lines) to a place *after* a specified line.

`MOVE::FROM {<starting line>|END}[-{<ending line>|END}], TO {<destination line>|END}!`

<starting line> -	Starting component command line number indicating the beginning of a component command line range to be moved. This can also be a single line number for moving single lines.
<ending line> -	Ending component command line number indicating the end of a component command line range to be moved.
END -	Last line in the macro file. End cannot be used in both parts of the command (starting line and the ending line or destination line).
<destination line> -	Component command line after which the component commands are moved. Use 0 to move lines *before* line 1.

— **LIST Command**. This command lists the lines or range or lines specified. To list all the lines in the macro, enter **`LIST!`**.

`LIST::{<starting line>|END}[-{<ending line>|END}]!`

NOTE:
Consider the following when constructing macros:

- — CHG MCON/MCOFF commands can be included in a macro to shut off (MCOFF) macro component COMPL messages.
- — A STOP keyword can be included in component RMV/RST, TCON, and TDIS commands to stop the macro if a component command fails.

- If BAD SYNTAX or other denial is received, reenter corrected command. If NOT ALLOWED is received, the command is not allowed either because it has to do with macros itself (for example, ED, EXC), or users (for example, LOGOFF), or link/user authorization.
- When "OK" is received, make next addition or move to different line and make any other changes. The system appends !OK to each valid command line in the macro.

- To store changes without quitting the session, enter **SAVE!**. To abort the macro session without storing changes, enter **QTEND!**.

> **NOTE:**
> As usual, the on-line help can be invoked while entering a component line to the macro using the "?".

6. After all components have been entered, enter **END!** to terminate the session. The DACS II should respond with MACRO ...COMPL message with COND 00 exceptions.

Example 1: This example shows how to create a macro. Figure 7-4 shows the component commands in the macro that do the following:

— **Line 1.** This command disconnects channel 01 of NPC 001 from channel 01 or NPC 003. If the command fails, the macro stops.

— **Line 2.** This command cross-connects channel 01 of NPC 001 to channel 01 or NPC 005. (The connection uses transparent trunk conditioning.)

— **Line 3.** This command cross-connects channel 02 of NPC 001 to channel 02 or NPC 005. (The connection uses transparent trunk conditioning.)

— **Line 4.** This command cross-connects channel 03 of NPC 001 to channel 03 or NPC 005. (The connection uses transparent trunk conditioning.)

— **Line 5.** This line outputs all connections on NPC 001.

```
TDIS::FROM 00101,TO 00301,STOP!OK
TCON::FROM 00101,TO 00501,TRSP!OK
TCON::FROM 00102,TO 00502,TRSP!OK
TCON::FROM 00103,TO 00503,TRSP!OK
UTL::QRY,CMAP 001!OK
```

Figure 7-4. Example of Macro (Extended NPC Numbering)

Example 2: Figure 7-5 shows a universal macro that, when executed with the variable values, does the same thing as the macro in Example 1. There may be as many as ten variables listed in one macro. The variables are entered as #01 through #10 in the message. Variables may be used for any parameter except action verbs and punctuation, and includes user ids, NPCs, channel numbers, trunk conditioning codes, etc. Variables are unique to a macro, that is, variable #01 may be used more than once in a macro to repeat the same value several times. Variable #01 may be used in another macro with an entirely different meaning.

> **NOTE:**
> To represent hierarchical NPC numbers, a variable must be used for each

part of the number. For example, if variables #01, #02, and #03 were used to represent NPC 01101, the last line entered in the example would be: **UTL::QRY,CMAP #01#02#03!**.

The following command (with extended NPC number values 001 and 005) would be entered to execute the macro in the example:

EXC::MACRO QWKCON,(001,005)!

```
TDIS::FROM #0101,TO 00301,STOP!OK
TCON::FROM #0101,TO #0201,TRSP!OK
TCON::FROM #0102,TO #0202,TRSP!OK
TCON::FROM #0103,TO #0203,TRSP!OK
UTL::QRY,CMAP #01!OK
```

Figure 7-5. Example of Macro (Extended NPC Numbering)

Execute Macro Package

Overview: This procedure is used to execute a macro package. If the frame administrator has established the priority of command execution, the component commands of the macro will determine when a macro is executed relative to other macros. The overall success of the macro execution is indicated by a final COMPL or DNY message. Macros can include a STOP keyword on the component line to stop the macro if critical components fail. Macros can also be aborted by entering the STOP command after the macro is running.

1. Enter the following command if you want to see the contents of the macro before executing:

   UTL::QRY,LIST,MACRO <name>[,USER <user id>]!

   Where:

   <name> = Macro name

   <user id> = Optional, to allow frame administrator to see another user's macro.

   - If CHG MCOFF and CHG MCON commands are not included in the macro and you want to shut off component command completion messages, enter:

     CHG::{USER <user id>|LINK j[mm]},MCOFF!

     Where:

     <user id> = User identification (2 to 8 alphabetic characters)

j[mm] = Physical link number (1 through 6) and virtual circuit (mm = 01 through 16) for synchronous link.

- If you want to stop the execution of the macro after it has started (in the next step), enter:

  STOP::MACRO[,LINK j[mm]]!.

  Where: j[mm] = Required by user to stop execution on link being used. Frame administrator can stop the execution of the macro on any link.

2. Enter the following command to execute the macro:

   EXC::MACRO <name>[,(p1,p2,p3,...p10)]!

   Where: p1,p2,p3 = Values for variables identified by numbers in the component commands; can also include special keyword "NULL" for variable and "STOP" at end of line.

   The following example shows how NPC numbers (extended numbering) and the STOP keyword would be entered for variables used in the macros:

   EXC::MACRO QWKCON2 (641,001,002,003,STOP)!

   - If the command is denied, find the reason for the denial and perform corrective action to obtain command completion (*Command Denials* has explanations of denial codes).
   - If CHG MCOFF was entered before executing the macro, enter:

     CHG::{USER <user id>|LINK j[mm]},MCON! to allow completion messages again.

Enter Command to Query User Macro Information

Overview: This procedure shows how to retrieve macro information from the system.

1. Enter the appropriate command for the information you are looking for:

   — **Filename List:**

   `UTL::QRY,MACRO,ATTR[,{USER <user id>|ALL}]!`

   — **Contents of the Macro**:

   `UTL::QRY,LIST,MACRO <name>[,USER <user id>]!`

   — **Allotted Map/Macro File Storage Space**:

   `UTL::QRY,MACRO,SPACE\`
   `[,{USER <user id>|ALL|SYSTEM}]!`.

   Where:

   <user id> = User identification (2 to 8 alphabetic characters).

   <name> = Name of the macro file.

   ALL = Allows the frame administrator to see all files on the frame.

   - If the command is denied, find the reason for the denial and perform corrective action to obtain command completion (*Command Denials* has explanations of denial codes).

Delete Macro from System

Overview: This procedure gives the command to delete a macro package from the system. Only the system administrator can delete macros created by other users. Users can only delete their packages; the command will not affect a macro with the same name that belongs to another user.

1. Enter the following command if you want to examine the macro file before deleting it:

   `UTL::QRY,LIST,MACRO <name>[,USER <user id>]!`

   Where:

   <name> = Name of the macro file

   <user id> = Optional, to allow frame administrator to address other users (given by user ID) package.

2. Enter the following command to delete the file:

   `DLT::MACRO <name>[,USER <user id>]!`

   - If the command is denied, find the reason for the denial and perform corrective action to obtain command completion (*Command Denials* has explanations of denial codes).

Maintenance

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Software Installation

Software Installation Procedure (New Frame)

For the procedure to install a new software release, refer to the *DACS II Release 8.0 Software Release Description*.

Database Archiving Procedures

The need (and how often) to archive the DACS II database is determined by your local requirements (usually tied to the frequency of changes to the database). The archived copies (flash cards) should be stored in a safe place also determined by your local requirements. The copy should be labeled indicating the DACS II frame it backs up and the date and time the archive copy was retrieved from the frame.

The procedure to archive the database and executables allows you to recover from one or more of the following:

- Failed PMEM and/or SMEM hardware, that may leave the database on either (or both) the SMEM and PMEM flash cards suspect.

The "archive" card resulting from these procedures is in effect the current SMEM card located in the DACS II frame. These procedures will remove and declare the SMEM flash card as the latest "archive" card. The remainder of the procedure involves inserting another flash card into the SMEM slot and mirroring PMEM to the new SMEM card.

If inserting a new or "blank" flash card into the SMEM slot, the mirroring process (PMEM to SMEM) can take up to 10 or more minutes to complete (depending upon the size and configuration of your frame). The mirroring process is accomplished by restoring the SMEM card manually while the MC is in-service. During this process, the MC is available to process a subset of input commands if the BKGRND keyword was used as part of the **`RST::SMEM`** command.

This procedure assumes the MC, PMEM, and SMEM are functioning properly and the database in RAM and on PMEM are correct.

Database Archiving Procedure

Use the following procedure to obtain an archive copy when the MC is in the IS state:

1. At the archive storage location—
   Retrieve the oldest archive copy (flash card) that you want to reuse.

   NOTE:
   If an archive flash card is not available or does not exist, find a new or blank card that is DACS II compatible.

2. Verify that the MC and SMEM are in-service by entering the following command:

   `UTL::QRY,MEMSTAT!`

   - If the MC and SMEM are in service—
     Go to Step 4.
   - If the MC is out-of-service (RAM state field in MEMSTAT output)—
     Enter the following command:

     `RST::MC!`

   - Reissue the command **`UTL::QRY, MEMSTAT!`**. If the SMEM is in-service proceed to Step 4.

3. If the SMEM is out-of-service—
   First copy the journal files to PMEM:

   `UTL::BMTR,FROM RAM,TO MEM`!

   Then restore SMEM in the background:

   `RST::SMEM,BKGRND!`

   When this command completes, SMEM is a mirror image of PMEM, suitable for archiving. Proceed to the next step.

4. Ensure that any previously entered **`RST`** command for SMEM has completed.

5. Remove the SMEM card logically by issuing the command:

   `RMV::SMEM!`

   When this command completes, place the ESD grounding strap on your wrist and physically remove the SMEM card from the CPU2. Figure 8-1 shows the memory card locations on the CPU2 circuit pack.

6. Label the just removed SMEM card as the latest archive card (with the frame information, date/time, when it was removed) and store it in the proper place for archive cards.

   NOTE:
   This is now the latest "archive" card.

7. Insert the card retrieved in step 1 (the "oldest archive" card), into the SMEM slot. Use a blank card if the oldest archive card is not available.
8. Enter the following command to restore the SMEM card to service:

   `RST::SMEM,BKGRND!`

NOTE:
The system executables and the database on the PMEM card will be copied onto the SMEM card such that each card is a mirrored image of the other.

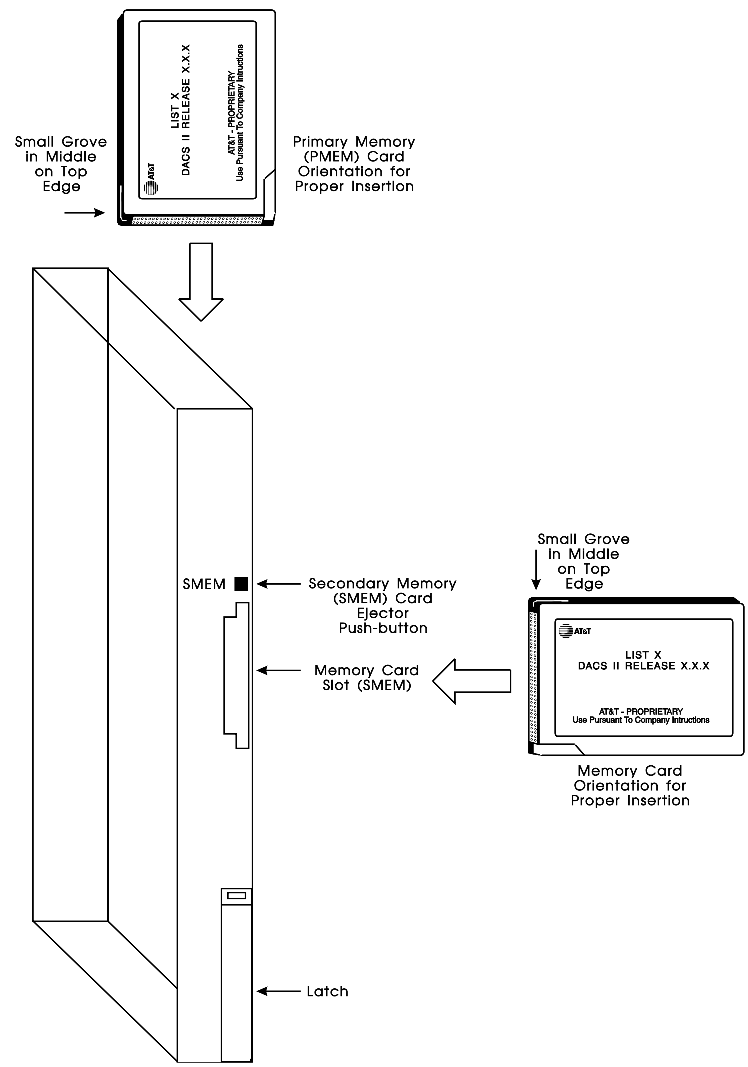

Figure 8-1. Memory Card Locations on CPU2

Memory Card Failure Recovery Procedure

The recovery procedure when a PMEM or SMEM card failure occurs is as follows:

1. Perform the following diagnostic tests on both the PMEM and SMEM cards:
   a. Do the card diagnostic test, craft code X'0004.
   b. Do the validate data base test, craft code X'0010.
   c. Validate the boot block, craft code X'0020.
   d. Validate executable header, craft code X'0040.
   e. Validate executables, craft code X'0080.

   Several possible cases can result from this set of tests that lead to different actions to resolve the problems:
   a. If the PMEM card fails card diagnostics and the SMEM card passes all tests, then go to Step 2.
   b. If the PMEM card succeeds on the card diagnostic test, but fails any of the other tests, while the SMEM card succeeds on all tests, then go to Step 3.
   c. If the PMEM and SMEM card both succeed on the card diagnostic tests, but both fail on one of the other diagnostic tests, then go to Step 4.
   d. If the SMEM card fails card diagnostics and the PMEM card passes all tests, then go to Step 5.
   e. If the SMEM card passes card diagnostics, but fails any of the other tests, while the PMEM card succeeds on all tests, then go to Step 6.

2. Replace the PMEM card (Figure 8-2) with the card currently in the SMEM slot by doing the following (PMEM card is suspected to be defective):
   a. Place the frame into MCOND before physically removing the the CPU2 pack by entering the following command:

      `RST::MC,MCOND!`

      The frame will deny this command if it is already in MCOND.
   b. Place the ESD grounding strap on your wrist and physically remove the CPU2 circuit pack while the MC is out-of-service..
   c. Replace the PMEM card with the card currently in the SMEM slot.

d. Insert a spare memory card into the SMEM slot.

e. Physically insert the CPU2 pack into the frame.

f. On the Status Panel, hold the RESET ENABLE switch to ON and momentarily press the RESET button.

g. The System should be brought into service with the correct version of the executables and database. If the boot completes successfully and the database is correct, discard the bad PMEM card and continue with Step 7.

   If PMEM fails to boot, run diagnostics on the PMEM card. The card diagnostic tests (craft code X'0004) will most likely fail, because the problem is most likely a PMEM card connector problem and the CPU2 board itself should be replaced. The system should be rebooted with the PMEM and SMEM cards in their original slots but with a new CPU2 pack.

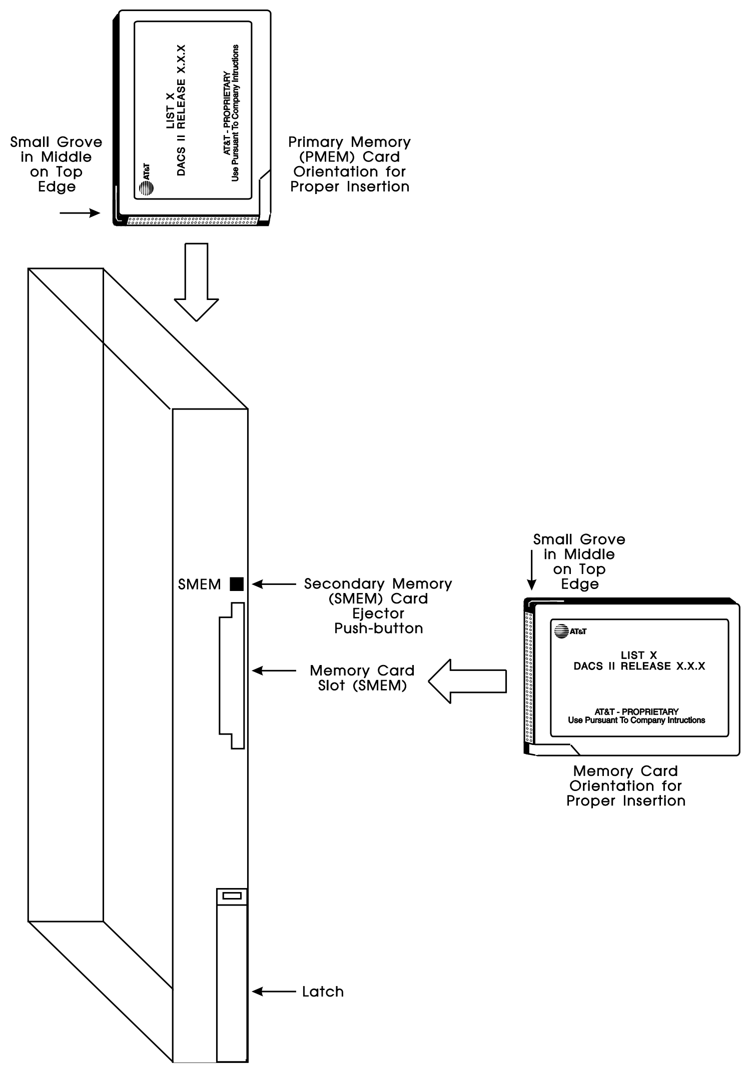

Figure 8-2. Memory Card Locations on CPU2

3. Replace the PMEM card (Figure 8-2) with the card currently in the SMEM slot by doing the following (PMEM card is suspected to contain corrupted executables or database):
   a. Place the frame into MCOND before physically removing the the CPU2 pack by entering the following command:

      `RST::MC,MCOND!`

      The frame will deny this command if it is already in MCOND.
   b. Place the ESD grounding strap on your wrist and physically remove the CPU2 circuit pack while the MC is out-of-service.
   c. Replace the PMEM card with the card currently in the SMEM slot.
   d. Insert a spare memory card into the SMEM slot.
   e. Physically insert the CPU2 pack into the frame.
   f. On the Status Panel, hold the RESET ENABLE switch to ON and momentarily press the RESET button.
   g. The system should be brought into service with the correct version of the executables and database. If the boot completes successfully and the database is correct, continue with Step 7. (The old PMEM card may be recycled as a future SMEM card.)

4. Replace the PMEM card (Figure 8-2) with the most recently archived memory card by doing the following (PMEM and SMEM cards are suspected to contain corrupted executables or database):
   a. Place the frame into MCOND before physically removing the the CPU2 pack by entering the following command:

      `RST::MC,MCOND!`

      The frame will deny this command if it is already in MCOND.
   b. Place the ESD grounding strap on your wrist and physically remove the CPU2 circuit pack while the MC is out-of-service.
   c. Replace the PMEM card with the most recently archived memory card.
   d. Insert a spare memory card into the SMEM slot.
   e. Physically insert the CPU2 pack into the frame.
   f. On the Status Panel, hold the RESET ENABLE switch to ON and momentarily press the RESET button.
   g. The System should be brought into service with the correct version of the executables and a valid but most likely not current database. If the boot completes successfully, continue with Step 7. (The PMEM card and the SMEM card may be recycled as future SMEM cards.)

5. Replace the SMEM card (Figure 8-3) with a spare memory card or with an older archive card that may be recycled. (SMEM card is suspected to be defective.):

   a. Remove the SMEM card physically from the CPU2 card. (Since the card has been found to be defective by the system, it must already be logically removed from the system.)

   b. Insert the spare memory card physically into the SMEM slot.

   c. Discard the bad SMEM card and continue with Step 7.

6. The SMEM card is good but has bad information on it.
   Restore the SMEM card:

   NOTE:
   The PMEM contents are copied onto the SMEM card when SMEM is restored. Each card is then a ‘‘mirrored image’’ of the other.

   `RST::SMEM,BKGRND!`

   If the command is denied because of bad or mismatching information on the SMEM card with the message:

   ```
   Warning: The SMEM Card being restored has the following problems!
   <message describing the problem>
       If YOU STILL WISH TO PROCEED, USE FRC OPTION
   ```

   Then use the command with the **`FRC`** option:

   `RST::SMEM,FRC,BKGRND!`

   You will get a response:

   `ARE YOU SURE? (YES/NO)`

   Answer YES and the restore operation should complete. Then go to Step 8.

7. To restore the SMEM card, enter the following command:

   NOTE:
   The PMEM contents are copied onto the SMEM card when SMEM is restored. Each card is then a ‘‘mirrored image’’ of the other.

   RST::SMEM,BKGRND!

8. If there is now a replacement card in the PMEM slot, then the PMEM may not contain the latest db changes, depending on which replacement card was used. Any changes not present need to be re-done.

9. Create a new archive copy if needed (archived copy was used to replace the PMEM). Refer to the "Database Archive Procedure" (Volume 1).

Repair and Replacement

Remove and Install Circuit Packs

The DACS II contains 4-, 8-, 12-, and 16-inch circuit packs. These circuit packs have the following design:

— **Single Latch:** These are the 4- and 8-inch circuit packs. Most of the circuit packs contained in the system are of this design.

— **Double Latch:** These are the 12-inch DS3U and 16-inch ECCN circuit packs. Each circuit pack has two latches; one on the top and one on the bottom.

You can easily damage circuit packs and other hardware by improperly removing and installing them in the frame. Read Cautions before beginning.

CAUTION:
Before touching any part of the equipment frame including the PMEM or SMEM cards, any circuit pack, reset switches, ACO or LED TEST buttons, ALWAYS ground yourself to the frame with a WRIST STRAP provided with the equipment.

CAUTION:
Never install or remove more than one circuit pack at a time. This could cause irreparable damage to each circuit pack.

CAUTION:
No circuit card nor the SMEM memory card should be physically removed from the frame or inserted into the frame while a frame reset or reboot is in progress.

The following sections explain how to remove and install the two different types of circuit pack designs.

Remove and Install Single-Latch Circuit Packs

The following procedures describe how to correctly remove and install 4- and 8-inch circuit packs with a single latch:

NOTE:
Main controller packs should only be physically removed/replaced when the frame is either Out Of Service (OOS) or in Maintenance Condition (MCOND). Both NPCs associated with a DDC or EDDC should be out of service before the pack can be physically removed/replaced. Entities such as UCs, FTMIs, and FCs should be OOS before they are physically removed/replaced.

— **To Remove a Circuit Pack:**

1. Unseat the circuit pack from the slot by carefully operating the latch.
2. Then remove the circuit pack with one continuous motion. DO NOT ROCK THE CIRCUIT PACK BACK AND FORTH.

— **To Install a Circuit Pack:**

1. Remove the plastic shipping protector from the contacts of new circuit packs.
2. Insert the circuit pack into the slot. DO NOT ROCK THE CIRCUIT PACK BACK AND FORTH.
3. Raise the latch. Push on the bottom part of the circuit pack until the latch engages the slot. DO NOT push with the latch.
4. After the latch engages the slot, close the latch (pull up) to seat the circuit pack.
5. After closing the latch, with one thumb on the latch and the other thumb at the top of the circuit pack, press firmly to ensure that the circuit pack is fully seated.

Remove and Install Double-Latch Circuit Packs

The following procedures describe how to correctly remove and install 12-inch DS3U and 16-inch ECCN circuit packs with double latches:

NOTE:
Main controller packs should only be physically removed/replaced when the frame is either Out Of Service (OOS) or in Maintenance Condition (MCOND).

— **To Remove a Circuit Pack:**

1. Unseat the circuit pack from the slot by carefully operating both the top and bottom latch together.
2. Then remove the circuit pack with one continuous motion. DO NOT ROCK THE CIRCUIT PACK BACK AND FORTH.

— **To Install a Circuit Pack:**

1. Remove the plastic shipping protector from the contacts of new circuit packs.
2. Insert the circuit pack into the slot and ensure that the latches are positioned to allow insertion. DO NOT ROCK THE CIRCUIT PACK BACK AND FORTH. Open both latches (Top - push up, Bottom - push down).
3. Push on the bottom part of the circuit pack until both latches engage the slot. DO NOT push with the latches.
4. After the latches engage the slot, close the latches (pull up top latch, push up lower latch) together to seat the circuit pack.
5. After closing the latches, with one thumb on the top latch and the other thumb at the top latch, press firmly to ensure that the circuit pack is fully seated.

Upgrade Circuit Packs

Upgrading From a CI to a ECI/HECI

Overview: This procedure is used for two purposes:

— To upgrade from a Communication Interface (CI) circuit pack to either an Enhanced Communication Interface (ECI) circuit pack or a High-speed Enhanced Communication Interface (HECI) circuit pack.

— To upgrade from an Enhanced Communication Interface (ECI) circuit pack to a High-speed Enhanced Communication Interface (HECI).

This procedure assumes that links 1 through 6 are all provisioned. For a CI circuit pack, links 1 through 6 can only be Snider links. For a ECI/HECI, links 1 and 2 can only be Snider, links 3 and 4 can either be Snider or TABS, and links 5 and 6 can only be X.25. This procedure is implemented on Link 1.

1. Enter **`RST::MC,MCOND!`** to place the frame in maintenance condition.
2. Replace the CI circuit pack with an ECI/HECI circuit pack or replace the ECI circuit pack with an HECI circuit pack.
3. On the DACS II status panel, hold the **RESET ENABLE** switch to **ON** and momentarily press the **RESET** button.

NOTE:
Reset may take up to 30 minutes.

If MC RESET COMPL (with no COND code) is received, then continue with the next step.

If MC RESET COMPL (with COND code) is received, refer to *DACS II - Operation and Maintenance Manual, Volume II - Trouble Clearing* to clear reset conditionally.

4. Link 1 can now be changed back to the preferred baud rate, if necessary:

```
ADD::LINK 1,PTCOL {S|X|T|M}[,BAUD bb]!
```

Where:

LINK = Link

PTCOL = Protocol.

S = SSCSAI (Snider protocol)

X = X.25 Synchronous protocol

T = TABS (Telementary Asynchronous Block Serial protocol)

M = Modified Snider protocol. Requires a baud rate of 1200.

BAUD = Baud

bb = Baud rate.

bb	Rate
03	300
06	600
12	1200
24	2400
48	4800
96	9600

Change the baud rate on the terminal setup so that it matches the link.

5. Remove links 3,4,5, and 6 using the following command:

   RMV::LINK j!

   Where:

   LINK = Link

   j = Link number. (1 through 6)

6. Change Link 1 to 1200 Baud using the following command:
   ADD::LINK 1,PTCOL S,BAUD 12!

   Change the terminal setup 10 1200 so that it matches the link.

7. (For upgrading from Communication Interface (CI) circuit pack only. Skip this step if upgrading from an ECI circuit pack to an HECI circuit pack.)

   Change links 5 and 6 to X.25 protocol (change links 3 and 4 to TABS if necessary) using the following command:

   ADD::LINK j,PTCOL X[,BAUD bb]!

8. Enter the following command to restore the links:

   RST::LINK j!

   Where:

   LINK = Link

   j = Link number (1 through 6).

Replacing an ECI/HECI With a CI

Overview: This procedure is used to replace an Enhanced Communication Interface (ECI) circuit pack or a High-speed Enhanced Communication Interface (HECI) circuit pack with a Communication Interface (CI) circuit pack. This procedure assumes that links 1 through 6 are all provisioned. For a CI circuit pack, links 1 through 6 can only be Snider links. For a ECI/HECI, links 1 and 2 can only be Snider, links 3 and 4 can either be Snider or TABS, and links 5 and 6 can only be X.25. This procedure is implemented on Link 1.

1. Enter **`RST::MC,MCOND`** to place the frame in maintenance condition.
2. Replace the ECI/HECI circuit pack with a CI circuit pack.
3. On the DACS II status panel, hold the **RESET ENABLE** switch to **ON** and momentarily press the **RESET** button.

   NOTE:
   Reset may take up to 30 minutes.

   If MC RESET COMPL (with no COND code) is received, then continue with the next step.

   If MC RESET COMPL (with COND code) is received, refer to *DACS II - Operation and Maintenance Manual, Volume II - Trouble Clearing* to clear reset conditionally.
4. Link 1 can now be changed back to the preferred baud rate, if necessary:

   `ADD::LINK 1,PTCOL {S|X|T|M}[,BAUD bb]!`

   Where:

   `LINK` = Link

   `PTCOL` = Protocol.

   `S` = SSCSAI (Snider protocol)

   `X` = X.25 Synchronous protocol

   `T` = TABS (Telementary Asynchronous Block Serial protocol)

   `M` = Modified Snider protocol. Requires a baud rate of 1200.

   `BAUD` = Baud

   `bb` = Baud rate.

bb	Rate
03	300
06	600
12	1200
24	2400
48	4800
96	9600

Change the baud rate on the terminal setup so that it matches the link.

5. Remove links 3, 4, 5, and 6 using the following command:

   RMV::LINK j!

   Where:

   LINK = Link

   j = Link number. (1 through 6)

6. Change Link 1 to 1200 Baud using the following command:
   ADD::LINK 1,PTCOL S,BAUD 12!

   Change the terminal setup 10 1200 so that it matches the link.

7. Change links 5 and 6 to Snider protocol (change links 3 and 4 to TABS if necessary) using the following command:

   ADD::LINK j,PTCOL S[,BAUD bb]!

8. Enter the following command to restore the links:

   RST::LINK j!

   Where:

   LINK = Link

   j = Link number (1 through 6).

Upgrading From an EMTC to an EMTC2

Overview: This procedure is used to replace the UM56 Enhanced Maintenance (EMTC) circuit pack to a UM75 Enhanced Maintenance (EMTC2) circuit pack.

1. Enter **`RST::MC,MCOND!`** to place the main controller in maintenance condition.
2. Replace the UM56 circuit pack with a UM75 circuit pack.
3. On the DACS II status panel, hold the **RESET ENABLE** switch to **ON** and momentarily press the **RESET** button.

Performance Monitoring

9

Contents

Performance Monitoring

9

DS1 Line Performance

The following DS1 line performance parameters are monitored by DACS II.

- **Line Coding Violations (CV)** – A count of CVs based on the DS1 line format. For AMI line coding, this is a count of bipolar violations (BPV). For B8ZS line coding, it is a count of BPVs that are not part of the zero substitution pattern. For B8ZS-coded lines, unexpected bit sequences such as 8 or more consecutive zeros are also a BPV.
- **Line Errored Seconds (ES)** – A count of seconds during which at least one CV has occurred.
- **Line Severely Errored Seconds (SES)** – A count of seconds during which at least 1544 line CVs have occurred.

DS1 Path Performance

The following DS1 path performance parameters are monitored by DACS II.

- **Path Coding Violations (CV)** – For ESF framing, this is a count of detected CRC-6 CVs. For D4 framing, this is a count of detected framing bit errors.
- **Path Errored Seconds (ES)** – A count of seconds during which at least one of the following has occurred:
  - — Path CV
  - — Controlled slip
  - — SEF event
- **Path Severely Errored Seconds (SES)** – For ESF framing, this parameter is a count of seconds which either 320 or more CRC-6 CVs or an SEF event has occurred. For D4 framing, this parameter is a count of seconds during which either 8 or more framing bit errors or an SEF event has occurred.
- **Path Severely Errored Framing Seconds (SEFS)** – A count of seconds during which at least one SEF event has occurred.
- **Path Controlled Slip Seconds (CSSP)** – A count of seconds during which a controlled slip has occurred.
- **Path Unavailable Seconds (UASP)** – A count of seconds from the onset of the condition that causes an Unavailable Signal Status to be declared to the onset of the condition that causes it to be cleared.

Change Performance Parameter Thresholds

Table 9-1 lists the default performance parameter thresholds.

Table 9-1. Default Performance Parameter Thresholds

Parameter	Number/Day	Number/15 Minutes
Line CVs (BPVs)	133,400	13,340
Path CVs (CRCs)	132,960	13,296
Path CVs (FEs in D4)	691	72
CSSP	4	1
SEFS	17	2
Line/Path ES	648	65
Line/Path SES	100	10
UASP	10	10

These default values can be changed by using the following command:

```
CHG::SETOP rr,{TYPE mn|ALL},NPCOP (set1,set2,set3)!
```

Where:

rr = Designates the parameter to be changed (see the following table for valid values).

set1,set2,set3 = User-programmable threshold values for the parameter.

- To change the facility performance parameter threshold values on a specified NPC without disconnecting and reconnecting provisioned circuits, enter the following command:

```
CHG::NPC <NPC no.>,OPTS(rr/m[,rr/m][...])!
```

Where:

rr = Facility performance parameter number

m = Facility performance parameter threshold index (0 through 3)

- To the threshold values for facility performance parameters on all NPCs of a particular type, enter the following command:

```
CHG::TYPE mnxyz,OPTS(rr/<m>[,rr/<m>][...])!
```

Where:

mnxyz = NPC type

rr = Facility performance parameter number

m = Facility performance parameter threshold index (0 to 3)

- To change facility threshold values for one or more NPCs of a particular type or SLC® bank without disconnecting and reconnecting provisioned circuits, enter the following command:

```
CHG::{NPC <NPC no.>|RT ffff|DL ffff|TYPE mnxyz,.lf 382
OPTS(rr/m[,rr/m,...])!
[ww]:rr/m[&rr/m...]!
```

Where:

RT = Remote terminal

DL = Digital Carrier Line Unit (DCLU)

mnxyz = NPC type

rr = facility performance parameter number

m = facility performance parameter threshold index (0 through 3)

rr	Parameter
41	Daily near-end path coding violations
42	Daily near-end path errored seconds
43	Daily near-end path severely errored seconds
44	Daily near-end severely errored framing seconds
45	Daily near-end path controlled slip seconds
46	Daily near-end path unavailable seconds
47	Daily near-end line coding violations
48	Daily near-end line errored seconds
49	Daily near-end line severely errored seconds
50	Daily far-end path coding violations
51	Daily far-end path errored seconds
52	Daily far-end path severely errored seconds
53	Daily far-end severely errored framing seconds
54	Daily far-end path controlled slip seconds
55	Daily far-end path unavailable seconds
56	Daily far-end line errored seconds
57	15-minute near-end path coding violations
58	15-minute near-end path errored seconds
59	15-minute near-end path severely errored seconds
60	15-minute near-end severely errored framing seconds
61	15-minute near-end path controlled slip seconds
62	15-minute near-end path unavailable seconds
63	15-minute near-end line coding violations
64	15-minute near-end line errored seconds
65	15-minute near-end line severely errored seconds
66	15-minute far-end path coding violations
67	15-minute far-end path errored seconds
68	15-minute far-end path severely errored seconds
69	15-minute far-end severely errored framing seconds
70	15-minute far-end path controlled slip seconds
71	15-minute far-end path unavailable seconds
72	15-minute far-end line errored seconds

Scheduling a Performance Monitoring Report

1. To schedule a performance monitoring report, issue the following command:

```
UTL::SCHED,PMREPT,NPC <npc No.1>[-<range>],RI rrrrr,\
ST ssss,NI nn,<parameter>,LV lllllllll,LOCN locn,\
AI aaaaa,TOF ttttt[-ooooo][,LK] p[vv][q[vv]]]!
```

Where:

<npc No.1> = The 3- or 4-digit nonhierarchical starting NPC number.

<range> = The 3- or 4-digit nonhierarchical ending NPC number.

rrrrr = The interval between performance monitoring reports. The following table lists valid intervals.

rrrrr	Explanation
{0001-1440}M	Report interval in minutes
{0001-0024}H	Report interval in hours
{0001-0007}D	Report interval in days

ssss = The starting time for the performance monitoring reporting schedule. {00-23}{00-59} is the Hour of day/Minute of Hour Format, while CURT is the value for the current time of day.

nn = The number of intervals over which performance monitoring is reported.

<parameter> = The parameter for which reporting is being scheduled. The following table lists valid parameters.

Parameter	Explanation
CVP	Path Coding Violations
CVL	Line Coding Violations
ESP	Path Errored Seconds
ESL	Line Errored Seconds
SESP	Path Severely Errored Seconds
SESL	Line Severely Errored Seconds
SESF	Path Severely Errored Framing Seconds
CSSP	Path Controlled Slip Seconds
UASP	Path Unavailable Seconds
ALLPAR	All listed parameters

LV = Level

`lllllllll` = The discriminating level for the requested parameter. This parameter is used to restrict report output to include only values that are above/below a defined level. The following table illustrates examples.

`lllllllll`	Explanation
{000000000-134217728}U	Discriminating Level-Up Direction
{000000000-134217728}D	Discriminating Level-Down Direction

Up = Parameters with values equal to or greater than the specified level.

Down = Parameters with values equal to or less than the specified level.

locn = The location being performance monitored. Either NEND for Near-end or FEND for Far-end.

aaaaa = The accumulation time period for the specified parameter. The following table shows examples.

aaaaa	Explanation
15MIN	15 minute accumulator
DAILY	Daily accumulator

ttttt = The age of the requested data registers at the reporting time.

ooooo = This parameter may be entered as a range to specify up to four historical data registers. The following scenario shows a valid example.

If:

start time = 1205
report interval = 0001H
Number of intervals = 03
accumulation interval = 15MIN

Then:

time offset = 00015-00060

Checking Performance Monitoring Data

Overview: This procedure describes the command to check DS1 performance monitoring data for DA and TA type NPCs.

1. To check performance monitoring data, enter the following command:

NOTE:
When the ALL option is used with this command, only the data of one performance parameter may be queried.

```
UTL::QRY,{NPC <npc No.1>[-<range>] | ALL},\
<parameter>,AI aaaaa[,LV llllllllll][,LOCN locn]\
[,MONDAT dddd][,MONTIM tttt]!
```

Where:

<npc No.1>	=	The 3- or 4-digit nonhierarchical starting NPC number.
<range>	=	Optional, the 3- or 4-digit nonhierarchical ending NPC number
ALL	=	Used to request parameter counts for all NPCs of type DA or TA. **If this option is selected, only one performance parameter may be queried.**
<parameter>	=	The performance parameter requested. One of:

CVP	Path Coding Violations
CVL	Line Coding Violations
ESP	Path Errored Seconds
ESL	Line Errored Seconds
SESP	Path Severely Errored Seconds
SESL	Line Severely Errored Seconds
SEFS	Path Severely Errored Framing Seconds
CSSP	Path Controlled Slip Seconds
UASP	Path Unavailable Seconds
ALLPAR	All parameters

NOTE:
If the value ALLPAR is selected, a single NPC must be specified, the MONTIM and MONDAT parameters may not have a value of ALL, and the LV option cannot be used.

aaaaa = The accumulation time period for the specified parameter: either 15MIN for parameter count from a 15-minute accumulator, or DAILY for parameter count from a daily accumulator.

llllllllll = Optional, the discriminating level for the requested parameter: 0000000000 - 134217728 followed by "U" (parameters with values equal to or greater than the discriminating level are reported) or "D" (parameters with values equal to or less than the discriminating value are reported).

If not specified, default is 1U. Cannot be specified when the ALL option is selected; then the default is 0U.

locn = The location being performance monitored: FEND for far-end or NEND for near-end (default).

dddd = The beginning date of the performance monitoring period. Specified in the format MMDD, where MM is the month (01-12) and DD is the day (01-31). The current date can be specified by making dddd = CURD (default). All daily accumulation registers can be retrieved by making dddd = ALL.

NOTE:
If the value ALL is selected, only one NPC can be specified in the command, aaaaa must equal DAILY, MONTIM cannot be selected, and ALLPAR cannot be selected for <parameter>.

tttt = The beginning time of day of the performance monitoring period. Specified in the format HHMM, where HH is the hour (00-24) and MM is the minute (00, 15, 30, 45). The current time can be set by making tttt = CURT (default). All 15-minute accumulation registers can be retrieved by making tttt = ALL.

NOTE:
If the value ALL is selected, only one NPC can be specified in the command, aaaaa must equal 15MIN, and ALLPAR cannot be selected for <parameter>.

2. The output of this command is handled as follows:
   - If a single NPC is specified, the data requested is output for that NPC.
   - If a range of NPCs is specified, the NPCs within the range that do not support the requested <parameter> will be skipped.
   - If the ALL option is requested, the data for all NPCs that support the requested <parameter> is output and NPCs that do not support the requested <parameter> are skipped.
3. If the command is denied, find the reason for denial and perform corrective action to obtain completion (*Command Denials* has explanations of denial codes).

Clearing Performance Monitoring Counts

Overview: This procedure describes the command to clear facility performance monitoring parameters for DA and TA type NPCs (FTUs) or DS3 Units.

Only counts that exceed current threshold levels cause threshold-crossing messages or alarms.

Intervals before the previous interval may be queried using the ALL keyword, however, they cannot be cleared by manual command. Counts are cleared automatically as intervals pass, providing new errors are not counted.

1. To clear performance monitoring parameters, enter the following command:

   NOTE:
   When the ALL option is used with this command, only a single facility parameter may be cleared.

```
UTL::CLR,{NPC <npc No.1>[-<range>] | ALL},\
<parameter>[,AI aaaaa][,LOCN locn]\
[,MONDAT dddd][,MONTIM tttt]!
```

Where:

<npc No.1>	=	The 3- or 4-digit nonhierarchical starting NPC number.
<range>	=	Optional, the 3- or 4-digit nonhierarchical ending NPC number
ALL	=	Used to clear a single parameter for all NPCs of type DA or TA. **If this option is selected, only one facility parameter may be cleared.**
<parameter>	=	The monitored parameter accumulation register to be reset. One of:

CVP	Path Coding Violations
CVL	Line Coding Violations
ESP	Path Errored Seconds
ESL	Line Errored Seconds
SESP	Path Severely Errored Seconds
SESL	Line Severely Errored Seconds
SEFS	Path Severely Errored Framing Seconds

CSSP	Path Controlled Slip Seconds
UASP	Path Unavailable Seconds
ALLPAR	All parameters
ALLL	All line parameters
ALLP	All path parameters

NOTE:
If the value ALLPAR, ALLL, or ALLP is selected, a single NPC must be specified and the MONTIM and MONDAT parameters may not have a value of ALL.

aaaaa = The accumulation time period for the specified parameter: either 15MIN to clear a 15-minute accumulator, or DAILY to clear a daily accumulator. Optional if MONDAT and MONTIM are set to HIST.

locn = The facility location corresponding to the set of performance monitor registers to be reset: FEND for far-end, NEND for near-end (default), or ALL for both far-end and near-end.

dddd = The beginning date of the performance monitoring period to reset. Specified in the format MMDD, where MM is the month (01-12) and DD is the day (01-31). The current date can be specified by making dddd = CURD (default). All near-end/far-end daily and 15-minute registers can be reset by making dddd = HIST (tttt must also be set to HIST).

tttt = The beginning time of day of the performance monitoring period to reset. Specified in the format HHMM, where HH is the hour (00-24) and MM is the minute (00, 15, 30, 45). The current time can be set by making tttt = CURT (default). All near-end/far-end 15-minute and daily accumulation registers can be reset by making tttt = HIST (dddd must also be set to HIST).

2. The output of this command is handled as follows:
   - If a single NPC is specified, the count for the requested parameter for that NPC is cleared.
   - If a range of NPCs is specified, the NPCs within the range that do not support the requested <parameter> will be skipped.
   - If the ALL option is requested, the counts for all NPCs that support the requested <parameter> are cleared and NPCs that do not support the requested <parameter> are skipped.
3. If the command is denied, find the reason for denial and perform corrective action to obtain completion (*Command Denials* has explanations of denial codes).

Facility Test Signals

DACS II provides the following "command and leave" test signals:

- Yellow Signal
- High Density Test Signal
- Low Density Test Signal
- Quasi-Random Test Signal
- In-Band Loopback Activate Signal
- In-Band Loopback Deactivate Signal
- Loopback Retention Signal

These signals support network maintenance activities.

Activate Facility Test Signals

1. To activate a facility test signal, input the following command:

   OPR::TSIG test,NPC <npc No.1>!

   Where:
   <npc No.1> = NPC number.

   test = Test signal type. The following table lists valid test signals.

test	Explanation
YELT	Yellow test signal
HDTS	High density test signal
LDTS	Low density test signal
QRTS	Quasi-random test signal
ILBA	In-band loopback activate signal
ILBD	In-band loopback deactivate signal
LRET	Loopback retention signal

NOTE:
The loopback retention signal is only applicable to NPCs grown with ESF framing.

Deactivate Facility Test Signals

1. To deactivate a facility test signal, input the following command:

   RLS::TSIG test,NPC <npc No.1>!

   Where:

   <npc No.1> = NPC number.

   test = Test signal type. The following list contains valid test signal types.

   - ALLP – All Payload Test Signals. Including high density test signal, low density test signal, quasi-random test signal, in-band loopback activate signal, in-band loopback deactivate signal, and yellow test signal in D4/T1DM mode.
   - ALLD – All Data Link Test Signals. Including yellow test signal in ESF mode, loopback retention signal, and ANSI bit-oriented far-end loopback activate/deactivate sequences.
   - ALL – All Test Signals in both the payload and data link.

Facility Loopback

NOTE:
This procedure is valid for all DS1s except for those DS1s embedded within a Hybrid DS3 signal. A separate procedure, described later, should be used for that case.

DACS II executes a near-end (at the DACS II) payload loopback by transmitting the received information bits of each frame back onto the DS1 facility. The framing bit position is regenerated by DACS II during a payload loopback. DACS II also sends payload, line, and network loopback commands on the ESF data link to far-end (at the terminal on the other end of the DS1 facility) equipment, ordering the equipment on the other end of the DS1 facility to execute the respective loopbacks.

Activate a Facility Loopback

1. To activate a facility loopback, input the following command:

   `OPR::LPBK loop,LOCN locn,NPC <npc No.1>!`

   Where:
   <npc No.1> = NPC number.
   locn = Loopback location. Either NEND for near-end or FEND for far-end.
   loop = Loopback type. The following table lists valid loopback types.

loop	Explanation
LINE	Line
PYLD	Payload
NTWK	Network

NOTE:
LINE and NTWK loopbacks are only applicable to FEND. Commands to activate/deactivate LINE/NTWK LPBK with NEND will be denied.

Deactivate a Facility Loopback

1. To deactivate a facility loopback, input the following command:

   `RLS::LPBK loop,LOCN locn,NPC <npc No.1>!`

   Where:

   <npc No.1> = NPC number.

   locn = Loopback location. Either NEND for near-end or FEND for far-end.

   loop = Loopback type. The following table lists valid loopback types.

loop	Explanation
LINE	Line
PYLD	Payload
NTWK	Network

Facility Loopback for TE or TH Type NPC within a Hybrid DS3

For TE or TH type NPCs that are associated with a Hybrid DS3 signal, DACS II executes a near-end (at the DACS II) line loopback by transmitting the received information bits of each frame back onto the embedded DS1 facility.

Activate a Facility Loopback for TE or TH Type NPC within a Hybrid DS3

1. To activate a facility loopback, input the following command:

   `OPR::LPBK loop[t],NPC <npc No.1>,LOCN locn!`

   Where:

   <npc No.1> = NPC number.

   loop = Loopback type. Only LINE is allowed for TE or TH type NPCs associated with a Hybrid DS3 signal.

   t = (Optional) Loopback signal transmission specifier. If used, t=N, which prevents the DACS II frame from sending AIS downstream. Otherwise, for TE and TH type NPCs on a HDS3U, AIS is sent downstream as the default.

   locn = Loopback location. Only NEND is allowed for TE or TH type NPCs associated with a Hybrid DS3 signal.

Deactivate a Facility Loopback for TE or TH type NPC within a Hybrid DS3

1. To deactivate a facility loopback, input the following command:

   `RLS::LPBK loop,LOCN locn,NPC <npc No.1>!`

   Where:
   <npc No.1> = NPC number.
   locn = Loopback location. Only NEND is allowed.
   loop = Loopback type. Only LINE is allowed.

Check and Operate Hybrid DS3 Loopback

Overview: This procedure contains the commands to check the loopback status for a Hybrid DS3 signal terminated within a Hybrid DS3U and to activate or release the loopback.

1. If you want to check the current loopback status, continue with Step **2.**
   - If you want to activate or release the Hybrid DS3 loopback, proceed to Step **4.**

2. Enter the command to check the loopback status as follows:

   `UTL:[FRM xy,SEQ ww]:QRY,LPBK,UNIT <[q]q>!`

   Where:
   xy = Optional, DACS II frame number.
   ww = Optional, command sequence number.
   <[q]q> = Unit number for the Hybrid DS3U (1 through 16)

   - If UTL ...DNY message is received, find the meanings of the condition codes in *Command Denials*.

3. Read the loopback state for each DS3 signal within the unit by referring to the detailed output messages documented in the Command and Message Manual for this command.

4. To change the loopback state, enter

   `OPR:[FRM xy,SEQ ww]:LPBK d[t],UNIT [q]q,MMFG a!`

   Where the variables d, t, q, and a may be set as shown:

   d = Loopback Type

   Code **E** when you want to activate an equipment loopback (diagnostic local loopback), such that the outgoing DS3 signal is looped back towards the DACS II equipment.

   Code **F** when you want to activate a facility loopback (line local loopback), such that the incoming DS3 signal is looped back towards the facility.

   Code **N** when you want to stop the loopback

   t = Loopback signal AIS specifier

   Code **N** when you do not want to send AIS upstream towards the facility, assuming you coded d=E, while the DS3 signal is looped back towards the DACS II equipment.

   If **t** is not specified for an equipment loopback request, the default is to send AIS upstream towards the facility while the DS3 signal is looped back towards the DACS II equipment.

Code **N** when you do not want to send AIS downstream towards the equipment, assuming you coded d=F, while the DS3 signal is looped back towards the facility.

Again, if **t** is not specified for a facility loopback, the default is to send AIS downstream towards the equipment while the DS3 signal is looped back towards the facility.

[q]q = Hybrid DS3 Unit number (1 through 16)

a = The number of the MMFG within the unit (P,1 through 6) (P means the protection MMFG)

- If OPR ...DNY message is received, find the meanings of the condition codes in *Command Denials*.

5. Check the output message to verify the loopback state.

Command Denials

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Contents

Command Denials

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Clear Command Denials

1. If you have one of the following word strings in the denial message, read the associated information and perform corrective action to obtain command completion.

   - **INACT** - The INACT message indicates that the command is invalid with the feature package being used.
   - **BAD SYNTAX** - Determine the portion of the command that was in error from the designator (BAD VERB/FRM ERR/SEQ ERR) in the message and reenter the command with the correct information. If you do not understand how to correctly construct the command, you can get on-screen help using the help routine (initiated by entering a question mark, ?).

     NOTE:
     The DACS II indicates where the input error occurred, by placing = signs around the word or portion in the echoed command.

   - **ERR, ABT** - Reenter the command; a transient frame condition may have caused the command to be aborted. If the command is aborted again, check the printout to find associated trouble messages.
   - **MC OOS** - The MC (main controller) must be restored to service to execute the command.

- **MCOND** - The MC is in the maintenance condition, and only commands which are considered frame maintenance commands can be used.
- **MC INSERVICE -** The MC must be in the maintenance condition to execute certain PMEM and SMEM commands.
- **MPDBASE** - The main processor data base is not loaded.
- **RESTRICTED, STOPPED** - Only users who have been assigned the use of restricted maintenance commands can use the command. The use of this set of commands is enabled by the frame administrator who enters the ADD command with option RMON for the user.

2. If you received a subrate data denial message string, check Table 10-1 for additional information.
3. If you received a COND cc DNY message, find the meaning of the COND code in Table 10-2.

   NOTE:
   Since only the last 2 digits of the condition code appear in the message, some of the codes have multiple meanings. If any meaning in Table 10-2 is not appropriate for the command that was denied, check the other meanings.

4. Command denials can be categorized under common causes. Check the following descriptions and, if applicable, perform corrective action to obtain command completion.
   - **Input Error -** Check each field of the command entry on the screen or printout against the documented command to find the error.
   - **Not Equipped, Not In-Service, or Failed** - The named equipment is not grown (equipped) or in-service to support the execution of the command. The commands to grow and restore the plug-in to service are covered in provisioning in Volume 1, and procedures to clear failed plug-in and trouble messages are in this trouble-clearing volume.
   - **Incorrect NPC/Channel Number** - Check each side of the cross-connect command to find incorrect numbers that are already assigned or assigned differently. There are query commands in the cross-connect procedures to obtain information about existing connections on the frame.
   - **Invalid Parameters** - Check each field of the command entry against the documented command to determine which keyword is incorrectly used.

- **Boot Failed** - This is a specific restore command denial. Reenter the restore plug-in command and subsequent diagnose command in an effort to get a DGN ...STF message for which there is trouble clearing in the respective trouble-clearing chapter. If no DGN ...STF message is obtained but the denial persists, replace the plug-in to be restored.

Table 10-1. Subrate Denial Strings

Message String	Corrective Action
Exceeds Limit of 21	Only 21 MJUs can be disconnected at one time. Split the MJUs to be disconnected into smaller groups.
INCL Required for All Subrate Circuits	This is a precaution to ensure that data customers are informed of maintenance action. Verify that you are addressing the correct channel and notify customers if you are going to remove service.
OLD Channel Not Established to Subrate Feature	The addressed channel has not been established to subrate with SECH command.
OLD Channel Has Associated Parity Channel	The PCH [ppp] option must be used to indicate the next or particular parity channel.
New Channel Not Same As Old	The new channel was established to Subrate differently (DS0A or DS0B). Check channel entries.
Exceeds EC/SRM/MJU Capacity	For EC, use ECLOC query to find which is being used (SRM or MJU); enter command to change ECLOC. For SRM/MJU, the next plug-in is required for more capacity.
MPTM Keyword Disallowed	The MPTB keyword is only valid for multipoint junction unit circuit.
MA Field Does Not Exist	The MJU entered in the MA field does not exist.
ALL Keyword Is Not Specified	The ALL must be used when there are branches. Verify command entry.
Associated with RT Digroups	An NPC entered in the command is associated with *SLC*® Carrier System; channels for these are entered as virtual channels on the DGA NPC, which allows channels 1 through 96 to be addressed on one NPC.

Table 10-2. Frame Denials

cc	*Explanation*
00	No conditions
01	Assignment of single priority to multiple SSPs Backup required before executing this command Invalid range for specified NPC type No FADs were activated by link n No test ports were activated by link n Subject entity is equipped
02	Invalid NPC type for AIS insertion

cc	*Explanation*
	Manual Pending is Active One or more FADs could not be released One or more test ports could not be released Subject entity is not equipped
03	DS3U NPC already In-Service No RDC or CUS circuits and INCL keyword used Subject entity is in service This NPC type does not allow unframed Clear-DS1
04	MONDAT keyword is invalid for this feature No NPC's out of service and OOS keyword used Subject entity is out of service This NPC type does not allow Payload
05	Invalid parameter combination Invalid use of CONV keyword Subject entity is pested This NPC type does not allow unframed Clear-DS1
06	Device failed to format Invalid range for specified FROM NPC type Mismatch between MXR and MIU HDW types
07	Device failed to initialize Invalid range for specified TO NPC type Mismatch between MXR and NPC types
08	Cannot remove own link Invalid FROM NPC type for AIS insertion Mismatch between service MXR and protection MXR types
09	Invalid TO NPC type for AIS insertion Last link in service Wrong MXR type grown for this MIU
0A	All CBTYPE NPCs out of service or failed DGN on subject entity failed Minor Slip threshold disabled before Major Slip threshold
0B	Another signal already active prevents this signal from being sent BOOT on subject entity failed Invalid CEPT NPC
0C	DGN on subject entity denied PM scheduling report is already inhibited for this entity The MONDAT and MONTIM parameters can not both be specified
0D	PM scheduling report is already allowed for this entity Unpesting error registers for subj. entity failed
0E	No equalization for CEPT FTMI Only one parameter is allowed The specified parameter is not applicable to operation mode of the RT
0F	Frame time is not set Side specified for non-duplicated NPC
10	NPC out of service or failed RT's alarm exists Unit is not equipped

cc	*Explanation*
11	NPC not equipped PMEM type no longer supported UC is out of service
12	Active CCN side not IS or failed or pested or hardware OOS First and Last NPCs are outside unit boundary UC is in service but failed
13	FTMI is not equipped First and Last NPCs are outside a module boundary UNIT not equipped, not in service, or failed
14	1 hr >= 24 hr for DM opt CCB not eqd, not IS, or failed or inactive side CCB not eqd or not IS FTMI is out of service OFFSET range is invalid
15	15 min >= 24 hr for SERS opt FTMI not equipped, not in service, or failed NPC is unequipped
16	15 min >= 24 hr for ERS opt FC not eqd, not IS, or failed or inactive side FC not eqd or not IS FC not eqd, not IS, or failed or inactive side FC not eqd or not IS Only up to 4 historical data registers are allowed SYNC TB is not equipped
17	15 min >= 24 hr for US opt Command did not execute for any entity specified in the command SYNC is out of service TSI not eqd, not IS, or failed or inactive side TSI not eqd or not IS
18	15 min >= 24 hr for SLIP opt CCNI is out of service DSPI not equipped, not in service, or failed DSPI not in service or failed Exceeded limit of reports with accum. interval of 15 min. or less
19	Exceeded maximum limit of PM reports Mate CCN side is out of service Test ports must be on CAS
1A	Mate SYNC is out of service Report already exists Required FLI not equipped, not in service, or failed The facility parameter not programmable for specified x or z parameter
1B	CCN side s is in service Historical data can not be specified Required MXR not equipped, not in service, or failed Two digroups from same bank added to different FTMIs
1C	CCN side s is out of service Reqd FMT not eqd,not IS,or failed,or inact side FMT not eqd, or not IS
1D	Level field is not allowed Required MIU not equipped, not in service, or failed
1E	Customer control or red circuit exists Monitored Date field is not allowed

cc	*Explanation*
	Monitored Date field is not allowed
1F	FTMI is in service but failed
	Scheduled reporting for this npc is inhibited
20	Line format types are incompatible
	Only DAILY for accumulation interval is allowed
	Only DAILY for accumulation interval is allowed
	Option rr/m has not been set up on 2nd database
	Software Identification Block is not readable
21	Minor >= major for SLIP opt
	Only 15MIN for accumulation interval is allowed
	Only 15MIN for accumulation interval is allowed
	Software Identification Block failed comparison
	Trunk conditioning is invalid
22	FMC cannot be cross-connected in this format
	FTMI is PESTED
	Minor <= major for BER opt
	Release number mismatch
23	Minor >= major for COFA opt
	No PM data available
	No PM data available
	Point number mismatch
24	Monitored Time field is not allowed
	Monitored Time field is not allowed
	PDI Version number mismatch
	Unit type error
25	Accumulation Interval field is missing
	FTMI type error
	Invalid FPI value
26	Feature deactivation would leave system with core software
	NPC type error
27	Disable not allowed - supports another feature
	Illegal connectivity specified
	Only historical data can be specified
28	Connectivity contains unequipped units
	Feature is active
	Scheduling report could not be found
29	Feature not enabled
	IW is UMUX (18) but NPC not type DE4yz
	This signal is already being sent
2A	DMI combined with T1DM
	Database not loaded
	Deny Clear-2MB for Alternate Maps
	Incorrect pack type in slot
2B	Bit c not settable
	Database corrupt
	Maj|Min BER threshold is 7, but not in T1DM or Fe mode
	Reading Feature Package Id from PMEM failed

cc	*Explanation*
2C	Write to CPR failed Writing Feature Package Id to PMEM failed not allowed for clear 2MB
2D	RTF keyword is used without DGA TS0 is crossconnected to TS0
2E	RTF keyword and the operation mode does not match bit value not allowed for NPC type
2F	Channels assigned, cannot be grown as test port TS0 connected to nonTS0 in Mode 2 - "a" should be "-" or equal to "b" The RT id entered is not a retrofit one
30	NPC not provisioned for CAS No signals active Termination is already assigned Unit is not FTU type
31	Accumulation Interval field is not allowed Failed to switch SYNC side NPC not provisioned for NSA
32	Bit 3 provisioned for use as RAI3 Termination is under test Threshold value is out of range
33	Bit 4 provisioned for use as RAIS NPC not DA or TA type. Termination is a test port Wrong TLI type
34	NPC type option xyz is unassigned NPC type option xyz is unassigned or invalid for feature package Termination is under customer control (CUS)
35	Invalid use of INCL keyword NPC has active circuit Termination is protected (RDC) The mate FLI is OOS and Protection MIU is equipped
36	DSPI not equipped INCL keyword needed when restricted Insertion Word specified TD on one(both) sync(s) is not equipped or not in-service Termination is not connected as indicated The mate FLI is OOS and Protection MXR is IS
37	DSPI out-of-service Major/Minor BER threshold value is invalid for SLC NPCs Selected FLI has LOC with at least one inservice MXR The mate FLI is OOS and at least one Service MXR is equipped Two confs. were prev. connected or the concat. cause BRD-BBL loop
38	Deny SP Type NPCs for Alternate Maps FC not equipped The selected FLI is IS and Pested and at least 1 Service MXR is eqd Unselected FLI has LOS with at least one inservice MXR
39	An autonomous switch is in progress MXR LOS with unselected FLI

cc	*Explanation*
	Not enough TSIs for CCB test
	Signaling state of the trunk failed for the channel
3A	Bit 4 provisioned for use as RBER
	Invalid FPI value
	Invalid poll time
	No unmapped slots on a bus
3B	Bit 5 provisioned for use as SFI
	Not valid for frame administrator
	Unspecified L2 address
3C	Bits 3 through 8 are provisioned for Transmic 1G
	Duplicate L2 address
	TS0 specified with width not 1
3D	Alarm bits cannot be passed through or inverted
	Illegal test access mode for TS0
	No mapped slots on a tsi
3E	DSPI failed
	Mapped slots exist on a tsi
	TS16 specified for test with width not 1
3F	Conference exists in a DMB
	G4 to G4.1 retrofit failed
	Illegal test access mode for TS16
40	CCN denied request
	FC out of service
	Not enough DSPPs are equipped
	Only one channel allowed to have this language
	Signaling processing is not activated for the channel
	The service FLI is out of service or pested (TOSRVC option)
41	Failed to boot subject CCN side
	Language "F" provisioned for this channel
	Not enough DSPPs are in service
	The protection FLI is out of service or pested (TOPRTN option)
42	Change not valid
	DSPP not in service, or failed
	RST failed to boot program
	The service FLI is already selected (TOSRVC option)
43	(NPC) Hardware mismatch
	RST failed to boot DB
	The protection FLI is already selected (TOPRTN option)
	Trying to change in NTR direction
44	Invalid direction specified for NTST TLA/TLR
	NPC not IU/TI type
	Service MXR is not equipped
45	A DMB on the UNIT is OOS
	IU/TI type NPC failed
	NPC not provisioned as DGA
	Service MXR is out of service
46	Failed to boot CONF file

cc	*Explanation*
	NPC Failed or Out of Service
	Service MIU is out of service
	virtual SLC NPC not provisioned
47	Failed to boot DB
	IU/TI type NPC
	Invalid channel number
	Protection MXR is out of service
48	Bad PRIM X’efgh values
	Failed to boot journal--recurrence indicates database corruption
	Invalid SLC Mode-III channel number
	Protection MIU is not equipped
49	FAC keyword is invalid for this feature
	Failed to boot unit
	Protection MIU is out of service
	test group unequipped
4A	PRIM keyword is invalid for this feature
	Red circuit, INCL not entered
	SMEM error, boot from PMEM
	The protection MMFG is serving another facility
	channel part of a TP or TG
4B	Customer controlled circuit, INCL not entered
	PMEM error, boot from SMEM
	The Service MMFG is already under protection
	The common bit(s) is(are) not set in both FAC & PRIM
	channel already under test
4C	BCON BBL has one or more legs under test
	Both FAC and PRIM values(keywords) are required
	Failed to boot CI
	The Service MMFG is not under protection
4D	DSPI is in service
	Gateway test access not supported
	MP database not consistent with Configuration file
	The switch is allowed (not inhibited)
4E	IW option is not allowed for new type of Clear-DS1 NPC
	RTBC conference exists
	The switch is already inhibited
4F	BER must not be less than 4 for Clear DS1
	NPC is not part of a one-way connection
	inconsistent BCON width for test access
50	CPR in buffer overflow condition
	Can’t run test on active side
	Invalid MIU/MXR type specified
	Trunk conditioning doesn’t match that of conference
	invalid channel designation for BCON
51	C-bit modify function is disabled
	CUS flag doesn’t match that of conference
	General boot failure (vanilla flavor)

cc	*Explanation*
	TG width incompatible with circuit The pair MXR is not equipped
52	CPR is not equipped Database is empty FDL selected with width not 1 RDC flag doesn’t match that of conference The MMFG is protected
53	CPR is out of service Database is not empty TO side of two-way to be converted is not an FTU NPC The associated MMFG is under protection (for Service MIUs) inconsistent HUB width for specified TG
54	Conversion leg is terminated Cross-connect to CPR is required The MIU is already equipped invalid mode for TLA/TLR
55	Invalid CFT code Some associated NPCs are equipped Width of existing two way does not match conference width circuit already terminated
56	FROM is a two-way and no CONV specified The MXR is in service Unrunnable CFT code circuit not terminated
57	Designated TG or circuit to be tested in process of being rolled FROM is not a backbone leg SIDE must be specified for subrate NPC
58	DSPU is not equipped NPC is OOS for a TGR command and OOS keyword not specified SLC 96 MD 1 RT DGP requires mate NPC to be unequipped Specified width does not match existing conference width
59	DSPU unit controller is out of service Invalid TC specification NTR invalid since existing conference is not already NTR Number of DGPs on each unit is limited to 32
5A	DSPU unit controller is failed LPD invalid since existing conference is not already LPD NPC not in service or failed
5B	C-bit modify function is active TO is not a leg of this/any conference channel is OCON in opposite direction
5C	Can’t disconnect return leg unless entire conference disconnected Inconsistent or invalid circuit type for Nx64Kbit TA NPC providing timing to inservice SSP
5D	Inconsistent Signaling on CEPT NPCTGs Sync source NPC is not inservice TO is the backbone leg of a conference

cc	*Explanation*
5E	Sync source NPC is not equipped TO is a part of the same conference as a previous TO invalid test access mode
5F	Conference is NTR: has no switchable return leg input channel out of range (SLC not supported)
60	Conference is LPD: has no switchable return leg Selectable AIS not valid for specified NPC(s) type User macro/map space is full circuit contains mapped channels for HUB request
61	All NPC(s) are either not valid or not grown System macro/map space is full TO is already the return leg not all FROM channels on same NPC
62	File is being accessed IU type NPC(s) cannot be provisioned for Minor Alarm Invalid channel number NPC type mismatch None of the designated NPCTG(s) are equipped
63	File already exists NPC is a DGP NPC is a channelized NPC None of the designated TG(s) are equipped
64	File doesn't exist/can't be accessed Frame is not in MCOND NPC is a non-channelized NPC NPC is already grown and added as SLC digroup TG width too large for single NPCTG
65	Another NPC is grown and added as this digroup Command invalid while backup in progress Ending channel is out of range Link being used is not Link 1
66	DGP designated to bank without data link Map/macro file write deferred until backup is completed TG number previously assigned User login-id is not DAX
67	DGA is not added Improper roll command sequence NPC(s) actual type incompatible with TYPE keyword and/or alarm type User logged off during session
68	Incorrect language/addressing mode NDL option is used without DGA NEW NPC already cross-connect or mapped channel(s) on new
69	Incorrect number of parameters Mapped parity channel(s) on new Use of this NPC is RESERVED for SLC 96 MD 1
6A	NPC type is not DS type New in CGA or PBA

cc	*Explanation*
	No macro is currently executing
6B	Invalid line number
	No mapped channel on old
	Operation mode and digroup name don’t match
6C	File is empty
	Framing format, digroup name & operational mode don’t match
	Old and new chan on same NPC and within the range
6D	Counting sequence and operational mode don’t match
	One NPC is a non-channelized type and the other is not
6E	DGA with NDL option is not provisioned with D4 or ESF framing format
	No edit session active
	Old or new is a non-channelized type in a DS0 command
6F	Adding two digroups from one bank on same DDC
	The OLD or NEW NPC is already being rolled.
	The session is terminated due to maintenance operation
70	Digroups from same bank have different modes
	NPC invalid type
	One of the FAR end channels is being rolled
	Some circuits not activated,cleared or pictured
	Try to add a BBL to VC,but the VC already has backbone
71	Digroups from same bank have different counting sequence
	NPC is a Facility Access Digroup
	The reference map does not exist
	Try to delete a BBL leg from VC;however, VC has no BBL leg
	Unmapped channel(s) on old
72	Digroups from same bank are added to two different FTUs
	Invalid test mode for an unmapped test session
	One of the far NPC(s) is SLC
	The NPC of VC BBL leg doesn’t match that in the input command
	The map is not valid
73	Both sides of CCN are OOS
	Channel has a FAR, which is within the range
	Invalid PWR/MISC alarm level
	Invalid test mode for a one-way test session
	The first channel of VC BBL leg doesn’t match that in the input command
74	At least one UC is OOS or At least one UC is failed
	Old and new are the same NPC in a DS1 command
	PWR/MISC alarm is specified to a digroup other than DGA
	Try to delete a BRD leg from VC; however, VC has no BRD leg
75	At least one UC is not the correct type
	Old and new channels have not been paired by a BCAST command.
	Test session already exists
	The input BRD leg is not in VC
76	AIS not entered for SPLTE/SPLTF/SPLTEF/LOOPE/LOOPF
	Alarm option and bank mode don’t match
	Channel or NPC not bridged
	The first channel of VC BRD leg doesn’t match that in the input command

cc	*Explanation*
77	Obsolete circuit type Tried to disconnect a nonexisting VC Unassigned operational mode
78	Protection switch process failed Ranges of old and new do not match Try to operate a ONE-WAY conference with a TWO-WAY input command
79	DCTN conference channel cannot be rolled DGA/DGP of RT/DL Mode I must be assigned to one DDC NPC is not a Facility Access Digroup Try to operate a TWO-WAY conference with an ONE-WAY input command
7A	Mode I RT/DL IDs don’t match for DGA/DGP on same DDC NPC is not an E-end Testport/testgroup channel cannot be rolled The NPC to delete has not been previously added to map
7B	Channel out of bound in a BCON/v.c Invalid change from previous mode Other NPC on this DDC not the same digroup for Mode I DGA/DGP
7C	Different DSxyz types are used for DGA/DGP on same DDC for Mode I Logical conflicts found in the map NPC is not a F-end Parity channel out of bound on new
7D	Can’t start new session - previous session still verifying Not first channel in a BCON/virtual conf The NDL options are different for DGA’s on the same DDC for Mode I
7E	Bank id number not found Framed/Unframed clear 2Mbit/s NPC invalid for Automatic CRC-4 Insufficient data for setting up a conference
7F	NPC is not added No OOS keyword is given for out-of-service NPC Unframed clear 2Mbit/s NPC invalid for TS0 processing
80	Database conference width does not match the range in input command Framed/Unframed clear 2Mbit/s NPC invalid for Transmic 1G, 2G Inconsistent channel range width NPC number and bank id don’t match Some TSIs to degrow are in service
81	Conference Port is currently registered to a different channel Frame ID is protected Framed/Unframed clear 2Mbit/s NPC invalid for Firmware Timing Invalid input BBL as fmd in ONE-WAY command NPC number and digroup name don’t match
82	Can not use 12-th TP when NPCTP is in the T1DM or DMI mode DL ffff is used w/ operational mode other than Mode I Invalid input BRD as tmd in ONE-WAY command Unframed clear 2Mbit/s NPC invalid for Bit 4 used as RA IS/RBER
83	Attention: preceding ccode 83 is an anomaly - see problem list Conference Port is already registered to the same group of channels Invalid input BBL in terminated TWOWAY/ONEWAY command

cc	*Explanation*
	Language is not allowed
	NPC type is inconsistent with FTMI type
	Option not programmable for this NPC type
84	Channel(s) is already registered
	Incompatible types of NPCs in a DDC
	Mate NPC is not equipped
	NPC is non-channelized
	Problem occurred while accessing SMEM or unformatted SMEM
	Trying to add or delete a leg when a conference is under test
85	IW not allowed to be specified in Clear 2Mbit/s
	Input BRD (BBL) has same NPC and channel as BBL (BRD)
	NPC has been designated as NPCTP
	New bank id is an assigned one
	Problem occurred while accessing PMEM
	Using the 24th channel of a T1DM NPC
86	Attempt to remove DGA w/o INCL keyword or prior prot. sw. request
	NPC is NPCTG and chan 24 is used in a TG;Can't change to T1DM or DMI
	NPC number out of range
	Source does not contain requested information
	Using the 24th channel of a DMI NPC
87	Copy source NPC is not equipped
	DGP is protecting a primary digroup
	NPC as 12th test port can not change to DMI nor T1DM
	Old_tape is a special install tape
88	Conference port is not registered
	NPC is not a NPCTP
	Report interval is not an integral number of accumulation interval
	SMEM is a normal SMEM
89	Can't delete because not all associated NPCs of the RT are entered
	Conference port is currently connected
	Interval is not valid/not available
	Interval is not valid/not available
	NPC is not designated for this NPCTP/NPCTG
	Problem occurred while accessing BOTH_MEM
8A	Mismatch between channel 0 crossconnect and keywords
	NPCTP is not grown
	x & z parameters on DSxyz are inconsistent
8B	Channels and conference port do not match
	Digroup name and bank id don't match
	PMEM not in service or not ready
	Test port is not idle or frame is not inservice
8C	DB MP or units ram error
	Digroup is protected
	The two FADS entered are not associated with one another.
8D	Clear gateway test access disallowed.
	DB PMEM error OP-CL-RD-WR-SK
	RT/DL has unrestored DGA

cc	*Explanation*
8E	Attempt to add to a null transmitting port DB can't send or receive mail DGA protected; use INCL to remove, or unswitch protection No mapped circuit under test; emode/fmode can't be changed.
8F	Can't lock or unlock ram database NPC not deleted Number of transmitting ports does not match existing conference One-way circuit under test; emode can't be changed.
90	Can't mount or unmount BOTH_MEM DB can't get the slave mail box Invalid change parameter combinations NDL option is specified for DGA The total number of receiving ports specified exceeds the max. emode/fmode can't be changed under current test mode.
91	Can't mount or unmount SMEM Can't mount or unmount password recovery card Duplicate ports specified Option not programmable for this NPC type SR NPC was specified - not allowed Sync is not configured yet
92	Boot TLI failed Can't mount or unmount PMEM Transmitting port cannot be dropped
93	All digroups not out of service PA NPC threshold already in inhibit mode SMEM is not present TB type in hardware mismatches DB The conference does not exist
94	Conference port is not in conference circuit Mate RT/DL mode is different PA NPC threshold already in allow mode SMEM unit is not restored
95	Invalid option,mailbox or flag Range overlapping between FROM and TO or between two TOs TG East/West type inconsistent with each other or circuit
96	Conference already exists Subject PWR to be cleared is not failed Unit(s) OOS, and additional backup required incompatible HUB feature types
97	Conference port cannot be dropped out of conference by switch command Entity can't be addressed in this configuration User quit the menu option LOCAL already exists
98	Checksums verification failed Error in input Test Port release failed Unable to verify Configuration file since MP DB not loaded

cc	*Explanation*
	option REMOTE already exists
99	G1 SMEM for SMEM->PMEM w/journals
	No Facility Line Interface (FLI) is In Service
	Unit type (xyz) not supported
	can’t change option, protection switch is active
9A	Formatter (FMT) on active CCN side is Out-Of-Service
	can’t change option, inhibition is active
	hub id not set when MJU pack grown
9B	INCL must be specified for SRDC ckts
	Termination is under test or is a test port or group
	The MXR is not grown
9C	Parity channel cannot be within the range of a DS0 command.
	SRDC timeslots are allocated on this NPC
	The MMFG is already In-Service
9D	Attempt to remove a Service MIU which is under protection
	NPC containing channel 000 is invalid type.
	current hub id specified in command
9E	MONDAT set to ALL is not allowed
9F	MONTIM set to ALL is not allowed
	current error corrector pack type specified in command
A0	Illegal LEG LEG combination
	No SAFE alarm for DGP
	Not a CRO TLI
	TS16 specified for CAS TG
	The selected MXR associated with the NPC is Out-Of-Service
A1	CRO type TLI (SSP portion not required)
	Illegal BBL BBL combination
	Loop back inhibited for digroup
	NPC has been designated as NPCTG
	The parameter specified does not match with the NPC type
	The selected MXR associated with the NPC is In-Service but failed
A2	All channels assigned, cannot be grown as NPCTG
	Illegal BRD BRD combination
	SSP number is illegal
	The requested digroup is carrying service
	The selected MIU associated with the NPC is Out-Of-Service
A3	Channels assigned, cannot be grown as test group
	Illegal SYM BRD combination
	LLB not initiated
	SSP number required
	The selected MIU associated with the NPC is In-Service but failed
	Transmic 1G NPC designated as SYNC source invalid
A4	Both syncs are in-service
	Firmware timing invalid for Transmic 1G NPC
	Illegal BRD SYM combination
	NPC is not a NPCTG
	The MXR diagnostics failed

cc	*Explanation*
A5	(Timing Distributor) TLI is not equipped AIS keyword incompatible with NPC type Autonomous loopback is active on DGA FPI on SMEM does not match one on PMEM Illegal BBL SYM combination Test group is not idle or frame is not In Service
A6	Deny SLC for Alternate maps Illegal SYM BBL combination Invalid switch request for DCLU Test group release failed The MIU diagnostics failed
A7	Deny non-channelized NPCs for Alternate Maps LEG mode was assigned to a DSPU-type NPC on the input NPC has been designated as NPCTP Sync 0 is not in-service The MIU boot failed
A8	A DMB mode was assigned to a FTU-type NPC on the input NPCTG not grown Sync 1 is not in-service The MMFG is Out Of Service
A9	Both syncs are out-of-service Circuits TCONed itself cannot be UTST Cross-connect not consistent with feature package INCL not specified and at least one NPC In Service No unmapped time slot Trying to add a BBL to a DMB conference that already has one
AA	DSPP pack UC Failed or Out of Service NPC is NPCTG, changing to CAS/NSA is not allowed Range entered without FRC keyword Syncs are equipped Trying to add a broadcast leg to a conference set up as SYM
AB	Bad sync mode DSPP pack FTMI Failed or Out of Service FRC specified for protection, and service MMFG is In Service Trying to add a SYM leg to conference set up as broadcast
AC	DSPP pack NPC Failed or Out of Service No protection is available for the Service MMFG Timing Extractor type TLI (need SSP info) Trying to add a BBL leg to a conference set up as SYM
AD	Not Timing Extractor type TLI (not SSP) The Protection MMFG is selected, and auto. switchback is unavailable
AE	A subrate circuit pack is specified in the command line MXR is failed NPC used as a timing reference Wrong TLI type (need CRO grow command)
AF	3 Timing Distributor type TLIs are equipped Delete or change a leg from a conference that has no leg

cc	*Explanation*
	MIU is failed
	Number of SLC RT's on each unit is limited to 80
B0	Bad use of INCL, cannot override the current state of the conference
	Combination of bit g (b7) and h (b8) is invalid
	FLI is out of service
	Unit 1 denied request
B1	Bad use of INCL, cannot use keyword on conf.-to-conf. connection
	FMT is out of service
	Illegal priority value
	Unit 2 denied request
B2	Illegal SSP type (not same as other SSPs)
	MXR is out of service
	Transmission parameters in command will not change existing settings
	Unit 3 denied request
B3	MIU is already in service
	Trying to change level out on BRD leg
	Unit 4 denied request
	X option is illegal
B4	NPC is channelized type
	Trying to change level in on BBL leg
	Unit 5 denied request
	Y option is illegal
B5	CPR circuit pack specified in the command
	NPC is a test port
	Unit 6 denied request
	Z option is illegal
B6	C-bit operations are enabled
	Sync architecture is same
	TO side is not a DMB type NPC
	The MXR boot failed
B7	Cannot perform DMB CHG on input direction F
	No DSP unit equipped
	Some TLIs are still equipped
	The associated MXR is In-Service but pested
B8	CRO is still equipped
	Cannot perform DMB CHG on input direction T
	No CBTYPE NPC equipped
B9	Cannot perform DMB CHG on input direction B
	No CBTYPE NPC capacity remaining
	Timing Extractor type TLIs are present
BA	Inactive side NPC out of service and inactive side in service
	TLI 3 or 4 still equipped
BB	Timeslot channel numbering not allowed with CAS
BC	DGA and DGB must be specified together in the command
	SSP with 0 priority present
BD	DGC and DGD must be specified together in the command
	Looped Circuit Access not allowed

cc	*Explanation*
	SSP with non 0 priority present
BE	Hardware mismatch or not present NPC type option Y is invalid for SLC-96 NPC
BF	MIU is not equipped Sync mode is same
C0	Cannot perform DMB CHG on input direction L NPC addressing scheme selected is not allowed in the configuration file Sync stratum is same
C1	Cannot perform DMB CHG on input direction G Stratum not allowed
C2	Cannot perform DMB CHG on input direction A ETSI cannot be initialized when ECCN side is OOS or inservice but pested SSP type(options) same
C3	Can’t perform DMB CHG because NTR flag set on FROM side Wrong SSP type(Timing Extractor type) XMIT continuity test won’t be run: CFT code specified
C4	Can’t perform DMB CHG because NTR flag set on TO side Sync architecture different XMIT continuity test won’t be run: no XMIT timeslots available
C5	Option NOT leg can not appear with F, T, or B RCV continuity test won’t be run: no available inservice NPCS for FC/FMT Some priority values required
C6	No available timeslots on any of the inservice NPCS associated with FC/FMT Option NOT leg is not a FTU leg Some priority values not required
C7	Option NOT leg is not in conference Priority values are same RCV continuity test won’t be run: no DMB timeslots available
C8	Exceeded depth limit of 6 on broadcast conference concatenation RCV continuity test won’t be run: at least one timeslot in use Sync pack denied command
C9	CATP due to skipping continuity test for FMT In-service NPC change not allowed Syncs failed to cross couple The INCL keyword is needed for DGA
CA	Connectivity can not be specified for CEF unit Mate sync pack denied command New NPC same as existing one No protection switch is currently active
CB	NPC parameter only valid with TU type TLI Protection entity out of service or failed Skip error summary since adjacent pack not in service or pested Sync not completely reset
CC	NPC is still provisioned to provide sync timing Protection entity is unequipped RCV continuity test won’t be run: SYNC OOS or pested
CD	Data link failed

cc	*Explanation*
	NPC not designated as sync timing source
	Subject NPC does not support CEPT BER feature
CE	CCI is out of service
	Far end failed to respond
	NPC already allocated as sync timing source
CF	MIU is out of service
	NPC already grown as non-synchronization source
	SYNC is inservice but failed
D0	Command is Frame administrator (DAX) only.
	FROM NPC is not provisioned as DGA
D1	CCI is not present
	Cannot create any more users
	Protection switch existing is autonomous
	TO NPC is not provisioned as DGA
D2	ETSI is not present
	Protection switching is already inhibited
	User has been created
D3	CCNI is inservice but failed
	Corresponding NPC for FROM virtual channel is not provisioned
	Protection switching is already allowed
	User does not exist
D4	A user is already logged in on the link/vc
	Active CCN side is out of service
	CCI is inservice but failed
	Corresponding NPC for TO virtual channel is not provisioned
D5	Boot in progress, can’t service request
	CCB is not equipped
	No user is logged in on the link/vc
D6	CCB is out of service
	Incorrect or missing password
	Invalid FROM channel number
D7	CCB is inservice but failed
	Cannot execute privileged command
	Invalid TO channel number
D8	Cannot remove Frame administrator
	ETSI is not equipped
D9	ETSI is out of service
	Invalid FROM channel number range
	User has logged in somewhere
DA	ETSI is inservice but failed
	Invalid TO channel number range
	User is not logged in
DB	FC is inservice but failed
	User still owns files
DC	A loopback is active on the FROM termination
	No zeros allowed for DAX privilege
DD	A loopback is active on the TO termination

cc	*Explanation*
	FMT is in service but failed
	Password recovery card is not READ-only
DF	Command and protocol are inconsistent
	FLI is inservice but failed
	Unmatched channel range
E0	Bad FAC value entered
	ETSI not equipped, not in service, or failed
	Hardware database mismatch
	Unmatched channel range involving SLC Mode III termination
E1	A locally switched channel is specified as BBL, LEG, or BRD
	No Memory Backup Has Been Scheduled
	Virtual circuit is not specified for X.25 link
E2	Attempt to one way cross-connect a locally switched channel
	Invalid link number specified
E3	Attempt to broadcast a locally switched channel
	Can’t Use LCN 0/LGN 0 - designated as a supervisory channel only
	Invalid keyword(s) combination specified
	One way unassigned channel/NPC in QRY,TO
E4	Broadcast unassigned channel/NPC in QRY,TO
	Invalid NPC addressing scheme specified
	NPC already has Equipment Loopback
	RT-DCLU cross-connect with different ids
E5	Adding DL DGP forbidden for SLC 96 MD 1
	Invalid combination of "x" and "z" values
	No user/link needs to be changed
	RT-DCLU cross-connect with different channel number
E6	Cross-connect a non Mode I channel to DCLU
	DB SMEM error OP-CL-RD-WR-SK
	No DL digroups can be added until the associated RT bank is created
E7	Cross-connect a non SLC channel to DCLU
	Invalid combination of "x" and "y" values
	PMEM not restored
E8	Other FLI is OOS
	SC invalid for cross-connection specified
E9	MUX or TRB invalid for cross-connection specified
	There are no INS MXRs to run test on
EA	AIS invalid for cross-connection specified
	XON/XOFF flow control is supported only on Snider link
EB	ENQ/ACK flow control is supported only on Snider link
	NAM invalid for cross-connection specified
EC	Invalid channel 000 cross-connection specified
ED	Invalid channel 031 cross-connection specified
	OLD termination is not mapped
EE	Trunk type is not allowed in the circuit specified
EF	Invalid circuit type
	SSC circuit pack is still equipped; pull-out/remove SSC
	Software does not contain Enhanced CEPT feature

cc	*Explanation*
F0	Clock absent for XPC to loop back Range not allowed for circuit type SSC Diagnostic Failure
F1	File has already been cleared PMEM and SMEM synchronization fail Parameter only valid with PA, PB, or PC type NPCs
F2	Invalid NPC number specified Not a DACS II compatible Flash Card
F3	Flash Card is empty Maximum number of CPRs have already been grown for this unit
F4	OLD and NEW channels cannot be the same PMEM and SMEM are different
F5	Conference first channel doesn't match input Flash Card is not present INCL keyword needed to perform this command
F6	Flash Card is bad Leg type mismatch T1DM or DMI mode and channel 24 is connected
F7	Can't mount or unmount old_tape Corresponding NPC for virtual channel is not provisioned OLD data channel cannot be parity channel type
F8	OLD and NEW Data and Parity channels partially overlap Old_tape is not present
F9	Cannot clear journals for OOS unit Mate NPC (DGA/DGP) is in service Old_tape unit is not restored
FA	Bad old_tape DB generic SSC software out of date The mode of the RT is not applicable
FB	Old_tape with journal PMEM verification failed
FC	Invalid executable on card Superuser logged on ZBTSI option is only valid with the ESF mode
FD	Command not allowed Line Loop Back is active NPC range crosses unit boundary Problem occurred while accessing old_tape
FE	AIS entered for MONE/MONF/MONEF/SPLTA/SPLTB/SPLTAB Change to non-ESF digroup with 16-state cross-connect Fail transfer DB from old_tape to SMEM
FF	Change to T1DM digroup with cross-connect that is not TRSP DB retrofit fail Termination is in process of being rolled

cccc	*Explanation*
0000	No conditions
0001	CEC bit on PRISM not cleared
0002	Firmware error
0003	Transmit underrun threshold exceeded
0004	Bad EMXR Acknowledgement
0005	Timeout while waiting for msg from EMXR
0006	RAM data error
0007	Invalid code checksum
0008	Error in PRISM register
0009	Error in HSCC register
000A	EPROM checksum error
000B	Timer 1 error
000C	Timer 2 error
000D	DUART error
000E	MIU access error
000F	CPU internal bus error
0010	CPU parallel bus parity error
0011	CPU serial bus parity error
0012	FLI register bit stuck
0013	FLI lock and key alarm
0014	MXR DS3 loss of signal
0015	MXR unknown error
0020	BX Access Error
0021	BX Ram Parity Over Low Byte
0022	BX Ram Parity Over High Byte
0023	Fan Bank Zero Error Flag
0024	D5 Spare Bit Error
0025	Fan Bank One Error Flag
0026	D7 Spare Bit Error
0027	BX stuck summary bit
0028	Unknown interrupt from BX
0029	Error from side 0 bus extension
002A	Error from side 1 bus extension
002B	Unknown interrupt from MTC
002C	MTC stuck summary bit
002D	Unused bits on MTC pack
002E	Error due to unused bit
002F	Error due unknown reasons
0030	Power Failure
0031	Sanity Time-out
0032	BX stuck CCNI summary bit
0033	FMT TF control bus error
0034	MXR M23 summary stuck error
0035	FMT multiple TF network data error
0036	FMT single TF network data error
0037	FMT TF device or clock receiver error
0038	FMT multiple TF clock error

cccc	*Explanation*
0039	FMT single TF sync error
003A	FMT multiple TF sync error
003B	FLI access error
003C	FLI communication link error
003D	DPC ROM error
003E	DPC loss of timing
003F	OOS RAM test ran while IS
0040	Bus Error Alarm
0041	CIA Device Error
0042	CIB Device Error
0043	CIC Device Error
0044	Pack can’t be accessed
0045	Loss of timing alarm
0046	Chip ID Comparison
0047	Data Strobe Signal
0048	Address Parity Error
0049	FC Stuck Bit on FTMI
004A	DDC Stuck Bit on FTMI
004B	FTMI lost clock
004C	FC can’t be accessed
004D	Timer Error
004E	Circuit ID Error
004F	Transmit Formatter Error
0050	Receiver Formatter Error
0051	Sanity Timer Interrupt
0052	RF bus error
0053	NPC bus error
0054	NPC can not be accessed
0055	NPC is alarming on FC
0056	Facility Processor Sanity Error
0057	SYNC Error
0058	Channel controller loss of clock
0059	Channel controller frame sync error
005A	CC configuration register error
005B	CC instruction ram error
005C	CC parity error
005D	CC transmit data error
005E	CC receiver data error
005F	CC exercise error
0060	CC summary bit error
0061	Hard RAM error
0062	Hard ROM check error
0063	Hard Error stuck bit
0064	Transceiver A stuck bit
0065	Transceiver A transmit slip
0066	Transceiver A Error
0067	Transceiver B stuck bit

cccc	*Explanation*
0068	Transceiver B transmit slip
0069	Transceiver B Error
006A	Circuit ID Error
006B	Facility errors
006C	NPC address parity error
006D	DSPI access error (e.g. pack not there)
006E	DSPI bus data parity error
006F	DSPI bus address parity error
0070	DMB access error (e.g. pack not there)
0071	DMB serial access error (pack not there)
0072	DMB parallel access error
0073	DMB bits stuck in exercise register
0074	DMB data processing error
0075	Multiple data parity error, CCB problem
0076	DMB clock error
0077	Multiple clock errors, CCB/SYNC problem
0078	DMB FIFO error
0079	Possible power failure on side
007A	DMB control memory error 0 (used for trans)
007B	DMB control memory error 1 (used for trans)
007C	Control Memory 0 control ram parity error
007D	Control Memory 1 control ram parity error
007E	Control Memory 0 control interface error
007F	Control Memory 1 control interface error
0080	Control Memory 0 loss of sync error
0081	Control Memory 1 loss of sync error
0082	Control Memory 0 DMB input data parity error
0083	Control Memory 1 DMB input data parity error
0084	DMB conference error 0 (used for trans)
0085	DMB conference error 1 (used for trans)
0086	Conference 0 control interface error
0087	Conference 1 control interface error
0088	Conference 0 control ram parity error
0089	Conference 1 control ram parity error
008A	Conference 0 DMB input data parity error
008B	Conference 1 DMB input data parity error
008C	Conference 0 DMB device (chip) error
008D	Conference 1 DMB device (chip) error
008E	Bad Ram Data in DMB device (bits alarms)
008F	Bad Ram Data in DMB device (bits alarms)
0090	CCNI access error (cannot access pack)
0091	High data byte bus parity error
0092	Low data byte bus parity error
0093	Address bus parity error
0094	Autonomous switch enable error
0095	Bus status register parity error
0096	CCNI stuck register bit, summary set, no other alarms

cccc	*Explanation*
0097	MXR communication link error
0098	CPR serial access error
0099	CPR clock error
009A	CPR processor interface failure
009B	CPR input data interface error
009C	CPR D-Bit interface parity error
009D	CPR control memory failure
009E	CPR control memory or state machine failure
009F	CPR FIFO FRDY/FFULL stuck bit
00A0	CCB packid error, wrong pack, can’t read pack
00A1	CCB sync pulse error
00A2	CCB clock error
00A3	CCB input port alarm error
00A4	CCB zero bit is stuck at 1
00A5	Corresponding CCNI bit is stuck
00A6	MXR channel controller transmit data error
00A7	MXR channel controller receiver data error
00A8	MXR channel controller exercise error
00A9	MXR channel controller stuck bit error
00AA	MXR transceiver framer error
00AB	MXR transceiver receive sync error
00AC	MXR transceiver transmitter error
00AD	MXR M23 device error
00AE	MXR M12 device error
00AF	MXR M12 summary stuck error
00B0	Pack id error, can’t read pack
00B1	TSI stuck bit, summary bit set, no devices alarming
00B2	TSI device error
00B3	TSI device id error, cannot read device
00B4	Illegal exercise bits set
00B5	Bus address error
00B6	Device clock error
00B7	Device control ram parity error
00B8	Output data parity error (from an FTM)
00B9	Corresponding CCNI bit is stuck
00BA	FLI loss of clock
00BB	FLI loss of signal
00BC	FLI circuit id error
00BD	FLI frame sync or internal error
00BE	FLI address bus parity error
00BF	MJU serial access error
00C0	MJU clock error
00C1	MJU processor interface failure
00C2	MJU input data interface failure
00C3	MJU error correction circuitry failure
00C4	MJU control memory failure
00C5	MJU output block failure

cccc	*Explanation*
00C6	MJU sampling circuitry failure
00C7	MJU control memory or state machine failure
00C8	SRM serial access error
00C9	SRM clock error
00CA	SRM processor interface failure
00CB	SRM input data interface failure
00CC	SRM error correction block failure
00CD	SRM control memory failure
00CE	SRM multiplexor block failure
00CF	SRM output block failure
00D0	CPU RAM Parity error
00D1	Source of error is unknown
00D2	Source of error was not found
00D3	Stuck bit in register
00D4	Bad UBX pack
00D5	Illegal/unknown condition code
00D6	MIU communication link error
00D7	FMT communication link error
00D8	MXR ROM error
00D9	MXR LCA error
00DA	MXR queue overflow
00DB	MXR channel controller loss of clock
00DC	MXR channel controller frame sync error
00DD	MXR channel controller configuration register error
00DE	MXR channel controller instruction ram error
00DF	MXR channel controller parity error
00E0	Hardware database mismatch
00E1	Hardware Failure
00E2	Hardware Boot Failed
00E3	Can’t access link
00E4	Transmit Time-out
00E5	Receiver Time-out
00E6	softerr failure which forces link removal
00E7	Unit could not be reset
00E8	Unit failed sanity check
00E9	failure to insert TCC
00EA	failure to remove TCC
00EB	failed to switch CCN sides
00EC	NPC’s facility queue overflow condition
00ED	Duplex entity failed diagnostics
00EE	Lost Clear-To-Send signal on X.25 links
00EF	Frame Audit reboot DDC failure
00F0	FMT access error
00F1	FMT timing error
00F2	FMT link id error
00F3	FMT bus timeout
00F4	FMT serial address parity error

cccc	*Explanation*
00F5	FMT 0-4TF timing error
00F6	FMT 0-4TF timing error
00F7	FMT error summary 1 stuck bit
00F8	FMT timing error, RF data parity
00F9	FMT error summary 2 stuck bit
00FA	FMT lock override, active select or kill parity
00FB	FMT FIFO or control PROM error
00FC	FMT RF control bus error
00FD	FMT RF port and monitor alarms
00FE	FMT RF port alarm; no monitor alarms
0101	CCI pack is not present
0102	Can’t communicate to CCI pack(incorrect version number)
0103	CCI pack’s summary is set but has no errors
0104	CCIERR bit is stuck in system status reg
0105	TSIERR bit is stuck in system status reg
0106	PUERR bit is stuck in system status reg
0107	Bus Terminator pack is not present
0108	The 32 MHz clock is out of lock
0109	CCI 240 sync is misaligned with frame sync
010A	CCI loss of 240 Frame Sync
010B	CCI loss of 8 KHz Frame Sync
010C	CCI detected Address Parity error
010D	CCI detected low byte data parity error
010E	CCI detected high byte data parity error
010F	CCI -5.2 power supply has failed
0110	CCI detected Bus Status Parity error
0111	CCI Peripheral Unit Alarm
0112	SYNC summary is set on CCI circuit pack
0120	ETSI pack is not present
0121	Can’t communicate to ETSI pack (incorrect version number)
0122	ETSI pack’s summary is set on CCI but has no errors
0123	ETSI loss of 32.768 MHz clock
0124	ETSI loss of 240 frame sync
0125	ETSI Rcv MDX summary stuck bit
0126	ETSI control RAM summary stuck bit
0127	ETSI TX MDX summary stuck bit
0128	ETSI loss of Vdd (3.3v) power
0129	Peripheral unit port alarm (RCV MDX)
012A	Receive MDX data source time slot parity error
012B	Receive MDX sync error
012C	Receive MDX address parity error
012D	Receive MDX write data parity error
012F	Receive MDX can’t be accessed (incorrect chip Id
0130	Transmit MDX data parity error
0131	Transmit MDX data source time slot parity error
0132	Transmit MDX sync error
0133	Transmit MDX address parity error

cccc	*Explanation*
0134	Transmit MDX write data parity error
0135	Transmit MDX can't be accessed (incorrect chip Id
0137	Control RAM parity error
0138	Control RAM sync alarm
0139	Control RAM port alarm
013A	Control RAM BIST flag is set
013B	Data RAM BIST flag is set
013C	Control RAM address parity error
013D	Control RAM write data parity error
013E	Control RAM device can't be accessed (incorrect chip Id)
013F	Control RAM circuit pack parity
0140	Control RAM device is in reset state
0141	Control RAM port alarm summary is stuck
0142	ETSI TRD3ST exercise bit is set
0143	ETSI ready high error on CCI
0144	ETSI ready time-out error on CCI(ETSI can't be accessed)
0145	Control RAM stuck bit error
016D	Invalid FPA state
016E	Invalid DDC pack id
01E1	MXR access error (can't access pack)
01E2	MXR hard error stuck bit
01E3	MXR facility error stuck bit
01E4	MXR pack is in reset state
01E5	MXR PIF Bus Parity Error
01E6	MXR loss of clock from unselected FLI
01E7	MXR 45MHz is not phase locked to system clock
01E8	MXR firmware error
01E9	MXR HSCC device error
01EA	MXR PIF I/O device error
01EB	MXR M13 summary stuck bit error
01EC	MXR transceiver summary stuck bit error
01ED	MXR program error
01EF	MXR RAM error
01F0	EMXR Timer error
01F1	EMXR DUART error
01F2	MIU got reset
01F3	Timeout for Yellow Inhibit/Enable Request
01F4	Queue overflow error
01F5	Packet layer parameters are mismatched between DACS II and the network
01F6	Failed to write XPC register
01F7	Transmit time-out because Clear To Send lost
01F8	R20 counter reaches limit
01F9	T3 timer expires
01FA	Too many interrupts or illegal interrupt from XPC
E000	CCNI summary bit set; no more info
E001	Sync says its down
E002	Sync says its time base is down

cccc	*Explanation*
E003	SYNC autonomously restarted itself
E004	MP-SYNC communications failure
E100	Unknown DPLL error
E101	ROM checksum error
E102	RAM data error, RAM address line stuck
E103	Phase/frequency output latch error
E104	Loss of energy on output of frequency synth.
E105	Loss of energy on output of phase shifter
E106	Loss of energy on generated SYNC pulse
E107	Loss of energy on time base strobe signal
E108	Interrupt controller error
E109	Interrupt holding register error
E10A	Uart error
E10B	Control data readable output latch error
E200	Unknown time base error
E201	Time base loss of energy detector
E202	TB i/o err. cant read TB packid or oven monitor
E203	Time base frequency drift
E204	Both syncs time base oven is cold
E205	Time base oven is cold
E300	Unknown PLL error,link went down before reading status
E301	PLL end of range
E302	PLL excessive phase error (125 uSec out of phase)
E303	PLL real time violations
E304	PLL fast start time out
E305	PLL end of range implicating TL
E400	Unknown mate error, link went down before read status
E401	Mate out of service
E402	Mate sync hardware error
E403	Cross couple loss of energy
E404	Cross couple loss of energy
E405	Mate link down
E406	Cross couple real time violation
E407	Cross couple fast lock range
E408	Cross couple frequency offset error
E409	Cross couple out of lock
E500	TLI error, link went down before status read
E501	TLI hardware error
E600	TL error reported, unknown
E601	TL out of service or loss of signal
E602	Timing Extractor type TLI has hardware problem
E603	Timing Extractor type TLI has autobaud failure
E700	CRO error, unknown due to link, SYNC error
E701	CRO loss of energy detected SYNC error
E702	CRO loss of energy CRO error
E703	CRO frequency offset
E704	CRO declared OOS

cccc	*Explanation*
E805	TL error cleared
E806	TLI error cleared
EF00	Unknown what sync switched to
EF01	SYNC switched to NORMAL mode
EF02	SYNC switched to HOLDOVER
EF03	SYNC switched to FAST mode
EF04	SYNC switched TLIs/SSPs
EF05	SYNC switched to cross couple

Glossary

A

ABT
Abort

ACO
Alarm Cutoff

Active
For duplicated entities, the entity is providing service rather than operating in hot standby.

AI
Alarm Interface

AIS
Alarm Indication Signal (also known as all 1s signal)

Alarm Delay
The alarm delay (in seconds) for software-detected alarm conditions. Initial value is 20 seconds.

Alarm Indication Signal (AIS)
A signal transmitted downstream to indicate that network transmission line failures were detected upstream.

All Ones Signal
Another name for DS1 Alarm Indication Signal (AIS). It is defined to contain all ones in the terminal-to-terminal mode.

ALM
Alarm

Alphanumeric Characters
Letters and digits.

Alternate Mark Inversion (AMI)
A DS1 line code in which alternate one bits are positive and negative, but zero substitution is not used.

AMI
Alternate Mark Inversion

ANSI
American National Standards Institute

AS&C
Alarm Surveillance and Control

ASCII Character
Letters, digits, and symbols used in the American Standard Code for Information Interchange.

ATAG
Autonomous Message Tag

ATP
All Tests Passed

Attribute
Alarm indication level: major, minor, or no alarm.

AUD
Audit

Autolock
When the system autolocks and entity, it switches to protection and forbids return to the working entity even if the trouble clears. This is usually caused by multiple protection switches on that entity in a short time period.

Autolock Number of Switches
This parameter is the number of times that the system restores an entity to service (after intermittent failures) in a given autolock switching interval before the entity is autolocked.

Autolock Release Time
The number of hours between times when the system automatically releases autolock.

Autolock Switching Interval
An interval in minutes (see Autolock Number of Switches).

Autonomous
Done automatically by the system without any manual intervention from the user.

Autoprovisioned
Put in the provisioned state automatically by the system.

B

B3Zs
Bipolar with 3-zero substitution, a DS3 line code.

B8ZS
Bipolar Eight Zero Substitution

Baud Rate
Transmission data rate (bits per second) on an administrative link.

BBL
Backbone Leg

BC
Bus Controller

BCON
Broadcast Cross-Connect

BDIS
Broadcast Disconnect

BER
Bit Error Rate

BER Metric
Specifies the metric for calculating bit error rate at a DS3 interface port. Options are bipolar variations (BPV) or parity (PTY). (Initial value is BPV).

Bipolar Violation
A violation of the alternating +1, -1 pattern in a 3-level code.

Bit Error Rate Threshold
3 stands for 0.001, 6 stands for 0.000001.

Blue Code
Same as AIS

BMTR
Back-up Memory Transfer

Boot
To transfer contents of a Memory Card into the system's working memory and system hardware. The contents of a Memory Card can include both system software and database.

BOS
Bit Oriented Signaling

BPV
Bipolar Violation

BRD
Broadcast Leg

Broadcast
Form a bridge connection.

BSRF
Basic Synchronization Reference Facility

BT
Bus Terminator

BX
Bus Extender

Byte
Usually refers to a group of eight consecutive binary digits, but sometimes used for bit groups of other sizes.

C

CAS
Channel Associated Signaling

CATP
Conditional All Tests Passed

CBIT
A DS3 line code in which parity checks on blocks of data are used to detect bits in error.

CCB
Cross-Connect Buffer

CCI
Clock and Control Interface

CCIS
Common Channel Interoffice Signaling

CCITT
International Telephone and Telegraph Consultative Committee

CCN
Cross-Connect Network

CCNI
Cross-Connect Network Interface

CEF
Capacity Expansion Frame

CFA
Carrier Failure Alarm

CFR
Synchronizer Configuration

CGA
Carrier Group Alarm

CHG
Change

CI
Communications Interface

CIU
Craft Interface Unit

Clear (CL)
An alarm condition no longer exists.

CLF
Carrier Line Failure

CMAP
Channel Map

COFA
Change-Of-Frame-Alignment

Condition
The type of alarm indication.

CP
Circuit Pack

CPR
C-Bit Processor

CPU
Central Processing Unit

CRC
Cyclic Redundancy Checking

CRO
Clock Reference Oscillator

Cross-Connect
A piece of hardware used to interconnect line-terminating equipment, multiplexers, and other equipment.

Cross-Connection
An interconnection between two specified NPC channels.

Crosstalk
A signal induced into one transmission line from another transmission line.

CRT
Cathode Ray Tube

CSS
Controlled Slip Seconds

CTAG
Correlation Tag

Current Value
In the dialog mode, it indicates that the current value of a parameter is used by the system unless you direct otherwise.

CV
Coding Violations

D

DACS
Digital Access and Cross-Connect System

Database
A record of the system configuration and status. It contains cross-connections, status of entities and transmission lines, performance monitoring threshold values and collected data.

DATS
Digital Access Test Set

DC
Digroup Circuit or Direct Current

DCC
Disconnect Code

DCLU
Digital Carrier Line Unit

DDC
Dual Digroup Circuit

DDS
Digital Data System

Default
A value the system automatically uses for a parameter if you do not specify a value.

Delimiter
A colon, comma, or space used to separate two parameters in a command or message.

Demultiplexer
A device used with a multiplexed signal for recovering signals contained within it and restoring the distinct individual channels of these signals.

DFB
Dual Fuse Board

Diagnose
Test an entity.

DIF
DACS Interface Module

DL
Data Link

DLC
Digital Loop Carrier

DM
Dual Multiplexer

DMA
Deferred Maintenance Alarm

DMAP
Digroup Map

DMB
Digital Multipoint Bridge

DMI
Digital Multiplex Interface

DMM
Digital Multimeter

DOTS
Digital Office Timing Supply

DPC
Dual Primary Circuit

DPLL
Digital-Phase Locked Loop

Driven
A driven port is being monitored, and a good signal is expected.

DS0
Digital Signal Level 0 (64-kb/s)

DS1
Digital Signal Level 1 (1.544-Mb/s)

DS1 Data Rate
The DS1 Data Rate is calculated as follows:
DS1 = (24 Channels x 8 bit/sample + 1 frame bit) x 8000 samples/sec
DS1 = 193 x 8000 = 1.544 Mb/s

DS1 Port
A DS1 port in either a DS1 interface module or a DS3 interface module.

DS3
Digital Signal Level 3

DS3U
DS3 Unit

DSP
Digital Signal Processor

DSPC
Digital Signal Processor Circuit

DSPI
Digital Signal Processor Interface

DSPU
Digital Signal Processor Unit

DSU
Data Service Unit

DSX
Digital Signal Cross-Connect

DTAC
Digital Test Access Connector

Duplex Entity
A pair of entities in which one is active and the other is in hot standby (clock generators).

Duplicated Entity
A pair of entities in which one is active and the other is in hot standby (for example, the Synchronizer Cross-Connect (SXC) circuit packs).

E

E1 Data Rate
The E1 Data Rate is calculated as follows:
E1 = (32 Channels x 8 bit/sample) x 8000 samples/sec
E1 = 256 x 8000 = 2.048 Mb/s

NOTE:
With this data rate, 30 channels carry traffic and two channels are reserved; one channel contains framing information and the other channel contains signaling information.

E2A
Type of Alarm Telemetry

EBX
Expanded Bus Extender

ECCN
Expanded Cross-Connect Network

Echo
Display of keystrokes entered from a terminal (passwords are not echoed).

ECI
Enhanced Communications Interface

EDDC
Enhanced Dual Digroup Circuit

EDPC
Enhanced Dual Primary Circuit

EER
Excessive Error Rate

EFC
Extended Frame Controller

EIA
Electronic Industries Association

EID
Entity Identification

EMC
Electromagnetic Compatibility

EMIU
Expanded Multiple Interface Unit

EMTC
Expanded Maintenance Circuit

Enter
Provision an entity by a command, not automatically by the system.

Entity
A specific piece of hardware (such as the Main Controller (MC) or Network Processing Circuit (NPC)) that has been assigned a name and is recognized by the system.

Entity Identifier
The name used by the system to refer to an entity.

Equalizer
A circuit adjustment used to maintain signal strength between desired limits.

Equipped
The entity is entered in the system database via a user provisioning command.

ER
Error Rate

ERS
Errored Seconds

ES
Errored Seconds

ESD
Electrostatic Discharge

ESF
Extended Superframe

ESR
Error Source Register

ESR1
Error Source Register 1

ESR2
Error Source Register 2

ETSI
European Telecommunication Standardization Institute

F

FAL
Fuse Alarm Lamp

FAS
Frame Alignment Signal

FC
Format Converter

FDL
Facility Data Link

Fe
Extended Superframe Format

FEBE
Far-End Block Error

FELP
Far End Loopback

FES
Far-End Errored Seconds

FLI
Facility-Line Interface

FMAC
Facility Maintenance and Administration Center

FMT
Formatter

Forced
A traffic-carrying entity (either service or protection) has been deliberately locked into a service providing state by manual command despite being bad.

FPA
Feature Package A

FPB
Feature Package B

FPC
Feature Package C

FRADT
Frame Audit

FRER
Framing Bit Error

Fs
Fx Framing Format

FSES
Far-End Severely Errored Seconds

FTM
Facility Terminating Module

FTU
Facility Terminating Unit

FUAS
Far-End Unavailable Seconds"

FW
Framing Word

G

Grooming
Rearrangement of DS1 signals in DS3 signals.

H

HDB3
High Density Bipolar 3 Zero Substitution

HDS3U
DS3 Hybrid Unit.

Header
The first line of a message.

Header Date
Specifies the current date as YYMMDD, where YY is the last two digits of the year, MM is the month, and DD is the day of the month.

Header Time
Specifies the current time of day as HHMMSS, where HH is the hour (00 to 23), MM is the minutes, and SS is the seconds.

HECI
High-Speed Enhanced Communications Interface

HFMT
Hybrid Formatter.

Hierarchy
An orderly ranking or sequence of elements, such as that of menus presented at a terminal.

Hit
A disruption of service that lasts for less than 1 second. See Outage.

HMXR
Hybrid Multiplexer.

Hot Standby
An entity ready for fast, automatic placement into operation to replace an active entity.

HUBID
Hub Identifier

I

ICLD
Idled

Idle
An output port is idle if it is not cross-connected to an input port.

Idle Channel
A channel on an NPC that has not been cross-connected.

IFTU
Integrated Facility Terminating Unit

In Service
The entity is performing normal service functions, either active or standby.

ISX
Integral Shelf Cross-Connect

ITU-TSS
International Telecommunication Union-Telecommunication Standardization Sector

J

Jitter
Short term variations in the phase of a digital signal.

K

kb/s or kbit/s
Kilobit Per Second

kHz
Kilohertz

L

LAN
Local Area Network

LBO
Line Build-Out

LED
Light-Emitting Diode

LFA
Loss of Frame Alignment

LILB
Line Interface Loopback

Link ID
The location and type of a user interface link.

LLB
Line Loopback

LMA
Loss of Multiframe Alignment

Location
The specific entity involved.

Loopback
A circuit arrangement that causes a received signal to be returned to its source.

LOS
Loss of Signal

M

M13
A standard format used for DS3 signals

Maintenance
The entity has been locked into a non-service providing state by a manual command.

Maintenance Condition (MCOND)
MCOND is a condition in which the Main Controller (MC) is isolated from system hardware in order for the user to perform memory transfer operations. Placing the MC in MCOND is non-service affecting. When the MC is in the MCOND service state, the system software and database are not transferred to the Memory Cards. The Maintenance Condition enables the user to transfer database and/or system software among the Memory Cards and the MC's Random Access Memory (RAM) in a controlled manner via user commands. The MCOND service state is also used to perform system software upgrades.

Mapped
Cross-connected.

Mb
Megabit

Mb/s or Mbit/s
Megabit Per Second

MBER
Minor Bit Error Rate

MC
Main Controller

MCOND
Maintenance Condition

MCP
Main Controller Peripheral

MEMA
Memory Card Slot A

MEMB
Memory Card Slot B

Memory Location
Specifies the equipment, DS1 interface port, or DS3 MUX port location associated with a memory type.

MER
Multiframe Error

MI
Maintenance Information

MIU
Multipoint Interface Unit

MJU
Mutlipoint Junction Unit

MMFG
Multiplexer-MIU Functional Group or HMXR-MIU Functional Group

MML
HuMan-Machine Language

MP
Main Processor

MPDIS
Multipoint Disconnect

MPM
Multipoint Mode

MTC
Maintenance Circuit

MXR
Mutliplexer

N

NA
No acknowledgement

NDL
No Data Link

NEBS
Network Equipment Building Systems

Network Element
A DACS II ISX system is a network element.

NFW
Not Framing Word

NG
No Good

NOBBL
No Backbone Leg

Notification Code
The notification code for alarm and status conditions, which include: MJ - major alarm; MN - minor alarm.

NPC
Network Processing Circuit

NPCTG
Network Processing Circuit Test Group

NPCTP
Network Processing Circuit Test Port

NSA
Nonsignaling Associated

NZCS
No Zero Code Suppression

O

OA&M
Operation, Administration and Maintenance

OCNT
One-Way Cross-Connect, Terminated

ODIS
One-Way Disconnect

OFS
Out-Of-Frame Seconds

OCON
One-Way Cross-Connect

OOS
See Out-of-service.

OS
Operations System

Out Of Service (OOS)
The entity is not providing its normal service function (removed from service) either because of a system problem or because it has been removed from service manually.

Outage
A disruption of service that lasts for more than one second. See Hit.

P

Parity Check
To determine whether a block of digital data has been corrupted in transmission, you can use an even-parity format in which an extra bit is added to the block at the transmitter if necessary so that the block always contain an even number of one bits. A parity-checking circuit at the receiving end can determine whether an error has occurred in transmission. An odd-parity format can also be used for the same purpose.

PBA
Primary Block Alarm

PBC
Primary Block Circuit

PBF
Primary Block Failure

PBX
Private Branch Exchange

PCM
Pulse Code Modulation

PCMCIA
Personal Computer Memory Card International Association

PDS
Program Documentation Standards (Language)

PF
Printout Follows

PFW
Pseudo-Frame Word

PLL
Phase-Locked Loop

PMA
Prompt Maintenance Alarm

PNI
Packet Network Interface

POTS
Plain Old Telephone Service

Primary Line
The second line in an output message.

Program
The software that directs the operation of the main controller and other frame elements.

Protocol
Detailed format and procedures used for transmitting digital data.

Protocol Type
Indicates the protocal supported on the interface link.

Provisioned
The entity has been configured by the user and entered into the system database and is ready to be restored to service.

PU
Power Unit

Pulse Code Modulation (PCM)
The process by which analog signals are sampled, quantized, and coded into a digital bit stream.

PVC
Permanent Virtual Circuit

R

R16
Remote Alarm Indication in TS16

RAI
Remote Alarm Indication

RAIS
Remote Alarm Indication Signal

RAM
Random Access Memory

RBER
Remote Bit Error Rate

RDC
Red Circuit

REER
Remote Bit Error

Released
If an input port, it is not under test access; if an output port, it is not cross-connected to an input port under test access.

RL
Retry later

RMS-D
Remote Measurement System - Digital

RMS-I
Remote Measurement System - International

Rollover
Operation used when the transmission facility between the system and an upstreamsystem is to be replaced.

RT
Remote Terminal

RTS
Remote Test System

RTS-5A
Remote Test System 5a

S

SAP
Status and Alarm Panel

SARTS
Switched Access Remote Test System

SCC
Subrate Cross-Connect

SCCSAI
Switching Control Center System Asynchronous Interface"

SECH
Subrate Establish Command

SERS
Severely Errored Seconds

SID
Source Identifier

SNIDER
Protocol (message format) used on asynchronous administrative links.

Software ID
Gives the software version information for a system: g - is a one-digit number giving the software release; i - is a two-digit number giving the issue; r- is a one-digit number giving the point release.

SPU
Synchronizer Power Unit

SRM
Subrate Multiplexer

SSC
Secondary Storage Controller

SSP
Select Synchronization Port

Standby
Entity is one of a duplicated pair, but not providing service. It is ready to be used to replace a similar entity either by protection or by duplex switching.

State
The state of an entity indicates whether it is defective or normal, whether it is ready for normal use, etc.

Subrate
In the digital data system, a data bit rate that is either 2.4, 4.8, or 9.6 kb/s.

SVC
Switched Virtual Circuit

SYNC
Synchronizer

Synchronizer Cross Connect
A dual function circuit pack that performs both synchronization and cross-connect functions.

System Executables
The software that directs the operation of the Main Controller (MC) and other system entities.

T

T1DM
T1 Data Multiplexer

TABS
Telemetry Asynchronous Block Signal

TAD
Test Access Digroup

TB
Time Base"

TC
Trunk Conditioning

TCNT
Two-Way Cross-Connection, Terminated

TD
Timing Distributor

TDIS
Two-Way Disconnection

TDM
Time Division Multiplexed

Test Access
A mode of operation that provides full access to the circuit under test but does not interfere with any other cross-connections that have been established.

Test Mode
Specifies the Test Access Mode

TG
Test Group

TID
Target Identifer

TLA
Terminate and Leave Activate

TLI
Timing Link Interface

TLP
Transmission Level Point

TLR
Terminate and Leave Release

TP
Test Port

TPR
Test Port Release

TSI
Time Slot Interchange

TTY
Teletypewriter Terminal

UAC
Unassigned Channel Code

U

UAS
Unavaillable Seconds

UATC
Unavailable Time Count

UBX
Unit Bus Extender

UC
Unit Controller

UMC
Unassigned Multiplexer Code

V

VC
Virtual Circuit

Z

ZBTSI
Zero Byte Time Slot Interchange

ZCS
Zero Code Suppression

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Lucent Technologies
Bell Labs Innovations

DACS II
Release 8.0 PDS
Operation and Maintenance Manual

Volume II - Trouble Clearing

365-353-121
Issue 1
November 1997

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About This Document

Purpose

This document provides procedural information required to support the craft personnel activities involved in the daily operation and maintenance of the DACS II (Digital Access and Cross-Connect System II). It also includes an overview that describes the physical and functional attributes of the DACS II. This volume contains the procedures to isolate and clear troubles.

Intended Audiences

This document is for individuals who are responsible for the acceptance, provisioning, operation, and maintenance of the DACS II system, Release 8.0.

How to Use This Document

Before you attempt to use the procedures in this document you should become familiar with its contents. The contents are described below.

The document is divided into two volumes:

Volume I - Operation and Maintenance and Reference Information
Volume II - Trouble Clearing

With the exception of the reference information contained in Volume I, each of the volumes stands on its own. The reference information applies to both volumes.

There are three ways to access the information in this document:

- The index in the back of each volume
- The tabs and the table of contents in the front of each tab
- The overall table of contents in the front of each volume.

Before you use the procedures in this document, you should have completed the DACS II Operation and Maintenance course (TR3521). If you were not able to take the training course, you should carefully study the information in Chapter 1 and the *Command Denials* section (found in each volume).

The procedures are arranged to be performed in the sequence in which they are presented. If you perform a procedure out of sequence, you may have trouble performing that procedure and the subsequent procedures.

Always start the trouble-clearing process by performing the procedures in Chapter 1 *Trouble Identification* of Volume II. The sections in Volume II are functional groupings of troubles. It is not always obvious from the message or alarm which of the trouble sections provides the procedure or procedures for clearing the trouble. If you begin with Chapter 1, you will be directed from procedure to procedure until the trouble is cleared.

Contents

Volume I

- **Chapter 1 - Introduction**

  This chapter provides an overview of the DACS II. It describes the DACS II hardware arrangements, functional operation, and command and message set. This chapter contains reference information required to operate and maintain the DACS II.

- **Chapter 2 - Acceptance**

  This chapter contains all the procedures required to accept a DACS II frame after it has been installed.

- **Chapter 3 - Provisioning**

  This chapter provides the procedures to install circuit packs and to grow and enable the common equipment (frame, synchronizer, and cross-connect network) and Units (FTU, DS3U, HDS3U, and DSPU).

  Included are the procedures to install circuit packs and to grow and enable the NPCs (FTU with or without *SLC*® Carrier, DS3U, HDS3U, and DSPU, Subrate, or DMB).

  Also included are the procedures to make the DSX connections and perform tests to establish DS1 facilities with or without *SLC* Carrier, DS3 and Hybrid DS3 facilities, and Subrate channels.

- **Chapter 4 - Test Access**

  This chapter contains the procedures to establish the test ports, make the DS0 and Clear-DS1 test connections, and establish and test-subrate channels.

- **Chapter 5 - Remove and Degrow Equipment**

  This chapter contains the procedures to remove and degrow NPCs, units, and cross-connect networks.

- **Chapter 6 - Cross-Connections and Disconnections**

  This chapter contains the procedures to make DS0, Clear-DS1, Channelized-DS1, and Subrate cross-connections and to disconnect the cross-connections.

- **Chapter 7 - Administration**

  This chapter contains the procedures to log on or log off the DACS II; create, change, and delete alternate maps; and create, activate, and delete macros.

- **Chapter 8 - Maintenance**

  This chapter contains the procedures for routine PMEM and SMEM memory card maintenance, PMEM and SMEM card removal, and plug-in removal and replacement.

- **Chapter 9 - Performance Monitoring**

  The procedures in this chapter tell you how to schedule and retrieve reports that monitor various DS1 performance parameters.

- **Chapter 10 - Command Denials**

  This chapter lists the command denial codes and their meanings. This information is useful in determining problems with the DACS II. You should be familiar with the contents of this chapter before you attempt any of the other procedures.

Volume II

- **Chapter 1 - Trouble Identification**

  This chapter contains the procedures for interpreting the alarms and messages that identify troubles. ***All trouble clearing starts here. You are directed from here to a procedure in one of the following chapters. That procedure may direct you to a procedure in a chapter that follows it. The process continues until you isolate the fault***.

- **Chapter 2 - Power Failures**

  This chapter contains the procedures for isolating power troubles.

- **Chapter 3 - Facility Alarms**

  This chapter contains the procedures for isolating troubles in the facilities that connect to DACS II.

- **Chapter 4 - Hardware Failures**

  This chapter contains procedures for locating internal DACS II troubles. The messages associated with these troubles usually identify one or more possible faulty plug-ins.

- **Chapter 5 - Manual Diagnostic Failures**

  This chapter contains the procedures for clearing troubles identified when you run manual diagnostics.

- **Chapter 6 - Controller and Link Troubles**

  The procedures in this chapter are used to isolate troubles in the controller or the link connecting the controller to a terminal or operating system. These troubles are usually associated with a reset.

- **Chapter 7 - Data Base Troubles**

  The procedures in this chapter are used to isolate a conditional reset or back-up memory trouble.

- **Chapter 8 - Frame Audits**

  The procedures in this chapter are used to isolate faults detected when frame audits are run.

- **Chapter 9 - Software Error**

  The procedures in this chapter are used to isolate troubles indicated by a software trouble message.

- **Chapter 10 - Command Denials**

  This chapter lists the command denial codes and their meanings. This information is useful in determining problems with the DACS II.

Conventions Used

This manual uses special fonts in order for the user to differentiate computer input/output. The constant width font indicates message formats, keywords, letter representations of parameters, parameter values, and messages as they would appear on a DACS II terminal screen.

Related Documentation

The following documents support the DACS II system:

- DACS II Release 8.0 Installation Manual:
  - IPH903 (DACS II CEF)
  - IPH903I (DACS II ESBF)

  Audience: Customers planning to install the equipment

  Content: Customer installation instructions.
- DACS II Release 8.0 Product Description Manuals:
  - 365-353-120 (24 Channel)
  - 365-353-140 (30 Channel)

  Audience: Network planners, engineers, and others that need to know how the DACS II works and fits into the network

  Content: Features, applications, and description and other reference information.
- DACS II Release 8.0 Operation and Maintenance Manuals:
  - 365-353-121 (PDS)
  - 365-353-131 (MML)
  - 365-353-141 (PDS 2.048-Mb/s Interface)
  - 365-353-151 (MML 2.048-Mb/s Interface)

  Audience: End-user maintenance personnel

  Contents: Procedures to operate and maintain the DACS II.

- DACS II Release 8.0 Command and Message Manuals:
  - — 365-353-122 (PDS)
  - — 365-353-132 (MML)
  - — 365-353-142 (PDS 2.048-Mb/s Interface)
  - — 365-353-152 (MML 2.048-Mb/s Interface).

  Audience: End-user maintenance personnel

  Content: Description of each software input message and its response along with a description of each system output report.

- DACS II Release 8.0 Quick Reference Guides:
  - — 365-353-123 (PDS)
  - — 365-353-133 (MML)
  - — 365-353-143 (PDS 2.048-Mb/s)
  - — 365-353-153 (MML 2.048-Mb/s)

  Audience: End-user maintenance personnel

  Content: Abbreviated list of system commands and parameters.

- DACS II Release 8.0, Software Release Description:
  - — Com. Code CC108164492

  Audience: End-user maintenance personnel

  Content: Upgrade procedures for the new software release, status of problems fixed in previous releases, and operating issues for the specified software release.

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Trouble Identification

1

Contents

Trouble Identification

1

Select Trouble-Clearing Procedure

This chapter offers three paths for finding the appropriate trouble-clearing information in this volume. The path you take depends on the amount of trouble isolation that is needed to identify the trouble.

- If you are looking for a procedure to direct you through the evaluation of troubles in the trouble printout, refer to Section 1.2, *Isolate Frame Trouble*.

  NOTE:
  If you are not sure which message in the trouble report to respond to first, use Section 1.2 to identify the troubles.

- If you are looking for a summary of trouble types and indications so that you can isolate the trouble yourself, refer to Table 1-1 to find the appropriate chapter in this volume. This path would be used if you have some experience with the DACS II and you know the priority of handling multiple trouble messages.
- If you are looking for a direct reference to the procedure to clear a particular trouble message, refer to Table 1-3 at the end of Section 1.2 to find the appropriate section of this volume. This path would be used if you have a single trouble or you have already isolated the trouble.

Table 1-1. Trouble Summary and Chapter References

Trouble Indication/ Trouble Messages	Consequence Action	Trouble Cause	Trouble Section
Fuse bead extended (48V fuse & alarm panel) LED lighted on fuse board	Plug-ins removed from service	Blown fuse: (1) Aged fuse failed, (2) Shorted backplane or plug-in.	2.1
ERR PWR COMPL	Major alarm: backup supplies the load Critical alarm: plug-ins removed from service	(1) Power unit failed, (2) Short on load	2.2
ALM UNIT DS3 {LOS|BER| OOF} COMPL	Service interruption; AIS sent.	DS3 line failure	3.1
AR01 MISC ALM MJ CGA COMPL	Service interruption; trunk conditioning	(1) Failed DS1 line, (2) Transmit/receive plug-in	3.2,3.3 3.4
ALM {MJ|MN} <parameter> NPC COMPL	Service interruption (with MJ alarm); trunk conditioning	(1) Line degradation, (2) Transmit-end equipment	3.5
ALM {15ME|24HR} <parameter> NPC COMPL	Transmission impaired	(1) Line degradation, (2) Transmit equipment	3.4
ERR ESR <entity> COMPL ERR ESR ANALYSIS REPORT RMV <entity> COMPL	Plug-in service removed; service switched to other side or protection	(1) Failed plug-in, (2) Wiring problem	4.2,4.3
ERR <entity> COMPL RMV <entity> DNY	Critical alarm: service interruption	(1) Multiple DS3 plug-ins failed, (2) Protection switching inhibited.	4.3
ALM ECCN OOS COMPL	Side failed; no duplex switching	Failed plug-in	4.1
UTL::QRY,ALMS! (input)	Frame alarm	Power failed, plug-in failed, CCN/ECCN plug-in removed, etc.	1.2
DGN <entity> STF COMPL	Diagnostic failed; Restore command denied	Failed plug-in	5.0
FAILURE lighted on status panel	Frame controller inoperative or in MCOND	(1) Reset needed, (2) Failed plug-in	6.1

Continued on next page

Table 1-1. ***Continued***

Trouble Indication/ Trouble Messages	Consequence Action	Trouble Cause	Trouble Section
RESET STOPPED	Frame controller inoperative	(1) Incorrect MC plug-in code, (2) failed plug-in	6.2
BOOT FAILED - BAD BOOT DEVICE	Frame controller inoperative	(1) Incorrect MC plug-in code, (2) Failed plug-in	6.4
Inoperative terminal (Frame Hung)	Can't enter commands	(1) Terminal setup, (2) Incorrect link provisioning, (3) Failed CI plug-in, (4) Link adapter or connections.	6.6
OVERLOAD {MP|CI}	Frame controller can't process commands; reset operated.	(1) Failed controller plug-in	6.5
OVERLOAD UNIT qq UC	Unit controller can't process commands; UC restored.	(1) Failed controller plug-in	6.5
BMTR ...DNY ALM MN SMEM COMPL	Backup transfer failed; SMEM will not be current	(1) SMEM problem, (2) Frame controller trouble	7.1
RESET COND cc COMPL	Frame controller inoperative or in MCOND	(1) Can't access PMEM/SMEM, (2) Failed plug-in	7.2
FRADTS FRCMP	Frame audit messages	Equipage/provisioning disagreement in memories.	8.1
FRADTS DGN	Plug-in removed from service	Failed plug-in	8.2
FRADTS BMCMP	Frame audit messages	Disagreement in RAM and PMEM	8.3
ERR MSGS TO LOG DISCARDED	Transient errors being recorded	Errors detected at plug-in	4.6
ERR HARDWARE	Plug-in removed from service or identified for maintenance	Error detected at plug-in	4.8
ERR SOFTWARE	Command aborted; autonomous maintenance action		9.1

Isolate Frame Trouble

1. If alarm cutoff is needed, enter **`UTL::ACO!`**. If the command is ineffective, press the **ACO** button on the DACS II status panel.
2. Check for blown fuses (see Note). If whole units of packs have failed, check the fuse and alarm panel for lighted **FA** lamp and a blown 48-volt feeder fuse. In the unit and other circuit groups, check for lighted LED indicator on or above fuse boards.

   NOTE:
   Depending on the type of fuse, a blown fuse is indicated by one of the following: (1) extended color bead on indicator fuse, (2) lighted LED on LED-fuse, or (3) lighted LED for group of fuses on fuse block.

   - If there is a blown fuse at the frame, go to Section 2.1 to clear blown fuse trouble.

3. Check printout for ERR PWR message.
   - If ERR PWR message occurs in printout, go to Section 2.2 to clear power unit failure.

4. Enter **`UTL::QRY,ALMS!`** for an alarm summary and use the following to interpret the output:
   — The frame and power alarm summaries occur early in the printout. The left-to-right assignment for the PWR line is: 1-6 for peripheral units, 7 and 8 for sync sides 0 and 1, 9 and 10 for CCN/ECCN sides 0 and 1, and 11-20 for other peripheral units.

   — Pack alarms are indicated by an "a" (for auto removal) or M (for major) in the message where the pack is listed. Unequipped packs are shown by dashes.

   — Alarms on DS1 terminations are indicated by an M (major), * (minor), I (INFO for type PB/PC NPC), or dash (no alarm) for the NPC.

   — DS3 facility alarms are indicated by a C* (critical) in the UTL QRY ALMS DS3 portion of the printout; dashes mean no alarms.

   — DS1 alarms (embedded in DS3) are indicated by an M (major) in the UTL QRY ALMS DS3U NPCS portion of the printout.

   — Figure 1-1 shows how to read the common equipment line in the output. Alarms are indicated by M (for major).

   - If the DACS II does not execute the command, refer to Step **16**.

M...UTL QRY ALMS a b c d e f g h i j k l m n o p q r s EOM

a = MC (Main Controller)
b = MP (Main Processor)
c = CI (Communications Interface)
d = SSC (Secondary Storage Controller)
e = PMEM
f = SMEM
g = Link 1
h = Link 2
i = Link 3
j = Link 4
k = Link 5
l = Link 6
m = Cross-connect Side 0
n = Cross-connect Side 1
o = CCI 0 / CCNI 0
p = CCI 1 / CCNI 1
q = TOD Reset
r = DATE Reset
s = SMEM OOS

Figure 1-1. Common Equipment Alarms

5. Check printout for any of the messages in Table 1-2.
   - If you have any of the messages in Table 1-2, go to the reference listed for the message.

Table 1-2. Facility Alarm Messages

Message Keywords	Reference
ALM UNIT qq DS3 c {AIS/BER/LOS/OOF}	Section 3.1
AR01 MISC ALM MJ CGA (DS1)	Section 3.3
AR01 MISC ALM MJ CGA (DS1 in DS3)	Section 3.2
AR01 MISC ALM MJ PBA (2.048 Mb/s line)	Section 3.4
ALM {MJ/MN} <parameter> NPC <npc No.>	Section 3.5
ALM IDLD UNIT qq DS3 c	Section 1.3
AR01 MISC ALM IDID CGA <npc No.>	Section 1.3

6. Check the printout for an ERR ESR ANALYSIS REPORT message. See Figure 1-2 for the typical sequence of messages.
   - If you have the ERR ESR ANALYSIS REPORT message, go to Section 4.2 to clear that message.

```
ERR ESR <entity> COMPL

ERR ESR ANALYSIS REPORT EVENT eeee  X LN MSG:
<suspect plug-in No.1>
<suspect plug-in No.2>
<suspect plug-in No.3>
<suspect plug-in No.4>   COMPL

RMV <entity> COMPL

DGN <entity> STF ppqq COMPL
```

Figure 1-2. Error Analysis Report

7. Check the printout for RMV <entity> COMPL and DGN <entity> COMPL sequence of messages.
   - If you have the RMV and DGN sequence of messages, go to Section 4.3 to clear the ERR <entity> message.
8. Enter **`UTL::QRY,ALL[,UNIT [q]q]!`** for the whole frame or unit (of the frame) and check output for failed and out-of-service plug-ins and compare results with the ALMs query entered previously.

   NOTE:
   Out-of-service, failed, and pested plug-ins are indicated by the presence of a "1" in the respective columns (out-of-service, failed, pested) of the output for each plug-in; unequipped NPCs are indicated by dashes.

9. If any circuits have failed status (shown in previous queries), Diagnose them with the DGN command. If they still have failed status, enter RMV command for plug-in, replace it, and enter RST command per Figure 1-3.
10. If any circuits are out-of-service but not failed, enter the RST command per Figure 1-3.

```
verb::<CP identification>[,option]!

{RMV::     SYNC a!                              a  =  0 or 1
/RST::     SYNC a,TLI n[,SSP b]!                n  =  1-4; b = sync port (0 or 1)
/DGRTH::   CCI s!                               s  =  side 0 or 1
/DGN::}    CCNI s!                              s  =  side 0 or 1
           ETSI sqq!                           qq  =  unit 1-16
           TSI sft!                             f  =  unit (receiving from) (1-6)
           CCB sf!                              t  =  unit (transmitting to) (1-6)
           ETSIS,ECCN s,ALL!                          For all ETSIs on the side
           TSIS,CCN s,ALL!                            For all TSIs on the side
           UNIT [q]q,UC!                     [q]q  =  unit (1-16)
           UNIT [q]q,{FTMI d|DSPI}!             d  =  module interface for units 1-4
           UNIT [q]q,FC sd!                    sd  =  FC side (0,1) and FC No. (1-4)
           UNIT [q]q,FLI k!                     k  =  service (S) or protection (P)
           UNIT [q]q,FMT s!                     s  =  side (0,1)
           UNIT [q]q,MMFG c                     c  =  DS3 group (1-6,P)
            [,FRC][,INCL]!                    FRC  =  forces remove with no prot. switch
                                             INCL  =  removes/restores MXR NPCs
           NPC <npc No.>[,SIDE s]!      <npc No.>  =  NPC number
                                                s  =  SIDE for DSPU
           LINK j!                              j  =  link 1-6
DGN::      UNIT [q]q,MXR c!                     c  =  DS3 group (1-6,P)
           UNIT [q]q,MIU c!                     c  =  DS3 group (1-6,P)
```

NOTE: Removing the NPC is service affecting.

Figure 1-3. Maintenance Command Construction

11. Check printout for any messages that start with an A (for autonomous) or I (information) prefix.
    - If you have an ERR LINK ...STATUS message, check if the terminal has been disconnected from any link (first data byte after word STATUS will be 00 or 01 if this is the case).
    - If you have any of the autonomous messages, refer to Table 1-3 for trouble procedure reference.
    - If the alarm has cleared, the trouble was either intermittent or the preceding activity cleared the alarm condition. The status panel alarm will clear and an IDLD message will be issued in most cases.

12. If the alarm is still present, reenter the following commands:
    UTL::QRY,ALMS!
    UTL::QRY,ALL[,UNIT [q]q][,COMMON]!
    - If any CPs have failed status, enter the RMV command, replace the plug-in, and enter the RST command per Figure 1-3.

13. To make a record of the error history on the PMEM (for use by technical consultant), enter one of the following commands (see Note):

    Time of Day/Time Interval:
    UTL::QRY,ERR,HWER,{INT mn|[DATE mmddyy,]TOD hhmmss}!

    Suspect Entity:
    UTL::QRY,ERR,HWER,ENTY eee!

    Where:
    INT = Interval of time (past 59 minutes)
    TOD = Time of day consisting of hour (hh=00 through 23), minutes (mm=00 through 60), seconds (ss=00 through 60). Date (month, day, year) is optional.
    eee = Plug-in designation, for example: BX, CCB, CCI, CCNI, FC, FTMI, LINK, MC, MP, MTC, NPC, DDC, FLI, FMT, MIU, MJU, MXR, SRM, SYNC, SMEM, TLI, TSI, UBX, UC.

NOTE:
If you do not know how full the error log is (not recently cleared), you will want to use a short interval, perhaps the past 5 minutes, to avoid overloading the link with old errors.

- If you do have trouble messages (from printout or error log) to work with, refer to Table 1-3 to clear the trouble.

  NOTE:
  Steps **14** and **15** deal with an MC problem causing false alarms to be reported. To avoid unnecessary plug-in replacements in the MC, it is important to be sure there are no other trouble messages.

14. Replace the EMTC or MTC plug-in in the MC.
15. On the DACS II status panel, hold the **RESET ENABLE** switch to **ON** and momentarily press the **RESET** button.
    - If the alarm clears, this procedure is completed.
    - If the alarm does not clear, there is an obscure trouble; contact technical consultant.

(Continue Here If DACS II Is Not Responding to Commands)

16. On the DACS II status panel, hold the **RESET ENABLE** switch to **ON** and momentarily press the **RESET** button.
    - If STARTUP ...STF message is received, go to Section 6 to clear reset stopped (startup diagnostic failed).
    - If the DACS II is now executing commands, this procedure is completed.
    - If the DACS II is still not executing commands, continue with Step **17**.

17. At the back of the frame, disconnect the administrative link cables (except link 1) from the main controller and tag them for correct installation after the trouble is cleared.
18. Replace the appropriate pack as follows:
    - — For RL response, replace the CPU2 in the main controller.
    - — For no response (no character echo), replace the HECI in the main controller.
19. On the DACS II status panel, hold the **RESET ENABLE** switch to **ON** and momentarily press the **RESET** button.
    - If RESET ...COMPL (with no COND code) message is received, this procedure is completed. Reconnect the administrative links.
    - If conditional completion is received, go to Section 7.2 to clear reset conditional completion.

Table 1-3. Autonomous Messages

Autonomous Message	Reference
ALM IDLD <parameter> NPC <npc No.> COMPL <parameter> = BER, SLIP, or other facility error	Section 1.3
ALM IDLD ECCN s OOS COMPL	Section 1.3
ALM IDLD UNIT qq DS3 c {AIS/LOS/BER/OOF} COMPL	Section 1.3
ALM MJ ECCN s OOS COMPL	Section 4.1
ALM MN SMEM COMPL	Section 7.1
ALM RESET {DATE/TOD/TOD DATE} ...COMPL	Section 6.3
ALM UNIT qq DS3 c {AIS/LOS/BER/OOF} COMPL	Section 3.1
ALM [LOS/LEN/EXJ/PHS/OOF/MAJ/MIN} CLR ...COND Eccc COMPL	Section 1.3
ALM [LOS/LEN/EXJ/PHS/OOF/MAJ/MIN} SET ...COND Eccc COMPL	Section 4.3
ALM {15ME/24HR} <parameter> NPC <npc No.> COMPL	Section 3.5
ALM {MJ/MN} <parameter> NPC <npc No.> COMPL <parameter> = BER, SLIP, or other facility error	Section 3.5
AR01 MISC ALM IDLD {CGA/PBA} <npc No.> <alarm type> COMPL	Section 1.3
AR01 MISC ALM MJ CGA <npc No.> {A/B/F/L/M/R/X/Y/V} COMPL	Section 3.3
AR01 MISC ALM {PMA/DMA/MI} PBA <npc No.> <alarm type> COMPL	Section 3.4
AUD QRY BER ALL NPCS TOT xxxx COMPL	Section 3.5
{BADVERB/FRMERR/SEQERR} BAD SYNTAX ...STOPPED	Section 10.1
BMTR ...DNY	Section 7.1
BOOT FAILED - BAD BOOT DEVICE	Section 6.4
HECI RESET	Section 1.4
HECI STARTUP STF	Section 6.2
CMD MC {OOS/MCOND/INSERVICE/MPDBASE} ...STOPPED	Section 10.1
DGN <entity> IN PROGRESS	Section 1.4
DGN CCB sq STF ppqq COMPL	Section 5.21
DGN CCI s STF ppqq COMPL	Section 5.13
DGN CCNI STF ppqq COMPL	Section 5.13
DGN HECI STF ppqq COMPL	Section 5.3
DGN PMEM STF ppqq COMPL	Section 5.4
DGN ETSI sqq STF ppqq COMPL	Section 5.14
DGN LINK a STF ppqq COMPL	Section 5.18
DGN MC STF ppqq COMPL	Section 5.1
DGN MP STF ppqq COMPL	Section 5.2
DGN SYNC STF ppqq COMPL	Section 5.5

Continued on next page

Table 1-3. ***Continued***

Autonomous Message	Reference
DGN SYNC a,TLI m STF ppqq COMPL	Section 5.7
DGN SYNC,TLI 3,CRO STF ppqq COMPL	Section 5.6
DGN TSI STF ppqq COMPL	Section 5.13
DGN SMEM STF ppqq COMPL	Section 5.16
DGN UNIT qq,DSPI STF ppqq COMPL	Section 5.10
DGN UNIT qq,FC sb STF ppqq COMPL	Section 5.11
DGN UNIT qq,FLI s STF ppqq COMPL	Section 5.18
DGN UNIT qq,FMT s STF ppqq COMPL	Section 5.19
DGN UNIT qq,FTMI d STF ppqq COMPL	Section 5.9
DGN UNIT qq,MXR c STF ppqq COMPL	Section 5.18
DGN UNIT qq,UC STF ppqq COMPL	Section 5.8
EBX STARTUP STF	Section 6.2
EMTC STARTUP STF	Section 6.2
ERR ANALYSIS REPORT ...COMPL	Section 4.2
ERR CMD ABT ...STOPPED	Section 10.1
ERR ESR CCI s TN dddd EVENT eeee ...COMPL	Section 4.3
ERR ESR ETSI sqq TN dddd EVENT eeee ...COMPL	Section 4.3
ERR ESR LINK a TN dddd STATUS a0 a1 a2 COMPL	Section 4.3
ERR ESR MC HECI TN dddd EVENT eeee ...COMPL	Section 4.3
ERR ESR MC EBX TN dddd EVENT eeee ...COMPL	Section 4.3
ERR ESR MC EMTC TN dddd EVENT eeee ...COMPL	Section 4.3
ERR ESR MC MP TN dddd EVENT eeee ...COMPL	Section 4.3
ERR ESR MC SSC TN dddd EVENT eeee ...COMPL	Section 4.3
ERR ESR NPC <npc No.>[-<range>] SIDE s TN dddd EVENT eeee ...COMPL	Section 4.3
ERR ESR NPC <npc No.>[-<range>] TN dddd EVENT eeee ...COMPL	Section 4.3
ERR ESR SYNC a TLI m SSP b TN dddd EVENT eeee ...COMPL	Section 4.3
ERR ESR SYNC a TN dddd EVENT eeee ...COMPL	Section 4.3
ERR ESR UNIT qq DSPI TN dddd EVENT eeee ...COMPL	Section 4.3
ERR ESR UNIT qq FC sb TN dddd EVENT eeee ...COMPL	Section 4.3
ERR ESR UNIT qq FLI k TN dddd EVENT eeee ...COMPL	Section 4.3
ERR ESR UNIT qq FMT s TN dddd EVENT eeee ...COMPL	Section 4.3

Continued on next page

Table 1-3. ***Continued***

Autonomous Message	Reference
ERR ESR UNIT qq FTMI b TN dddd EVENT eeee ...COMPL	Section 4.3
ERR ESR UNIT qq MIU c TN dddd EVENT eeee ...COMPL	Section 4.3
ERR ESR UNIT qq MXR c TN dddd EVENT eeee ...COMPL	Section 4.3
ERR ESR UNIT qq {UC/UBX} TN dddd EVENT eeee ...COMPL	Section 4.3
ERR HARDWARE ....COMPL	Section 4.8
ERR MSGS TO LOG DISCARDED COMPL	Section 4.6
ERR PWR ...COMPL	Section 2.2
ERR SOFTWARE ...COMPL	Section 9.1
ERR SYNC a MODE {FAST/HOLDOVER/NORMAL} ...COND Eccc COMPL	Section 4.3
ERR SYNC a TLI m SSP b [NPC <npc No.>]	Section 4.3
FRADTS <nnppqq> CYCLE STARTED	Section 1.4
FRADTS BMCMP ...COMPL	Section 8.3
FRADTS DGN ...COMPL	Section 8.2
FRADTS FRCMP ...COMPL	Section 8.1
FRADTS MC DGN tttt COMPL	Section 8.2
MC RESET ...COND cc COMPL	Section 7.2
RMV <entity> COMPL	Section 4.5
MP STARTUP STF	Section 6.2
MTC STARTUP STF	Section 6.2
OVERLOAD {MP/HECI/UNIT qq UC} ...COMPL	Section 6.5
RESET {DATE/TOD/TOD DATE} ...COMPL	Section 6.3
RESET STOPPED	Section 6.2
RL (After Each Entry)	Section 6.7
SC ALM MJ CGA ...COMPL	Section 3.7
SC ALM MN {CGA/INH/MSW/PSW/DLF} ...COMPL	Section 3.8
SC ALM {CR/IDLD} DPLX ...COMPL	Section 1.5
SC ALM COMP MN RT ...COMPL	Section 3.9
SC ALM COMP IDLD RT ...COMPL	Section 1.5
SC ALM {MJ/MN/IDLD} {MC/UC/PWR/FTMI/DSP}	Section 1.5
SC ALM MN {MISC/PWR/EEPROM/RGF} ...COMPL	Section 3.11
UTL RCY <entity> <action> COND cc COMPL	Section 1.4
UTL RCY <entity> <action> COND cc DNY	Section 9.1
UTL RCY IN PROGRESS	Section 1.4

Check ALM IDLD or INFO Message

Overview: This procedure deals with alarm IDLD (idled) and INFO (information) messages. Facility alarm idled messages are received after the line signal is restored on a facility that previously had a CGA (carrier group alarm). Alarm information messages are received on 2.048-Mb/s lines when an alarm condition designated as maintenance information occurs. Alarm idled messages do not occur after minor alarms due to facility error (for example, for SLIP or BER) are cleared. The error counts for these parameters are checked and the counts are cleared using utility commands.

1. Which one of the following keywords appears in the message?
   - If **IDLD**, continue with Step **2.**
   - If **INFO**, proceed to Step **6.**

2. This message reports that an alarm has cleared. For facility alarms, the NPC (or DS3 position in the unit) and the type of alarm are given in the message; for example, CGA (carrier group alarm), PBA (primary block alarm), and facility parameter BER (bit error rate).

3. If the message is the CGA type, refer to Table 1-4 for the meaning of the alarm type given at the end of the IDLD message.

Table 1-4. CGA Alarm Types

Indicator	Meaning
A	Alarm Indication Signal
B	Both red and yellow (not registered with TG80/TG80B NPC)
F	Frame format error rate (TG180 NPC)
L	Local multiframe alarm (DMI equipment)
M	Remote multiframe alarm (DMI equipment)
R	Red; incoming line failure
V	Line format violation (TG180 NPC)
X	Multiple alarms (TG180 NPC)
Y	Yellow; outgoing line failure

4. If the message is for a timing link failure (ERR SYNC messages) or for a DS3 line failure, refer to Table 1-5 for the meaning of the alarm type.

5. If the message is the PBA type for a 2.048-Mb/s line, refer to Table 1-6 for the meaning of the alarm type given at the end of the IDLD message.

Table 1-5. Keyword Meanings

Alarm Keyword	Meaning
AIS	Alarm indication signal (DS3)
BER	Bit error rate high (DS3)
LOS	Loss of signal
LEN	Loss of energy
EXJ	Excessive jitter
PHS	Phase shift
OOF	Out of frame
PMA	Prompt maintenance alarm
DMA	Deferred maintenance alarm

Table 1-6. PBA Alarm Types

Indicator	Meaning
A	All 1s signal (AIS) received from far end.
B	Incoming high bit error rate (BER).
E	Excessive errors received at far end (REER).
G	Far-end loss of CRC4 multiframe alignment in TS0 (FLCMA).
I	Remote all 1s indication (RAIS).
L	Loss of multiframe alignment (LMA). [Note 1]
M	Remote loss of alignment sent on TS16 (R16). [Note 1]
P	TS0 pseudo-frame word out-of-frame (PFWOOF).
R	Loss of signal primary block failure (LOS PBF); loss of frame primary block failure (LOF PBF). [Note 2]
S	Far end sync has gone into holdover (Sync Fail Indication).
V	All 1s indication on TS16 (A16). [Note 1]
X	Incoming excessive error rate (EER).
Y	Remote alarm indication (RAI).

Note 1: These only occur with CAS line format.

Note 2: R can be either LOF PBF or LOS PBF for PB/PC NPCs.

6. An "A" after the CGA word and NPC number reports the receipt of an AIS (alarm indication signal, all 1s, blue signal) from the far end.

7. Consider the following situations in which the far end will send an all 1s signal:
   - — On a DS1 facility connecting to multiplexers, the all 1s signal originates at the alarmed terminal (red) in the failed span and is forwarded along the route to prevent multiple red alarms that would hinder troubleshooting.
   - — The far-end NPC can be grown to send an all 1s signal when it is removed from service.

Check Autonomous Action or Command In-Progress Messages

NOTE:
Action messages indicate that some action has been initiated; frequently, an autonomous action brought by a trouble condition. In-progress messages are issued every 20 seconds while commands with longer execution times are underway. Other commands will be ignored while a command is in-progress.

1. See Table 1-7 for an explanation of the message. The message may not require any action, but associated messages may require action. Messages that do not require action are: ACO ACTIVE and CI/ECI/HECI RESET.

Table 1-7. Message Explanations

Message Keywords	Explanation
DGN <entity> IN PROGRESS	Autonomous or manually requested diagnostic is being run.
RMV <entity> IN PROGRESS	Autonomous or manually requested remove from service is being executed; this operation takes up to 3 minutes for the tape drive.
UTL <verb> IN PROGRESS	Autonomous or manually requested utility command is being executed.
ACO ACTIVE	Alarm cutoff has been activated using the status panel control.
FRADTS CYCLE STARTED	Frame audit routine was autonomously initiated to compare values stored in different memory locations.
UTL RCY IN PROGRESS	Autonomous trouble recovery action is being executed.
HECI RESET	Notification to operations systems on links that main controller has been reset.

2. Which type message do you have?
   - If FRADTS ...STARTED, continue with Step **3**.
   - If DGN, RMV, or UTL ...IN PROGRESS, proceed to Step **4**.
   - If UTL RCY ...IN PROGRESS, proceed to Step **5**.

3. When resulting frame audit messages are received, refer to the appropriate trouble-clearing procedure as follows:
   - If FRADTS FRCMP, refer to Section 8.1.
   - If FRADTS DGN, refer to Section 8.2.
   - If FRADTS BMCMP, refer to Section 8.3.

4. If the IN PROGRESS message was received in response to entry of a manual command, wait to see if command completion is received after 20 seconds. See Note.
   - If command completion message is received after 20 minutes, this procedure is completed.

   NOTE:
   Operations may be delayed because higher priority commands are being processed. Some commands take longer to complete.

5. If IN PROGRESS messages are still being received after an hour, hold the **RESET ENABLE** switch on and press the **RESET** button on the DACS II status panel.
   - If the trouble persists, contact technical consultant.

   NOTE:
   At this point the system is "hung" and the only way to establish communication with the frame is by performing the RESET mentioned above. However, you may run the risk of a service interruption by performing this RESET.

6. Check the printout for ERR ESR MC messages and other trouble messages and check if the **FAILURE** LED is lighted on the status panel. Also enter the following commands: **`UTL::QRY,ALMS!`** and **`UTL::QRY,ALL!`** and refer to the appropriate part (listed in order of importance) as follows:

   - If ERR ESR message, go to Section 4.3.
   - If FAILURE lighted on status panel, go to Section 6.1.
   - If retry later (RL) responses, go to Section 6.7.
   - If ERR SOFTWARE message, go to Section 9.1.
   - If frame alarm, go to Section 1.2.
   - If failed or out-of-service plug-ins, go to Section 4.5.
   - If other trouble message, find the message in Table 1-3 at the end of Section 1.2 and go to that reference.

Check SC Information Messages

1. See Table 1-8 for an explanation of the message keywords and consider the following about the SC (*SLC*® Carrier System) messages:

   — These messages are issued to inform the personnel at operations centers of DACS II troubles which may interrupt operations. Other messages are used by the DACS II technicians to clear the trouble. The SC information messages are:

   ```
   I ...SC ALM <state> DPLX <entity> NE COMPL
   I ...SC ALM <state> {MC|UC qq|PWR hhh|FTMI qqb|
      DSPI} NE COMPL
   ```

   — The NE keyword indicates that the trouble is at the near end (in the DACS II).

   — The possibilities for the <state> field are: CR, MJ, MN, IDLD. These are for critical alarm, major alarm, minor alarm, and for message idled. When IDLD is received, the trouble has cleared and capabilities are restored.

Table 1-8. Keyword Explanation

Keyword	Explanation
MC	Main controller failure. Customer service will not be affected, but DACS II message processing may be interrupted.
UC qq	Unit controller failure. Customer service will not be affected, but unit commands may be denied.
FTMI qqb/ DSPI qq	Unit interface failure. Customer service will not be affected, but unit commands may be denied.
PWR hhh	Power unit failed. A single power unit failure does not affect service because there is redundant power. Hexadecimal digits identify the power unit.
DPLX <entity>	Both sides of a duplicated entity have failed. Customer service will be interrupted. The entity named in the message is the last side that failed.

Power Failures

2

Contents

Power Failures

2

This chapter contains the procedures to clear power troubles due to a blown fuse, a failed power unit, or the loss of 48-volt input power.

- **Blown Fuses.** There is no backup power for a blown fuse. However, fusing is designed so that a single failure will only affect one side of any duplicated network and a minimum of plug-ins. The indications of a blown fuse are the lighted indicator on the panel or fuse board and the output messages indicating that groups of plug-ins have failed.
- **Power Unit Failure.** The failure of a power converter is indicated by the lighted failure LED on the plug-in and by the receipt of the ERR PWR message. The failure of a single power unit does not cause a loss of service, because a redundant power unit is always provided to supply the load. A single power unit failure causes a major alarm to draw immediate attention; more than one failure in a power unit group causes a critical alarm and the loss of service.
- **Loss of Input Battery.** The arrangement of the four input power feeders is as follows: feeders A and B supply side 0 circuit groups, and feeders C and D supply side 1 circuit groups. This arrangement prevents the loss of service if one feeder fails. The procedure to recover from loss of all input power is to reset the frame controller after the power is connected. This will cause the MC and sync packs to be reset and restored. Cross-connect network and peripheral unit plug-ins must be restored using manual input commands.

NOTE:
If you already have isolated the trouble to powering, you can go directly to the procedure for that trouble; otherwise, go to *Trouble Identification* to first isolate the trouble.

Clear Blown Fuse Trouble

1. Locate blown fuse by lighted LED fuse or extended fuse bead. An **FAL** indicator on the fuse and alarm panel will be lighted for a 48-volt fuse. The fuse and alarm panel is at the bottom of the multibay frame and at the top of single-bay frame.
2. Replace blown fuse. For LED-type fuses, use extractor or long-nose pliers. If separate 1/2 A indicator fuses are provided, replace the higher amperage fuses before the indicator fuses.

   CAUTION:
   Using a replacement fuse of higher amperage rating can cause equipment damage.

   NOTE:
   The color of the bead indicator fuses denotes the amperage. Red is for 1/2 A (70G), orange is for 2A (70B), and green with black stripe is for 5A (70D) fuse.

   NOTE:
   On older fuse panels, which do not use a 5A indicator fuse for positions A5-1, A6-1, B5-1, B6-1, etc., the fuses for those positions are 1/2 A indicator fuses and the associated 7.5A fuses.

   - If the fuse holds, proceed to Step **13.**
   - If the fuse does not hold, continue with Step **3.**
3. If the blown fuse is on the 48-volt fuse and alarm panel, continue with Step **4**.
   - If the blown fuse is not on that panel, proceed to Step **7.**
4. Replace associated power unit or CP (circuit pack) listed in the appropriate table:
   — Table 2-1 for the CEF
   — Table 2-2 for the non-CEF multibay frame
   — Table 2-3 for the single-bay frame.
5. Replace fuses.

Table 2-1. 48-Volt Power (for CEF)

Feed A Fuse	Power Unit/CP			
	Type (Note)	Assignment	Size	Bead Color
A1	411A,SM566, 424AA, or 563A	Unit 1	70D,5A	Green
A2	411A,SM566, 424AA, or 563A	Unit 2	70D,5A	Green
A3	411A,SM566, 424AA, or 563A	Unit 3	70D,5A	Green
A4	411A,SM566, 424AA, or 563A	Unit 4	70D,5A	Green
A5-1	Indicator for A5-2	-	70G,0.5A	Red
A5-2	CCI,ETSIs	ECCN 0	74J,7.5A	-
A6-1	-	-	-	-
A6-2	-	-	-	-
A7	411AA,SM566, 424AA, or 563A	Unit 5	70D,5A	Green
A8	TG58	0SPU (SYNC 0)	70D,5A	Green
A9	411AA,SM566, 424AA, or 563A	Unit 6	70D,5A	Green
A12	411AA,SM566, 424AA, or 563A	Unit 7 (0PU)	70D,5A	Green
A13	411AA,SM566, 424AA, or 563A	Unit 8 (0PU)	70D,5A	Green
A14	411AA,SM566, 424AA, or 563A	Unit 10	70D,5A	Green
A15	411AA,SM566, 424AA, or 563A	Unit 11 (0PU)	70D,5A	Green
A16	411AA,SM566, 424AA, or 563A	Unit 13 (0PU)	70D,5A	Green
A17	411AA,SM566, 424AA, or 563A	Unit 14 (0PU)	70D,5A	Green
A18	411AA,SM566, 424AA, or 563A	Unit 15	70D,5A	Green
A19	-	-	-	-

Note: The type depends on the type of unit (IFTU, DSPU, DS3U, or HDS3U).

Table 2-1. ***Continued***

Feed B Fuse	Power Unit/CP			
	Type (Note)	**Assignment**	**Size**	**Bead Color**
B1	411A,SM566, 424AA, or 563A	Unit 1	70D,5A	Green
B2	411A,SM566, 424AA, or 563A	Unit 2	70D,5A	Green
B3	411A,SM566, 424AA, or 563A	Unit 3	70D,5A	Green
B4	411A,SM566, 424AA, or 563A	Unit 4	70D,5A	Green
B5-1	-	-	-	-
B5-2	-	-	-	-
B6-1	-	-	-	-
B6-2	-	-	-	-
B7	411AA,SM566, 424AA, or 563A	Unit 5	70D,5A	Green
B8	-	CRO	70D,5A	Green
B9	411AA,SM566, 424AA, or 563A	Unit 6	70D,5A	Green
B12	411AA,SM566, 424AA, or 563A	Unit 7	70D,5A	Green
B13	411AA,SM566, 424AA, or 563A	Unit 9 (0PU)	70D,5A	Green
B14	411AA,SM566, 424AA, or 563A	Unit 10 (0PU)	70D,5A	Green
B15	411AA,SM566, 424AA, or 563A	Unit 11	70D,5A	Green
B16	411AA,SM566, 424AA, or 563A	Unit 12 (0PU)	70D,5A	Green
B17	411AA,SM566, 424AA, or 563A	Unit 14	70D,5A	Green
B18	411AA,SM566, 424AA, or 563A	Unit 15 (0PU)	70D,5A	Green
B19	411AA,SM566, 424AA, or 563A	Unit 16 (0PU)	70D,5A	Green

Note: The type depends on the type of unit (IFTU, DSPU, DS3U, or HDS3U).

Table 2-1. *Continued*

Feed C Fuse	Power Unit/CP			
	Type (Note)	Assignment	Size	Bead Color
C1	411A,SM566, 424AA, or 563A	Unit 1 (1PU)	70D,5A	Green
C2	411A,SM566, 424AA, or 563A	Unit 2 (1PU)	70D,5A	Green
C3	411A,SM566, 424AA, or 563A	Unit 3 (1PU)	70D,5A	Green
C4	411A,SM566, 424AA, or 563A	Unit 4 (1PU)	70D,5A	Green
C5-1	Indicator for C5-2	-	70G,0.5A	Red
C5-2	CCI,ETSIs	ECCN 1	74J,7.5A	-
C6-1	-	-	-	-
C6-2	-	-	-	-
C7	411AA,SM566, 424AA, or 563A	Unit 5	70D,5A	Green
C8	TG58	1SPU (SYNC 1)	70D,5A	Green
C9	411AA,SM566, 424AA, or 563A	Unit 6 (1PU)	70D,5A	Green
C12	411AA,SM566, 424AA, or 563A	Unit 7 (1PU)	70D,5A	Green
C13	411AA,SM566, 424AA, or 563A	Unit 8 (1PU)	70D,5A	Green
C14	411AA,SM566, 424AA, or 563A	Unit 9	70D,5A	Green
C15	411AA,SM566, 424AA, or 563A	Unit 11 (1PU)	70D,5A	Green
C16	411AA,SM566, 424AA, or 563A	Unit 12	70D,5A	Green
C17	411AA,SM566, 424AA, or 563A	Unit 13 (1PU)	70D,5A	Green
C18	411AA,SM566, 424AA, or 563A	Unit 16	70D,5A	Green
C19	-	-	-	-

Note: The type depends on the type of unit (IFTU, DSPU, DS3U, or HDS3U).

Table 2-1. ***Continued***

Feed D Fuse	Power Unit/CP			
	Type (Note)	**Assignment**	**Size**	**Bead Color**
D1	-	-	-	-
D2	-	-	-	-
D3	-	-	-	-
D4	-	-	-	-
D5-1	-	-	-	-
D5-2	-	-	-	-
D6-1	-	-	-	-
D6-2	-	-	-	-
D7	411AA,424AA, or	+5 MC Power	70D,5A	Green
D9	SM565 (MCP)	MC Power	70B,2A	Orange
D10	-	MTC	70G,0.5A	Red
D12	411AA,SM566, 424AA, or 563A	Unit 8 (0PU)	70D,5A	Green
D13	411AA,SM566, 424AA, or 563A	Unit 9 (1PU)	70D,5A	Green
D14	411AA,SM566, 424AA, or 563A	Unit 10 (1PU)	70D,5A	Green
D15	411AA,SM566, 424AA, or 563A	Unit 12 (1PU)	70D,5A	Green
D16	411AA,SM566, 424AA, or 563A	Unit 13	70D,5A	Green
D17	411AA,SM566, 424AA, or 563A	Unit 14 (1PU)	70D,5A	Green
D18	411AA,SM566, 424AA, or 563A	Unit 15 (1PU)	70D,5A	Green
D19	411AA,SM566, 424AA, or 563A	Unit 16 (1PU)	70d,5A	Green

Note: The type depends on the type of unit (IFTU, DSPU, DS3U, or HDS3U).

Table 2-2. Multibay Power (Non-CEF)

	Power Unit/CP			
Fuse	Type	Designation/ Location	Size	Bead Color
A1	411AA	128-012	70D,5A	Green
A2	411AA	128-108	70D,5A	Green
A3	411AA	328-012	70D,5A	Green
A4	411AA	328-108	70D,5A	Green
A5-1	485AB	PU1 (CCN0)	70D,5A	Green
A5-2	-	-	-	-
A6-1	485AB	PU2 (CCN 0)	70D,5A	Green
A6-2	-	-	-	-
A7	411AA	1PU (Unit 5)	70D,5A	Green
A8	TG58	0SPU (SYNC 0)	70D,5A	Green
A8	-	0TB	70D,5A	Green
A9	411AA	1 PU (UNIT 6)	70D,5A	Green
B1	411AA	128-024	70D,5A	Green
B2	411AA	128-124	70D,5A	Green
B3	411AA	328-024	70D,5A	Green
B4	411AA	328-124	70D,5A	Green
B5-1, B5-2	485AB	PU3 (CCN 0)	70D,5A	Green
B6-1, B6-2	485AB	PU4 (CCN 0)	70D,5A	Green
B7	411AA	0PU (UNIT 5)	70D,5A	Green
B8	TG58	1SPU (SYNC 1)	70D,5A	Green
B8	-	1TB	70D,5A	Green
B9	411AA	0PU (UNIT 6)	70D,5A	Green

Table 2-2. ***Continued***

	Power Unit/CP			
Fuse	**Type**	**Designation/ Location**	**Size**	**Bead Color**
C1	411AA	128-048 (Unit 1)	70D,5A	Green
C2	411AA	128-148 (Unit 2)	70D,5A	Green
C3	411AA*, 424AA, SM566, or 563A	328-048* (Unit 3)	70D,5A	Green
C4	411AA*, 424AA, SM566, or 563A	328-148* (Unit 4)	70D,5A	Green
C5-1	-	Indicator for C5-2	70G,.5A	Red
C5-2,	485AB	PU5 (1CCN)	70D,5A	Green
C6-1	-	Indicator for C6-2	70G,.5A	Red
C6-2,	485AB	PU6 (1CCN)	70D,5A	Green
C7	411AA	(Unit 5)	70D,5A	Green
C8	-	TLIs	70D,5A	Green
C9	SM566*, 424AA, 411AA, or 563A	DCP6* (Unit 6)	70D,5A	Green
D1	411AA	128-064 (Unit 1)	70D,5A	Green
D2	411AA	128-160 (Unit 2)	70D,5A	Green
D3	411AA*, 424AA, SM566, or 563A	328-064* (Unit 3)	70D,5A	Green
D4	411AA*, 424AA, SM566, or 563A	326-160* (Unit 4)	70D,5A	Green
D5-1	-	Indicator for D5-2	70G,.5A	Red
D5-2	485AB	PU7 (1CCN)	70D,5A	Green
D6-1	-	Indicator for D5-2	70G,.5A	Red
D6-2,	485AB	PU8 (1CCN)	70D,5A	Green
D7	411AA	226-148	70D,5A	Green
D8	-	226-160	70D,5A	Green
D9	411AA	226-136 (MCP)	70,2A	Orange
D10	-	MTC	70G,.5A	Red

Note: These are power units and locations for non-flex bay 3; An FTU in units 3 and 4, and a DSPU in unit 6.

Table 2-3. Single-Bay Power (Non-CEF)

Fuse	Power Unit Type	Power Unit Designation/Location
A1	411AA	FTU1-First PU
A2	TG58	0SPU (Sync Power)
A3	411AA	0PU (DSPU Side 0 Power)
A4	411AA	CCN2 Side 0 Power Unit
B1	411AA	FTU1-Second PU
B2	TG58	1SPU (Sync Power)
B3	411AA	1PU (DSPU Side 1 Power)
B4	411AA	CCN2 Side 1 Power Unit
C1	411AA	FTU1-Third PU
C2	NONE	48 Volts to TLIs 1-4, Both Sides
C3	SM566	DCP (DSPU Power)
D2	411AA	+5 Controller Power
D4	SM565	MCP (Main Controller Power)
D5	NONE	48 Volts to MTC Pack

6. If the fuse holds, verify that power unit output voltage is within limits (see Note 1) per Table 2-4 using a digital multimeter (such as KS-20599).

NOTE 1:
The FTU and DS3U power units feed a common bus. To test the replacement for low voltage, one of the other units in the group must be temporarily disconnected.

- If output is out of limits, replace the power unit with one that meets requirements.
- If the fuse does not hold, refer to the appropriate schematic from the list below to locate the wiring trouble between feeder fuse and the power unit.
  - — SD-96699-01 for CEF
  - — SD-96658-01 for non-CEF multibay frame
  - — SD-96684-01 for single-bay frame.

NOTE 2:
After the wiring trouble is corrected, you will have to use the commands of Figure 2-1 to restore all plug-ins that were removed from service (see trouble printout).

Table 2-4. Power Unit Requirements

Power Unit Code	Output Requirement (DC Volts)	Meter Connections	
		Positive Lead	Negative Lead
SM565	+11.75 to +12.25 –11.75 to –12.25	+V2 –V2	RTN RTN
411AA	+5.1 to +5.3	+	–
TG58	+4.75 to +5.25 –4.95 to –5.45	+ +	– –
424AA	+5.0 to +5.5	+	–
485AB	+5.1 to +5.4	+	–
SM566	+4.75 to +5.25	+	–
563A	+4.9 to +5.3	5.5V	GRD

7. Refer to the appropriate table(s) that follows and the trouble printout to see the associated packs.
   - Table 2-5 for controller and sync fuses (CEF)
   - Table 2-6 for controller and sync fuses (non-CEF)
   - Table 2-7 for IFTU fuses
   - Table 2-8 for DSPU fuses (flexible bay)
   - Table 2-9 for DSPU fuses (original interface bay)
   - Table 2-10 for DS3U fuses
   - Table 2-11 for CCN fuses (original interface bay)
   - Table 2-12 for FTUs (original interface bay). See Note.

NOTE:
For LED-type fuses, the designation strips which have the right half offset up are read as follows: the lower left designation is for the bottom fuse on the fuse board, and the upper right one is for the top fuse (for example, CA at bottom and CH at top on ED-2C863-30, G1 dual fuse board).

8. Use RMV commands per Figure 2-1 to remove any affected packs from service that were not removed as part of error recovery (RMV ...COMPL in printout).
9. Disengage CPs associated with the blown fuse and replace fuse(s).

verb::<CP identification>[,option]!

{RMV::	SYNC a!	a	= 0 or 1
/RST::	SYNC a,TLI n[,SSP b]!	n	= 1-4; b = sync port (0 or 1)
/DGRTH::	CCI s!	s	= side 0 or 1
/DGN::}	CCNI s!	s	= side 0 or 1
	ETSI sqq!	qq	= unit 1-16
	TSI sft!	f	= unit (receiving from) (1-6)
	CCB sf!	t	= unit (transmitting to) (1-6)
	ETSIS,ECCN s,ALL!		For all ETSIs on the side
	TSIS,CCN s,ALL!		For all TSIs on the side
	UNIT [q]q,UC!	[q]q	= unit (1-16)
	UNIT [q]q,{FTMI d|DSPI}!	d	= module interface for units 1-4
	UNIT [q]q,FC sd!	sd	= FC side (0,1) and FC No. (1-4)
	UNIT [q]q,FLI k!	k	= service (S) or protection (P)
	UNIT [q]q,FMT s!	s	= side (0,1)
	UNIT [q]q,MMFG c	c	= DS3 group (1-6,P)
	[,FRC][,INCL]!	FRC	= forces remove with no prot. switch
		INCL	= removes/restores MXR NPCs
	NPC <npc No.>[,SIDE s]!	<npc No.>	= NPC number
		s	= SIDE for DSPU
	LINK j!	j	= link 1-6
DGN::	UNIT [q]q,MXR c!	c	= DS3 group (1-6,P)
	UNIT [q]q,MIU c!	c	= DS3 group (1-6,P)

NOTE: Removing the NPC is service affecting.

Figure 2-1. Maintenance Command Construction

10. If the fuse holds, continue with Step **11.**

    - If the fuse does not hold, refer to appropriate schematic listed below to clear wiring problem (see Note). After trouble is cleared, reinsert CPs; the packs affected by the power loss will also have to be restored to service per Figure 2-1.

        — SD-96699-01 for CEF

        — SD-96658-01 for non-CEF multibay frame

        — SD-96684-01 for single-bay frame.

NOTE:
You can use the coordinate location stamped over the plug-in position on the front panel to locate the slot wiring on the backplane.

11. Reinsert CPs one by one while watching fuse to find defective CP which blows fuse.
12. Replace CP that blows fuse and replace blown fuses.
13. Use RST commands per Figure 2-1 to restore affected packs (RMV ...COMPL in printout). The commands are listed according to the hierarchy of the packs in the frame.

    If the CCI cannot be restored, enter **`UTL::BOOT,FRAME!`** and, after the boot completes, restore the CCI to service.

    - If RST ...DNY message is received, find the meanings of the condition codes in *Command Denials*.

Table 2-5. Sync and Controller Fuses (CEF)

Power Unit/ Location	Associated Circuit Pack/Location	Power Unit/ Location	Associated Circuit Pack/Location
	0TLI2 /10-112		EBX /04-128
	0TLI3 /10-120		CPU2 /04-120
	0TLI4 /10-128		EMTC /04-112
	0DPLL /12-084		CI /04-136
1SPU /14-160	1TLI4 /10-136		EBX /04-128
	1TLI3 /10-144		CPU2 /04-120
	1TLI2 /10-152		EMTC /04-112
	1TLI1 /10-160		CI /04-136

Table 2-6. Sync and Controller Fuses (non-CEF)

Synchronizer		Main Controller	
Power Unit/ Location	**Associated Circuit Pack/Location**	**Power Unit/ Location**	**Associated Circuit Pack/Location**
0SPU /227-010	0TLI1 /223-008	MCP /225-136	
	0TLI2 /223-016		BX /225-100
	0TLI3 /223-024		CPU2 /225-108
	0TLI4 /223-032		MTC /225-120
	0DPLL /225-076		CI /225-128
A8 FUSE	0TB /227-032	PU /225-148	
1SPU /227-064	1TLI1 /223-064		BX /225-100
	1TLI2 /223-056		CPU2 /225-108
	1TLI3 /223-048		MTC /225-120
	1TLI4 /223-040		CI /225-128

Table 2-7. IFTU Fuse Assignment

Fuse Boards	Designation (Note)	Associated Plug-Ins
ED-9C011-30 ED-9C011-30	+5A1 through +5A4 (1-4 through 17-20) +5A5	 4 plug-ins (8 NPCs) per fuse (see +5A5 below)
ED-9C012-30 ED-9C011-30	+5A1 through +5A4 (1 through 20) +5A5, number 1 +5A5, number 2 +5A5, number 3 +5A5, number 4 +5A5, number 5	 1 plug-in (2 NPCs) per fuse CPU UBX FTMI 0-Side FC 1-Side FC

Note: Designations +5A1 through +5A4 correspond to the modules (shelves) of the unit. The fuse numbers correspond to the plug-ins on the shelf (either 1 for 1 or 1 fuse per 4 plug-ins, depending on the fuse board).

Table 2-8. DSPU Fuses (Flexible Bay)

Fuse	Side	DSP Position (Note)
(Top) No. 1 No. 2 No. 3 No. 4	0 DSPU	(Left Panel) First and second Third and fourth Fifth and sixth Seventh and eighth
(Bottom) No. 5 No. 6 No. 7 No. 8	1 DSPU	(Right Panel) First and second Third and fourth Fifth and sixth Seventh and eighth

Note: Each fuse supplies two DSP circuit packs.

Table 2-9. DSPU Fuses - Original Interface Bay

DSPU5		DSPU6	
Fuse or PU/ Location	**Associated Circuit Pack/Location**	**Fuse or PU/ Location**	**Associated Circuit Pack/Location**
(SIDE 0)		(SIDE 0)	
0PU/109-160		0PU/312-160	
JBH/109-148	NPC641 /109-006 NPC661 /109-012	JBH/312-148	NPC801 /312-006 NPC821 /312-012
JBG	NPC681 /109-018 NPC701 /109-024	JBG	NPC841 /312-018 NPC861 /312-024
JBF	NPC721 /109-030 NPC741 /109-036	JBF	NPC881 /312-030 NPC901 /312-036
JBE	NPC761 /109-042 NPC781 /109-048	JBE	NPC921 /312-042 NPC941 /312-048
(SIDE 1)		(SIDE 1)	
1PU/109-142		1PU/312-142	
JBD/109-148	NPC641 /109-074 NPC661 /109-080	JBD/312-148	NPC801 /312-074 NPC821 /312-080
JBC	NPC681 /109-086 NPC701 /109-092	JBC	NPC841 /312-086 NPC861 /312-092
JBB	NPC721 /109-098 NPC741 /109-104	JBB	NPC881 /312-098 NPC901 /312-104
JBA	NPC761 /109-110 NPC781 /109-116	JBA	NPC921-310 NPC941 /312-116
DCP5 /109-130	CPU5 /109-056 DSPI5 /109-062	DCP6 /312-130	CPU6 /312-056 DSPI6 /312-062

Table 2-10. DS3U Fuses

Fuse Designation	Associated CPs
L	P MXR (HMXR)
K	1 MXR (HMXR)
J	2 MXR (HMXR)
I	3 MXR (HMXR)
H	0 FMT (HFMT)
G	UC
F	1 FMT (HFMT)
E	S FLI
D	P FLI
C	4 MXR (HMXR)
B	5 MXR (HMXR)
A	6 MXR (HMXR)

Table 2-11. CCN Fuses - Original Interface Bay

CCN0		CCN1	
Fuse/ Location	**Associated Circuit Pack/Location**	**Fuse/ Location**	**Associated Circuit Pack/Location**
JA1 /215-072	0CCNI /246-150 0TSI11 /246-014 0TSI13 /246-020	JA1 /215-088	1CCNI /269-150 1TSI11 /269-014 1TSI13 /269-020
JA2	0CCB1 /246-032 0TSI15 /246-026 0TSI21 /246-038	JA2	1CCB1 /269-032 1TSI15 /269-026 1TSI21 /269-038
JA3	0TSI12 /254-014 0TSI14 /254-020 0TSI16 /254-026	JA3	1TSI12 /277-014 1TSI14 /277-020 1TSI16 /277-026
JA4	0CCB2 /254-032 0TSI22 /254-038	JA4	1CCB2 /277-032 1TSI22 /277-038
JA5	0TSI23 /246-044 0TSI25 /246-050 0TSI31 /246-056	JA5	1TSI23 /269-044 1TSI25 /269-050 1TSI31 /269-056
JA6	0CCB3 /246-078 0TSI33 /246-066 0TSI35 /246-072	JA6	1CCB3 /269-078 1TSI33 /269-066 1TSI35 /269-072
JA7	0TSI24 /254-044 0TSI26 /254-050 0TSI32 /254-056	JA7	1TSI24 /277-044 1TSI26 /277-050 1TSI32 /277-056
JA8	0TSI34 /254-066 0TSI36 /254-072	JA8	1TSI34 /277-066 1TSI36 /277-072
JB1 /215-076	0TSI41 /246-084 0TSI43 /246-090 0TSI45 /246-096	JB1 /215-092	1TSI41 /269-084 1TSI43 /269-090 1TSI45 /269-096
JB2	0TSI51 /246-102 0TSI53 /246-108	JB2	1TSI51 /269-102 1TSI53 /269-108
JB3	0CCB4 /254-078 0TSI42 /254-084 0TSI44 /254-090	JB3	1CCB4 /277-078 1TSI42 /277-084 1TSI44 /277-090
JB4	0TSI46 /254-096 0TSI52 /254-102 0TSI54 /254-108	JB4	1TSI46 /277-096 1TSI52 /277-102 1TSI54 /277-108
JB5	0CCB5 /246-124 0TSI55 /246-118 0TSI61 /246-130	JB5	1CCB5 /269-124 1TSI55 /269-118 1TSI61 /269-130
JB6	0TSI63 /246-136 0TSI65 /246-142	JB6	1TSI63 /269-136 1TSI65 /269-142
JB7	0CCB6 /254-124 0TSI56 /254-118 0TSI62 /254-130	JB7	1CCB6 /277-124 1TSI56 /277-118 1TSI62 /277-130
JB8	0TSI64 /254-136 0TSI66 /254-142	JB8	1TSI64 /277-136 1TSI66 /277-142

Table 2-12. 77-Type, FTU Fuses - Original Interface Bay

Fuse	Associated NPCs			
(Note)	FTU 1	FTU 2	FTU 3	FTU 4
CA	1-8	161-168	321-328	481-488
CB	9-16	169-176	329-336	489-496
CC	17-24	177-184	337-344	497-504
CD	25-32	185-192	345-352	505-512
CE	33-40	193-200	353-360	513-520
CF	41-48	201-208	361-368	521-528
CG	49-56	209-216	369-376	529-536
CH	57-64	217-224	377-384	537-544
CI	65-72	225-232	385-392	345-552
CJ	73-80	233-240	393-400	553-560
CK	81-88	241-248	401-408	561-568
CL	89-96	249-256	409-416	569-576
CM	97-104	257-264	417-424	577-584
CN	105-112	265-272	425-432	585-592
CO	113-120	273-280	433-440	593-600
CP	121-128	281-288	441-448	601-608
CQ	129-136	289-296	449-456	609-616
CR	137-144	297-304	457-464	617-624
CS	145-152	305-312	465-472	625-632
CT	153-160	313-320	473-480	633-640
CU	(0)FC 1-4	(0)FC 1-4	(0)FC 1-4	(0)FC 1-4
CV	(1)FC 1-4	(1)FC 1-4	(1)FC 1-4	(1)FC 1-4
JW	FTMI 1-4	FTMI 1-4	FTMI 1-4	FTMI 1-4
JX	CPU, UBX	CPU, UBX	CPU, UBX	CPU, UBX

Note: The unit number that the fuses supply is identified on the fuse panel.

Clear Power Unit Trouble

1. To see which power unit has failed, enter **`UTL::QRY,ALMS!`**.

   NOTE:
   The failed power unit is indicated by an "M" in the PWR line of the message. The left-to-right assignment on the PWR line is: positions 1 through 6 for units 1 through 6, 7 and 8 for syncs 0 and 1, 9 and 10 for ECCN sides 0 and 1, and 11 through 20 for units 7 through 16.

2. At the frame, locate the power unit with the lighted **ALM** LED. Figure 2-2 shows the relationship of the power units to the FTUs in an original interface bay and the power units in an IFTU of a flexible bay. The DSPU power units are mounted the same in both type bays.

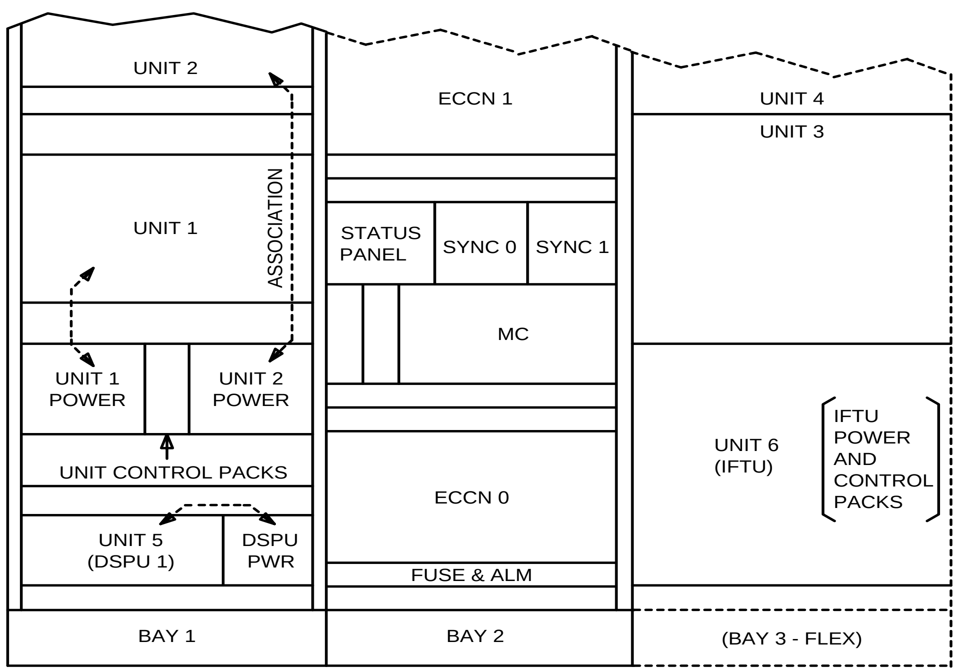

Figure 2-2. Retrofit Frame

3. If the **ALM** indicator is lighted on any power unit, then proceed to Step **6.**
   - If no **ALM** indicator is lighted, then continue with Step **4.**

4. See Note. With digital multimeter (such as KS-20599), check the outputs of the power units identified by the ALMS message. Measure between + and –V (and V2) jacks Table 2-13.

   NOTE:
   The FTU and DS3U power units feed a common bus, and low voltage can only be detected if one power unit is failed or disconnected.

Table 2-13. Power Unit Requirements

Power Unit Code	Output Requirement (DC Volts)	Meter Connections	
		Positive Lead	**Negative Lead**
SM565	+11.75 to +12.25 –11.75 to –12.25	+V2 –V2	RTN RTN
411AA	+5.1 to +5.3	+	–
TG58	+4.75 to +5.25 –4.95 to –5.45	+ +	– –
424AA	+5.0 to +5.5	+	–
485AB	+5.1 to +5.4	+	–
SM566	+4.75 to +5.25	+	–
563A	+4.9 to +5.3	5.5V	GRD

5. If the requirement of Table 2-13 is met, re-install any power unit that was removed and proceed to Step **11.**
   - If the requirement of Table 2-13 is not met, continue with Step **6.**

6. Reseat the suspect power unit by moving the latch switch to open and then back to closed.

   NOTE:
   To find a failed FTU, DS3U, or HDS3U power unit (when LED is not lighted), use the process of elimination. Remove one power unit for that FTU/DS3U and check for low voltage; reinstall that unit, remove a different one, and measure again. Repeat until you can determine which one causes the low voltage.

7. If the **ALM** indicator on the replacement goes off and remains off, proceed to Step **11.**

   - If the **ALM** indicator does not go off and remain off, continue with Step **8.**

8. See Notes 1 and 2; enter **`RMV::UNIT [q]q,UC!`** to avoid possible ESR COND 31 message. Replace the suspect power unit with one that has the same equipment code.

   NOTE 1:
   To find a failed FTU or DS3U power unit (when LED is not lighted), use the process of elimination. Remove one power unit for that FTU/DS3U and check for low voltage; reinstall that unit, remove a different one, and measure again. Repeat until you can determine which one causes the low voltage.

   NOTE 2:
   Insertion of a power unit into a unit can produce an ESR COND 31 message and result in the unit UC being taken out of service. The unit UC can be manually removed before inserting the power unit to avoid the trouble message.

9. If the **ALM** indicator goes off and remains off, continue with Step **10.**

   - If the **ALM** indicator does not go off and remain off, clear wiring trouble between power unit and unit fuses using the appropriate schematic listed below. After the trouble is cleared, the circuit packs affected by the power loss will still have to be restored to service per Figure 2-3.

     — SD-96699-01 for CEF

     — SD-96658-01 for non-CEF multibay frame

     — SD-96684-01 for single-bay frame.

10. If the unit UC was removed from service, enter **`RST::UNIT [q]q,UC!`**.

11. To allow future alarms from subject power unit, enter **`UTL::CLR,PWR pp!`**

    Where: pp = 00 for all power units, 01 through 06 for corresponding unit, 07 or 08 for sync 0 or 1, 09 for ECCN0, and 10 for ECCN1, and 11 through 20 for corresponding power unit.

12. Enter **UTL::QRY,OOS!** to see which packs have been autonomously removed from service.

    NOTE:
    The out-of-service status is indicated by the presence of a "1" in the out-of-service column for each pack. Unequipped NPCs are indicated by dashes.

13. Use the RST commands in Figure 2-3 to restore affected packs to service; MC and sync packs will be reset/restored (and sync will go to fast start) when power is reapplied.

    - If ETSIs (expanded time slot interchange) cannot be restored after a DSPU failure, do the following and retry the ETSI restoral after each corrective action. First, remove and restore the subject unit UC.
    - If the ETSIs still cannot be restored, remove any DMBs for those units from service, reseat them in the slots, and restore them.
    - If the ETSIs do restore, this procedure is completed.

verb::<CP identification>[,option]!

{RMV::	SYNC a!	a	= 0 or 1
/RST::	SYNC a,TLI n[,SSP b]!	n	= 1-4; b = sync port (0 or 1)
/DGRTH::	CCI s!	s	= side 0 or 1
/DGN::}	CCNI s!	s	= side 0 or 1
	ETSI sqq!	qq	= unit 1-16
	TSI sft!	f	= unit (receiving from) (1-6)
	CCB sf!	t	= unit (transmitting to) (1-6)
	ETSIS,ECCN s,ALL!		For all ETSIs on the side
	TSIS,CCN s,ALL!		For all TSIs on the side
	UNIT [q]q,UC!	[q]q	= unit (1-16)
	UNIT [q]q,{FTMI d|DSPI}!	d	= module interface for units 1-4
	UNIT [q]q,FC sd!	sd	= FC side (0,1) and FC No. (1-4)
	UNIT [q]q,FLI k!	k	= service (S) or protection (P)
	UNIT [q]q,FMT s!	s	= side (0,1)
	UNIT [q]q,MMFG c	c	= DS3 group (1-6,P)
	[,FRC][,INCL]!	FRC	= forces remove with no prot. switch
		INCL	= removes/restores MXR NPCs
	NPC <npc No.>[,SIDE s]!	<npc No.>	= NPC number
		s	= SIDE for DSPU
	LINK j!	j	= link 1-6
DGN::	UNIT [q]q,MXR c!	c	= DS3 group (1-6,P)
	UNIT [q]q,MIU c!	c	= DS3 group (1-6,P)

NOTE: Removing the NPC is service affecting.

Figure 2-3. Maintenance Command Construction

Recover From Loss of Input Power

Overview: The most direct approach to recovering from a total input power loss is to simply reset the frame after the 48 V power is restored. The MC and sync packs will be reset/restored (and the sync will go to fast start). Unit and ECCN packs that are out-of-service must be restored using manual input commands. One factor that changes the reset operation is that if the DACS II cannot boot from the PMEM. This would only apply if the PMEM was corrupted because it was being written to at the time of the power loss. In this case, the PMEM card must be replaced with the most recent backup copy. If SMEM was in service at the time, it will also be corrupted and the archived memory card should be used. This archived copy should be placed in the PMEM slot.

NOTE:
The database in the circuit pack memories is lost after a power failure, but the database can be restored from the flash cards, if they have not been corrupted.

CAUTION:
To prevent damage to the power converters from a power surge, disconnect converters before restoring power.

1. After the power is restored, reinsert the power units. Wait 30 minutes (not necessary if power is off only momentarily) for the sync TB ovens to heat up and, on the DACS II status panel, hold the **RESET ENABLE** switch to **ON** and momentarily press the **RESET** button.
2. Watch the output messages. The reset will go through CI and MP STARTUP to the point where the system will attempt to use the PMEM to boot the frame.
   - If any STARTUP STF message is received, go to *Controller and Link Troubles* to clear startup trouble.
   - If BOOT FROM PMEM message was not received, continue with Step **3.**
   - If the reset sequence proceeds to the receipt of RESET COMPL (with no COND code) message, proceed to Step **16.**
   - If the reset sequence proceeds to the receipt of RESET COMPL (with COND code) message, go to *Data Base Troubles* to clear conditional reset.
3. Place the ESD grounding strap on your wrist and physically remove the CPU2 circuit pack.

4. Replace the failed PMEM memory card with the most recent SMEM memory card (this may be the one currently installed in the SMEM slot on the CPU2 or it may be the most recent archived copy).
5. Insert a spare memory card in the SMEM slot.
6. Physically insert the CPU2 back into the slot.
7. On the Status Panel, hold the RESET ENABLE switch to ON and momentarily press the RESET button.
8. The System should be brought into service with the correct version of the executables and database. If the boot completes successfully and the database is correct, continue with step 16.
9. If the boot does not complete or the original problem persists, then the replacement card is also corrupted, continue with the next step. This is most likely to occur when the replacement card for PMEM was the SMEM card currently being used in the system. If the cards are mirror images of each other, i.e., both PMEM and SMEM are IS at the time the problem occurred, it is likely that both cards will contain the problem.
10. Place the ESD grounding strap on your wrist and physically remove the CPU2 circuit pack.
11. Replace the failed PMEM memory card with the most recent archived memory card.
12. Physically insert a spare memory card in the SMEM slot.
13. Physically insert the CPU2 back into the slot.
14. On the Status Panel, hold the RESET ENABLE switch to ON and momentarily press the RESET button.
15. The system should be brought into service with the correct version of the executables and database.
16. To restore the SMEM card, enter the following command:

    RST::SMEM,BKGRND

    NOTE 1:
    This command will overwrite the SMEM card with the contents of the PMEM card.

    NOTE 2:
    Any database changes made since the last archived copy was made, must be redone.

17. If early codes of NPCs (Series 4 DDC or Series 2 DMBs) are installed, these codes will have to be disconnected from the frame and reinserted (reset by power up) in order for the packs to be restored to service.

18. Enter **`UTL::QRY,ALL!`** to obtain listing of out-of-service, failed, and pested plug-ins.

   NOTE:
   Out-of-service, failed, and pested plug-ins are indicated by the presence of a "1" in the respective columns of the output message for each plug-in; unequipped NPCs are indicated by dashes.

19. To check only common equipment, enter the following command and read the output per Figure 2-4:

   `UTL::QRY,{OOS|FAIL|PEST|ALL},COMMON!`.

```
M...UTL QRY <parameter> g h i j k l  m n  o p EOM

g = Link 1
h = Link 2
i = Link 3
j = Link 4
k = Link 5
l = Link 6
m = Cross-Connect Side 0
n = Cross-Connect Side 1
o = CCI 0 / CCNI 0
p = CCI 1 / CCNI 1
```

Figure 2-4. Common Equipment Readout

20. See Note. If any CPs are equipped but out-of-service, enter the RST (restore) command per Figure 2-5 for the pack.

   - If command denial occurs, find the meanings of the condition codes in *Command Denials*.

   NOTE:
   When a CP in a duplex/protected network (ECCN, DSPU, DS3U) fails, service is switched and all the CPs on the failed side/group are removed from service and pested. To correct the problem, the failure must be cleared so the side (or all CPs) can be restored. If both sides/groups are failed, trouble must be cleared on the out-of-service side/group first; removal of the other side will be denied.

21. If any CPs are failed, enter the DGN (diagnose) command per Figure 2-5 for the pack.
    - If DGN ...STF message is received, go to *Manual Diagnostic Failures* to clear failed diagnostic.
    - If diagnostic passes, enter RST command.

verb::<CP identification>[,option]!

{RMV::	SYNC a!	a	=	0 or 1
/RST::	SYNC a,TLI n[,SSP b]!	n	=	1-4; b = sync port (0 or 1)
/DGRTH::	CCI s!	s	=	side 0 or 1
/DGN::}	CCNI s!	s	=	side 0 or 1
	ETSI sqq!	qq	=	unit 1-16
	TSI sft!	f	=	unit (receiving from) (1-6)
	CCB sf!	t	=	unit (transmitting to) (1-6)
	ETSIS,ECCN s,ALL!			For all ETSIs on the side
	TSIS,CCN s,ALL!			For all TSIs on the side
	UNIT [q]q,UC!	[q]q	=	unit (1-16)
	UNIT [q]q,{FTMI d|DSPI}!	d	=	module interface for units 1-4
	UNIT [q]q,FC sd!	sd	=	FC side (0,1) and FC No. (1-4)
	UNIT [q]q,FLI k!	k	=	service (S) or protection (P)
	UNIT [q]q,FMT s!	s	=	side (0,1)
	UNIT [q]q,MMFG c	c	=	DS3 group (1-6,P)
	[,FRC][,INCL]!	FRC	=	forces remove with no prot. switch
		INCL	=	removes/restores MXR NPCs
	NPC <npc No.>[,SIDE s]!	<npc No.>	=	NPC number
		s	=	SIDE for DSPU
	LINK j!	j	=	link 1-6
DGN::	UNIT [q]q,MXR c!	c	=	DS3 group (1-6,P)
	UNIT [q]q,MIU c!	c	=	DS3 group (1-6,P)

NOTE: Removing the NPC is service affecting.

Figure 2-5. Maintenance Command Construction

22. To check for out-of-service, failed, and pested CPs, enter **`UTL::QRY,ALL[,UNIT [q]q]!`**.
23. If any CPs are still pested, enter the commands to first remove and then restore the CPs per Figure 2-5.
    - If command denial occurs, find the meanings of the condition codes in *Command Denials*.
    - If there are no pested CPs or command denials did not occur, this procedure is completed.

Facility Alarms

3

Contents

Facility Alarms

3

This chapter contains the procedures to clear facility alarms for all the facility types that connect to the DACS II.

NOTE:
If you already have isolated the alarm to one of the facility alarms listed, you can proceed directly to the procedure for that alarm; otherwise, you should go to *Trouble Identification* to first isolate the trouble.

Familiarize yourself with the following equipment considerations.

- The IFTU (and older FTU) equipment and the DS3U or HDS3U equipment terminate external facilities; the DSPU equipment does not. Any type unit can be placed in any of the three unit positions in a flexible interface bay.
- There is an NPC (network processing circuit) associated with each DS1 or E1 facility, whether the DS1 is terminated directly or is embedded in a DS3 signal. The NPC commands, including the STATE query, are operative for any type NPC. For direct DS1 and terminations, the circuitry for two NPCs is mounted on a single plug-in unit. For embedded NPCs, the circuitry for 28 DS1s is mounted on the DS3 MXR plug-in.
- Replacing the NPC plug-in equipment is not the first line of action in clearing a facility trouble. Not only are multiple line signals affected (two for direct DS1s and 28 for DS3) when the plug-in is replaced, but it can take over 30 seconds for the line signal to be restored.

> **CAUTION:**
> *When the command to remove an NPC is executed, the service on all channels within that NPC is interrupted. The restore command operation runs diagnostic tests and establishes end-to-end transmission. Accordingly, it can take over 30 seconds for the line transmission to be restored plus any alarm refinement time.*

- Whenever maintenance is required on a facility, arrangements must be made to notify special service customers and to patch service to another facility (maintenance spare).

  For the *SLC*® carrier system, facility protection switching is provided to automatically cross-connect the failed channels to channels in the protection line.

- For the DS3U or HDS3U, the protection switching does not protect against facility failures, it protects against DS3 plug-in failures. In the rare case where a DS3U or HDS3U plug-in must be replaced to clear a facility failure, service will be switched to the protection MMFG when the suspect MMFG is removed from service.

> **CAUTION:**
> *If the protection MMFG is already serving a previous failure, that failure will have to be cleared to make the protection switch available. If the plug-in is replaced while protection switching is not available, service on all 28 DS1 or 21 E1 signals will be interrupted, and the replacement MMFG cannot be restored to service because service removal would have been denied when protection is not available.*

Clear ALM UNIT DS3 Message

NOTE:
Receipt of this message indicates a DS3 signal failure. Since the DACS II equipment is not at fault, the protection switching is not operated. The DACS II sends an AIS signal downstream (except for high BER) on all the component NPC channels.

1. If alarm cutoff is needed, enter **`UTL::ACO!`**.
2. Notice which alarm state is reported as follows:
   - — LOS (loss of signal)
   - — BER (bit error rate)
   - — OOF (out-of-frame)
   - — AIS (alarm indication signal).
3. If the AIS state is reported, take no action; this is an information message and the alarm will clear when the trouble is cleared in the upstream equipment. The AIS is sent from upstream equipment to indicate trouble and to prevent registering a local alarm so that the trouble can be isolated to the section with the incoming failure alarm.
   - If the AIS is not reported, proceed to Step **4**.
4. To see if other DS3 lines have failed, possibly because of a cable cut or maintenance activity, enter **`UTL::QRY,ALM,DS3!`** and read the output message using Figure 3-1.

M ...UTL QRY ALM DS3 TOT ttt e LN MSG:
UNIT [q]q xxloba <MMFG2> <MMFG3> <MMFG4> <MMFG5> <MMFG6> COMPL

ttt	=	Total number of DS3 facilities in the output segment reporting reporting critical facility alarms.
e	=	Number of lines in the output message.
xx	=	DS3 status: CR (critical alarm), ER (error & pested), CL (clear), UX (unit OOS, no data), or dashes for unequipped.
l	=	Loss of Signal: 1 (Present), 0 (Absent), or - (no data).
o	=	Out of Frame: 1, 0, or - (no data).
b	=	Bit Error Rate (High): 1, 0, or - (no data).
a	=	Alarm Indication Signal: 1, 0, or - (no data).

Figure 3-1. DS3 Alarm Readout

5. To see LOC (loss of clock) indications at FLI pack, enter **`UTL::QRY,ESR,UNIT [q]q,FLI {S|P}!`** and read output message using Figure 3-2. Each byte consists of 2 hexadecimal digits which when converted to binary gives 8 bits (the bit positions are designated 76543210 from left-to-right). When a bit equals a 1, the LOC exists for that DS3 input.

```
M ...UTL QRY ESR UNIT [q]q FLI k  2 LN MSG:
<byte 1> <byte 2> <byte 3> <byte 4> COMPL

<byte 3>   =   Loss of Clock on inputs as follows:
   Bit 0   =   LOC for DS3 No. 1
   Bit 1   =   LOC for DS3 No. 2
   Bit 2   =   LOC for DS3 No. 3
   Bit 3   =   LOC for DS3 No. 4
   Bit 4   =   LOC for DS3 No. 5
   Bit 5   =   LOC for DS3 No. 6
 Bit 6,7   =   Not Used
```

Figure 3-2. Error Source Register for FLI

6. At this point, you know the trouble is incoming signal loss. So, you can check the line signal using an external test set at the DSX-3 bay or you can assist the far end as required to loop back or isolate the line trouble.
   - To check if FLI is causing loss of signal, continue with Step **7**.

7. Enter **`UTL::QRY,PSTATE,UNIT [q]q!`** for the unit with the alarm to see the FLI maintenance state (IS, OOS, or ISF for in-service and failed) and switch state (SLT -selected, USLT - unselected).

8. Make sure both FLI packs are installed in the unit, then enter appropriate command to switch to the other (unselected) FLI.
   `SW::UNIT [q]q,FLI,TOPRTN!`
   `SW::UNIT [q]q,FLI,TOSRVC!`
   - If switch is denied because the other side is out-of-service, clear the trouble on that FLI per Section 4.9 to enable switching.

     NOTE:
     DS3 plug-ins must only be disconnected and replaced if the plug-ins can be removed from service; otherwise, the restore command will be denied after the replacement because the plug-in was never removed. If the mate plug-in is failed, it will have to be replaced to enable switching.

9. Enter **`RMV::UNIT [q]q,FLI {S|P}!`** to remove the FLI (now unselected) and replace it.
   - If RMV ...DNY message is received, find the reason for denial in the output message and perform corrective action to obtain command completion. The *Command Denials* section in this document gives the meanings of the condition codes.

10. Enter **`RST::UNIT [q]q,FLI {S|P}!`** to restore the replacement FLI.
    - If RST ...DNY message is received, find the reason for denial in the output message and perform corrective action to obtain command completion. The *Command Denials* section in this document gives the meanings of the condition codes.

Clear CGA on DS1 or PBA on E1 Embedded in DS3 Signal

NOTE:
Each DS3 signal is composed of 28 DS1 signals. In the case of a hybrid DS3 signal, the signal may be composed of 28 DS1 signals or 21 E1 signals or a combination of the two. This procedure deals with CGA alarms on the embedded DS1 or PBA alarms on the embedded E1 and includes information to determine whether there is a DS3 trouble affecting all the DS1s (E1s) or if isolated DS1 (E1) signals have alarms.

1. If alarm cutoff is needed, enter **`UTL::ACO!`**.
2. Notice the NPC number given in the CGA (PBA) message and notice which alarm state is indicated. See Table 3-1 for meanings of states.

NOTE 1:
For any of the outgoing DS1 (E1) signal failures, DACS II error recovery would do looped tests to check the MXR circuitry and would do protection switching if a trouble is present.

NOTE 2:
A red alarm supersedes an AIS; if the DACS II has a red alarm and an AIS is subsequently received in the incoming bit stream (as part of testing), the red alarm will remain instead of changing to AIS. When good transmission is restored (no alarm signal), the red alarm will clear.

Table 3-1. Alarm Designations

Designation	Meaning
R	Red alarm (incoming failure)
Y	Yellow alarm (outgoing failure)
B	Both red and yellow (D-bank looped)
L	Local multiframe (LMA)
M	Remote multiframe (RMA)
F	Frame format error (FFER)
V	Line format violation rate (LFVR)
A	Alarm indication signal

3. Check printout for ESR ANALYSIS REPORT or ERR ESR message showing hardware failure in ECCN or DS3U (HDS3U). A duplex side failure or an unprotected DS3U (HDS3U) failure would cause DS3 and DS1 (E1) signal failures.
   - If there is a failure message for ECCN or DS3U (HDS3U) plug-ins, go to *Hardware Failures* to clear ANALYSIS REPORT or ERR ESR message.

4. If you do not already know if the DS3 signal (or multiple DS1s [E1s]) failed, you can determine the extent of the trouble using the following queries:
   — To see all alarms on the frame, enter **`UTL::QRY,ALMS!`**.
   — To see DS3 line alarms, enter **`UTL::QRY,ALM,DS3!`**.
   — To see the maintenance and protection status of one MMFG/DS3 in a unit, enter **`UTL::QRY,PSTATE,UNIT [q]q,DS3 c!`**.

NOTE:
For the DS3 line alarms, there is a field (xxloba) for each MMFG which gives the status (xx = CL, CR, ER, UX, or dash), the LOS (loss of signal - 0,1), BER (bit error rate - 0,1), or AIS (alarm indication signal - 1,0). The meanings of the status words are: CL (clear), CR (critical), ER (error condition, out-of-service or failed in-service), or UX (unit out-of-service, no data output).

NOTE:
For protection status, the keywords are made up of the following parts: INH (inhibited), ALW (allowed), MP (manual switch), AP (auto switch), and S (switch).

5. Which failure condition exists? See Note.
   - If **DS3 LINE FAILED,** then go to Section 3.1 to clear DS3 alarm message.
   - If **ONLY DS1 (E1) LINE(S) FAILED,** then continue with Step **6**.

NOTE:
With a failed incoming DS3 signal, an AIS (alarm indication signal) is sent out on all the component NPC channels.

6. Enter **`UTL::QRY,DS3,LBO!`** to check the DS3 line build out setting.

7. Compare the settings with settings for other units going to the DSX-3, DACS IV, office records, and the following.

	TO DSX-3		TO NETWORK ELEMENT	
LBO SETTING	**KS-19224, L2 CABLE**	**734A CABLE**	**KS-19224, L2 CABLE**	**734A CABLE**
ON	0 to 75 feet	0 to 225 feet	0 to 150 feet	0 to 450 feet
OFF	75 to 150 feet	225 to 450 feet	150 to 300 feet	450 to 900 feet

- If the LBO is incorrect, continue with Step **8**.
- If the LBO is correct, the trouble must be at the far-end M13 (or other) muldem.

NOTE:
If clear-channel DS1s (E1s) are involved, a test access connection can be established to the facility to allow testing with external test equipment. Test access procedures are covered in Volume I.

8. If the MXR (HMXR) for the DS3 is not already out-of-service (RMV ...COMPL in trouble printout), enter **`RMV::UNIT [q]q,MMFG c[INCL]!`** for the unit and multiplexer to be changed.

Where:
[q]q = Unit number (1 through 16).
c = MMFG number for subject DS3 (1 through 6).
INCL = Optional, to remove all equipped component NPCs from service.

9. Enter **`CHG::UNIT [q]q,DS3 c,LBO {ON|OFF}!`**

10. Enter **`RST::UNIT [q]q,MMFG c[,INCL]!`**.

Where: INCL = Optional, to cause all equipped NPCs on the subject multiplexer to be restored to service.

Clear DS1 Facility CGA (Except *SLC*® Carrier System)

Overview: This procedure deals with alarms caused by facility failures and NPC hardware failures. Alarms can also be caused by maintenance activity or by incompatible NPC growth specifications. If an obscure alarm occurs on a new facility or one in which the IW (insertion word) was recently changed, the line formats and IW specifications for the NPCs may not be end-to-end compatible.

1. If alarm cutoff is not already operated, enter **`UTL::ACO!`**.
2. Enter **`AUD::QRY,CGA!`** to list current CGAs and check far-end conditions to determine if the troubles are associated.
   - If DS1 line connects to 19.2-kb/s MJU shelf, see Table 3-2 for summary of how MJU alarms are reported to DACS II. Refer to the *DACS II DS1 Multipoint Junction Unit (MJU) Shelf - Description, Operation, and Maintenance* manual (365-352-007) for information on how to clear these alarms.
   - If multiple NPCs are alarmed and the NPCs are in the same FTU, check printout for equipment failures. See *Trouble Identification*..
   - If multiple NPCs are alarmed and the alarms are not related (on same cable or due to maintenance activity), select one CGA to proceed with and, after isolating that trouble, repeat for the next one.

NOTE:
A critical alarm indication on the status panel and a "C" at the beginning of the alarm message means six or more in-service digroups have failed.

Table 3-2. 19.2-kb/s Alarms Registered at DACS II

MJU Alarm	DACS II Alarm	Meaning
HDW	CGA R	MJU hardware failure. Flashing light means can't initialize circuits on CP. Steady light means power or microprocessor failure.
LOS	CGA AIS	Incoming line signal loss detected at MJU.
LOF	CGA Y	Incoming loss of DS1 framing detected at MJU.
RFA	CGA R	Remote frame alarm (DACS II detected incoming signal loss and sent RFA to MJU).

3. Find the alarm designation in the message (located after the NPC number) and check Table 3-3 for the meaning of the alarm (see Notes 1 and 2).

NOTE 1:
Trunk conditioning (AIS for clear-DS1; AIS for 24-channel range connections if specified in the cross-connections) is sent downstream from the equipment that registers a red (incoming) alarm. By sending the trunk conditioning downstream, other equipment is alarmed as required to make circuits unavailable, but only one terminal has a red alarm to show the failed section of the route.

NOTE 2:
A red alarm supersedes an AIS; if the DACS II has a red alarm and an AIS is subsequently received in the incoming bit stream (as part of testing), the red alarm will remain instead of changing to AIS. When good transmission is restored (no alarm signal), the red alarm will clear.

Table 3-3. Alarm Designations

Indicator	Meaning
A	Alarm Indication Signal
B	Both red and yellow (not registered with TG80/TG80B NPC)
F	Frame format error rate (TG180 NPC)
L	Local multiframe alarm (DMI equipment)
M	Remote multiframe alarm (DMI equipment)
R	Red; incoming line failure
V	Line format violation (TG180 NPC)
X	Multiple alarms (TG180 NPC)
Y	Yellow; outgoing line failure

4. Which alarm did you start with when you came to this procedure? See Note.
   - If **Y, B,** or **M (Remote Alarm),** continue with Step **5.**
   - If **R** or **L (Local Alarm),** proceed to Step **6.**
   - If **A,** no action is necessary. This signal (blue signal) originates upstream at an alarmed terminal and is forwarded along the route to prevent multiple red alarms. The trouble can be isolated to a single span with only one red alarm in the route. The far-end NPC can also be grown to send an all 1s signal when it is removed from service.

NOTE:
With the CGA present, the NPC sends trunk conditioning toward the connected facility to make far-end equipment unavailable for service. Consequently, even though the NPC could be quickly checked by looping at DSX-1 bay to see if the alarm clears or changes, the following tests should be used unless service has been patched off at the ends of the facility.

5. At DSX-1 bay, use DS1 signal test to check for pulses with no errors at the MON jack for the transmit of the DACS II. Be sure the test set controls are set for the correct line format (D4, ESF, T1DM, etc.).
   - If pulses without errors were detected, the trouble is either in the line going to the far end or in the alarm detection equipment at the far end. Have the far end perform looped D-bank test or check for pulses with an external test set. If the line is at fault, have facility maintenance crew isolate trouble.
   - If no pulses or if errors were detected, proceed to Step **7.**

NOTE:
The trouble is isolated by testing the signal at intermediate offices with a test set to determine where the trouble first appears along the line. Document 365-800-003 details the isolation procedure for T1 lines.

6. At DSX-1 bay, use test set such as J98725A to test for pulses without errors at the MON jack for the receive line (to DACS II).
   - If pulses without errors were detected, continue with Step **7.**
   - If no pulses or pulses with errors were detected, the trouble is on incoming facility or at far-end equipment. Have the far end perform looped D-bank test or check for pulses with external test set. If the line is at fault, have maintenance crew isolate trouble.

   NOTE:
   The trouble is isolated by testing the signal at intermediate offices with a test set to determine where the trouble first appears along the line. Document 365-800-003 details the isolation procedure for T1 lines.

7. Verify that NPC for alarmed facility is out-of-service (RMV NPC ...COMPL in printout) to allow more complete diagnostic testing; if necessary, enter **`RMV::NPC <npc No.>[,INCL]!`**.

   Where: <npc No.> = NPC number, either extended (for example, [0]001) or hierarchical (for example, 01101).
   INCL = Optional, to enable the removal of which is designated as carrying special service circuits.

8. Enter **`DGN::NPC <npc No.>!`**.

   NOTE:
   The diagnostic tests the NPC transmission paths except for the line transformers. So, if the cabling is not at fault, the NPC could still be causing the trouble.

9. If DGN ...STF message is received, replace the plug-in for the NPC as follows and restore the NPC(s) to service.
   - Arrange a time when both NPCs on the DDC plug-in can be removed from service, and enter **`RMV::NPC <npc No.>[,INCL]!`** for each NPC; then replace the plug-in (for example, DDC).
   - Enter **`RST::NPC <npc No.>!`** for EACH of the removed NPCs.

10. If the DGN ...STF message is not received, then the trouble is in cabling to DSX-1 bay. Repair or replace cabling using local procedures; after trouble is cleared, enter **`RST::NPC <npc No>!`** for EACH of the removed NPCs.

Clear 2.048-Mb/s Facility AR01 MISC ALM Message

Overview: This procedure isolates the cause of an incoming or outgoing signal problem to either the facility or the DACS II equipment and provides the interpretation of received alarm signals. The alarm message also indicates the alarm status: PMA for prompt maintenance, DMA for deferred maintenance, or MI for information. When a receive failure occurs, the DACS II sends a remote alarm signal over the facility to produce a remote alarm indication (RAI, REER, or R16) at the other end. Failure of a facility that serves as a timing link for the DACS II sync brings sync error messages.

1. If alarm cutoff is needed, enter **`UTL::ACO!`**.
2. To list all current primary block alarms, enter **`AUD::QRY,CFA!`**, and if associated facilities are alarmed, check records and far-end conditions to determine if trouble is due to cable problem or maintenance activity.
   - If the alarms on other facilities are not related, continue with procedure to clear trouble on one facility and repeat for others.

   NOTE:
   A critical alarm indication on the status panel or a "C*" at the beginning of the alarm message means six or more channel groups have failed.

3. When more than one alarm indication is received on the same facility, refer to Table 3-4 to determine the priority of the alarm types.

Table 3-4. Alarm Priorities

Priority	Alarm Type	Class	Prefix
1	A (for AIS)	MI,DMA or PMA	I, *, **, or *C
2	R (for PBF)	PMA	** or *C
3	Y (for RAI)	MI	I
4	B (for MBER)	DMA	*
	E (for RBER)	MI	I
5	V (for A16)[1]	MI	I
6	L (for LMA)[1]	PMA	** or *C
	X (EER or LOS)	PMA	**
7	M (for R16)[1]	MI	I
	I (for RAIS)	MI	I
	S (for Sync Fail)	MI	I

[1] These only occur with CAS line format.

4. Which alarm type appears in the MISC ALM message?
   - If **Y** or **E (Remote Alarm),** continue with Step **5.**
   - If **B, R, L,** or **X (Local Alarm),** proceed with Step **8.**
   - If other **(A, V, M, I, S),** proceed to Step **12.**

5. At jack on DPC pack or at line interface jacks (if provided), use office test set to check signal at the MON jack for the transmit line (from DACS II).
   - If good clock signal with no alarms was detected, continue with Step **6.**
   - If good clock signal with no alarms was not detected, proceed to Step **15** and replace the plug-in for the NPCs.

NOTE:
The jack on the DPC provides bridging access to the transmit paths at a level approximately 30 dB below the transmit level. The bottom jack is for the odd numbered NPC and the top jack is for the even numbered NPC.

NOTE:
The Y alarm type (TS0 bit 3) indicates loss of signal, excessive errors, or loss of frame alignment at the far end, and the E alarm type (TS0 bit 4) indicates excessive error rate at the far end.

6. If the trouble is in the line going to the far end or in the alarm detection equipment at the far end, have far-end personnel check for pulses without errors with an external test set. If the line is at fault, have facility maintenance crew isolate trouble by testing for signal at intermediate offices. If the office equipment is at fault, replace receive pack.
7. If 2.048-Mb/s signal loopback (toward the line side) is requested at DACS II to allow testing from the far end, place loopback at line interface bay.

For Local Alarm Indicator, Continue Here

8. The type L (LMA) indication means that there is a loss of multiframe alignment for the CAS signaling sent on time slot 16 for all service channels. Enter **`UTL::QRY,STATE,NPC <npc No.>!`** for alarmed facility and verify that the NPC is provisioned for CAS.

   Where: <npc No.> = NPC number, either extended (for example, [0]001) or hierarchical (for example, 01101).

   NOTE:
   The first digit of the NPC growth specification will be an odd number when the CAS option is selected.

9. If line interface jacks are provided, use the office test set to test signal at the MON jack for the receive line (to DACS II). The incoming line failure may be due to signal loss, loss of framing, or bit error rate greater than 10^{-3} .
   - If good clock with no alarms is detected, then proceed to Step **15** and replace the plug-in for the NPC.
   - If good clock was not detected, then continue with Step **10.**
10. If the trouble is on the incoming facility or at far-end equipment, have far-end personnel check the signal with external test set. If the line is at fault, have maintenance crew isolate trouble by testing for signal at intermediate offices.

    NOTE:
    The type L alarm is not likely to be caused by the line; the far-end transmission equipment is suspect.

11. If 2.048-Mb/s line signal loopback (toward line side) is requested to allow testing from the far end, place loopback at line interface bay.

For Alarm Type A, V, M, I, S, Continue Here

12. Which alarm type appears in the MISC ALM message?
    - If **M,** proceed to Step **13.**
    - If **S,** notify the connecting DACS II tester to use ERS SYNC to isolate the trouble. The type S (sync failure indication) means that the far-end DACS II frame timing has gone into the holdover mode. During holdover, the internal clock is supplying the signal without receiving timing from external timing links.
    - If **A, V, or I,** an alarm indication signal is being received from the far-end equipment, either on all channels (type A-AIS), on TS16 (type V-A16), or on TS0 bit 4 (type RAIS - remote AIS). This alarm is sent to indicate trouble upstream without registering a PBF; consequently, the trouble is isolated to the section with the PBF and RAI alarms. The alarm will clear when the trouble is cleared in the upstream equipment.
13. The type M (R16) indication appears when signaled from the far-end equipment over time slot 16. This indicates that the far end has lost multiframe alignment for CAS signaling in time slot 16 and consequently has an LMA alarm.
14. Enter **`UTL::QRY,STATE,NPC <npc No.>!`** for alarmed facility to verify that the NPC is provisioned for CAS format (see Notes 1 and 2).

NOTE 1:
The first digit of the NPC growth specification will be an odd number when the CAS option is selected.

NOTE 2:
If the far end clears the trouble, the type M (R16) alarm will clear; otherwise, you may have to assist in troubleshooting.

To Replace Plug-In for NPC, Continue Here

15. Verify that NPC for alarmed facility is out-of-service (RMV NPC ...COMPL in printout) to allow more complete diagnostic testing; if necessary, enter **`RMV::NPC <npc No.>[,INCL]!`**

    Where: INCL = Optional, needed to remove NPC with special circuits.

16. Enter **`DGN::NPC <npc No.>!`**.
    - If DGN ...STF message is received, continue with Step **17.**
    - If DGN ...STF message is not received, the trouble is in cabling to the line interface jacks. Repair or replace the cabling; after trouble is cleared, enter **`RST::NPC <npc No.>!`** for each of the removed NPCs.

NOTE:
The diagnostic tests the NPC transmission paths except for the line transformers. So, if cabling is not at fault, the NPC could still be causing the trouble.

17. Arrange a time when both NPCs on the dual DPC card can be removed from service; enter **`RMV::NPC <npc No.>[,INCL]!`** for other NPC, and replace the dual pack.
18. Enter **`RST::NPC <npc No.>!`** for each of the removed NPCs.

DS1 Facility Error Messages (Except *SLC* Carrier System)

Overview: This procedure is used to clear alarms that are registered when any facility errors reach alarm threshold levels. The DS1 parameters that the DACS II monitors are: BER (bit error rate), BPV (bipolar violations), ERS (errored seconds), ER (error rate), SERS (severe-ERS), SLIP (slips), OOF (out-of-frame), FRER (framing error), CRC (cyclic redundancy), and COFA (change of frame alignment). The troubleshooting strategy is to first verify that correct NPC alarm options are selected, have the far end check for errors in the transmit direction, and then use signal loopback to check the digital line.

CAUTION:
The line looping in this procedure interrupts service on all channels of the line, so service will have to be removed or patched to another facility. For minor alarms (not service affecting), you may want to postpone testing until nonbusy hours.

NOTE:
The type of error (SLIP or ERS) and whether on a new facility often indicates the source of the trouble. Timing SLIPS are usually caused by not having the far end optioned for loop timing or by a loop timing pack not functioning. This is more likely to occur on a new facility as incorrect NPC provisioning. The other parameters indicate facility problems.

1. If alarm cutoff is not already operated, enter **`UTL::ACO!`**.
2. Enter **`UTL::QRY,STATE,NPC <npc No.>!`** for NPC on alarmed facility.

   Where: <npc No.> = NPC number, either extended (for example, [0]001) or hierarchical (for example, 01101).

3. Read the selected alarm threshold for the facility parameter from the output message and compare to office records or other (same type) NPCs.

   - If the alarm threshold for the parameter is incorrect, enter following command with the required parameter identifiers:
     `CHG::{NPC <npc No.>|TYPE mnxyz},OPTS(rr/l,ss/m ...,tt/n)!`

     Where:

NPC or TYPE field	=	Selects number of NPCs to be changed: one NPC given as extended (for example, [0]001), hierarchical (for example, 01101), or all NPCs with the same type specification (mnxyz).
rr,ss,tt	=	Listing of any of the associated alarm types
l,m,n	=	Predefined number (0 through 3) per Table 3-6 which selects alarm threshold.

Table 3-5. Alarm Parameters (DE/TE/DS/DA/TA Type NPCs)

Type (rr,ss,tt)	Meaning
01	Type DE/TE/DS SLIPs, Major Alarm
02	Type DE/TE/DS SLIPs, Minor Alarm
03	Type DE/TE/DS BER, Major Alarm
04	Type DE/TE/DS BER, Minor Alarm
05	Type DE/TE/DS ERS
06	Type DE/TE/DS SERS
07	Type DE/TE/DS COFA, Major Alarm
08	Type DE/TE/DS COFA, Minor Alarm
09	Type DS SANE
10	Type DS SAFE
41	Type DA/TA Near-end Path CV, Daily
42	Type DA/TA Near-end Path ES, Daily
43	Type DA/TA Near-end Path SES, Daily
44	Type DA/TA Near-end SEFS, Daily
45	Type DA/TA Near-end CSS, Daily
46	Type DA/TA Near-end US, Daily
47	Type DA/TA Near-end Line CV, Daily
48	Type DA/TA Near-End Line ES, Daily
49	Type DA/TA Near-end Line SES, Daily
50	Type DA/TA Far-end Path CV, Daily
51	Type DA/TA Far-end Path ES, Daily
52	Type DA/TA Far-end Path SES, Daily
53	Type DA/TA Far-end SEFS, Daily
54	Type DA/TA Far-end CSS, Daily
55	Type DA/TA Far-end US, Daily
56	Type DA/TA Far-end Line ES, Daily
57	Type DA/TA Near-end Path CV, 15 Min.
58	Type DA/TA Near-end Path ES, 15 Min.
59	Type DA/TA Near-end Path SES, 15 Min.
60	Type DA/TA Near-end SEFS, 15 Min.
61	Type DA/TA Near-end CSS, 15 Min.
62	Type DA/TA Near-end US, 15 Min.
63	Type DA/TA Near-end Line CV, 15 Min.
64	Type DA/TA Near-End Line ES, 15 Min.
65	Type DA/TA Near-end Line SES, 15 Min.
66	Type DA/TA Far-end Path CV, 15 Min.
67	Type DA/TA Far-end Path ES, 15 Min.
68	Type DA/TA Far-end Path SES, 15 Min.
69	Type DA/TA Far-end SEFS, 15 Min.
70	Type DA/TA Far-end CSS, 15 Min.
71	Type DA/TA Far-end US, 15 Min.
72	Type DA/TA Far-end Line ES, 15 Min.

Table 3-6. DS1 Option Selection

Option (l,m,n)	Meaning
0	Default Value
1	First Option Value (set1)
2	Second Option Value (set2)
3	Third Option Value (set3)

4. Enter **`UTL::CLR,<parameter>,NPC <npc No.>[-<range>]!`**, and, after recording period, enter **`UTL::QRY,<parameter>,NPC <npc No.>!`**.

   Where:

   <parameter> = For DS1 facility: BER, BPV, COFA, CRC, ER, ERS, FRER, OOF, SERS, or SLIP.

   <range> = Optional, last NPC of continuous range.

5. If an alarm is received on facility or error count is still near alarm threshold, continue with Step **6.**
   - If there is no alarm or high error counts, there is no trouble at this time; either return facility to service and watch for further trouble or test the facility for a longer period.

6. At far end, have tester connect external test set to MON jack at DSX-1 for transmit direction and check for errors.
   - If errors were registered (and far end has DACS II), have far-end tester refer to Step **13**.
   - If errors were registered (and far end does not have DACS II), then refer trouble to tester at far-end terminal equipment.
   - If errors were not registered at far end, continue with Step **7**.

CAUTION:
Signal looping in the following portion will interrupt service on all channels of the line; service must be patched to another facility or customers notified of loss of service.

7. In the following portion, a signal loopback will be established at DSX-1 at one end so that the other end can check the entire line (both directions) for errors.
8. Either patch service to another facility or arrange for facility to be taken out-of-service.
9. Have the far-end tester place a loop on the line side at DSX-1 to loop the signal toward you.

10. At end receiving looped signal, check errors again either with test set or with DACS II; enter **`UTL::CLR,<parameter>,NPC <npc No.>!`** and, after recording period, enter **`UTL::QRY,<parameter>,NPC <npc No.>!`**.
    - If alarm is received or high error count is still received, continue with Step **11.**
    - If alarm or high error count is not received, there is an intermittent line trouble or the far-end terminal was causing errors. Either return the facility to service and watch for further trouble or test the facility (or far terminal) for a longer period.

11. At end receiving looped signal, place looping cord on equipment side jacks on DSX-1 bay to test local cabling and receive equipment. Have far-end personnel remove any line-side signal loop.
12. Either check errors again with test set or enter **`UTL::CLR,<parameter>,NPC <npc No.>!`** and, after recording period, enter **`UTL::QRY,<parameter>,NPC <npc No.>!`**.
    - If alarm is received or high error count is still received, continue with Step **13.**
    - If alarm or high error count is not received, there is trouble on facility. Remove signal loopback and isolate defective span line by placing signal loops (or testing) at intermediate offices. After trouble is cleared, remove all line-interface bay signal loops.

13. Enter **`RMV::NPC <npc No.>[,INCL]!`** to remove the involved NPC from service in order to run complete diagnostics.

    Where: INCL = Optional, needed to remove NPC with special circuits.

    NOTE:
    The NPC itself is not a likely source of errors. The out-of-service diagnostic checks some transmit and receive error-detecting and clearing circuits. The NPC line transformers are not included in internal loop during the diagnostics.

14. Enter **`DGN::NPC <npc No.>!`**.
15. If DGN ...STF message is received, continue with Step **16.**
    - If DGN ...STF message is not received, there is trouble in cabling to line-interface bay; repair or replace cabling.

16. Arrange a time when both NPCs can be removed from service. Enter **`RMV::NPC <npc No.>[,INCL]!`** for that NPC and replace the plug-in.
17. Enter **`RST::NPC <npc No.>!`** for each NPC. Remove all line interface bay signal loops.

NOTE:
The parameter counts are cleared during restore operation.

Clear DS1 Facility Error Messages - *SLC* Carrier System

Overview: This procedure is used to clear major or minor alarms that are registered when facility parameters reach threshold levels. The facility parameters that the DACS II monitors are: BPV (bipolar violations), BER (bit error rate, ERS (errored seconds), ER (error rate), SERS (severe-ERS), SLIP (slips), OOF (out-of-frame), FRER (framing error), CRC (cyclic redundancy code), COFA (change of frame alignment), SANE (shelf alarm-near end), and SAFE (shelf alarm-far end). *When OOF or BER/BPV reach major thresholds, an SC ALM message occurs and protection switching operates (if provided) for the digroup.*

NOTE:
If protection switching is not provided, service on the subject digroup must be patched to the maintenance spare line in order to do the looped line test in this procedure; unless you have a major alarm, postpone testing until nonbusy hours when service can be patched to a maintenance line.

NOTE:
The type of error (SLIP vs. ERS) and whether or not it occurs on a new facility often indicates the source of trouble. Timing SLIPs are usually caused by not having the far end optioned for loop timing or by a malfunctioning loop timing pack. These conditions are more likely on a new facility as is incorrect NPC provisioning.

1. If error message reports shelf alarms - SAFE (far end) or SANE (near end), you only need to check for associated SC ALM messages in this procedure since the shelf alarms are only information messages. The shelf alarms can occur just before the protection switch operates or can accompany other alarms.
2. If alarm cutoff is needed, enter **`UTL::ACO!`**.
3. If there is an SC ALM message present for the same digroup, refer to the appropriate procedure in this chapter as follows:

   For SC ALM ...MN, then go to Section 3.8.
   For SC ALM ...MJ, then go to Section 3.7.

4. Obtain facility performance information and options for one of the alarmed NPCs by entering
   UTL::QRY,STATE,NPC <npc No.>[-<range>]!

   Where:
   <npc No.> = NPC number, either extended (for example, [0] 001) or hierarchical (for example, 01-1-01).
   <range> = Last NPC in a range.

5. Read the reported occurrences and the threshold values for alarms from the listing in the message for the failed parameter to see which threshold options are available; enter **UTL::QRY,OPT,ALL,NPCS!**.

6. If alarms are due to incorrect (too low) alarm threshold, enter following command with the required parameter identifiers:
   CHG::{NPC <npc No.>|TYPE mnxyz},OPTS(rr/l,ss/m ...,tt/n)!

   Where:
   NPC or TYPE Field = Selects number of NPCs to be changed: one field NPC given as extended (for example, [0]001), hierarchical (for example, 01101), or all NPCs with the same type specification (mnxyz).

   rr,ss,tt = Listing of any of the associated alarm types per Table 3-7.

   l,m,n = T{ Predefined number (0 through 3) per Table 3-8 which selects alarm threshold.

   - After changing the threshold, clear the count (**UTL::CLR,<parameter>,NPC <npc No.>!**). If trouble persists, continue with Step **7**.

Table 3-7. Alarm Parameters (DE/TE/DS/DA/TA Type NPCs)

Type (rr,ss,tt)	Meaning
01	Type DE/TE/DS SLIPs, Major Alarm
02	Type DE/TE/DS SLIPs, Minor Alarm
03	Type DE/TE/DS BER, Major Alarm
04	Type DE/TE/DS BER, Minor Alarm
05	Type DE/TE/DS ERS
06	Type DE/TE/DS SERS
07	Type DE/TE/DS COFA, Major Alarm
08	Type DE/TE/DS COFA, Minor Alarm
09	Type DS SANE
10	Type DS SAFE
41	Type DA/TA Near-end Path CV, Daily
42	Type DA/TA Near-end Path ES, Daily
43	Type DA/TA Near-end Path SES, Daily
44	Type DA/TA Near-end SEFS, Daily
45	Type DA/TA Near-end CSS, Daily
46	Type DA/TA Near-end US, Daily
47	Type DA/TA Near-end Line CV, Daily
48	Type DA/TA Near-End Line ES, Daily
49	Type DA/TA Near-end Line SES, Daily
50	Type DA/TA Far-end Path CV, Daily
51	Type DA/TA Far-end Path ES, Daily
52	Type DA/TA Far-end Path SES, Daily
53	Type DA/TA Far-end SEFS, Daily
54	Type DA/TA Far-end CSS, Daily
55	Type DA/TA Far-end US, Daily
56	Type DA/TA Far-end Line ES, Daily
57	Type DA/TA Near-end Path CV, 15 Min.
58	Type DA/TA Near-end Path ES, 15 Min.
59	Type DA/TA Near-end Path SES, 15 Min.
60	Type DA/TA Near-end SEFS, 15 Min.
61	Type DA/TA Near-end CSS, 15 Min.
62	Type DA/TA Near-end US, 15 Min.
63	Type DA/TA Near-end Line CV, 15 Min.
64	Type DA/TA Near-End Line ES, 15 Min.
65	Type DA/TA Near-end Line SES, 15 Min.
66	Type DA/TA Far-end Path CV, 15 Min.
67	Type DA/TA Far-end Path ES, 15 Min.
68	Type DA/TA Far-end Path SES, 15 Min.
69	Type DA/TA Far-end SEFS, 15 Min.
70	Type DA/TA Far-end CSS, 15 Min.
71	Type DA/TA Far-end US, 15 Min.
72	Type DA/TA Far-end Line ES, 15 Min.

Table 3-8. DS1 Option Selection

Option (l,m,n)	Meaning
0	Default Value
1	First Option Value (set1)
2	Second Option Value (set2)
3	Third Option Value (set3)

7. If protection switching is provided for subject digroup, enter the following commands to operate the protection switch for the digroup and operate far-end loopback:
   SW::{NPC <npc No.>|RT ffff,DGx},PSW!
   TTST::{RT|DL} ffff,DGx,LLB,TO,INI!

   Where:
   ffff = RT or DCLU identification.

   DGx = Digroup designation (DGA, DGB, DGC, DGD).

   - If protection switching is not provided, continue with Step **8.**

8. During nonbusy hours, patch service from subject facility to maintenance spare line.
9. If the protection switch and far-end loopback were not operated, have far end place loop on line-side at DSX-1 bay.
10. Either use external test set to check looped line for errors or enter **UTL::CLR,<parameter>,NPC <npc No.>!**, and, after about 1 hour, enter **UTL::QRY,<parameter>,NPC <npc No.>!**.
11. If alarm is received on facility or if count for parameter is near alarm threshold, then continue with Step **12.**
    - If there are no alarms or high counts, there is no trouble at this time. Either return the facility to service and watch for further trouble or test the facility for a longer time.

12. At DSX-1 bay, connect patch cord between DACS-side OUT and IN jacks to loop the signal back. Have far end remove any line-side signal loop.
13. Either check errors again with test set or enter **UTL::CLR,<parameter>,NPC <npc No.>!**, and, after about 1 hour, enter **UTL::QRY,<parameter>,NPC <npc No.>!**.
14. If alarm is received or count for parameter is near alarm threshold, continue with Step **15.**
    - If there is no alarm or high count, the trouble is on facility. After trouble is cleared, remove all DSX-1 bay signal loops.

15. Enter **RMV::NPC <npc No.>[,INCL]!** to remove the involved NPC from service in order to run complete diagnostics.

    Where: INCL = Optional, needed to remove NPC with special circuits.

16. Enter **DGN::NPC <npc No.>!**.

17. If DGN ...STF message is received, then continue with Step **18.**

    - If the DGN ...STF message is not received, the trouble is in cabling to DSX-1 bay; repair or replace cabling. Remove DSX-1 bay line loops and enter **UTL::CLR,<parameter>,NPC <npc No.>!**.

NOTE:
The NPC itself is not a likely source of errors. The out-of-service diagnostic checks some transmit and receive error detecting and clearing circuits. The NPC line transformers are not included in the internal loop during diagnostics.

18. Arrange a time when both NPCs can be removed from service, enter **RMV::NPC <npc No.>[,INCL]!** for both NPCs, and replace the plug-in.

19. Enter **RST::NPC <npc No.>!** for each NPC. Remove all DSX-1 bay signal loops.

NOTE:
The parameter counts are cleared during restore operation.

Clear SC ALM MJ CGA Message

Overview: This procedure deals with CGA major alarm messages received on: (1) *unprotected* facilities or (2) the protection line itself *when the far end sends a shelf alarm*. The major alarm indicates a possible loss of service. The location is identified by the message keywords: CLF (carrier line failure) and direction (R or Y for receive or transmit), NE (near end; DACS II failure), or FE (far-end; RT failure). Before reporting the location, the DACS II automatically performs a line loopback test and checks the data link for remote alarm indications. Line looping at DSX-1 bays is not used to isolate troubles because line looping interferes with trunk conditioning sent to down stream equipment.

1. If alarm cutoff is needed, enter **`UTL::ACO!`**.
2. If the prefix on the alarm message is *C, five or more digroups have failed. For this situation, check the possibility of maintenance activity or a cable cut that may be causing the failures.
3. From the alarm message, read the RT or DCLU ID, the digroup, and the NPC number which appears after the digroup. Also, notice the alarm location (NE, FE, CLF).
4. Consider the following possible causes of an MJ alarm:
   - Incoming line failure on an unprotected facility
   - Protection switching not available, either already in use or protection line failed. If the switch was manually operated, it must be manually released or the line failure must be cleared to remove the major alarm.
   - Receipt of a shelf alarm from the RT or DCLU or receipt of a yellow (Y) alarm from a *SLC*® 96 carrier Mode III RT
   - Failure of the *SLC* carrier data link
   - Failure (or removal from service) of a DACS II NPC.
5. Which message word appears after the NPC number in the alarm message?
   - If **NE,** continue with Step **6.**
   - If **FE,** proceed to Step **9.**
   - If **CLF,** proceed to Step **12.**

6. Check printout for other SC ALM messages (such as MJ CGA) on the protection line which indicate that shelf and major alarms were sent from the RT or DCLU. These messages implicate the connecting equipment. Check the printout for ESR ANALYSIS REPORT messages that name the failed circuit in DACS II.

7. If the subject NPC for the facility failed diagnostics and removed from service, continue with Step **8.**

   - If the NPC has not failed and been removed, find other trouble messages in printout and go to *Trouble Identification* to find trouble procedure reference.

8. Replace the plug-in for the NPC as follows to clear the trouble.

   - Arrange a time when the other NPC on the S96D or SS5D card can be removed from service; enter **`RMV::NPC <npc No.>[,INCL]!`** for that NPC, and replace the card.

     Where:
     <npc No.> = NPC number, either extended (for example, [0] 001) or hierarchical (for example, 01101).
     INCL = Optional, needed to remove NPC with special circuits.

   - Enter **`RST::NPC <npc No.>!`** for each NPC.

9. At DSX-1 bay, use office test set to check signal loss and excessive bit error rate at the MON jack for the transmit line (from DACS II).

   - If signal loss or excessive errors were found, continue with Step **10.**
   - If signal loss or excessive errors were not found, the trouble is either in the line going to the far end or at the far end. If the line is at fault, have facility maintenance crew isolate trouble by testing for signal at intermediate offices.

10. Verify that NPC for alarmed facility is out-of-service to allow more complete diagnostic testing; if necessary, enter **`RMV::NPC <npc No.>[,INCL]!`**.

11. Enter **`DGN::NPC <npc No.>!`**.

    - If DGN ...STF message is received, go to *Manual Diagnostic Failures* to clear failed NPC diagnostic.
    - If DGN ...STF message is not received, the trouble is in cabling to DSX-1 bay. Repair or replace cabling; after trouble is cleared, enter **`RST::NPC <npc No.>!`** for each of the removed NPCs.

      NOTE:
      The diagnostic checks the NPC transmission paths except for the line transformers. If the diagnostic passes but there is no trouble in office wiring, the NPC could still be the trouble.

12. From alarm message, notice the alarm direction, either R (local/receive) or Y (remote/transmit). At DSX-bay, use office test set to check signal loss and excessive bit error rate at the MON jack for the failed direction as follows: for R CLF, the incoming line (to DACS II); for Y CLF, the outgoing line (from DACS II).
    - If signal loss or excessive errors were found, continue with Step **13.**
    - If signal loss or excessive errors were not found, then the trouble is either in the line going to the far end or at the far end. If the line is at fault, have facility maintenance crew isolate trouble by testing for signal at intermediate offices.
13. Which direction of CLF alarm do you have?
    - If **R,** continue with Step **14.**
    - If **Y,** refer trouble to line maintenance crew.
14. Enter **`UTL::QRY,STATE,SCDG,NPC <npc No.>!`** and check the output message for SWMR (switch - manual request) or SWAR (switch - autonomous request) under PLSW heading. The presence of either keyword indicates that the protection switching is activated.
15. Refer trouble to line maintenance personnel; trouble is either on incoming facility or at far-end equipment.

NOTE:
If you want to use fault-locate test set to isolate trouble, enter TTST LLB TO command to produce far-end loopback, and connect test set to DSX-1 jacks for failed facility.

NOTE:
To prevent looped test set from reaching NPC and possibly clearing the alarm indication, keep cord end or dummy plug inserted in DACS II side DSX-1 IN jack.

Clear SC ALM MN {INH/MSW/PSW/DLF/CGA} Message

Overview: This procedure deals with SC ALM messages received on *protected* facilities going to an RT bank or a DCLU (for *5ESS*® switch). The location is identified by message keywords: CLF (carrier line failure), and the direction (R or Y for receive or transmit), NE (near end; DACS II failure), or FE (far end; RT failure). Before reporting the location for a facility trouble, the DACS II automatically performs a line loopback test and checks the data link for remote alarm indications. Line looping at DSX-1 bays is not used to isolate line troubles because it interferes with trunk conditioning and protection switching.

1. If alarm cutoff is needed, enter **`UTL::ACO!`**.
2. Notice the following information in the alarm message: the alarm status MN, RT or DCLU ID, digroup, NPC (after digroup), and trouble location (NE, FE, CLF). See Table 3-9 for the interpretation of the alarm message keywords.

Table 3-9. Alarm Interpretation

Keyword	Location	Interpretation
INH	NE or FE	Protection switching inhibited on digroup.
MSW	NE or FE	Protection switching manually activated at DACS II.
PSW	NE or FE	Protection switching automatically activated at DACS II or far end.
DLF	CLF	Series 5 data link failure.

3. Enter **`UTL::QRY,STATE,SCDG,NPC <npc No.>!`** for the NPC and check the output message for the protection switch (PLSW) status (either manual or automatic requested/activated - SWMR, SWAR) and LLB status.

NOTE:
Protection switching occurs only on the RT side.

4. Consider the following possible causes of the alarm:
   - A line failed (or NPC was removed from service) and service was switched to the protection line.
   - LLB was received from far end and line loopback was activated.
   - The protection line alone failed.

— Protection switching is inhibited (with no current line failures).

5. Check for INH (inhibit) keyword in message.

   - If NE (near end) is inhibited, determine if the inhibit is required (see Note). If it is not required, enter command to remove the inhibit: **`SW::NPC <npc No.>,ALW!`**.
   - If FE (far end) is inhibited on *SLC* Series 5 FPC, determine if the inhibit is required; if it is not required, contact far end or dispatch maintenance to remove the inhibit.
   - If INH keyword does not occur, continue with Step **6**.

   NOTE:
   The switch may have been inhibited to free up the switch to protect other lines or for maintenance.

6. Check message for DGP and location CLF keywords (see Table 3-9 and Note).

   - If these keywords appear in the message, contact far end or dispatch maintenance.
   - If the DLF keyword appears in the message, it indicates that the Series 5 data link has failed either at the near or far end. If the NE keyword appears, the DACS II NPC is implicated; if the FE keyword appears, the trouble is at the RT site. Continue with this procedure for further testing.

- Which message word appears after the NPC number in the alarm message?
  - If **NE,** continue with Step **9.**
  - If **FE,** proceed to Step **12.**
  - If **CLF,** proceed to Step **16.**

- Verify that NPC named for alarmed digroup is out-of-service (RMV NPC ...COMPL in printout). If necessary, enter **RMV::NPC <npc No.>[,INCL]!** to remove NPC from service.

  Where:
  <npc No.> = NPC number, either extended (for example, [0] 001) or hierarchical (for example, 01101).
  INCL = Optional, needed to remove NPC special circuits.

- Enter **DGN::NPC <npc No.>!** for the same NPC.

  NOTE:
  The diagnostic checks the NPC transmission paths except for the line transformers. So, if the diagnostic passes but there is no trouble in office wiring, the NPC could still be causing the trouble.

- Is DGN ...STF message received?
  - If DGN ...STF message is received, go to *Manual Diagnostic Failures* to clear failed NPC diagnostic.
  - If DGN ...STF message is not received, check printout for related trouble messages and go to *Trouble Identification* to find the trouble reference. For SC ALM MJ CGA message, go directly to Section 3.7.

- Connect an external test set to check for line errors at the DSX-1 MON jack for the *outgoing* span line.
  - If signal loss or high errors are detected, continue with Step **13.**
  - If no signal loss or high errors are detected, the trouble is either on ongoing span line or at RT equipment or DCLU. Before dispatching crew to RT or testing DCLU, you can use the fault-locate test set to isolate the trouble on the ongoing span line or test at DSX-1 for DCLU.

- Verify that NPC named for alarmed digroup is out-of-service (RMV NPC ...COMPL in printout). If necessary, enter **`RMV::NPC <npc No.>[,INCL]!`** to remove NPC from service.

  Where:
  <npc No.> = NPC number, either extended (for example, [0] 001) or hierarchical (for example, 01101).
  INCL = Needed to remove NPC with designated special circuits.

- Enter **`DGN::NPC <npc No.>!`** for the same NPC.

  NOTE:
  The diagnostic checks the NPC transmission paths except for the line transformers. So, if the diagnostic passes but there is no trouble in office wiring, the NPC could still be causing the trouble.

- Is DGN ...STF message received?
  - If DGN ...STF message is received, go to *Manual Diagnostic Failures* to clear failed NPC diagnostic.
  - If DGN ...STF message is not received, check printout for related trouble messages and go to *Trouble Identification* to find the trouble reference.

- From alarm message, notice the direction of the failure which is given in the message as either R for local/receive or Y for remote/transmit. If the following steps show that the line is good, the direction of the alarm will dictate where to look for the problem.
- Use an external test set to check for errors *in both directions* at DSX-1 **MON** jacks for connecting equipment and for the DACS II.
  - If errors or signal loss are found on the digital line, continue with Step **18.**
  - If errors or signal loss are not found, for R CLF alarm, repair or replace cabling alarm between the DSX-1 bay and the DACS II. For Y CLF alarm, have far-end isolate the trouble.

- If the failed facility connects to RT equipment and you want to use the fault-locate test set to isolate the trouble on the incoming line, unseat the NPC for the failed primary and connect the test set to the DSX-1 jacks for the failed facility.

  NOTE:
  The TTST LLB TO command can be used to produce a loopback at the RT in order to use the fault-locate test set to isolate trouble on the incoming line.

  NOTE:
  The NPC is moved to prevent the protection switch from releasing when the test set signal is received. The NPC must be installed after the test set is disconnected.

- Refer line trouble to line maintenance personnel.

Clear SC ALM COMP MN RT Message

Overview: This message indicates that the handshaking exchange required to initiate communications over the data link for *SLC*® Series 5 carrier has failed. This compatibility negotiation takes place at system startup and after the ADD command is used to change the configuration when the digroup A NPC is restored to service.

1. If the alarm cutoff is needed, enter **`UTL::ACO!`**.
2. Which explanatory keyword appears after the RT ID in the message?
   - If **AB or CD**, continue with Step **3**.
   - If **P**, proceed to Step **4**.
   - If **INDX**, proceed to Step **5**.
   - If **LBRV or ALP**, proceed to Step **6**.
3. The alarm indicates that the status of the digroup pairs is different. To clear the alarm, enter **`RST::NPC <npc No.>!`** for the remaining digroup NPCs. These digroup pairs (A and B, C and D) are associated at the RT controller, are assigned together in the ADD command, and must be restored without delay so that the pairs have the same status.

   Proceed to Step **7**.
4. The alarm indicates that the status of the protection digroup NPC is different from that of the primary digroup NPCs. To clear the alarm, enter **`RST::NPC <npc No.>!`** for the protection digroup NPC.

   Where:

   <npc No.> = NPC number, either extended (for example, [0] 001) or hierarchical (for example, 01-1-01).

   Proceed to Step **7**.

5. The alarm indicates that DACS II is not able to adjust its software within its limits to match the controller at the RT. Verify that the RT equipment is correct for *SLC* Series 5 carrier and for direct connection to DACS II. After the trouble is cleared, enter DLT command to delete the digroup NPC designations and repeat the entire procedure at the DACS II to establish the facility.

   Proceed to Step **7**.

6. These alarms identify the portion of the handshaking exchange that failed. Contact technical consultant, and, after trouble is cleared, attempt to restore the NPCs to service or repeat the entire procedure at DACS II to establish the facility.

7. After all the digroup NPCs have been restored to service, verify that same alarm does not recur. Enter **`UTL::QRY,ALMS,RT ffff!`** for the target RT and verify that there is no COMP alarm (by the presence of a dash under heading).

8. If there is an alarm on any of the associated digroup NPCs, enter **`UTL::QRY,STATE,NPC <npc No.>!`** and check for timing slips. If present, enter **`UTL::CLR,NPC <npc No.>,PARAMS!`** to clear the counts.

Clear SC ALM MN {RT/DL} FE Message

Overview: This trouble message applies to *SLC*® Series 5 carrier. The message indicates an alarm was received from the RT or DCLU (as shown by the FE keyword). Since the message indicates a problem with the far-end equipment, no digroup is named in the message.

1. If the alarm cutoff is needed, enter **`UTL::ACO!`**.
2. Obtain the RT (or DCLU) bank identifier from the message.
3. Report the trouble to far-end personnel or dispatch maintenance to the far end. Check for possible failure of the ringing generator at the far end.

Check Facility ALM IDLD or INFO Message

Overview: This procedure deals with facility alarm IDLD (idled) and INFO (information) messages. Alarm idled messages are received after the line signal is restored on a facility that previously had a CGA (carrier group alarm). Alarm information messages are received on 2.048-Mb/s lines when an alarm condition designated as maintenance information occurs. Alarm idled messages do not occur after minor alarms due to facility error (for example, for SLIP or BER) are cleared. The error counts for these parameters are checked and the counts are cleared using utility commands.

1. Which one of the following keywords appears in the message?
   - If **IDLD**, then continue with Step **2.**
   - If **INFO**, proceed to Step **6.**
2. This message reports that an alarm has cleared. For facility alarms, the NPC (or DS3 position in the unit) and the type of alarm are given in the message; for example, CGA (carrier group alarm), PBA (primary block alarm), and facility parameter BER.
3. If the message is the CGA type, refer to Table 3-10 for the meaning of the alarm type given at the end of the IDLD message.

Table 3-10. CGA Alarm Types

Indicator	Meaning
A	Alarm Indication Signal
B	Both red and yellow (not registered with TG80/TG80B NPC)
F	Frame format error rate (TG180 NPC)
L	Local multiframe alarm (DMI equipment)
M	Remote multiframe alarm (DMI equipment)
R	Red; incoming line failure
V	Line format violation (TG180 NPC)
X	Multiple alarms (TG180 NPC)
Y	Yellow; outgoing line failure

4. If the message is for a timing link failure (ESR SYNC messages) or for a DS3 line failure, refer to Table 3-11 for the meaning of the alarm type.
5. If the message is the PBA type for a 2.048-Mb/s line, refer to Table 3-12 for the meaning of the alarm type given at the end of the IDLD message.

Table 3-11. Keyword Meanings

Alarm Keyword	Meaning
AIS	Alarm indication signal (DS3)
BER	Bit error rate high (DS3)
LOS	Loss of signal
LEN	Loss of energy
EXJ	Excessive jitter
PHS	Phase shift
OOF	Out of frame
MAJ	Error rate, major alarm
MIN	Error rate, minor alarm

6. An "A" after the CGA word and NPC number reports the receipt of an AIS (alarm indication signal, all 1s, blue signal) from the far end.
7. Consider the following situations in which the far end will send an all 1s signal:
   — On a DS1 facility connecting to multiplexers, the all 1s signal originates at the alarmed terminal (red) in the failed span and is forwarded along the route to prevent multiple red alarms that would hinder troubleshooting.
   — The far-end NPC can be grown to send an all 1s signal when it is removed from service.

Table 3-12. PBA Alarm Parameters

Indicator	Meaning
A	All 1s signal (AIS) received from far end.
B	Incoming high bit error rate (BER).
E	Excessive errors received at far end (REER).
G	Far-end loss of CRC4 multiframe alignment in TS0 (FLCMA).
I	Remote all 1s indication (RAIS).
L	Loss of multiframe alignment (LMA). [Note 1]
M	Remote loss of alignment sent on TS16 (R16). [Note 1]
P	TS0 pseudo-frame word out-of-frame (PFWOOF).
R	Loss of signal primary block failure (LOS PBF); loss of frame primary block failure (LOF PBF). [Note 2]
S	Far end sync has gone into holdover (Sync Fail Indication).
V	All 1s indication on TS16 (A16). [Note 1]
X	Incoming excessive error rate (EER).
Y	Remote alarm indication (RAI).

Note 1: These only occur with CAS line format.

Note 2: R can be either LOF PBF or LOS PBF for PB/PC NPCs.

Hardware Failures

4

Contents

Hardware Failures

4

This chapter contains the procedures for clearing hardware troubles that are detected and processed by the DACS II error recovery operation.

Error recovery is an autonomous operation in the DACS II. This activity is evidenced by ERR ESR messages and the service removal and diagnostic failure on a plug-in. The failure brings a major office alarm. For failures in the duplicated circuit groups (sync, cross-connect network, etc.), the service removal is preceded by a side switch to the duplicated side (or DS3 protection) to maintain service.

NOTE:
Never replace packs or take packs from the active side of a duplicated group (for example, SYNC) when the other side is failed. The in-service side is carrying service; it is not a source of spare plug-ins.

Error Recovery Operation

Error recovery begins with the detection of an internal hardware error, proceeds with a monitoring period (hit timing) to verify that the trouble was not a transient, and results in the service removal of the failed pack. This recovery process evaluates all error inputs (including power converters) and, if the trouble is not transient, reports the service removal and the diagnostic failure on the most likely cause of the trouble. When more than the failed pack itself can cause the trouble, the other packs are listed in the ERR ANALYSIS REPORT. A side switch (or DS3U protection switching) occurs for any single failure on the active side of a duplicated (or protected) circuit group. For a power converter failure, only high-level control packs are removed from service so that fewer packs need to be restored after the trouble is cleared. If needed to enable maintenance on the MC, error recovery will place the frame in the maintenance condition as evidenced by the RST MC MCOND message.

DS3 Equipment Considerations

The following items summarize the service status of a duplicated circuit group when a plug-in fails on both sides:

- When the plug-in on one side is already out-of-service and the mate on the other side fails, the service removal of the failed plug-in will be denied. That side of the duplicated circuit group will also be pested (alarms inhibited).
- Clearing the trouble on the out-of-service side will enable the side switch and work on the other side. The alarm status will change from critical to major.
- When the failure on the pested side is cleared and the service restored on the replacement plug-in, the whole side will be unpested.

The following items summarize the service status of the protected DS3 equipment when more than one plug-in fails:

- The first MMFG (MXR MIU function group) to fail will be the one served by the protection MMFG. If all the MMFGs have failed, MMFG 1 will probably be put on protection.
- If a failed MMFG cannot be switched to protection, it will be given an ISF (in-service and failed) status. The service removal of an MMFG with ISF status will be denied because switching is not available, and service restoral (after plug-in replacement) will be denied because the plug-in is already in-service.
- When a failed MMFG (on protection) is cleared and the MMFG restored to service, the next failed MMFG will switch to protection. If only two MMFGs failed, the alarm status will change from critical to major.
- The preferred configuration is to have FLI S and the service MMFGs selected because the reset/reboot operations revert to that configuration.

CAUTION:
To prevent transmission hits whenever the protection plug-in is selected, enter command to remove the FLI S or service MMFG (or disconnect plug-in if command is ineffective) before doing a frame reset, a boot frame, or remove and restore unit UC.

Cross-Connect Side Out-of-Service

Clear ALM ECCN OOS Message

Overview: This alarm indicates that one side of the ECCN is out-of-service and troubleshooting is required to return the side to service. The alarm must be cleared because a failure on the other side or inadvertent maintenance activity on the other side could cause loss of customer service. To force this maintenance effort, the DACS II goes to a major alarm if the initial minor alarm indication is pested for more than 2 minutes because of other alarms. The DACS II does not remove a failed pack when its mate on the other side is already out-of-service; the alarms on the active side are pested.

CAUTION:
Never replace packs or take packs from the active side of a duplicated group (for example, ECCN) when the other side is failed. The in-service side is carrying service; it is not a source of spare plug-ins.

NOTE:
If you have not checked for power troubles (per the *Trouble Identification* section), do so before proceeding.

1. If ESR ...ANALYSIS REPORT message occurs in the printout, notice the listing of implicated plug-ins (see Note) in the message and proceed to Step **3**; otherwise, continue with Step **2**.

   NOTE:
   The plug-ins are listed in the order of likelihood of causing the trouble, and the first plug-in will already be removed from service.

2. If the pack has been autonomously removed from service (with no failed DGN), try restoring the pack to service per Figure 4-1 and proceed to Step **11**.

   - If pack has not been removed, notice the pack named in the DGN ...STF message and continue with Step **3**.

3. Replace the first pack named in the ESR ...ANALYSIS REPORT or the pack named in the DGN ...STF message if no ANALYSIS REPORT.

4. Enter command to restore the replacement to service per Figure 4-1. If associated ETSIs on mate NPC were removed, enter command to restore those packs to service.

NOTE:
For DS3U or HDS3U, clearing a failure in the ECCN which caused MMFGs to be failed (and MXRs and MIUs pested) will reboot the MMFGs so that those MMFGs will not have to be restored manually.

- If DGN ...STF message is received, continue with Step **5**.
- If RST ...DNY message is received, find the meanings of the condition codes in *Command Denials*.
- If RST ...COMPL message is received, proceed to Step **8**.

verb::<CP identification>[,option]!

{RMV::	SYNC a!	a =	0 or 1
/RST::	SYNC a,TLI n[,SSP b]!	n =	1-4; b = sync port (0 or 1)
/DGRTH::	CCI s!	s =	side 0 or 1
/DGN::}	CCNI s!	s =	side 0 or 1
	ETSI sqq!	qq =	unit 1-16
	TSI sft!	f =	unit (receiving from) (1-6)
	CCB sf!	t =	unit (transmitting to) (1-6)
	ETSIS,ECCN s,ALL!		For all ETSIs on the side
	TSIS,CCN s,ALL!		For all TSIs on the side
	UNIT [q]q,UC!	[q]q =	unit (1-16)
	UNIT [q]q,{FTMI d|DSPI}!	d =	module interface for units 1-4
	UNIT [q]q,FC sd!	sd =	FC side (0,1) and FC No. (1-4)
	UNIT [q]q,FLI k!	k =	service (S) or protection (P)
	UNIT [q]q,FMT s!	s =	side (0,1)
	UNIT [q]q,MMFG c	c =	DS3 group (1-6,P)
	[,FRC][,INCL]!	FRC =	forces remove with no prot. switch
		INCL =	removes/restores MXR NPCs
	NPC <npc No.>[,SIDE s]!	<npc No.> =	NPC number
		s =	SIDE for DSPU
	LINK j!	j =	link 1-6
DGN::	UNIT [q]q,MXR c!	c =	DS3 group (1-6,P)
	UNIT [q]q,MIU c!	c =	DS3 group (1-6,P)

NOTE: Removing the NPC is service affecting.

Figure 4-1. Maintenance Command Construction

5. If the single pack (or all packs) listed in the ANALYSIS REPORT has been replaced, proceed to Step **10**.
   - If all the packs have not been replaced, continue with Step **6**.
6. The previous pack was not the cause of trouble. Enter the command to remove the next pack from service per Figure 4-1. Replace the pack and repeat from Step **4**.
7. If trouble persists or same trouble recurs, repeat the procedure, but this time work with the next pack listed in the ANALYSIS REPORT.
8. If another pack was autonomously removed (on other side or other protection group) after the original trouble cleared, repeat the procedure to clear next trouble.
   - If another pack was not removed, continue with Step **9**.
9. Enter **`UTL::QRY,ALL!`** to find packs which are still failed, pested, or out-of-service, and perform the necessary corrective action to place all equipped packs in service.

   NOTE:
   The conditions are indicated by the presence of a "1" in the respective columns (out-of-service, failed, and pested) for each pack. Unequipped NPCs are indicated by dashes.

10. From Table 4-1, find the explanation of the COND code which appears in the ERR,ESR message for the subject pack.
11. If you were able to clear the trouble using the meaning of the ESR code, go to Step **9**.
    - If you were not, continue with Step **12**.
12. If there are any other ERR ESR messages involving packs in other circuit groups, go to Section 4.3.
    - If there are no other ERR ESR messages, continue with Step **13**.

13. To make a record of the error history on the PMEM (for use by technical consultant), enter one of the following commands (see Note):

    Time of Day/Time Interval:
    UTL::QRY,ERR,HWER,{INT mn|[DATE modayr,]TOD hrmnsc}!

    Suspect Entity:
    UTL::QRY,ERR,HWER,ENTY eee!

    Where: INT = Interval of time (past 59 minutes)
    TOD = Time of day consisting of hour (hh=00 through 23), minutes (mm=00 through 60), seconds (ss=00 through 60). Date (month, day, year) is optional.
    eee = Plug-in designation for example: CCI, DMB, EBX, ETSI, FC, FMT, SYNC, or TLI.

    NOTE:
    All error events are logged on PMEM; however, the file is overwritten when the file capacity is reached. If you do not know how full the error log is (not recently cleared), you will want to use a short interval, perhaps the past 5 minutes, to avoid overloading the link with old errors.

14. Contact technical consultant.

Table 4-1. ESR Condition Codes - CCI, ETSI

COND 01	Software could not access CCI; pack does not acknowledge. Corrective Action: (1) verify that CCI is securely seated; (2) look for loss of sync to CCI and replace CCI; (3) look for MC, EBX, or CPU interface trouble.
02	Incorrect version number on CCI.
03	Summary bit set, but no other errors.
04	CCI ERR bit set in system status register.
05	ETSI ERR bit set in system status register.
06	Peripheral unit bit set in system status register.
07	Bus terminator pack absent.
08	32-MHz clock out of phase lock.
09	240 frame sync misaligned.
0A	Loss of 240 frame sync.
0B	Loss of 8-kHz frame sync.
0C	CCI detected address parity error.
0D	CCI detected low byte data parity error.
0E	CCI detected high byte data parity error.
0F	CCI -5.2 power supply failure.
10	CCI detected bus status parity error.
11	Peripheral unit alarm.
12	Sync summary bit set on CCI pack.
20	Software could not access ETSI; pack does not acknowledge. Corrective Action: see CCI action and substitute ETSI for CCI in wording.
21	Incorrect version number on ETSI pack.
22	Summary bit set, but no other errors.
23	Loss of 32.768-MHz clock.
24	Loss of 240 frame sync.
25	Receive MDX summary bit set.
26	Control RAM summary bit set.
27	Transmit MDX summary bit set.
28	Loss of 3.3-volt power from CCI pack.
29	Peripheral unit port alarm (receive MDX).
2A	Receive MDX data source time-slot parity error.
2B	Receive MDX sync error.
2C	Receive MDX address parity error.
2D	Receive MDX write data parity error.
2F	Receive cannot be accessed; incorrect chip ID.
30	Transmit MDX data parity error.
31	Transmit MDX data source time-slot parity error.
32	Transmit MDX sync error.
33	Transmit MDX address parity error.
34	Transmit MDX write data parity error.
35	Transmit MDX cannot be accessed; incorrect chip ID.
37	Control RAM parity error.
38	Control RAM sync alarm.
39	Control RAM port alarm.
3A	Control RAM BIST flag is set.
3B	Data RAM BIST flag is set.
3C	Control RAM address parity error.
3D	Control RAM write data parity error.
3E	Control RAM device cannot be accessed; incorrect chip ID.
3F	Control RAM circuit pack parity.
40	Control RAM device is in reset state.
41	Control RAM port alarm summary bit set.
42	TRD3 status exercise bit is set.
43	Ready high error detected from CCI.
44	Ready timeout error from CCI; CCI cannot access ETSI.
45	Control RAM stuck bit error.

Clear ALM CCN OOS Message

Overview: This alarm indicates that one side of the CCN is out-of-service and troubleshooting is required to return the side to service. The alarm must be cleared because a failure on the other side or inadvertent maintenance activity on the other side could cause loss of customer service. To force this maintenance effort, the DACS II goes to a major alarm if the initial minor alarm indication is pested for more than 2 minutes because of other alarms. The DACS II does not remove a failed pack when its mate on the other side is already out-of-service; the alarms on the active side are pested.

CAUTION:
Never replace packs or take packs from the active side of a duplicated group (for example, CCN) when the other side is failed. The in-service side is carrying service; it is not a source of spare plug-ins.

NOTE:
If you have not checked for power troubles (per the *Trouble Identification* section), do so before proceeding.

1. If ESR ...ANALYSIS REPORT message occurs in the printout, notice the listing of implicated plug-ins (see Note) in the message and proceed to Step **3**: otherwise, continue with Step **2**.

   NOTE:
   The plug-ins are listed in the order of likelihood of causing the trouble, and the first plug-in will already be removed from service.

2. If the pack has been autonomously removed from service (with no failed DGN), try restoring the pack to service per Figure 4-2 and proceed to Step **11**.
   - If pack has not been removed, notice the pack named in the DGN ...STF message and continue with Step **3**.
3. Replace the first pack named in the ESR ...ANALYSIS REPORT or the pack named in the DGN ...STF message if no ANALYSIS REPORT.
4. Enter command to restore the replacement to service per Figure 4-2. If associated TSIs on mate NPC were removed, enter command to restore those packs to service.

   NOTE:
   For DS3U or HDS3U, clearing a failure in the CCN which caused MMFGs to be failed (and MXRs and MIUs pested) will reboot the MMFGs so that those MMFGs will not have to be restored manually.

- If DGN ...STF message is received, continue with Step **5**.
- If RST ...DNY message is received, find the meanings of the condition codes in *Command Denials*.
- If RST ...COMPL message is received, proceed to Step **8**.

```
verb::<CP identification>[,option]!

{RMV::     SYNC a!                               a  =  0 or 1
/RST::     SYNC a,TLI n[,SSP b]!                 n  =  1-4; b = sync port (0 or 1)
/DGRTH::   CCI s!                                s  =  side 0 or 1
/DGN::}    CCNI s!                               s  =  side 0 or 1
           ETSI sqq!                            qq  =  unit 1-16
           TSI sft!                              f  =  unit (receiving from) (1-6)
           CCB sf!                               t  =  unit (transmitting to) (1-6)
           ETSIS,ECCN s,ALL!                          For all ETSIs on the side
           TSIS,CCN s,ALL!                            For all TSIs on the side
           UNIT [q]q,UC!                      [q]q  =  unit (1-16)
           UNIT [q]q,{FTMI d|DSPI}!              d  =  module interface for units 1-4
           UNIT [q]q,FC sd!                     sd  =  FC side (0,1) and FC No. (1-4)
           UNIT [q]q,FLI k!                      k  =  service (S) or protection (P)
           UNIT [q]q,FMT s!                      s  =  side (0,1)
           UNIT [q]q,MMFG c                      c  =  DS3 group (1-6,P)
            [,FRC][,INCL]!                     FRC  =  forces remove with no prot. switch
                                              INCL  =  removes/restores MXR NPCs
           NPC <npc No.>[,SIDE s]!       <npc No.>  =  NPC number
                                                 s  =  SIDE for DSPU
           LINK j!                               j  =  link 1-6
DGN::      UNIT [q]q,MXR c!                      c  =  DS3 group (1-6,P)
           UNIT [q]q,MIU c!                      c  =  DS3 group (1-6,P)
```

NOTE: Removing the NPC is service affecting.

Figure 4-2. Maintenance Command Construction

5. If the single pack (or all packs) listed in the ANALYSIS REPORT has been replaced, proceed to Step **10**.
   - If all the packs have not been replaced, continue with Step **6**.
6. The previous pack was not the cause of trouble. Enter the command to remove the next pack from service per Figure 4-2. Replace the pack and repeat from Step **4**.
7. If trouble persists or same trouble recurs, repeat the procedure, but this time work with the next pack listed in the ANALYSIS REPORT.

8. If another pack was autonomously removed (on other side or other protection group) after the original trouble cleared, repeat the procedure to clear next trouble.

   - If another pack was not removed, continue with Step **9**.

9. Enter **`UTL::QRY,ALL!`** to find packs which are still failed, pested, or out-of-service, and perform the necessary corrective action to place all equipped packs in service.

   NOTE:
   The conditions are indicated by the presence of a "1" in the respective columns (out-of-service, failed, and pested) for each pack. Unequipped NPCs are indicated by dashes.

10. From Table 4-2, find the explanation of the COND code which appears in the ERR,ESR message for the subject pack.

    - If you were able to clear the trouble using the meaning of the ESR code, go to Step **9**.

11. If there are any other ERR ESR messages involving packs in other circuit groups, go to Section 4.3.

    - If there are no other ERR ESR messages, continue with Step **12**.

12. To make a record of the error history on the PMEM (for use by technical consultant), enter one of the following commands (see Note):

    Time of Day/Time Interval:
    UTL::QRY,ERR,HWER,{INT mn|[DATE modayr,]TOD hrmnsc}!

    Suspect Entity:
    UTL::QRY,ERR,HWER,ENTY eee!

    Where: INT = Interval of time (past 59 minutes)
    TOD = Time of day consisting of hour (hr=00 through 23), minutes (mn=00 through 60), seconds (sc=00 through 60). Date (month, day, year) is optional.
    eee = Plug-in designation for example: CCB, CCNI, DMB, DSPI, EBX, FC, SYNC, TLI, TSI.

    NOTE:
    All error events are logged on PMEM; however, the file is overwritten when the file capacity is reached. If you do not know how full the error log is (not recently cleared), you will want to use a short interval, perhaps the past 5 minutes, to avoid overloading the link with old errors.

13. Contact technical consultant.

Table 4-2. ESR Condition Codes - CCNI, CCB, TSI

CCNI Pack	
COND 90	Software could not access CCNI; pack does not acknowledge. Corrective Action: (1) verify that CCNI is securely seated; (2) look for loss of sync to CCNI and replace CCNI; (3) look for MC, BX or CPU interface trouble.
91	RAM error in high data byte on MC-MP. Trouble in MC (BX or CPU), or CCNI.
92	RAM error in low data byte on MC-MP. See COND 91.
93	Address parity error. Corrective Action: enter command to restore CCNI.
94	Autonomous switch error. Circuit in CCNI for side switch independent of MP disagrees with mate CCNI.
95	Bus status error. Circuit cannot determine active side. Corrective Action: (1) replace CCNI; (2) if persists, report possible software error.
96	Stuck summary bit. Error leads from CCB or TSI stuck high, but no trouble can be found. Subject CCB and TSI packs are identified in messages.
CCB Pack	
COND A0	Software could not access CCB; pack does not acknowledge. Corrective Action: (1) verify that CCB is securely seated; (2) look for loss of sync to CCB and replace CCB; (3) look for MC, BX or CPU interface trouble.
A1	Loss of sync pulse signal for approx. 100 ms. Trouble in CCB or SYNC or sync interface between.
A2	Loss of 8 MHz clock. See COND A1.
A3	Bad data from TSI ports. If most ports are reported in ESR, probably the CCB is bad. If only a few ports are reported, probably the TSIs are bad.
A4,A5	Zero bit stuck at 1 in CCB (A4) or CCNI (A5).
TSI Pack	
B0	Software could not access TSI; pack does not acknowledge. Corrective Action: (1) verify that TSI is securely seated; (2) look for loss of sync through CCB and replace TSI; (3) look for MC, BX or CPU interface trouble.
B1	Stuck summary bit that indicates troubles from TSI devices, but no actual trouble can be found.
B2	TSI device error that clears during recovery; transient error.
B3	Software could not access TSI device; device failed or lost sync clock.
B4	Diagnostic exercise bits set on TSI device. Replace TSI.
B5	Error on address bus to TSI device. Trouble in TSI, CCNI, or MC-BX pack.
B6	TSI device not receiving good sync clock. Trouble in TSI, related CCB, or SYNC.
B7	Error on TSI control RAM which defines maps. Replace TSI.
B8	Parity error on port from FC or DSPU-DMB. If most all TSI ports are reported in ESR message, replace TSI. If isolated ports are reported, the FCs or DMBs are probably bad. Adjacent NPCs that share the DBM ports will be reported although only one is bad.
B9	Parity error from CCNI.

Clear ERR ESR ANALYSIS REPORT Message

1. If a CRITICAL alarm is being registered (CRITICAL lighted on status panel LED and "*C" message prefix), continue with Step **2**.
   - If a CRITICAL alarm is not registered, go to Step **5**.
2. Which of the following conditions caused the CRITICAL alarm?
   - If **multiple NPCs removed**, continue with Step **3**.
   - If **both duplex sides alarmed**, proceed to Step **4**.
   - If **unprotected failure in DS3U or HDS3U** (see Note), go to Section 4.9.

NOTE:
Either the DS3 protection switch is already active for another failure or protection switching is inhibited. For unprotected DS3 failures, the DACS II does not remove (COND AC DNY) the second failed pack but pests alarms from the second failed pack. After the first failure is cleared, the protection switch can serve the second failure.

3. Check the frame for blown fuses or failed power units. A blown fuse feeding NPCs or two failed power units for a unit would cause multiple NPC failures. Also check for DS3 failure that would cause all 28 DS1s to fail. If neither of these conditions exist, proceed to Step **5**.
4. From the trouble printout, determine which side of the ECCN/CCN (0 or 1) has been removed from service; that will be the side on which the failed plug-in has been autonomously removed. Proceed to Step **5** and clear the trouble **on the out-of-service side**.

NOTE:
For duplex (both sides) failures, clearing out-of-service side will enable side switch and work on the other side. The alarm status will also change from critical to major.

NOTE:
The DACS II does not remove a duplicated pack when its mate is already out-of-service; instead, the DACS II pests alarms on the active side.

5. See Figure 4-3 for the general format and sequence of messages of the error recovery operation with an ERR ...ANALYSIS REPORT message. The plug-in which is most suspect will be removed from service and the diagnostic results given. Other likely causes of the trouble will also be listed in the report.

```
ERR ESR <entity> COMPL

ERR ESR ANALYSIS REPORT EVENT eeee  X LN MSG:
<suspect plug-in No.1>
<suspect plug-in No.2>
<suspect plug-in No.3>
<suspect plug-in No.4>   COMPL

RMV <entity> COMPL

DGN <entity> STF ppqq COMPL
```

Figure 4-3. Error Analysis Report

6. Replace the first pack named in the ESR ...ANALYSIS REPORT.
7. Enter command to restore the replacement to service per Figure 4-4. If associated ETSIs or TSIs on mate NPC were removed, enter command to restore those packs to service.

NOTE:
For DS3U or HDS3U, clearing a failure in the ECCN which caused MMFGs to be failed (and MXRs (HMXRs) and MIUs pested) will reboot the MMFGs so that those MMFGs will not have to be restored manually.

- If DGN ...STF message is received, continue with Step **8**.
- If RST ...DNY message is received, find the meanings of the condition codes in *Command Denials*.
- If RST ...COMPL message is received, proceed to Step **11**.

verb::<CP identification>[,option]!

{RMV::	SYNC a!	a	=	0 or 1
/RST::	SYNC a,TLI n[,SSP b]!	n	=	1-4; b = sync port (0 or 1)
/DGRTH::	CCI s!	s	=	side 0 or 1
/DGN::}	CCNI s!	s	=	side 0 or 1
	ETSI sqq!	qq	=	unit 1-16
	TSI sft!	f	=	unit (receiving from) (1-6)
	CCB sf!	t	=	unit (transmitting to) (1-6)
	ETSIS,ECCN s,ALL!			For all ETSIs on the side
	TSIS,CCN s,ALL!			For all TSIs on the side
	UNIT [q]q,UC!	[q]q	=	unit (1-16)
	UNIT [q]q,{FTMI d|DSPI}!	d	=	module interface for units 1-4
	UNIT [q]q,FC sd!	sd	=	FC side (0,1) and FC No. (1-4)
	UNIT [q]q,FLI k!	k	=	service (S) or protection (P)
	UNIT [q]q,FMT s!	s	=	side (0,1)
	UNIT [q]q,MMFG c	c	=	DS3 group (1-6,P)
	[,FRC][,INCL]!	FRC	=	forces remove with no prot. switch
		INCL	=	removes/restores MXR NPCs
	NPC <npc No.>[,SIDE s]!	<npc No.>	=	NPC number
		s	=	SIDE for DSPU
	LINK j!	j	=	link 1-6
DGN::	UNIT [q]q,MXR c!	c	=	DS3 group (1-6,P)
	UNIT [q]q,MIU c!	c	=	DS3 group (1-6,P)

NOTE: Removing the NPC is service affecting.

Figure 4-4. Maintenance Command Construction

8. If all the plug-ins listed in the ERR ANALYSIS REPORT have been replaced, proceed to Step **10**.

   - If all the listed plug-ins have not been replaced, enter the command to remove the next pack from service per Figure 4-4 (see Note) and replace that plug-in. The previous pack was not the cause of trouble.

     NOTE:
     When facility NPCs are removed from service, the service on all channels is interrupted. Arrangements must be made to patch service or notify data customers.

9. Enter command to restore the replacement to service per Figure 4-4. If associated ETSIs or TSIs on mate NPC were removed, enter command to restore those packs to service.
   - If DGN ...STF message is received, continue with Step **10**.
   - If RST ...DNY message is received, find the meanings of the condition codes in *Command Denials*.
   - If RST ...COMPL message is received, proceed to Step **11**.
10. If you are clearing ERR SYNC messages, go to Section 4.4.
    - If you are not clearing ERR SYNC messages, go to Section 4.7.
11. If another pack was autonomously removed on the other side (or other protection group) after the original trouble was cleared, then repeat the procedure to clear the next trouble.
12. Enter **`UTL::QRY,ALL!`** to find packs which are still failed, pested, or out-of-service and perform the necessary corrective action to place all equipped packs in service.

    NOTE:
    Out-of-service, failed, and pested plug-ins are indicated by the presence of a "1" in respective columns (out-of-service, failed, and pested) of the output for each plug-in; unequipped NPCs are indicated by dashes.

Clear ERR [ESR] <entity> Messages

1. Check for a blown fuse (see Note) and failed power units (which give ERR PWR message). Loss of power causes removal of transmission plug-ins.
   - If power trouble is present, go to *Power Failures* to clear power trouble.

   NOTE:
   Blown fuses are indicated by one of the following: (1) for a 48 V fuse, lighted FAL indicator and extended color bead on 48 V fuse and alarm panel, or (2) lighted LED fuse or LED indicator on unit fuse board.

2. If sync error messages occur in the printout, check if there are any timing link troubles or if timing link trouble has cleared (COND E800 series messages). See Table 4-3 for meaning of alarm keywords in ERR [ESR] SYNC TLI SSP messages.

   NOTE:
   If the timing link for the highest priority sync port fails and the DACS II switches to the port on the other side, it can take up to 35 minutes for the DACS II to switch back to the higher priority port.

   - To force the switch back to the higher port after the timing link trouble is cleared, enter the commands to remove and restore the higher priority port as follows (the query output shows the priorities):
     UTL::QRY,ALL,COMMON!
     RMV::SYNC a,TLI n,SSP s!
     RST::SYNC a,TLI n,SSP s!

Table 4-3. Sync Alarm Keywords

Alarm Keyword	Meaning
LOS	Loss of signal
LEN	Loss of energy
EXJ	Excessive jitter
PHS	Phase shift
OOF	Out of frame
MAJ	Error rate, major alarm
MIN	Error rate, minor alarm

3. If the plug-in named in the ERR [ESR] message was autonomously removed but there was no failed diagnostic (DGN ...STF) for that plug-in, enter the RST command for that plug-in.

   NOTE:
   If hardware mismatch condition (COND 43) accompanies the removal of the plug-in, it indicates that the plug-in code is not correct for the type that was grown.

4. If there is a failed diagnostic (DGN ...STF), enter the command to remove the plug-in (if not already removed) per Figure 4-5, and replace the failed plug-in.

   NOTE:
   When facility NPCs are removed from service, the service on all channels is interrupted. Arrangements must be made to patch service or notify data customers.

verb::<CP identification>[,option]!

{RMV::	SYNC a!	a	=	0 or 1
/RST::	SYNC a,TLI n[,SSP b]!	n	=	1-4; b = sync port (0 or 1)
/DGRTH::	CCI s!	s	=	side 0 or 1
/DGN::}	CCNI s!	s	=	side 0 or 1
	ETSI sqq!	qq	=	unit 1-16
	TSI sft!	f	=	unit (receiving from) (1-6)
	CCB sf!	t	=	unit (transmitting to) (1-6)
	ETSIS,ECCN s,ALL!			For all ETSIs on the side
	TSIS,CCN s,ALL!			For all TSIs on the side
	UNIT [q]q,UC!	[q]q	=	unit (1-16)
	UNIT [q]q,{FTMI d|DSPI}!	d	=	module interface for units 1-4
	UNIT [q]q,FC sd!	sd	=	FC side (0,1) and FC No. (1-4)
	UNIT [q]q,FLI k!	k	=	service (S) or protection (P)
	UNIT [q]q,FMT s!	s	=	side (0,1)
	UNIT [q]q,MMFG c	c	=	DS3 group (1-6,P)
	[,FRC][,INCL]!	FRC	=	forces remove with no prot. switch
		INCL	=	removes/restores MXR NPCs
	NPC <npc No.>[,SIDE s]!	<npc No.>	=	NPC number
		s	=	SIDE for DSPU
	LINK j!	j	=	link 1-6
DGN::	UNIT [q]q,MXR c!	c	=	DS3 group (1-6,P)
	UNIT [q]q,MIU c!	c	=	DS3 group (1-6,P)

NOTE: Removing the NPC is service affecting.

Figure 4-5. Maintenance Command Construction

5. Enter command to restore the replacement to service per Figure 4-5. If associated ETSIs or TSIs on mate NPC were removed, enter command to restore those packs to service.

   NOTE:
   For DS3U or HDS3U, clearing a failure in the ECCN which caused MMFGs to be failed (and MXRs (HMXRs) and MIUs pested) will reboot the MMFGs so that those MMFGs will not have to be restored manually.

   - If DGN ...STF message is received, continue with Step **6**.
   - If RST ...DNY message is received, find the meanings of the condition codes in *Command Denials*.
   - If RST ...COMPL message is received, proceed to Step **7**.

6. If you are clearing ERR [ESR] SYNC messages, go to Section 4.4.
   - If you are not clearing ERR [ESR] SYNC messages, go to Section 4.7.

7. If another pack was autonomously removed on the other side (or other protection group) after the original trouble was cleared, repeat this procedure to clear next trouble.

8. Enter **`UTL::QRY,ALL!`** to find packs which are still failed, pested, or out-of-service and perform the necessary corrective action to place all equipped packs in service.

   NOTE:
   Out-of-service, failed, and pested plug-ins are indicated by the presence of a "1" in the respective columns (out-of-service, failed, and pested) of the output for each plug-in; unequipped NPCs are indicated by dashes.

Clear ERR SYNC Message

Overview: This procedure is used for sync troubles after completing Section 4.2 or 4.3 which deals with the error messages on sync plug-ins. The corrective action is based primarily on the ERR SYNC COND code. The series of codes beginning with E0 implicate the DPLL pack, the interface with the controller MP, or the SPU power. The E1 series indicates an internal DPLL problem; the E2 series implicates the DPLL and the TB; the E3 series indicates a phase-locked loop problem or input timing problem; and the E4 series indicates a cross-couple problem in which the two syncs are not locked together in phase.

CAUTION:
Never attempt to troubleshoot and replace packs on the in-service side and never take packs from the in-service side for use as replacements for the failed side.

1. Check the printout for RMV ...SYNC message to verify that the failed SYNC was removed from service.
2. If the trouble is found before you reach the end of this procedure, ignore "if trouble persists" steps and go to the end of the portion to restore the sync to service.
3. Which series of COND codes does your ERR SYNC message fall into?
   - If **E2 SERIES,** continue with Step **4.**
   - If **E0** or **E1 SERIES,** proceed to Step **9.**
   - If **E3** or **E4 SERIES,** proceed to Step **14.**

COND E2-- CODES

4. For COND E205, the TB (time base) oven has not reached operating temperature. Wait at least 30 minutes and enter **`RST::SYNC a!`** (a = failed sync side). Although the sync can be restored after 30 minutes, it can take up to 2 hours for a stratum 2 sync to reach rated precision.
5. For other COND code or if E205 persists, replace the TB pack and wait for oven to reach operating temperature. Then, enter **`RST::SYNC a!`**.
6. If sync failure persists, unplug TB pack and check the slot for broken pins or damaged backplane. Reinstall TB after inspection and allow for warmup time.

7. If no wiring problem is found, replace the DPLL pack and enter **`DGN::SYNC a!`** for the subject sync side.
8. After the TB ovens have reached temperature (30 minutes), enter **`RST::SYNC a!`**.

COND E0-- OR E1-- CODES

9. Unplug and reseat the DPLL pack and enter **`DGN::SYNC a!`**.
10. If failure persists (for original E0-- code trouble), unplug DPLL and check plug-in position for bent pins or damaged backplane. Reinstall DPLL after inspection.
11. If sync failure persists, replace DPLL pack and reenter sync diagnostic.
12. If ERR SYNC ...COND E004 message is received with the failed diagnostic, continue with Step **13**.
    - If the COND E004 message is not received, replace the TB pack for the sync and reenter the sync diagnostic. If the trouble cleared, allow time for the TB ovens to reach temperature (30 minutes) and enter **`RST::SYNC a!`**.
13. Replace SPU pack for failed sync side and reenter sync diagnostic command.
    - If DGN ...ATP (or CATP) is received, enter **`RST::SYNC a!`** for the subject sync side (0 or 1) and to clear all power alarms, enter **`UTL::CLR,PWR 00!`**.
    - If sync failure persists, enter **`RMV::MC!`**, unplug the same CPU2, and check plug-in position for bent pins or damaged backplane. Reinstall CPU2, enter **`RST::MC!`** and reenter sync diagnostic.
    - If trouble persists, remove the MC from service, replace the CPU2 in the main controller, and enter restore MC to service.

COND E3-- OR E4-- CODES

14. Replace the DPLL pack and enter **`DGN::SYNC a!`**.
15. If DGN ...STF message is received, continue with Step **16**.
    - If the message is not received, proceed to Step **22.**

16. Which ERR SYNC ...COND code message do you have?
    - If **COND E3--,** continue with Step **17**.
    - If **COND E4--,** proceed to Step **19.**
17. Enter **`UTL::QRY,STATE,SYNC!`** to determine the active SSP. Remove the active SSP on the failed side as follows: **`RMV::SYNC a,TLI n,SSP s!`**. Enter command to remove the same SSP on the other side.
18. Reenter the sync diagnostic command and watch for the reoccurrence of the sync error.
    - If the trouble was found, enter **`RST::SYNC a!`**.
    - If the trouble was not found, there is an obscure trouble; contact technical consultant.
19. Unplug the DPLL and check the plug-in position for bent pins or backplane damage. Reinstall DPLL after inspection.
20. If no wiring problem is found, the other sync side may be causing the problem. During nonbusy hours, make attempts to restore the failing sync by entering **`RST::SYNC a!`**. If the sync will remain in service even for a brief time, enter **`DGN::SYNC a!`** for the other sync, and repeat this portion of troubleshooting if other side fails.
21. If the trouble was found (or diagnostic passed), continue with Step **22**.
    - If the trouble was not found, there is an obscure trouble; contact technical consultant.
22. Enter **`RST::SYNC a!`**.
23. If TLI-SSP was removed from service (in Step 17), the timing link was probably causing the trouble. Either check or replace the timing link. Enter **`RST::SYNC a,TLI n,SSP s!`** for both removed SSPs.

Respond to Failed Status for Plug-In

1. To obtain listing of equipped CPs (circuit packs), enter **`UTL::QRY,EQD[,{UNIT [q]q|UNITS|ETSIS|TSIS|NPCS|MXRS}]!`** See Figure 4-6 for link and CCN/ECCN plug-ins if entire frame is checked.

   Where:

UNIT [q]q, UNITs, ETSIs, TSIs, NPCs, MXRs	=	Optional, to request the equipage in specific unit or of specific plug-ins instead of entire frame.

   NOTE:
   Equipped CPs are indicated by a "1" alongside the CP or by the CP number in the sequence. For duplicated entities (FC, ETSIs/TSIs), there will be listings for both the zero and one sides for each duplicated plug-ins.

2. To obtain a listing of out-of-service, failed, and pested CPs (see Notes), enter **`UTL::QRY,ALL[,UNIT [q]q]!`** where: [q]q = Unit number (1 through 16).

   NOTE:
   The conditions are indicated by the presence of a "1" in the respective columns (out-of-service, failed, and pested) for each pack. For duplicated entities (FC, ETSIs/TSIs), there will be listings for both the zero and one sides for each duplicated plug-ins. Unequipped NPCs are indicated by dashes.

   NOTE:
   If XON option is selected, you can use CTRL-S and CTRL-Q to stop and start the output.

3. To check only common equipment, enter **`UTL::QRY,{OOS|FAIL|PEST|ALL},COMMON!`** and see Figure 4-6 to read the link and ECCN/CCN output.

```
M...UTL QRY <parameter> g h i j k l  m n  o p EOM

        g  =  Link 1
        h  =  Link 2
        i  =  Link 3
        j  =  Link 4
        k  =  Link 5
        l  =  Link 6
        m  =  Cross-Connect Side 0
        n  =  Cross-Connect Side 1
        o  =  CCI 0 / CCNI 0
        p  =  CCI 1 / CCNI 1
```

Figure 4-6. Common Equipment Readout

4. See Note. If any CPs are equipped but out-of-service, enter the RST (restore) command per Figure 4-7 for the pack.
   - If command denial occurs, find the meanings of the condition codes in *Command Denials*.

NOTE:
When a CP in a duplex/protected network (ECCN/CCN, DSPU, DS3U, HDS3U) fails, service is switched and all the CPs on the failed side/group are removed from service and pested. To correct the problem, the failure must be cleared and the side (or all CPs) can be restored. If both sides/groups are failed, trouble must be cleared on the out-of-service side/group first; removal of the other side will be denied.

5. If any CPs are failed, enter the DGN (diagnose) command per Figure 4-7 for the pack.
   - If DGN ...STF message is received, go to *Manual Diagnostic Failures* to clear failed diagnostic.
   - If diagnostic passes (ATP or CATP), enter RST command.

6. To check for out-of-service, failed, and pested CPs, enter **`UTL::QRY,ALL[,UNIT [q]q]!`**.

7. If any CPs are still pested, enter the commands to first remove and then restore the CPs per Figure 4-7.

   - If command denial occurs, find the reason for denial in the output message and perform corrective action to obtain command completion. The *Command Denials* section gives the meanings of the condition codes.

---

verb::<CP identification>[,option]!

{RMV::	SYNC a!	a =	0 or 1
/RST::	SYNC a,TLI n[,SSP b]!	n =	1-4; b = sync port (0 or 1)
/DGRTH::	CCI s!	s =	side 0 or 1
/DGN::}	CCNI s!	s =	side 0 or 1
	ETSI sqq!	qq =	unit 1-16
	TSI sft!	f =	unit (receiving from) (1-6)
	CCB sf!	t =	unit (transmitting to) (1-6)
	ETSIS,ECCN s,ALL!		For all ETSIs on the side
	TSIS,CCN s,ALL!		For all TSIs on the side
	UNIT [q]q,UC!	[q]q =	unit (1-16)
	UNIT [q]q,{FTMI d|DSPI}!	d =	module interface for units 1-4
	UNIT [q]q,FC sd!	sd =	FC side (0,1) and FC No. (1-4)
	UNIT [q]q,FLI k!	k =	service (S) or protection (P)
	UNIT [q]q,FMT s!	s =	side (0,1)
	UNIT [q]q,MMFG c	c =	DS3 group (1-6,P)
	[,FRC][,INCL]!	FRC =	forces remove with no prot. switch
		INCL =	removes/restores MXR NPCs
	NPC <npc No.>[,SIDE s]!	<npc No.> =	NPC number
		s =	SIDE for DSPU
	LINK j!	j =	link 1-6
DGN::	UNIT [q]q,MXR c!	c =	DS3 group (1-6,P)
	UNIT [q]q,MIU c!	c =	DS3 group (1-6,P)

NOTE: Removing the NPC is service affecting.

Figure 4-7. Maintenance Command Construction

Clear Transient Trouble Using ERROR LOG Message

Overview: All error messages are recorded on the PMEM and can be read on command; transient errors for which the DACS II does not produce autonomous output messages are also recorded. When there is an overload of messages, the frame may report a lot of ERR MSGS messages. FRADTS messages and the autonomous removal of units with a COND D1 (unknown error) may also occur.

1. To get the history of hardware errors, enter **`UTL::QRY,ERR,HWER,INT tt!`** where tt is interval up to 59 minutes ago. It is advisable to start with a small interval (say 1 minute) because a dump of the whole contents could take hours.
2. Familiarize yourself with the ERR message output per Figure 4-8.

```
M ... UTL QRY ERR HWER ... 5 LN MSG
HOST00xx  ENTT00xx  ERRC00xxxx ERRTxxxx  TRANxxxx  EVENxxxx
<data7>   <spare>   <spare>    <data10>  <data11>  <data12>
<data13>  <data14>  <data15>   <data16>  <data17>  <data18>
```

Figure 4-8. General Error History Message Format

3. Refer to Table 4-4 for the meaning of the first 2 data bytes (HOST -host ID and ENTT -entity) and to Table 4-5 for the meaning of data 3 (ERRC -error class).

Table 4-4. Host ID and Entity

Host	Meaning	ENTT	Meaning
0000	UC1 error	1	unit UC
0001	UC2 error	2	UBX
0002	UC3 error	3	EBX
0003	UC4 error	4	FTMI
0004	UC5 error	5	FC
0005	UC6 error	6	DDC
0006	UC7 error	7	DSPI
0007	UC8 error	8	DMB
0008	UC9 error	9	CCNI
0009	UC10 error	a	CCB
000A	UC11 error	b	TSI
000C	UC13 error	d	EMTC
000D	UC14 error	e	Sync
000E	UC15 error	f	TLI
000F	UC16 error	10	Timing Link
0010	CI error	11	PMEM
0011	MP error	12	SMEM
0012	CCN error	13	MP
0013	Frame error	14	CI
0014	Local error	15	LINK
0015	Unknown error	16	NPC
0016	MC error	17	MC
0017	PMEM error	18	MJU
0018	SMEM error	19	SRM
		1a	DS3U MXR
		1b	DS3U FLI
		1c	DS3U FMT
		1d	DS3U MIU
		1e	PR
		1f	EMTC
		20	EBX
		21	CCI
		22	ETSI

Table 4-5. Error Class Meanings

Code	Meaning
1	Hardware error
2	Transient error
3	Power error
4	Sanity bit error
5	CI link errors
6	Sync mode switch
7	Software error recovery
8	Error not found
9	Sync booted
A	Sync timing link errors
B	Background audits
C	Facility errors
D	Hardware error detected by application software

4. Use data 10 (or data 13 for DSPU NPC) to identify the hardware entity as follows:

   — For a duplicated unit entity, the left half (4 digits) of data 10 gives the unit number (0 through 5 for units 1 through 6) and the right half gives the module (0 through 3 for FTM 1 through 4).

   — For an ETSI entity, the left half (4 digits) of data 10 gives the side (0, 1) and the right half gives the unit (0 through F for units 1 through 16).

   — For an FTU NPC entity, the left half (4 digits) of data 10 gives the unit number (0-5 for units 1 through 6) and the right half gives the NPC number in HEX. To get the NPC number, convert the HEX number to decimal and add 1 (see Figure 4-9 and Table 4-6).

   — For a DSPU NPC entity, the left half (4 digits) of data 13 gives the side (0, 1) and the right half gives the NPC number in HEX. To get the NPC number, convert the HEX number to decimal and add 1 (see Figure 4-9).

   — If ERRC=d then data 10 will correspond to an ASCII text file name. For Example:

```
ENTT0016 - npc
ERRC000d
Byte 10 BYTE11 BYTE12
55434650 706274 72 65732E63
UCFP pbtr eb.L
```

Powers of 16 = 16^3 16^2 16^1 16^0

Example: Hex = 005A
Decimal Number = (0×16^3)
$+ (0 \times 16^2)$
$+ (5 \times 16^1)$
$+ (A \times 16^0)$, where $16^0 = 1$

0s = $(0 \times 0) = 0$
5 = $(5 \times 16) = 80$
A = $+ (A \times 1) = 10$, where A = 10
Decimal Number = 90
(NPC Number = 90 + 1 because internal count started with 0)

Hex Characters: = A = 10, B =11, C = 12, D = 13, E = 14, F = 15

Figure 4-9. Hexadecimal-to-Decimal Conversion Example

Table 4-6. Hexadecimal Numbers

(1) 01	(21) 15	(41) 29	(61) 3D	(81) 51	(101) 65	(121) 79	(141) 8D
02	16	2A	3E	52	66	7A	8E
03	17	2B	3F	53	67	7B	8F
04	18	2C	40	54	68	7C	90
05	19	2D	41	55	69	7D	91
06	1A	2E	42	56	6A	7E	92
07	1B	2F	43	57	6B	7F	93
08	1C	30	44	58	6C	80	94
09	1D	31	45	59	6D	81	95
(10) 0A	(30) 1E	(50) 32	(70) 46	(90) 5A	(110) 6E	(130) 82	(150) 96
0B	1F	33	47	5B	6F	83	97
0C	20	34	48	5C	70	84	98
0D	21	35	49	5D	71	85	99
0E	22	36	4A	5E	72	86	9A
0F	23	37	4B	5F	73	87	9B
10	24	38	4C	60	74	88	9C
11	25	39	4D	61	75	89	9D
12	26	3A	4E	62	76	8A	9E
13	27	3B	4F	63	77	8B	9F
(20) 14	(40) 28	(60) 3C	(80) 50	(100)64	(120) 78	(140) 8C	(160) A0

5. Find the meaning of the condition code given in data 4 (ERRT) from Table 4-7 or Table 4-8 in Section 4.7.

   NOTE:
   The CCI and ETSI errors are interactive; errors on one will affect the other. If most of the ETSIs for a unit are reporting errors, the common CCI for the unit has probably failed. If a CCI is reporting errors, one of the connecting ETSIs may have failed.

6. Enter command to remove the entity from service per Figure 4-10.
7. Enter command to diagnose same pack per Figure 4-10.

   NOTE:
   Attempt to clear pested packs on the same side before working on the other side. Only, if both sides are pested, you will need to bring the entire side up to service before attempting restoral of any failed or pested packs on the other side.

8. If DGN ...STF message is received, then go to *Manual Diagnostic Failures* to clear failed diagnostic.
   - If the message is not received, continue with Step **9**.
9. Replace the plug-in for the subject entity (or other replacements per Section 4.7) and enter commands to restore replacement packs to service per Figure 4-10.
10. If same transient messages are recorded again in error history on PMEM, contact technical consultant.

verb::<CP identification>[,option]!

{RMV::	SYNC a!	a	= 0 or 1
/RST::	SYNC a,TLI n[,SSP b]!	n	= 1-4; b = sync port (0 or 1)
/DGRTH::	CCI s!	s	= side 0 or 1
/DGN::}	CCNI s!	s	= side 0 or 1
	ETSI sqq!	qq	= unit 1-16
	TSI sft!	f	= unit (receiving from) (1-6)
	CCB sf!	t	= unit (transmitting to) (1-6)
	ETSIS,ECCN s,ALL!		For all ETSIs on the side
	TSIS,CCN s,ALL!		For all TSIs on the side
	UNIT [q]q,UC!	[q]q	= unit (1-16)
	UNIT [q]q,{FTMI d|DSPI}!	d	= module interface for units 1-4
	UNIT [q]q,FC sd!	sd	= FC side (0,1) and FC No. (1-4)
	UNIT [q]q,FLI k!	k	= service (S) or protection (P)
	UNIT [q]q,FMT s!	s	= side (0,1)
	UNIT [q]q,MMFG c	c	= DS3 group (1-6,P)
	[,FRC][,INCL]!	FRC	= forces remove with no prot. switch
		INCL	= removes/restores MXR NPCs
	NPC <npc No.>[,SIDE s]!	<npc No.>	= NPC number
		s	= SIDE for DSPU
	LINK j!	j	= link 1-6
DGN::	UNIT [q]q,MXR c!	c	= DS3 group (1-6,P)
	UNIT [q]q,MIU c!	c	= DS3 group (1-6,P)

NOTE: Removing the NPC is service affecting.

Figure 4-10. Maintenance Command Construction

Isolate Trouble with ERR COND Code Meanings

1. From Table 4-7 or Table 4-8, find the explanation of the COND code which appears in the ERR,ESR message for the subject pack.
2. If you were able to clear the trouble using the meaning of the ERR code, go to Step **4**.
   - If you were not, continue with Step **3**.
3. Check printout for ERR SOFTWARE message.
   - If ERR SOFTWARE message also occurs in printout, go to *Software Error*.
4. To make a record of the error history on the PMEM (for use by technical consultant), enter one of the following commands (see Note):

   Time of Day/Time Interval:
   `UTL::QRY,ERR,HWER,{INT mn|[DATE mmddyy,]TOD hhmmss}!`

   Suspect Entity:
   `UTL::QRY,ERR,HWER,ENTY eee!`

   Where:
   INT = Interval of time (past 59 minutes)
   TOD = Time of day consisting of hour (hh=00 through 23), minutes (mm=00 through 60), seconds (ss=00 through 60). Date (month, day, year) is optional.
   eee = Plug-in designation, for example: BX, CCB, CCI, CCNI, FC, FTMI, LINK, MC, MP, MTC, NPC, DDC, FLI, FMT, MIU, MJU, MXR, SRM, SYNC, TLI, TSI, UBX, UC.

   NOTE:
   All error events are logged on PMEM; however, the file is overwritten when the file capacity is reached. If you do not know how full the error log is (not recently cleared), you will want to use a short interval, perhaps the past 5 minutes, to avoid overloading the link with old errors.

5. Contact technical consultant.

Table 4-7. ESR Condition Codes - CCNI,CCB,TSI

CCNI Pack	
COND 90	Software could not access CCNI; pack does not acknowledge. Corrective Action: (1) verify that CCNI is securely seated; (2) look for loss of sync to CCNI and replace CCNI; (3) look for MC, BX or CPU interface trouble.
91	RAM error in high data byte on MC-MP. Trouble in MC (BX or CPU), or CCNI.
92	RAM error in low data byte on MC-MP. See COND 91.
93	Address parity error. Corrective Action: enter command to restore CCNI.
94	Autonomous switch error. Circuit in CCNI for side switch independent of MP disagrees with mate CCNI.
95	Bus status error. Circuit cannot determine active side. Corrective Action: (1) replace CCNI; (2) if persists, report possible software error.
96	Stuck summary bit. Error leads from CCB or TSI stuck high, but no trouble can be found. Subject CCB and TSI packs are identified in messages.
CCB Pack	
COND A0	Software could not access CCB; pack does not acknowledge. Corrective Action: (1) verify that CCB is securely seated; (2) look for loss of sync to CCB and replace CCB; (3) look for MC, BX or CPU interface trouble.
A1	Loss of sync pulse signal for approx. 100 ms. Trouble in CCB or SYNC or sync interface between.
A2	Loss of 8 MHz clock. See COND A1.
A3	Bad data from TSI ports. If most ports are reported in ESR, probably the CCB is bad. If only a few ports are reported, probably the TSIs are bad.
A4,A5	Zero bit stuck at 1 in CCB (A4) or CCNI (A5).
TSI Pack	
B0	Software could not access TSI; pack does not acknowledge. Corrective Action: (1) verify that TSI is securely seated; (2) look for loss of sync through CCB and replace TSI; (3) look for MC, BX or CPU interface trouble.
B1	Stuck summary bit that indicates troubles from TSI devices, but no actual trouble can be found.
B2	TSI device error that clears during recovery; transient error.
B3	Software could not access TSI device; device failed or lost sync clock.
B4	Diagnostic exercise bits set on TSI device. Replace TSI.
B5	Error on address bus to TSI device. Trouble in TSI, CCNI, or MC-BX pack.
B6	TSI device not receiving good sync clock. Trouble in TSI, related CCB, or SYNC.
B7	Error on TSI control RAM which defines maps. Replace TSI.
B8	Parity error on port from FC or DSPU-DMB. If most all TSI ports are reported in ESR message, replace TSI. If isolated ports are reported, the FCs or DMBs are probably bad. Adjacent NPCs that share the DBM ports will be reported although only one is bad.
B9	Parity error from CCNI.

Table 4-8. ESR Condition Codes

MC-CI Pack	
COND D0	RAM parity error.
D5	Illegal/unknown condition code.
MC-MP Pack	
COND D0	RAM parity error.
D5	Illegal/unknown condition code.
2E	Unused bit error.
2F	Unknown error source.
30	Power failure.
31	Processor not sane. Corrective Action: verify that MP pack is securely seated.
MC-MTC Pack	
COND D5	Illegal/unknown condition code.
2B	Unknown interrupt from MTC.
2C	Stuck summary bit.
2D	Unused bit error.
30	Power failure.
31	Pack no same.
MC-EBX Pack	
COND D5	Illegal/unknown condition code.
16	Write RAM parity error, low byte.
17	Write RAM parity error, low byte.
18	RAM parity, CPU-EBX.
19	D9 bit error.
1A	D10 bit error.
1B	D11 bit error.
20	Access error. Corrective Action: (1) verify that EBX is securely seated; (2) replace EBX pack.
21	RAM parity error, low byte.
22	RAM parity error, high byte.
23	Fan Bank 0 error flag.
24	D5 spare bit error.
25	Fan Bank 1 error flag.
26	D5 spare bit error.
27	Stuck summary bit.
28	Unknown interrupt.
29	Error from side 0 bus extension.
2A	Error from side 1 bus extension.

Continued on next page

Table 4-8. ***Continued***

Unit-UC or UBX Pack (Types UA, UD, UC)	
COND 10	CPU parallel bus parity error.
11	CPU serial bus parity error.
0F	CPU internal bus error.
31	Unit UC is not sane. Corrective Action: verify that unit CPU is securely seated.
D0	Unit UC has RAM parity error. Corrective Action: replace unit CPU.
D1	Unknown error.
D2	Error source not found.
D3	Stuck bit in register on the pack.
D4	Failed UBX pack. Corrective Action: replace UBX pack.
D5	Invalid condition code.
30	Power failure.
FTMI Pack	
COND D5	Illegal/unknown condition code.
40	Error detected on bus from FTMI. Trouble either in FTMI, UBX, or MC-CPU.
41	Communications device (CIA) error.
42	Communications device (CIB) error.
43	Communications device (CIC) error.
44	Software could not access FTMI; pack does not acknowledge. Corrective Action: (1) verify that the FTMI is securely seated; (2) verify that FCs are securely seated and not failed; (3) verify that CCIs and ETSIs for unit are securely seated and not failed.
45	Loss of sync clock from UBX.
46	Device ID disagreement.
47	Data strobe signal.
48	Address parity error. Corrective Action: enter command to restore FTMI.
49	Stuck bit on port from FC. If most of the ports are listed in ESR, the FTMI is probably bad. If isolated ports are reported, an FC is probably bad.
4A	Stuck bit on port from NPC. If most of the ports are listed in ESR, the FTMI is probably bad. If isolated ports are reported, an FC is probably bad.
4B	All FTMIs have lost sync clock. Trouble on related CCB or SYNC.

Continued on next page

Table 4-8. ***Continued***

FC Pack	
COND D5	Illegal/unknown condition code.
4C	Software could not access FC; pack does not acknowledge. Corrective Action: (1) verify that FC is securely seated; (2) look for loss of sync from CCIs and ETSIs and replace FC; (3) look for unit UBX or UC trouble.
4D	Pack timer error.
4E	Circuit ID error.
4F	Transmit formatter error on ports from NPCs. If most of the ports are listed in ESR, the FC is probably bad.
50	Receive formatter error on ports from NPCs. Corrective action: (1) Restore FC; if restore denies, replace pack. (2) If FC is removed again and NPC is implicated in message, replace NPC.
51	Sanity timer interrupt.
52	RF bus error.
DS3U MXR Pack	
COND 14	DS3 loss of signal.
15	Unknown error.
34	M23 summary register stuck bit.
97	Communications link error.
A6	Chan controller transmit data error.
A7	Chan controller receiver data error.
A8	Chan controller exercise error.
A9	Chan controller register stuck bit.
AA	Transceiver framer error.
AB	Transceiver receive sync error.
AC	Transceiver transmitter error.
AD	M23 device error.
AE	M12 device error.
AF	M12 summary stuck error.
D5	Illegal/unknown condition.
D8	MXR ROM error.
D9	MXR LCA error.
DA	MXR queue overflow.
DB	Chan controller loss of clock.
DC	Chan controller frame sync error.
DD	Chan controller config register error.
DE	Chan controller instruction RAM error.
DF	Chan controller parity error.

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Table 4-8. *Continued*

DS3U MXR Pack (contd)	
COND E1	MXR access error.
E2	Hard error stuck bit.
E3	Facility error stuck bit.
E4	MXR is in reset state.
E5	PIF bus parity error.
E6	Loss of clock from unselected FLI.
E7	45 MHz not phase locked to system clock.
E8	Firmware error.
E9	HSCC device error.
EA	PIF I/O device error.
EB	M13 summary register stuck bit.
EC	Transceiver summary stuck bit error.
ED	Program error.
EF	RAM error.
DS3U MIU Pack	
COND 01	CEC bit (on HSCC) not cleared.
02	Firmware error.
03	Excessive transmit data underruns.
04	Invalid acknowledge from MXR.
05	No acknowledge from MXR.
06	RAM data error.
07	Invalid code checksum.
08	FDL (on HSCC) register error.
09	MXR (on HSCC) register error.
0A	EPROM checksum error.
0B	Timer 1 error.
0C	Timer 2 error.
0D	DUART error.
0E	MIU access error.
D5	Illegal/unknown condition.
D6	Communication error.

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Table 4-8. *Continued*

DS3U FLI Pack	
COND 12	Register bit stuck.
13	Switch lock and key alarm.
3B	FLI access error.
3C	Communication error.
BA	Loss of clock.
BB	Loss of signal.
BC	Circuit ID error.
BD	Frame sync or internal error.
BE	Address bus parity error.
D5	Illegal/unknown condition.
DS3U FMT Pack	
COND 33	TF control bus error.
35	Multiple TF network error.
36	Single TF network error.
37	TF device or clock receiver error.
38	Multiple TF clock error.
39	Single TF sync error.
3A	Multiple TF sync error.
D5	Illegal/unknown condition.
D7	Communication error.
F0	FMT access error.
F1	Timing error.
F2	Link ID error.
F3	FMT bus timeout.
F4	Serial address parity error.
F5	0-4 TF timing error.
F6	0,4 TF timing error.
F7	RF data parity timing error.
F8	Error summary register 1 stuck bit.
F9	Error summary register 2 stuck bit.
FA	Lock override, active select, or kill parity error.
FB	FIFO or control PROM error.
FC	RF control bus error.
FD	RF port and monitor alarms.
FE	RF port alarm, no monitor alarms.

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Table 4-8. ***Continued***

FTU-NPCs (Common for DPCs and DDCs)	
COND 53	DDC bus error.
54	Software could not access NPC; pack does not acknowledge. Corrective Action: (1) verify that NPC is securely seated; (2) check loss of sync from FC; (3) check unit UBX or UC trouble; (4) if persists, replace NPC.
55	NPC is sending a port alarm to the FC.
56	Facility processor on NPC is not sane.
57	SYNC error on FC.
58	Loss of sync clock to channel controller.
59	Loss of frame sync error to channel controller.
5A	Channel controller configuration error.
5B	Channel controller RAM error. Corrective Action: enter command to restore NPC.
5C	Channel controller parity error. Corrective Action: enter command to restore NPC.
5D,5E	Channel controller transmit (5D) or receive (5E) error.
5F	Channel controller exercise error.
60	Channel controller summary bit error.
61	Hard RAM error.
62	Hard ROM check error.
63	Hard error stuck bit.
64,67	Transceiver A (64) or B (67) stuck bit.
65,68	Transceiver A (65) or B (68) transmit slip.
66,69	Transceiver A (66) or B (69) error.
6A	Circuit ID error.
6B	Facility errors.
6C	DDC address parity error.
6D	Invalid FPA state.
6E	Invalid DDC pack ID.
D5	Illegal/unknown condition.
DSPU NPC - MJU	
	Corrective Action for COND BF-C7: replace MJU (subject side).
COND BF	Serial access error.
C0	Clock error.
C1	Processor interface error.
C2	Input data interface error.
C3	Error correction circuitry failure.
C4	Control memory failure.
C5	Output block failure.
C6	Sampling circuitry failure.
C7	Control memory or state machine failure.

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Table 4-8. ***Continued***

DSPU NPC - SRM	
	Corrective Action for COND C8-CF: replace SRM (subject side).
COND C8	Serial access error.
C9	Clock error.
CA	Processor interface failure.
CB	Input data interface failure.
CC	Error correction block failure.
CD	Control memory failure.
CE	Multiplexer block failure.
CF	Output block failure.
FTU NPC - CEPT DPC	
COND 3D	ROM error.
3C	TS0 monitoring overflow.
3E	Loss of timing.
3F	OOS test ran while pack was in service.
DSPU-DSPI	
COND 6D	Software could not access DSPI; pack does not acknowledge. Corrective Action: (1) verify that DSPI is securely seated; (2) look for loss of sync from UBX and replace DSPI; (3) look for unit CPU trouble.
6E	Bus parity error. Trouble either on unit CPU or DSPI.
6F	Bus address parity error. Corrective Action: enter command to restore DSPI.
D3	Stuck bit on unit CPU, but no ESR bits set on DSPI.
CPR Packs	
COND 98	CPR serial access error.
99	CPR clock error.
9A	CPR processor interface failure.
9B	CPR input data interface failure.
9C	CPR D-bit interface parity error.
9D	CPR control memory failure.
9E	CPR control memory or state machine failure.
9F	CPR FIFO FRDY/FFULL stuck bit.

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Table 4-8. ***Continued***

DSPU NPC - DMB	
COND 70	Software could not access DMB. Corrective Action: (1) verify that DMB is securely seated; (2) check clock loss from DSPI; (3) replace DMB; and (4) replace DSPI.
71	No reply on serial interface bus to NPC pair.
72	No reply on parallel interface bus to NPC pair.
73	Diagnostic exercise bits for DMB set on DSPI. If error persists after DSPI replacement, report possible software trouble.
74	DMB data processing error.
75	Multiple data parity error; however, check bit in DMB not set. Corrective Action: replace associated unit ETSI pack.
76	Sync clock error. Trouble in NPC or associated unit ETSI.
77	Sync clock error on multiple DMBs. Trouble in associated unit ETSI or the SYNC.
78	DMB FIFO error.
79	Power failure on DSPU side.
7A,7B	Transient error on control memory 0 (7A) or mem 1 (7B).
7C,7D	RAM parity error on control memory 0 (7C) or mem 1 (7D).
7E,7F	Interface error on control memory 0 (7E) or mem 1 (7F).
80,81	Loss of sync on control memory 0 (80) or mem 1 (81).
82,83	Input data parity error on control memory 0 (82) or mem 1 (83).
84,85	Transient on conferencer 0 (84) or conferencer 1 (85).
86,87	Control interface error on conferencer 0 (86) and 1 (87).
88,89	Control RAM parity error in control data or configuration field for conferencer 0 (88) or conferencer 1 (89).
8A,8B	Input data parity error on conferencer 0 (8A) or 1 (8B).
8C,8D	Parity, configuration, or reset error on conferencer 0 (8C) or conferencer 1 (8D).
8E,8F	Bit alarms on control memory 0 (8E) or mem 1 (8F).
D5	Illegal/unknown condition.
CCI Pack	
COND 01	Software could not access CCI. Corrective action: (1) verify that CCI is securely seated; (2) look for loss of clock (3) replace CCI; and (4) check MC, EBX, or CPU interface trouble.
02	Incorrect version number on CCI.
03	Summary bit set, but no other errors.
04	CCI ERR bit set in system status register.
05	ETSI ERR bit set in system status register.
06	Peripheral unit bit set in system status register.
07	Bus terminator pack absent.
08	2-MHz clock out of phase-lock.
09	240 frame sync misaligned.
0A	Loss of 240 frame sync.
0B	Loss of 8-kHz frame sync.
0C	CCI detected address parity error.
0D	CCI detected low byte data parity error.
0E	CCI detected high byte data parity error.
0F	CCI -5.2 power supply failure.
10	CCI detected bus status parity error.
11	Peripheral unit alarm.
12	Sync summary bit set on CCI pack.

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Table 4-8. *Continued*

ETSI Pack	
COND 20	Software could not access ETSI; pack does not acknowledge. Corrective Action: (1) verify that ETSI is securely seated; (2) look for loss of sync to ETSI and replace ETSI; (3) look for MC, EBX, or CPU interface trouble.
21	Incorrect version number on ETSI pack.
22	Summary bit set, but no other errors.
23	Loss of 32.768-MHz clock.
24	Loss of 240 frame sync.
25	Receive MDX summary bit set.
26	Control RAM summary bit set.
27	Transmit MDX summary bit set.
28	Loss of 3.3-volt power from CCI pack.
29	Peripheral unit port alarm (receive MDX).
2A	Receive MDX data source time-slot parity error.
2B	Receive MDX sync error.
2C	Receive MDX address parity error.
2D	Receive MDX write data parity error.
2F	Receive cannot be accessed; incorrect chip ID.
30	Transmit MDX data parity error.
31	Transmit MDX data source time-slot parity error.
32	Transmit MDX sync error.
33	Transmit MDX address parity error.
34	Transmit MDX write data parity error.
35	Transmit MDX cannot be accessed; incorrect chip ID.
37	Control RAM parity error.
38	Control RAM sync alarm.
39	Control RAM port alarm.
3A	Control RAM BIST flag is set.
3B	Data RAM BIST flag is set.
3C	Control RAM address parity error.
3D	Control RAM write data parity error.
3E	Control RAM device cannot be accessed; incorrect chip ID.
3F	Control RAM circuit pack parity.
40	Control RAM device is in reset state.
41	Control RAM port alarm summary bit set.
42	TRD3 status exercise bit is set.
43	Ready high error detected from CCI.
44	Ready timeout error from CCI; CCI cannot access ETSI.
45	Control RAM stuck bit error.

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Table 4-8. *Continued*

SYNC Packs	
COND 96	Transient error on sync pack.
D5	Illegal/unknown condition.
E000	Gross SYNC error registered at CCI. Communications with SYNC failed. Corrective Action: check if SYNC plug-ins have been disconnected.
E001	SYNC reports bad DPLL pack to error recovery.
E002	SYNC reports bad TB pack to error recovery.
E003	SYNC restarted itself autonomously.
E004	Software could not communicate with SYNC. Trouble with SYNC or in MC-MP.
E100	Transient caused by MP to SYNC communications failure. This error also brings E004 and remove SYNC.
E101	SYNC ROM checksum failure.
E102	SYNC RAM data or address error.
E103	SYNC has phase/freq. output latch error.
E104	Loss of 2.048 MHz output from frequency synthesizer.
E105	Loss of 2.048 MHz output from phase shift circuit.
E106	Loss of generated sync pulse output.
E107	Loss of time base strobe pulse.
E108	SYNC interrupt controller error.
E109	SYNC interrupt holding register error.
E10A	SYNC UART error.
E10B	SYNC control data output latch error.
E200	Unknown TB transient error; brings E004 message and RMV SYNC.
E201	Loss of output from TB.
E202	SYNC could not read TB pack ID or oven temperature.
E203	For MASTER timing, SYNC finds its TB has drifted out of limits.
E204	Ovens in both SYNC TBs are cold.
E205	New TB pack oven has not reached temperature. For Stratum 3, message appears once, though subsequent restorals will fail until temperature is reached. For Stratum 2, the message is repeated.
E300	Unknown PLL transient error; also brings E004 and RMV SYNC.
E301	One or both SYNCs report that PLL remains at end of range for 1 minute. If both SYNCs report the TLI is removed. If one reports, that SYNC is removed.
E302	Reporting SYNC finds excessive phase error (125 μ out of phase).
E303	Reporting SYNC found PLL violations.
E304	Noise on timing link caused PLL to go from fast start to normal mode.
E305	Accompanies E301 to declare timing link (SSP) failure.
E400	Unknown mate SYNC transient; also brings E004 and RMV SYNC.
E401	Reporting SYNC found bad mate. Mate declared out-of-service; ESR bits are from reporting SYNC.
E402	One SYNC communicated failure to reporting SYNC. ESR bits are from reporting SYNC.
E403	One SYNC communicated loss of cross-coupling for 1 millisecond to reporting SYNC. ESR bits are from reporting SYNC.

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Table 4-8. *Continued*

SYNC Packs (contd)	
COND E404	One SYNC communicated loss of cross-coupling for 30 msec. See E403.
E405	Communication link with mate is down. ESR bits are from reporting SYNC.
E406	Cross-coupling violation that indicates trouble with mate rather than DPLL. ESR bits are from reporting SYNC.
E407	Cross-couple fast lock circuit failed to align phase of two syncs.
E408	For MASTER timing, the TB in the mate SYNC has drifted out of limits.
E409	One SYNC communicated loss of cross-couple lock to reporting SYNC.
E500	Transient TLI error; no further communication. Brings E004 message and RMV SYNC.
E501	TLI hardware error as defined by the ESR message bits. For TE type, one or both SSPs may be effected.
E600	Unknown SSP error; no further communication. Brings E004 message and RMV SYNC.
E601	Subject SSP has errors and cannot be used as timing source. Error brings diagnostic on SSP. Trouble either on incoming link or in TLI-SSP.
E602	Subject TLI-SSP was found to be cause of errors and was removed from service.
E603	Incoming unipolar clock does not match frequency field requirements defined in ESR message bits.
E700	Unknown CRO error; no further communication. Error brings E004 message and RMV SYNC.
E701	Loss of CRO clock signal.
E702	Loss of CRO clock signal. If one SYNC declares error, trouble is probably TB or DPLL. If both declare error, trouble is probably CRO which will be removed.
E703	SYNCs report that CRO has drifted out of limits.
E704	SYNC declared that CRO is out-of-service.
E800	Unknown clear message.
E801	Mate error cleared.
E802	PLL error cleared.
E803	TB error cleared.
E804	CRO error cleared.
E805	Timing link error cleared; link can once again be used as source. Error brings diagnostic and updated link status.
E806	TLI error cleared.
EF00	Transient unknown SYNC side switch error. Error brings E004 message and RMV SYNC.
EF01	SYNC changed to NORMAL mode and is on named SSP source.
EF02	SYNC changed to HOLDOVER mode and is on internal osc.
EF03	SYNC changed to FAST START and is on named SSP source.
EF04	SYNC switched to different TLI for timing source.
EF05	SYNC changed to CROSS-COUPLE and derives timing from mate.

Clear ERR HARDWARE Message

1. Notice which plug-in is named in the ERR HARDWARE message in the field after the HARDWARE keyword. Also check for error code or further explanation in the message.
2. Study the associated messages to determine if the subject plug-in has been removed and diagnosed.
3. Check for a blown fuse on the 48-volt fuse and alarm panel and on the frame fuse boards. Also check for ERR PWR message (for failed power unit) in printout.
   - If there is a blown fuse, go to *Power Failures* to clear the blown fuse trouble.
   - If there is a failed power unit, go to *Power Failures* to clear the failed power unit.
4. Which of the following codes/explanations are given in the ERR message?
   - If **Code E1**, then continue with Step **5.**
   - If **Code E2**, then proceed to Step **8.**
   - If **Code E3**, then proceed to Step **10.**
   - If **other code**, then proceed to Step **12.**
   - If **no code or explanation**, check trouble printout for associated trouble messages. If you cannot identify the trouble using printout and the *Trouble Identification* section, contact technical consultant.
5. Hardware does not match inventory in data base or there is a hardware failure. Enter following command and check if correct equipment code plug-ins are installed for sync or NPC plug-ins that have growth specifications.
   `UTL::QRY,ALL[,UNIT [q]q]!` where UNIT field limits NPC information to one unit.

   NOTE:
   The conditions are indicated in the output message by the presence of a "1" in the out-of-service, failed, and pested columns for each pack. Unequipped NPCs are indicated by dashes.

   - If incorrect plug-in installation was found and if the plug-in named in message was removed from service, enter RST command for CP per Figure 4-11. This procedure is completed.

verb::<CP identification>[,option]!

{RMV::	SYNC a!	a =	0 or 1
/RST::	SYNC a,TLI n[,SSP b]!	n =	1-4; b = sync port (0 or 1)
/DGRTH::	CCI s!	s =	side 0 or 1
/DGN::}	CCNI s!	s =	side 0 or 1
	ETSI sqq!	qq =	unit 1-16
	TSI sft!	f =	unit (receiving from) (1-6)
	CCB sf!	t =	unit (transmitting to) (1-6)
	ETSIS,ECCN s,ALL!		For all ETSIs on the side
	TSIS,CCN s,ALL!		For all TSIs on the side
	UNIT [q]q,UC!	[q]q =	unit (1-16)
	UNIT [q]q,{FTMI d|DSPI}!	d =	module interface for units 1-4
	UNIT [q]q,FC sd!	sd =	FC side (0,1) and FC No. (1-4)
	UNIT [q]q,FLI k!	k =	service (S) or protection (P)
	UNIT [q]q,FMT s!	s =	side (0,1)
	UNIT [q]q,MMFG c	c =	DS3 group (1-6,P)
	[,FRC][,INCL]!	FRC =	forces remove with no prot. switch
		INCL =	removes/restores MXR NPCs
	NPC <npc No.>[,SIDE s]!	<npc No.> =	NPC number
		s =	SIDE for DSPU
	LINK j!	j =	link 1-6
DGN::	UNIT [q]q,MXR c!	c =	DS3 group (1-6,P)
	UNIT [q]q,MIU c!	c =	DS3 group (1-6,P)

NOTE: Removing the NPC is service affecting.

Figure 4-11. Maintenance Command Construction

6. If plug-in named in message was not removed from service and diagnosed, enter the **RMV** and **DGN** commands for the CP per Figure 4-11.
   - If DGN ...STF message is received, go to *Manual Diagnostic Failures* to clear the failed diagnostic.
7. Enter RST command for plug-in.
   - If trouble persists, contact technical consultant.

For Code E2, Continue Here

8. Software could not access subject pack. Verify that the pack is installed.
9. If the subject pack has not been diagnosed, enter DGN command to diagnose pack per Figure 4-11.
   - If DGN ...STF message is received, go to *Manual Diagnostic Failures* to clear the failed diagnostic.

For Code E3, Continue Here

10. Hardware boot failed. If the subject pack has not been removed from service, enter RMV command to remove pack per Figure 4-11.
11. Enter RST command to restore same pack to service per Figure 4-11.
12. Find expanded explanation in Table 4-9 and perform corrective action. Refer to Figure 4-11 for command construction. Remember to enter commands to remove pack before replacing, and restore after replacing.
    - If you were not able to find the trouble, check trouble printout for associated trouble messages. If you cannot identify the trouble using printout and the *Trouble Identification* section, contact technical consultant.

Table 4-9. Error Hardware Explanations

Code	Explanation/Corrective Action
E0	Hardware and data base do not agree. Check associated ERR ESR message for named plug-in (hardware).
E1	Attempt to write to named pack failed.
E2	Attempt to boot (reset or restore) pack failed.
E3	X.25 layer 3 protocol failure; far end is not transmitting or responding. Check on far-end equipment or software failure.
E4	For X.25 link, there is a layer 1 (clear-to-send) failure; check link cabling and connections. For Snider link, there is a possible CI (DUART circuit) failure; enter **DGN::LINK!** and replace CI to clear failure.
E5	X.25 layer 1 or 2 protocol failure; far-end is not transmitting or responding. Check far-end equipment or software failure.
E6	Software failure forced link out-of-service. Enter **RST::LINK j!**
E7	Unit could not be reset for boot. Enter appropriate RMV command (UNIT [q]q, UC or MC), replace CPU (in UNIT) and MTC (in MC), and restore pack. Check unit to MC cabling.
E8	Unit failed sanity check for boot. Enter remove **UNIT UC**, replace CPU in unit, and restore pack.
E9	NPC failed to insert trunk conditioning. Enter **DGN::NPC!** Remove and replace if necessary.
EA	NPC failed to remove trunk conditioning. Remove and replace NPC.
EB	Failure to verify ECCN side switch. Enter **DGN::CCI s!** for each side. If no failure is found, enter commands to remove and restore each CCI to reestablish active side.
EC	NPCs/facilities hardware error overflow. Check for DS3 or multiple facility failures or all NPCs in unit failing because of common equipment.
ED	Duplex entity failed. On side (for plug-in) that was autonomously removed from service, replace failed plug-in, and enter restore command.
EE	Lost clear-to-send signal on X.25 links.
EF	Frame audit reboot DDC failure.

Clear DS3 Equipment Critical Alarm

NOTE:
One thing to remember about DS3 protection switching is that a failed MMFG that cannot be automatically switched to protection will be marked ISF (in-service, failed). An MMFG with ISF status cannot be removed because the protection switch is in use, and the MMFG cannot be restored (after plug-in replacement) because it is already in-service. After one MMFG failure is cleared, another failed MMFG will switch to protection.

1. If alarm cutoff is needed, enter **`UTL::ACO!`**.
2. Consider the following possible causes of the critical alarm:
   - — The DS3 facility has failed. The DS3U (HDS3U) protection switching only protects against loss of service due to DS3U (HDS3U) plug-in failures.
   - — More than one MXR (HMXR) function group has failed. Only one protection MXR (HMXR) function group is provided for backup protection.
   - — An MXR (HMXR) function group has failed and the protection switching for that group is inhibited.
3. Study printout to find the trouble message(s). Look for ESR ANALYSIS REPORT messages. The DACS II analyzes all the error inputs and reports packs that have failed diagnostics and related packs that can also cause the failure.
4. Check for blown fuses. If whole units of packs have failed, check the fuse and alarm panel for lighted **FA** lamp and a blown 48-volt feeder fuse. In the unit and other circuit groups, check for lighted LED indicator on fuse boards or 80-type LED fuses.
   - If there is a blown fuse at the frame, go to *Power Failures*.
5. If there is an ALARM UNIT DS3 message, go to *Facility Alarms* to clear UNIT DS3 alarm.
   - If there is no unit DS3 alarm message, continue with Step **6.**
6. There are two vital query commands for the DS3 equipment:
   - — **`UTL::QRY,STATE,UNIT [q]q,DS3 c[-d]!`** which shows the protection state (PSTATE) and status of the MXR function group and the facility (or continuous range of MMFGs and facilities).
   - — **`UTL::QRY,PSTATE,UNIT [q]q!`** which shows the MXR and MIU maintenance and the protection states for each MMFG and FLI circuit pack.

7. Enter the query commands from above and study the output information using the following:
   - — Facility failures are indicated by the presence of OOF (out-of-frame), LOS (loss of signal), or HBER (high BER) in the DS3 query.
   - — Table 4-10 gives the meanings of the various codes in the PSTATE output. The message is as follows: (1) the protection MMFG is listed first on the left, and (2) for each MMFG, the top code is the MXR maintenance status, next down the MIU (if any) status, next the MMFG protection status, and lastly, the protection availability.

8. Which problem is indicated by the outputs of the query commands?
   - If **More Than One MMFG Has Failed,** proceed to Step **15.**
   - If **Protection Switching Inhibited,** continue with Step **13.**
   - If **Undetermined,** continue with Step **9.**

9. Enter command to switch FLI to protection as follows:
   `SW::UNIT [q]q,FLI,TOPRTN!`
10. If critical alarm clears, continue with Step **11**.
    - If alarm does not clear, enter following command to switch back to service FLI and go to Section 4.3 to *clear ERR <entity> messages*.
      `SW::UNIT [q]q,FLI,TOSRVC!`

11. Enter command to remove FLI per Figure 4-12 and replace service FLI plug-in (FLI S).
12. Enter command to restore replacement per Figure 4-12.
    - If RST ...DNY message is received, find the meanings of the condition codes *Command Denials*.
    - If RST ...COMPL message is received, enter following command to switch back to service FLI; this procedure is completed.
      `SW::UNIT [q]q,FLI,TOSRVC!`

13. Enter **`ALWSW::UNIT [q]q,MMFG c,TOPRTN!`** for the MMFG for which switching is inhibited.
14. If alarm status changes from critical to major, then proceed to Step **17**.
    - If the status does not change, repeat from Step **8**.

Table 4-10. Maintenance and Protection Keywords

Keyword	Meaning
Maintenance Status	
IS	In-Service
ISF	In-Service, but Failed and Pested
OOS	Out-Of-Service
UEQD	Unequipped
Protection Status	
SLT	Protection MMFG/FLI Selected
USLT	Protection MMFG/FLI Unselected
SALW	MMFG Is Carrying Service and Switching Is Allowed
SINH	MMFG Is Carrying Service and Switching Is Inhibited
MPALW	Manual Protection Switch Active and Auto Switchback Allowed
APALW	Auto Protection Switch Active and Auto Switchback Allowed
MPINH	Manual Protection Switch Active and Auto Switchback Inhibited
APINH	Auto Protection Switch Active and Auto Switchback Inhibited
(dashes)	Service MMFG Not Equipped
Protection Availability	
AVL	Available for Switching
NVL	Not Available for Switching
(dashes)	MMFG Not Selected for Service

15. From the query information and the trouble printout, determine which MMFG is switched to protection.

NOTE:
The first MMFG to fail will be served by the protection MMFG, and the other failed MMFGs are marked ISF (in-service and failed). If all the MMFGs in the unit have failed, MMFG 1 will probably be the one that is switched to protection.

16. If you need to cause the protection switch to move to another failed MMFG, enter **SW::UNIT [q]q,MMFG c,TOPRTN,FRC!** for the MMFG which you want to place on protection to maintain service or to enable maintenance (see Note).

NOTE:
If an MMFG is in-service and failed (because another MMFG was being served by protection), plug-ins cannot be replaced and restored to service. When switched to protection, the same MMFG will be removed from service (OOS) allowing maintenance.

17. Use the ERR ESR messages for the DS3U (HDS3U) plug-ins to determine which MMFG plug-in(s) are implicated and replace the named pack(s). The implicated circuit packs have either an OOS (out-of-service) or ISF (in-service and failed) status.

18. Enter command to restore the replacement plug-in to service per Figure 4-12.

verb::<CP identification>[,option]!

{RMV::	SYNC a!	a	=	0 or 1
/RST::	SYNC a,TLI n[,SSP b]!	n	=	1-4; b = sync port (0 or 1)
/DGRTH::	CCI s!	s	=	side 0 or 1
/DGN::}	CCNI s!	s	=	side 0 or 1
	ETSI sqq!	qq	=	unit 1-16
	TSI sft!	f	=	unit (receiving from) (1-6)
	CCB sf!	t	=	unit (transmitting to) (1-6)
	ETSIS,ECCN s,ALL!			For all ETSIs on the side
	TSIS,CCN s,ALL!			For all TSIs on the side
	UNIT [q]q,UC!	[q]q	=	unit (1-16)
	UNIT [q]q,{FTMI d|DSPI}!	d	=	module interface for units 1-4
	UNIT [q]q,FC sd!	sd	=	FC side (0,1) and FC No. (1-4)
	UNIT [q]q,FLI k!	k	=	service (S) or protection (P)
	UNIT [q]q,FMT s!	s	=	side (0,1)
	UNIT [q]q,MMFG c	c	=	DS3 group (1-6,P)
	[,FRC][,INCL]!	FRC	=	forces remove with no prot. switch
		INCL	=	removes/restores MXR NPCs
	NPC <npc No.>[,SIDE s]!	<npc No.>	=	NPC number
		s	=	SIDE for DSPU
	LINK j!	j	=	link 1-6
DGN::	UNIT [q]q,MXR c!	c	=	DS3 group (1-6,P)
	UNIT [q]q,MIU c!	c	=	DS3 group (1-6,P)

NOTE: Removing the NPC is service affecting.

Figure 4-12. Maintenance Command Construction

19. If you were able to clear the trouble, then continue with Step **20**.
    - If you were not, then go to Section 4.3.

    NOTE:
    When the service MMFG is restored to service, the next failed MMFG will switch to protection. If only two MMFGs failed, the alarm status will change from critical to major.

    NOTE:
    If a failed MMFG cannot be switched to protection, it will be marked ISF (in-service, failed). An MMFG with ISF status cannot be removed because the protection switch is in use, and the MMFG cannot be restored (after plug-in replacement) because it is already in-service.

20. Repeat Steps 15 through 19 to clear remaining DS3 alarms.
21. Enter **`UTL::QRY,PSTATE,UNIT [q]q!`** to check the maintenance and protection status of each of the MMFGs.
22. If the protection switch was operated (or inhibited) manually to enable maintenance, enter the command to reverse the operation as follows:

    Release Protection
    `SW::UNIT [q]q,MMFG c,TOSRV!`

    Allow Switching
    `ALWSW::UNIT [q]q,MMFG c,TOPRTN!`

23. Enter **`UTL::QRY,ALL,UNIT [q]q!`** to check for failed or out-of-service plug-ins. Clear failures as follows:
    — For failed plug-ins, enter RMV command for plug-in, replace it, and enter RST command per Figure 4-12.
    — For failed facilities, check facility errors and clear counts. If NPC was removed from service, enter RST command for NPC per Figure 4-12.

Manual Diagnostic Failures

5

Contents

Contents

Manual Diagnostic Failures

5

This chapter contains the procedures to clear failed diagnostic tests on the DACS II circuit packs or circuit groups. The failed diagnostic will be reported as a result of a manual entry of the diagnostic command or autonomous error recovery operation. A failed diagnostic is always indicated by the STF keyword in the message.

NOTE:
If you already have isolated the trouble to a failed diagnostic, proceed directly to the procedure for that failed diagnostic; otherwise, go to *Trouble Identification* to first isolate the trouble.

The following equipment considerations pertain to the diagnostic tests:

— The diagnostic for a plug-in specifically tests that plug-in, and the plug-in itself is always the first one implicated by the failure.

— The diagnostic tests are run as part of the command to restore the plug-in to service.

— The diagnostics for facility NPCs include loopback tests which check the internal transmission paths (except line transformers) and tests which checks the facility error detecting circuits.

— With the CEF (capacity expansion frame), diagnostic tests for various plug-ins also include cabling tests. The FC , FMT (for DS3), and DSP NPC diagnostics check wiring between the unit and the ECCN. The unit UC diagnostic checks wiring between the unit and the FC. The ETSI diagnostic sources and reads time slots in and out of the ECCN bus.

Clear Failed MC Diagnostic

1. If alarm cutoff is needed, enter **`UTL::ACO!`**. If the command is ineffective, press the **ACO** button on the DACS II status panel.
2. Locate the diagnostic trouble number that appears immediately after the STF word in the output message.
3. On CEF frame, if the trouble number is 0C00, check if the CCI packs are installed in both sides of the network.
   - If the packs are not installed, clear the trouble by installing and restoring the CCI packs, using the command **`RST::CCI s!`** (s = Side 0 or 1).
   - If the MC (main controller) was removed from service (RMV MC ...COMPL), proceed to Step **7**.
4. If trouble number is in the range from 0100 to 0500, enter the diagnostic command for the implicated plug-in per Table 5-1 and refer to the trouble procedure for the failed diagnostic.
5. If an RMV MC ...COMPL message did not accompany the DGN MC ...STF message, enter **`RMV::MC!`** to remove the MC from service.
6. If the trouble number is greater than 0500, replace the pack implicated by the diagnostic trouble number per Table 5-1.

Table 5-1. Implicated MC Plug-Ins

Trouble Number	Implicated CP	Diagnostic	Reference
0100	MP	DGN::MP!	Section 5.2
0200	CI	DGN::CI!	Section 5.3
0400	PMEM	DGN::PMEM!	Section 5.15
0500	SMEM	DGN::SMEM!	Section 5.16
0600, 0700, 0800, or 0900	EMTC/MTC	None	None
0A01, 0A02, 0A03, 0A04, 0A05, or 0C00	EBX/BX2	None	None
0B00, 1000	EBX/BX2 or CCI (active side)	None	None

7. On the DACS II status panel, hold the **RESET ENABLE** switch to **ON** and momentarily press the **RESET** button.

   NOTE 1:
   The terminal must be set to the default baud rate (1200 baud) to see the information as it scrolls on the screen.

   NOTE 2:
   The RESET activity in this step initializes the components in the MC and boots the unit controllers and frame memories with data from the PMEM (or from SMEM if the PMEM cannot be used). The reset sequence begins with the startup diagnostics of the CI, MP, and continues with the boot. It may take several minutes for the reset to complete depending on the size of the frame; a BOOT IN PROGRESS message will be output every 20 seconds during the boot routine.

   NOTE 3:
   If the unit controllers and frame memories are booted with data from the SMEM, the MC will be in MCOND and no database will be present. The SMEM only supplies executables when the PMEM cannot be used for booting.

   - If RESET...COMPL (with no COND) message is received, this procedure is completed.
   - If RESET...COMPL (with COND) message is received, go to *Data Base Troubles* to clear conditional reset completion.

8. Enter **`DGN::MC!`**

   - If DGN MC ...STF message is received, contact technical consultant.

Clear Failed MP Diagnostic

1. If the alarm cutoff is needed, enter **`UTL::ACO!`**. If the command is ineffective, press the **ACO** button on the DACS II status panel.
2. Find the diagnostic trouble number that is located immediately after STF in the message.
3. If the MC (main controller) has not been removed from service (as shown by previous RMV MC COMPL or RST MC DNY in printout), enter **`RMV::MC!`**.

   NOTE:
   If the remove command is entered and the MC is already out of service, the RMV COND 04 DNY message will be received.

4. Replace the CPU2 (code TM778) located in the MC.
5. On the DACS II status panel, hold the **RESET ENABLE** switch to **ON** and momentarily press the **RESET** button.

   NOTE 1:
   The terminal must be set to the default baud rate (1200 baud) to see the information as it scrolls on the screen.

   NOTE 2:
   The RESET activity in this step initializes the components in the MC and boots the unit controllers and frame memories with data from the PMEM (or from SMEM if the PMEM cannot be used). The reset sequence begins with the startup diagnostics of the CI, MP, and continues with the boot. It may take several minutes for the reset to complete depending on the size of the frame; a BOOT IN PROGRESS message will be output every 20 seconds during the boot routine.

   NOTE 3:
   If the unit controllers and frame memories are booted with data from the SMEM, the MC will be in MCOND and no database will be present. The SMEM only supplies executables when the PMEM cannot be used for booting.

   - If STARTUP STF message is received in the reset sequence, follow the same sequence to replace the CPU2.

- If RESET ...COMPL (with no COND code) message is received, you have completed this procedure.
- If RESET ...COMPL (with COND code) message is received, refer to *Data Base Troubles* to clear conditional reset completion.

6. If trouble persists, contact technical consultant for assistance.

Clear Failed CI Diagnostic

1. If the alarm cutoff is not already operated, enter **`UTL::ACO!`**. If the command is ineffective, press the **ACO** button on the DACS II status panel.
2. If the MC (Main Controller) has not been removed from service, enter **`RMV::MC!`**.

   NOTE:
   If the remove command is entered and the MC is already out of service, the RMV COND 04 DNY message will be received.

3. Replace the CI (TM658C), ECI (TM736C), or HECI (TM762), whichever is installed, circuit pack with the same circuit pack code.
4. On the DACS II status panel, hold the **RESET ENABLE** switch to **ON** and momentarily press the **RESET** button.

   NOTE 1:
   The terminal must be set to the default baud rate (1200 baud) to see the information as it scrolls on the screen.

   NOTE 2:
   The RESET activity in this step initializes the components in the MC and boots the unit controllers and frame memories with data from the PMEM (or from SMEM if the PMEM cannot be used). The reset sequence begins with the startup diagnostics of the CI, MP, and continues with the boot. It may take several minutes for the reset to complete depending on the size of the frame; a BOOT IN PROGRESS message will be output every 20 seconds during the boot routine.

   NOTE 3:
   If the unit controllers and frame memories are booted with data from the SMEM, the MC will be in MCOND and no database will be present. The SMEM only supplies executables when the PMEM cannot be used for booting.

5. Early in the reset sequence, if CI STARTUP ATP message is received, continue with the Step **6**.

- If CI STARTUP ATP message is not received, check CI/ECI slot and backplane for damage. If no wiring problem is found, contact technical consultant for assistance.

6. During the sequence, if STARTUP STF is received for MP, refer to Section 5.2.

   - If STARTUP STF is not received, continue with Step **7**.

7. If MC RESET COMPL (with no COND code) is received, you have completed this procedure.

   - If MC RESET COMPL (with COND code) is received, refer to *Data Base Troubles* to clear reset completed conditionally.

Clear Failed Sync Diagnostic

1. If the alarm cutoff is needed, enter **`UTL::ACO!`**. If the command is ineffective, press the **ACO** button on the DACS II status panel.

   CAUTION:
   Never attempt to troubleshoot and replace packs on the in-service side and never take packs from the in-service side for use as replacements for the failed side.

2. If the SYNC has not been removed from service (RMV SYNC COMPL or RST SYNC DNY in printout), enter **`RMV::SYNC a!`**

   Where: a = Sync side (0 or 1).

3. If SYNC ESR ...E001 message is found in connection with failed sync, disengage and reinsert the DPLL pack (on the same side as failed sync) for the sync and proceed to Step **17**.

   - If ESR ...E001 message does not occur, continue with Step **4**.

4. If required to prevent circuit noise (see Note), enter commands to remove all unit FCs **on the same side** as follows: **`RMV::UNIT [q]q,FC sb!`** for all units (q) and modules (1through 4) in each unit. The FC number (sb) consists of the side and the unit module.

   NOTE:
   If a series G2 backplane (printed wiring) is used for the FTU or if CN 00118.1mv has been implemented on the G1 backplane (hard wiring), it is not necessary to remove the FCs before replacing sync packs. The CN (change notice) involved adding a wiring termination board to the FTU backplane.

   CAUTION:
   Be sure to unplug packs from the inactive side because unplugging FC packs on the active side of the network will cause loss of service in the unit.

5. Unplug the same FCs that were previously removed from service.
6. Replace DPLL pack (TM590 code) for the sync side named in failed sync message. The TLIs are not implicated by this failure; separate messages occur for the TLI and CRO.

7. Enter **`DGN::SYNC a!`**.
   - If DGN ...STF 0100 message is received, continue with Step **8**.
   - If DGN ...STF 0200 message is received, proceed to Step **14**.
8. If failed diagnostic is accompanied with the ESR SYNC COND E004 message, replace SPU pack for failed sync side and reenter sync diagnostic command.
   - If ESR ...E004 does not occur, proceed to Step **14**.
9. If trouble persists, enter **`RMV::MC!`**.
10. Replace the CPU2 (TM778) located in the main controller.
11. On the status panel, hold the **RESET ENABLE** switch to **ON** and momentarily press the **RESET** button.
12. Reenter **`DGN::SYNC a!`** for subject sync side.
13. If trouble persists, enter **`RMV::MC!.`** Unplug the same CPU2 pack and check plug-in position for bent pins or damaged backplane. The connections between the CPU2 and the sync are suspect. Reinstall CPU2 after inspection and perform frame reset.
   - If trouble is found, proceed to Step **17**.
   - If trouble is not found, check backplane for damage. If no wiring trouble is found, contact technical consultant for assistance.
14. Replace the TB pack and wait at least 30 minutes for the TB oven to warm up. The TB can be restored; but, for stratum 2 operation, it may take up to 2 hours to reach rated precision.
15. Reenter **`DGN::SYNC a!`** for subject side.
16. If trouble persists, unplug the DPLL and TB and check positions for bent pins or damaged backplane. The connections between the two positions are suspect. Reinstall packs after inspection.
   - If trouble is cleared, continue with Step **17**.
   - If trouble is not cleared, check backplane for damage. If no wiring trouble is found, contact technical consultant for assistance.
17. Enter **`RST::SYNC a!`** to restore the sync.
18. Enter **`CFR::SYNC a,FPLL!`** to initiate sync fast start.

19. After approximately 5 minutes, enter **`UTL::QRY,STATE,SYNC!`** to verify that the MODE for the subject side is NORMAL. Table 5-2 lists the outputs for each field of the query.

Table 5-2. SYNC Status Outputs

Message Field	Outputs and Meanings
CFR	MASTER or SLAVED sync configuration.
STRATUM	STR2, STR3, CEPT TOLL, or CEPT LOCAL.
MODE	HOLDOVER, FAST, or NORMAL for each DPLL.
SOURCE	Source for sync DPLL (HOLDOVER, TLI, or CRO; other side will be MATE).
IN SERVICE-DPLL	DPLL side 0 side 1, TB side 0 side 1, SOURCE side 0 side 1; presence of a 0 for side means out-of-service and a 1 means in-service.
ACTIVE-LINK	Gives TLI No. and its SSP (0, 1) which is active on each side (0 and 1).
PLL TIMING ERROR	Presence of 0 for side means no error and presence of 1 for side means error.

20. Reinstall FC packs in their slots and enter the command(s) to restore each one as follows: **`RST::UNIT [q]q,FC sb!`**

    Where: sb = FC number which consists of side (s) and unit module (b).

21. Enter **`UTL::QRY,ALL!`** to find any packs that are failed or out-of-service and perform corrective action.

    NOTE:
    The conditions are indicated by the presence of a "1" in the out-of-service, failed, and pested columns for each pack. Unequipped NPCs are indicated by dashes.

22. See Note. If any CPs are equipped but out-of-service, enter the RST (restore) command per Figure 5-1 for the pack.

    - If command denial occurs, find the meanings of the denial codes in *Command Denials*.

    NOTE:
    When a CP fails in the sync, ECCN/CCN, DSPU, DS3U, or HDS3U service is switched and all the CPs on the failed side/group are removed from service and pested. To correct the problem, the failure must be cleared and the side (or all CPs) can be restored. If both sides/groups are failed, trouble must be cleared on the out-of-service side/group first; removal of the other side will be denied.

23. If any CPs are failed, enter the DGN (diagnose) command per Figure 5-1 for the pack.
    - If DGN ...STF message is received, refer to appropriate procedure in this chapter to clear the failed diagnostic.
    - If diagnostic passes (ATP or CATP), enter RST command.
24. To check for out-of-service, failed, and pested CPs, enter **`UTL::QRY,ALL[,UNIT [q]q]!`**.
25. If any CPs are still pested, enter the commands to first remove and then restore the CPs per Figure 5-1.
    - If command denial occurs, find the meanings of the denial codes in *Command Denials*.

---

verb::<CP identification>[,option]!

{RMV::	SYNC a!	a	=	0 or 1
/RST::	SYNC a,TLI n[,SSP b]!	n	=	1-4; b = sync port (0 or 1)
/DGRTH::	CCI s!	s	=	side 0 or 1
/DGN::}	CCNI s!	s	=	side 0 or 1
	ETSI sqq!	qq	=	unit 1-16
	TSI sft!	f	=	unit (receiving from) (1-6)
	CCB sf!	t	=	unit (transmitting to) (1-6)
	ETSIS,ECCN s,ALL!			For all ETSIs on the side
	TSIS,CCN s,ALL!			For all TSIs on the side
	UNIT [q]q,UC!	[q]q	=	unit (1-16)
	UNIT [q]q,{FTMI d|DSPI}!	d	=	module interface for units 1-4
	UNIT [q]q,FC sd!	sd	=	FC side (0,1) and FC No. (1-4)
	UNIT [q]q,FLI k!	k	=	service (S) or protection (P)
	UNIT [q]q,FMT s!	s	=	side (0,1)
	UNIT [q]q,MMFG c	c	=	DS3 group (1-6,P)
	[,FRC][,INCL]!	FRC	=	forces remove with no prot. switch
		INCL	=	removes/restores MXR NPCs
	NPC <npc No.>[,SIDE s]!	<npc No.>	=	NPC number
		s	=	SIDE for DSPU
	LINK j!	j	=	link 1-6
DGN::	UNIT [q]q,MXR c!	c	=	DS3 group (1-6,P)
	UNIT [q]q,MIU c!	c	=	DS3 group (1-6,P)

NOTE: Removing the NPC is service affecting.

Figure 5-1. Maintenance Command Construction

Clear Failed CRO Diagnostic

1. If the alarm cutoff is not already operated, enter **UTL::ACO!**. If the command is ineffective, press the **ACO** button on the DACS II status panel.
2. If TLI 3 has not been removed from service (RMV COMPL in printout), enter **RMV::SYNC,TLI 3,CRO!**.
3. Replace the CRO (clock reference oscillator) (that is, the additional TB pack on lower shelf) with the same code as the original one.
4. Enter **DGN::SYNC,TLI 3,CRO!**.
   - If DGN ...STF message is received, continue with Step **5**.
   - If DGN ...STF message is not received, wait 30 minutes for TB oven to reach temperature and then enter **RST::SYNC,TLI 3,CRO!** to restore the CRO and to complete this procedure.
5. Locate diagnostic trouble number which appears immediately after STF in the diagnostic message.
   - If trouble number is 0600, continue with Step **6**.
   - If the trouble number is not 0600, check CRO slot and backplane for damage. If no wiring trouble is found, contact technical consultant for assistance.
6. Verify that the same code of TB is used for all the sync TBs and determine if the sync configuration was changed subsequent to installation. The CRO (TLI 3 CRO) must be grown with the same TYPE designation as the other TBs in the sync.
   - If the CRO was equipped incorrectly, enter grow command as follows:

     RMV::SYNC,TLI 3,CRO! to remove additional TB pack from service.

     DGRTH::SYNC,TLI 3! to degrow the additional TB.

     Enter command to regrow same TB with same type field as the TBs on the sides, **GRTH::SYNC,TLI 3,TYPE TBpqr!**.

     Wait 30 minutes for TB oven to reach temperature and then enter **RST::SYNC,TLI 3,CRO!**.
   - If the CRO was equipped correctly, contact technical consultant for assistance.

Clear Failed TLI Diagnostic

1. If alarm cutoff has not already been operated, enter **`UTL::ACO!`**. If the command is ineffective, press the **ACO** button on the DACS II status panel.
2. Locate the trouble number which appears immediately after STF in the failed diagnostic message.
   - If trouble number is 0400, continue with Step **3**.
   - If trouble number is not 0400, proceed to Step **4**.
3. Check for ESR,ERR SYNC ...COND E601 message which indicates the T1 timing link connecting to the failed TLI has failed or has errors.
   - If you could determine there is trouble on the associated facility timing link, proceed to Step **8**.
   - If not, continue with Step **4**.
4. If the failed TLI has not been removed from service (as shown by previous RMV TLI COMPL or RST TLI DNY in printout), enter **`RMV::SYNC a,TLI m[,SSP b]!`**

   Where:

   a = Subject sync side (0 or 1)

   m = TLI number (1 through 4)

   b = SSP number (0 or 1); required for all TLI types except type TD.

   NOTE:
   If the remove command is entered and the TLI is already out of service, the RMV TLI COND 04 DNY message will be received.

5. Replace the subject TLI pack with the same code as the original.
6. Enter **`DGN::SYNC a,TLI m[,SSP b]!`**.
   - If DGN ...STF message is received, continue with Step **7**.
   - If DGN ...STF message is not received, enter **`RST::SYNC a,TLI m[,SSP b]!`** to restore the sync and to complete this procedure.
7. If the trouble number in the failed diagnostic is 0400, continue with Step **8**.
   - If the trouble number in the failed diagnostic is not 0400, check TLI slot and backplane for damage. If no wiring problem is found, contact technical consultant.

8. Trouble is on facility timing link. Isolate trouble on timing link or contact network timing coordinator about using another facility. The TLI must be restored after the timing link is operating; the command is
   `RST::SYNC a,TLI m[,SSP b]!`

   Where:
   a = Sync side
   m = Subject TLI number.
   b = SSP number (0 or 1); required for all TLI types except type TD.

Clear Failed Unit UC Diagnostic

1. If the alarm cutoff is needed, enter **`UTL::ACO!`**. If the command is ineffective, press the **ACO** button on the DACS II status panel.
2. If failed unit UC is in a DS3 unit, continue with Step **3**.
   - If failed unit UC is not in a DS3 unit, proceed to Step **6**.
3. Enter **`UTL::QRY,PSTATE,UNIT [q]q!`** and determine which FLI (S or P) is selected. The selected one will have SLT under the heading for it in the FLI portion of the message.

   Where: [q]q = Unit number (1 through 16).

   NOTE:
   Steps 4 and 5 are needed to prevent unnecessary transmission hits caused by repeated operation of the FLI protection switching when the unit UC is removed and restored.

4. Which FLI is selected?
   - If **FLI P**, continue with Step **5.**
   - If **FLI S**, proceed to Step **6**.
5. Enter **`RMV::UNIT [q]q,FLI S!`** to remove FLI S from service.
   - If the remove is denied (COND 11 DNY), the FLI S can be disconnected (that is, if FLI S is selected and the unit UC is out of service so that the FLI can be eventually restored) to prevent transmission hits.

     NOTE:
     If the FLI S is failed (DGN FLI S STF in the trouble printout), also replace it while the unit UC is out of service. The preferred configuration is to have FLI S selected because reset/reboot operations revert to that configuration.

6. If the UC (unit controller) has not been removed from service (as shown by previous RMV UC COMPL or RST UC DNY in printout), enter **`RMV::UNIT [q]q,UC!`**

   NOTE:
   If the remove command is entered and the unit UC is already out of service, the RMV UC COND 04 DNY message will be received.

7. Find the diagnostic trouble number that appears immediately after STF in the diagnostic message.
   - If trouble number 0A00 or 0B00 is received, then replace the UBX (UM28 code) and proceed to Step **9**.
   - If other trouble number is received, continue with Step **8**.

8. Which unit is affected?
   - If IFTU, or DSPU, replace the CPU2 (TM778) for the unit.
   - If DS3U or HDS3U, replace the UC (KER2 code) for the unit.

9. Enter **`RST::UNIT [q]q,UC!`**

   Where: [q]q = Unit number (1 through 16).
   - If DGN ...STF message is received, check UC slot and backplane for damage. The diagnostic includes continuity tests:
     - — STF 0700 indicates LAN wiring (two twisted pairs)
     - — STF 0900 indicates CPU error wiring (one wire with ground)
     - — STF 0600 indicates CPU reset wiring (one wire with ground)
     - — If no wiring problem is found, contact technical consultant.
   - If RST ...DNY is received, find the meanings of the denial codes in *Command Denials*.

10. If FLI S was removed from service (or disconnected) in this procedure, (install the plug-in and) enter **`RST::UNIT [q]q,FLI S!`** to restore FLI S to service.

Clear Failed FTMI Diagnostic

1. If alarm cutoff is needed, enter **UTL::ACO!**. If the command is ineffective, press the **ACO** button on the DACS II status panel.
2. Check if the UBX pack (UM28 code) associated with the unit is installed. If it is not, install the pack and enter respective restore commands.
3. Enter **DGN::UNIT [q]q,FTMI d!**

   Where:
   [q]q = Unit number (1 through 16)
   d = FTMI number (1 through 4).

   - If DGN ...STF message is received, continue with Step **4**.
   - If DGN ...STF message is not received, proceed to Step **12**.

4. If the FTMI (facility terminating module interface) has not been removed from service (RMV FTMI COMPL or RST FTMI DNY in printout), enter **RMV::UNIT [q]q,FTMI d!**.
5. Replace the FTMI (TG81 code) for the unit. This pack is implicated by any of the DGN FTMI ...STF trouble numbers.
6. Enter **DGN::UNIT [q]q,FTMI d!** to diagnose the FTMI.
   - If DGN ...STF message is received, continue with Step **7**.
   - If DGN ...STF message is not received, proceed to Step **12**.

7. Locate the data bytes on the line below the STF number in the failed diagnostic message. These are referred to as data 5 through data 0, going from left to right.
   - If data 5 byte is equal to FF, continue with Step **8**.
   - If not, proceed to Step **9**.

8. The FTMI is not functioning, possibly because it is not receiving timing which is delivered through the associated FC. Verify that these packs are in-service and check printout for string of failure messages; also check the backplane for obvious damage to pins at the involved plug-in positions.
   - If the trouble is found and corrected, proceed to Step **12**.
   - If not, contact technical consultant for assistance.

9. Enter **RMV::UNIT [q]q,UC!**.

   Where: [q]q = Unit number (1 through 16).

10. Replace UBX (UM28 code).
11. Enter **`RST::UNIT [q]q,UC!`**.
12. Enter **`RST::UNIT [q]q,FTMI d!`**.
    - If DGN ...STF message is received, contact technical consultant for assistance.
    - If not, this procedure is completed.

Clear Failed DSPI Diagnostic

1. If the alarm cutoff is not already operated, enter **`UTL::ACO!`**. If the command is ineffective, press the **ACO** button on the DACS II status panel.
2. Notice which DSPU is named in the failed diagnostic message.
3. Enter **`UTL::QRY,ALL,COMMON!`** to determine if the ETSI on one side for the unit is in-service and not failed. Ones in the 3-digit field for each ETSI indicate out-of-service, failed, or pested conditions.
   - If the ETSIs on both sides for the unit are failed, refer to Section 5.13 to clear the CCI failure which is causing the DSPI failure.
4. If the DSPI has not been removed from service (RMV DSPI COMPL or RST DSPI DNY in printout), enter **`RMV::UNIT [q]q,DSPI!`**

   Where: [q]q = Unit number (1 through 16).
5. Replace the DSPI pack (UM29 code) for that DSPU. There is only one DSPI in the unit and it is the interface between the unit UC and the other DSP packs; it does not carry service channels.
6. Enter **`RST::UNIT [q]q,DSPI!`**.
   - If DGN ...STF message is received, check connector pins at DSPI slot and check backplane for damage. If no wiring trouble is found, contact technical consultant.
   - If RST ...COMPL message is received, this procedure is completed.
   - If RST ...DNY message is received, find the meanings of the condition codes in *Command Denials*.

Clear Failed FC Diagnostic

NOTE:
The FC diagnostic runs continuity tests between the FC and the ECCN. These tests actually involve accessing time slots on an NPC in the unit and checking the connection through the cables and the ECCN. Similarly, when the ETSI for the unit was diagnosed, the interconnection between it and the other ETSIs was tested.

1. If alarm cutoff is needed, enter **`UTL::ACO!`**. If the command is ineffective, press the **ACO** button on the DACS II status panel.
2. Check if the UBX (UM28 code) and the network CCI/CCNI and ETSI/TSI packs associated with the unit are installed and/or restored. If they are not, install the pack(s) and enter the respective restore commands.
3. If all the FCs on the inactive side have failed, check for SYNC ...ERR,ESR messages (see Note). To check for change from cross-couple timing, enter **`UTL::QRY,STR,SYNC a!`** (a = Side 0 or 1), and see Figure 5-2.

   NOTE:
   A sync error can cause the mate sync to lose cross-couple timing which will cause loss of timing to the FCs. If there are no cross-connections on the frame, this condition will not be reported.

4. Enter **`DGN::UNIT [q]q,FC sb!`**

   Where:
   [q]q = Unit number (01 through 16)
   sb = FC number consisting of side (0 or 1) and FC in module (1 through 4).

   - If DGN ...STF message is received, continue with Step **5**.
   - If DGN ...STF message is not received, proceed to Step **16**.

5. If the FC has not been removed (RMV FC COMPL or RST FC DNY in printout), enter **`RMV::UNIT [q]q,FC sb!`**.
6. Replace subject FC pack (TG79 code). The FC itself is always implicated by any of the DGN FC ...STF trouble numbers.
7. Enter **`DGN::UNIT [q]q,FC sb!`** for the same unit and FC numbers.
   - If DGN ...STF message is received, continue with Step **8**.
   - If DGN ...STF message is not received, proceed to Step **16**.
   - If message has one of the following trouble numbers: STF 0F03 through 0F06 and optional second line giving UPN and XPN numbers, proceed to Step **10**.

M...UTL QRY STR SYNC a
byte1, byte2, byte3, byte4, byte5, byte6
byte7,byte8,byte9,byte10,byte11, byte12 COMPL

BYTE 1 (BITS abcdefgh)

a = spare	e = TLI 1 in service
b = sync hardware failed	f = TLI 2 in service
c = mate failed or OOS	g = TLI 3 in service
d = TB failed or OOS	h = TLI 4 in service

BYTE 3 (BITS abcdefgh)

a = sync reset, needs config.	e = crosscouple trouble
b = DPLL hardware error	f = CRO timing trouble
c = TB error	g = spare
d = PLL symmetry error	h = spare

BYTE 5 BIT POSITIONS: ab cde fgh

SOURCE (BITS ab)	ACTIVE PORT (BITS cde) (if BITS ab = 01)
00 = holdover	000 = TLI 1, SSP 0
01 = timing link	001 = TLI 1, SSP 1
10 = cross-couple	010 = TLI 2, SSP 0
11 = CRO	011 = TLI 2, SSP 1
	100 = TLI 3, SSP 0
	101 = TLI 3, SSP 1
	110 = TLI 4, SSP 0
BITS fgh (unused)	111 = TLI 4, SSP 1

BYTE 9 (BITS abcdefgh)

a = loss of energy	d = TB oven still cold
b = TB command error	e = spare
c = TB oscillator drift (master mode)	fgh = 000 for stratum 3, 001 for 2-Mb/s local 010 for 2-Mb/s toll, 011 for stratum 2

Figure 5-2. Sync Status Register

8. Convert the first data byte after the STF number in the diagnostic message to binary. The right HEX-digit gives bits 4,3,2,1. If bit 2 equals 1, a network ETSI or CCB could be causing the diagnostic failure; check the printout for ETSI or SYNC ...ERR,ESR messages.

9. If you found an ETSI or CCB related failure, continue with Step **10.**

   ■ If you did not find an ETSI or CCB related failure, proceed to Step **13.**

10. If the ETSI or CCB for the same unit and side as the failed FC is not out-of-service, enter appropriate command as follows:

    `RMV::ETSI sqq!`.
    `RMV::CCB sf!`.

    Where: s = Side
    qq = Unit number
    f = CCB number (1 through 6).

11. Replace that ETSI or CCB and enter appropriate command as follows:

    `RST::ETSI sqq!`.
    `RST::CCB sf!`.

12. Enter **`DGN::UNIT [q]q,FC sb!`** for the subject unit and FC.

    ■ If DGN ...STF message is received, continue with Step **13**.

    ■ If DGN ...STF message is not received, proceed to Step **16**.

    ■ If message has one of the following trouble numbers: STF 0F03 through 0F06 and optional second line giving UPN and XPN numbers, proceed to Step **17**.

13. Enter **`RMV::UNIT [q]q,UC!`**.

14. Replace the UBX (UM28 code) for the subject unit.

15. Enter **`RST::UNIT [q]q,UC!`** for the subject unit.

16. Enter **`RST::UNIT [q]q,FC sb!`** for the subject unit and FC.

    ■ If DGN ...STF message is received, obscure problem; contact technical consultant.

    ■ If DGN ...STF message is not received, this procedure is completed.

17. From Table 5-3, identify the faulty cable connecting to the subject FC pack by the UPN (unit plug number) and XPN (ECCN plug number) named in the message. Notice that there are different listings for the flexible interface and original interface bays and that the ECCN plug number includes the unit number.
18. Replace (or have repaired) the cable identified above. The unit and ECCN plug numbers are stamped alongside the connectors on the ECCN panel; see Figure 5-3.
19. Enter **`RST::UNIT [q]q,FC sb!`** for the subject unit and FC.

NOTE:
The diagnostic reports one cable problem at a time; so if different UPN and XPN numbers occur, clear that trouble before contacting the technical consultant.

- If DGN ...STF message is received, obscure problem; contact technical consultant.

Table 5-3. Cable Identification

Unit Plug (Flex Bay)	Unit Plug (Orig. Bay)	ECCN Plug	Direction	Involved FC
P1	P2	P<unit>A	Receive	FC 01
P2	P1	P<unit>E	Transmit	FC 01
P3	P7	P<unit>B	Receive	FC 02
P4	P6	P<unit>F	Transmit	FC 02
P5	P12	P<unit>C	Receive	FC 03
P6	P11	P<unit>G	Transmit	FC 03
P7	P17	P<unit>D	Receive	FC 04
P8	P16	P<unit>H	Transmit	FC 04
P10	P5	P<unit>A	Receive	FC 11
P11	P4	P<unit>E	Transmit	FC 11
P12	P10	P<unit>B	Receive	FC 12
P13	P9	P<unit>F	Transmit	FC 12
P14	P15	P<unit>C	Receive	FC 13
P15	P14	P<unit>G	Transmit	FC 13
P16	P20	P<unit>D	Receive	FC 14
P17	P19	P<unit>H	Transmit	FC 14

(LEFT SIDE OF ECCN PANEL)

	P3A	P3B	P3C	P3D	P3E	P3F	P3G	P3H	
	P4A	P4B	P4C	P4D	P4E	P4F	P4G	P4H	
	P6A	P6B	P6C	P6D	P6E	P6F	P6G	P6H	
	P9A	P9B	P9C	P9D	P9E	P9F	P9G	P9H	
	P10A	P10B	P10C	P10D	P10E	P10F	P10G	P10H	
	P12A	P12B	P12C	P12D	P12E	P12F	P12G	P12H	
	P15A	P15B	P15C	P15D	P15E	P15F	P15G	P15H	
	P16A	P16B	P16C	P16D	P16E	P16F	P16G	P16H	
BOTTOM	P17A	P17B	P18A			P19			TOP
	P14A	P14B	P14C	P14D	P14E	P14F	P14G	P14H	
	P13A	P13B	P13C	P13D	P13E	P13F	P13G	P13H	
	P11A	P11B	P11C	P11D	P11E	P11F	P11G	P11H	
	P8A	P8B	P8C	P8D	P8E	P8F	P8G	P8H	
	P7A	P7B	P7C	P7D	P7E	P7F	P7G	P7H	
	P5A	P5B	P5C	P5D	P5E	P5F	P5G	P5H	
	P2A	P2B	P2C	P2D	P2E	P2F	P2G	P2H	
	P1A	P1B	P1C	P1D	P1E	P1F	P1G	P1H	

(RIGHT SIDE OF ECCN PANEL)

Figure 5-3. Cable Connectors on ECCN Panel

Cross-Connect Interface

Clear Failed CCI Diagnostic

Overview: This procedure deals with a failed CCI (clock control interface) diagnostic. If the trouble is not the CCI pack itself, it can be caused by circuit packs associated with ECCN, MC, or SYNC depending on the diagnostic trouble code. For an associated ETSI (trouble code 0800), the raw data bytes in the DGN CCI STF message are used to identify the particular ETSI.

1. If alarm cutoff is needed, enter **`UTL::ACO!`**. If the command is ineffective, press the **ACO** button on the DACS II status panel.
2. If the CCI has not been removed from service (RMV CCI COMPL or RST CCI DNY in printout), enter **`RMV::CCI s!`** for the side (0 or 1) that failed.
3. Locate the trouble number which appears immediately after STF in the diagnostic message.
4. If trouble number 0080 appears in the message, then check CCI slot and backplane for damage. For associated sync trouble, the suspect wiring is in the two small 6-wire cables going between the top of P19 and P37 for ECCN1 and the bottom of P19 and P36 for ECCN0. If no wiring problem is found, contact technical consultant.
   - If trouble number 0080 does not appear, proceed to Step **7.**
5. Unseat the CCI pack for the side of the network named in the message and reinsert the pack to reset it.
6. Enter **`DGN::CCI s!`** for the same CCI pack.
   - If DGN ...STF message is received, continue with Step **7.**
   - If DGN ...STF message is not received, proceed to Step **27.**
7. Replace CCI pack (BBS1 code) named in the diagnostic message.
8. Enter **`DGN::CCI s!`** for same pack.
   - If DGN ...STF message is received, continue with Step **9.**
   - If DGN ...STF message is not received, proceed to Step **27.**

9. Which trouble number appears in the diagnostic message?
   - If **0000**, proceed to Step **12.**
   - If **0100**, continue with Step **10.**
   - If **0001** or **0010**, proceed to Step **12.**
   - If **0004, 0040,** or **0200**, check CCI slot and backplane for damage. For associated sync trouble, the suspect wiring is in the two small 6-wire cables going between P20, P36, and P37. If no wiring problem is found, contact technical consultant.
   - If **0020**, proceed to Step **12.**
   - If **0002** or **0008**, proceed to Step **18.**
   - If **0800**, proceed to Step **20.**
   - If **8000**, proceed to Step **10.**

10. Verify that the BT on each side of the ECCN shelf is securely installed.

    NOTE:
    The bus terminators contain only passive components and are not likely to fail. However, if the same diagnostic trouble number persists after all suspect packs have been replaced, you may want to try replacing the BTs, one at a time.

11. If DGN ...STF message is received after BTs are reseated (or replaced) and diagnostic is reentered, continue with Step **12.**
    - If DGN ...STF message is not received, proceed to Step **27.**

Continue for Trouble No. 0000, 0001, 0010, 0020, 0100, or 8000

12. Enter **`RMV::MC!`**.
13. Disconnect and reseat appropriate pack in the MC for trouble number as follows:
    - — For 0020, replace the EMTC (UM75 code).
    - — For others, replace the EBX (UM71 code).
14. On the DACS II status panel, hold the **RESET ENABLE** switch to **ON** and momentarily press the **RESET** button.

    NOTE:
    It is important to remember that after this RESET is complete, the frame will be in simplex mode. Resetting the frame does not automatically restore the side containing the new CCI circuit pack.

15. Enter **`DGN::CCI s!`**.
    - If DGN ...STF message is received, continue with Step **16.**
    - If DGN ...STF message is not received, proceed to Step **27.**
16. Replace the plug-in that was previously reseated.
17. On the DACS II status panel, hold the **RESET ENABLE** switch to **ON** and momentarily press the **RESET** button and proceed to Step **26.**

Continue for Trouble No. 0002 or 0008

18. Enter **`RMV::SYNC s!`** for the sync on the same side as the failed CCI.
19. Replace the DPLL (TM590 code) in the same side of the sync and enter **`RST::SYNC s!`** to restore the same sync.
    - If DGN ...STF message is received, go to Section 5.6.
    - If DGN ...STF message is not received, proceed to Step **27.**

Continue for Trouble No. 0800

20. Notice the data bytes starting on the second line of the failed CCI diagnostic message. These bytes are referred to as data 21 through data 00, starting on the second line and running to the end of the third line.
21. If data 19 (third from the left in the top row of data) equals 07, continue with Step **22.**
    - If data 19 (third from the left in the top row of data) does not equal 07, then check CCI slot and backplane for damage. For associated sync trouble, the suspect wiring is in the two small 6-wire cables going between P20, P36, and P37. If no wiring problem is found, contact technical consultant.
22. Convert data 21 and 20 (first two data bytes in the top row of data) from hexadecimal to binary as follows:
    - Work with each digit of a data byte individually.
    - Convert each hexadecimal digit to the 4-place binary equivalent. Hex numbers run from 1 through 9 and a through f (for 10 through 16); for example, hex 5 = 0101 binary.
23. Combine the patterns of the binary numbers for data 21 and 20 and locate the bit position where the value is a 1. For example, if data 21 equals 00000000 binary and data 20 equals 10000000 binary, the combined pattern would be 0000000010000000, and the value 1 is located in position 8 (counting from right to left).
24. Enter **`RMV::ETSI sqq!`** for the ETSI of the unit number that matches the bit position with the value 1. (In the above example, that would be unit 08.)

    Where:
    s = Side 0 or 1

    qq = Unit number (01 through 16).
25. Replace the same ETSI (BBS2 code) and enter **`RST::ETSI sqq!`** for that pack.

26. Enter **`DGN::CCI s!`**.
    - If DGN ...STF message is received, check CCI slot and backplane for damage. For associated sync trouble, the suspect wiring is in the two small 6-wire cables going between P20, P36, and P37. If no wiring problem is found, contact technical consultant.
    - If DGN ...STF message is not received, continue with Step **27.**
27. Enter **`RST::CCI s!`** to restore CCI to service.
28. If DGN ...STF message is received, check CCI slot and backplane for damage. For associated sync trouble, the suspect wiring is in the two small 6-wire cables going between P20, P36, and P37. If no wiring problem is found, contact technical consultant.
29. If DGN ...STF message is not received, enter **`UTL::QRY,ALL!`** to find any packs that are failed or out-of-service and perform corrective action.

NOTE:
The conditions are indicated by the presence of a "1" in the out-of-service, failed, and pested columns for each pack. Unequipped NPCs are indicated by dashes.

Clear Failed CCNI Diagnostic

Overview: This procedure deals with a failed CCNI (cross-connect network interface) diagnostic. If the trouble is not caused by a failed CCNI or BX in the MC, it may be caused by an error from a unit FTMI, a network CCB, or a TSI connected to the CCNI. When the failed diagnostic is caused by an error from an associated pack, that pack is identified by the raw data fields of the DGN CCNI STF message.

1. If alarm cutoff is needed, enter **`UTL::ACO!`**.
2. If the CCNI has not been removed from service (RMV CCNI COMPL or RST CCNI DNY in printout), enter **`RMV::CCNI s!`** for the side (0 or 1) that failed.
3. Replace CCNI pack (UM30 code) for the side of the CCN network named in the diagnostic message.
4. Enter **`DGN::CCNI s!`**.
    - If DGN ...STF message is received, continue with Step **5.**
    - If DGN ...STF message is not received, proceed to Step **12.**

5. Locate trouble number which appears immediately after STF in the diagnostic message.
   - If the trouble number does NOT start with 074 or 07B, proceed to Step **9.**
6. Enter **`RMV::MC!`**.
7. Replace BX pack in the MC.
8. On the DACS II status panel, hold the **RESET ENABLE** switch to **ON** and momentarily press the **RESET** button, and proceed to Step **12.**
9. Locate the data bytes to the right of the STF number in the failed diagnostic message. These bytes are referred to as data 5 through data 0, going from left to right.
   - If any of the these bytes (data 5 through data 1) have nonzero characters, then continue with Step **10.**
   - If not, check CCNI slot and backplane for damage. If no wiring problem is found, contact technical consultant.
10. From Table 5-4, determine the pack which is sending an error to the CCNI. The value of the character (8,4,2,1) and its position in the 4-place data byte indicates the associated pack. For example, if data byte d2 =0040 (row "cccc" in table), the 4 in the column implicates TSI s54. The side (s) is the same as the subject CCNI.
11. Enter command to remove the same pack from service and replace the pack. For FTMI, enter **`RST::UNIT q,FTMI b!`** to restore it to service.

    Where: q = Unit number
    b = FTMI number (1 through 4) in the unit.
12. Enter **`RST::CCNI s!`**.
    - If DGN ...STF message is received in restore sequence, check CCNI slot and backplane for damage. If no wiring problem is found, contact technical consultant.
13. If an associated TSI or CCB was removed from service, enter command to restore it using the appropriate command, **`RST::TSI sft!`** or **`RST::CCB sf!`**.

    Where:
    sf = CCB number consisting of side (0 or 1) and unit number.

    sft = TSI number consisting of side (0 or 1), from-side unit number, and to-side number.

14. Enter **`UTL::QRY,ALL!`** to find any packs that are failed or out-of-service and perform corrective action.

   NOTE:
   The conditions are indicated by the presence of a "1" in the out-of-service, failed, and pested columns for each pack. Unequipped NPCs are indicated by dashes.

Table 5-4. Port Alarms (CCNI Diagnostic)

SINGLE CHARACTER VALUE	DATA 1 (ESR1, TSI FROM, TO UNIT ID)			
	b	b	b	b
8	43	63	22	41
4	33	52	12	31
2	23	42	61	21
1	13	32	51	11
	DATA 2 (ESR2, TSI FROM, TO UNIT ID)			
	c	c	c	c
8	26	45	64	24
4	16	35	54	14
2	65	25	44	63
1	55	15	34	53
	DATA 3 (ESR3, FTM NO. OR TSI FROM, TO UNIT ID)			
	d	d	d	d
8	Unit 3,FTMI 4	Unit 2,FTMI 4	Unit 1,FTMI 4	66
4	Unit 3,FTMI 3	Unit 2,FTMI 3	Unit 1,FTMI 3	56
2	Unit 3,FTMI 2	Unit 2,FTMI 2	Unit 1,FTMI 2	46
1	Unit 3,FTMI 1	Unit 2,FTMI 1	Unit 1,FTMI 1	36
	DATA 4 (ESR4, FTM NO. OR CCB NO.)			
	e	e	e	e
8	CCB4	Unit 6,DSPI	Unit 5,DSPI	Unit 4,FTMI 4
4	CCB3	Unit 6,DSPI	Unit 5,DSPI	Unit 4,FTMI 3
2	CCB2	Unit 6,DSPI	Unit 5,DSPI	Unit 4,FTMI 2
1	CCB1	Unit 6,DSPI	Unit 5,DSPI	Unit 4,FTMI 1
	DATA 5 (ESR5, CCB NO.)			
	f	f	f	f
8	-	-	-	-
4	-	-	-	-
2	-	-	-	CCB 6
1	-	-	-	CCB 5

Time Slot Interchange

Clear Failed ETSI Diagnostic

Overview: This procedure deals with the failed ETSI (expanded time slot interchange) diagnostic. If the trouble is not the ETSI pack itself, it can be caused by other ECCN packs or an associated MC or Sync pack depending on the diagnostic trouble number. The data bytes in the diagnostic message in some cases identify another suspect ETSI pack; otherwise, the other ETSI is determined by trial and error. *Multiple ETSI failures are usually caused by a failed CCI pack; autonomous error recovery operations may have already removed the CCI to allow replacement.*

1. If the alarm cutoff is needed, enter **`UTL::ACO!`**. If the command is ineffective, press the **ACO** button on the DACS II status panel.
2. If the subject ETSI has not been removed from service (RMV ETSI COMPL or RST ETSI DNY in printout), enter **`RMV::ETSI sqq!`**

   Where: sqq = Failed ETSI number consisting of the side (s) and unit number (qq) that it serves.

3. To avoid the possibility of alarms on ETSI ports, enter command to remove service from side with failed ETSI, **`RMV::CCI s!`** (s = side).
4. Replace the subject ETSI pack (BBS2 code) named in the failed diagnostic message. If a second ETSI pack is named in the message, that ETSI pack will be addressed (as an additional suspect pack) in subsequent steps.
5. Enter command to restore side to service, **`RST::CCI s!`** (s = side).
6. Enter **`DGN::ETSI sqq!`**.
   - If DGN ...STF message is received, continue with Step **7.**
   - If DGN ...STF message is not received, enter **`RST::ETSI sqq!`** for the subject ETSI pack. This procedure is completed.
7. Locate the trouble number which appears immediately after STF in the diagnostic message. Also notice the data bytes starting on the second line of the failed ETSI diagnostic message. These bytes are referred to as data 15 through data 00, starting on the second line and running to the end of the third line.

8. Which trouble number (or keyword) appears in the message?
   - If **additional ETSI named in message**, proceed to Step **22.**
   - If **0080**, continue with Step **9.**
   - If **0100**, continue with Step **9.**
   - If **0008**, proceed to Step **14.**
   - If **0020, 0040, 0800,** or **1000**, proceed to Step **27.**
   - If **8000**, proceed to Step **15.**
   - If **other number**, proceed to Step **15.**

9. Locate data 1; the data bytes occur in left-to-right order from d15 to data 00. Convert the 2 lower digits (right half) to binary as follows:
   — Work with each digit of the data byte individually.
   — Convert each hexadecimal digit to the 4-place binary number equivalent. Hex numbers run 1 through 9 and a through f (for 10 through 16); for example, hex 5 = 0101 binary.

10. The resulting 8-bit binary number represents the connecting ports from the FC (in FTU), FMT (in DS3U or HDS3U), or NPC (in DSPU), as applicable; a 1 in the port position indicates a trouble. Identify the suspect pack as follows:
    — For FCs, each pair of bits (in the 8-bit number) represents the FC for the module as follows: pair 8-7 is module 4, pair 6-5 is module 3, pair 4-3 is module 2, and pair 2-1 is module 1.
    — For FMT, a 1 in any of the 8 bits indicates the FMT for the side.
    — For DSPU NPC, each bit (in the 8-bit number) represents one of the DSPs in the unit (**the odd bits are for the even DSPs and the even bits are for the odd DSPs**) as follows:

bit 2 is DSP 1	bit 1 is DSP 2
bit 4 is DSP 3	bit 3 is DSP 4
bit 6 is DSP 5	bit 5 is DSP 6
bit 8 is DSP 7	bit 7 is DSP 8

11. If any ports are alarmed, enter the RMV command for the suspect pack per Figure 5-4 and reseat the same pack. Enter commands to restore the subject ETSI (for timing to unit) and the suspect pack.

NOTE:
If DSPU NPC is to be replaced, remove the side from service before doing replacement (**`RMV::CCI s!`**). Restore side to service after replacement (**`RST::CCI s!`**).

verb::<CP identification>[,option]!

{RMV::	SYNC a!	a	=	0 or 1
/RST::	SYNC a,TLI n[,SSP b]!	n	=	1-4; b = sync port (0 or 1)
/DGRTH::	CCI s!	s	=	side 0 or 1
/DGN::}	CCNI s!	s	=	side 0 or 1
	ETSI sqq!	qq	=	unit 1-16
	TSI sft!	f	=	unit (receiving from) (1-6)
	CCB sf!	t	=	unit (transmitting to) (1-6)
	ETSIS,ECCN s,ALL!			For all ETSIs on the side
	TSIS,CCN s,ALL!			For all TSIs on the side
	UNIT [q]q,UC!	[q]q	=	unit (1-16)
	UNIT [q]q,{FTMI d|DSPI}!	d	=	module interface for units 1-4
	UNIT [q]q,FC sd!	sd	=	FC side (0,1) and FC No. (1-4)
	UNIT [q]q,FLI k!	k	=	service (S) or protection (P)
	UNIT [q]q,FMT s!	s	=	side (0,1)
	UNIT [q]q,MMFG c	c	=	DS3 group (1-6,P)
	[,FRC][,INCL]!	FRC	=	forces remove with no prot. switch
		INCL	=	removes/restores MXR NPCs
	NPC <npc No.>[,SIDE s]!	<npc No.>	=	NPC number
		s	=	SIDE for DSPU
	LINK j!	j	=	link 1-6
DGN::	UNIT [q]q,MXR c!	c	=	DS3 group (1-6,P)
	UNIT [q]q,MIU c!	c	=	DS3 group (1-6,P)

NOTE: Removing the NPC is service affecting.

Figure 5-4. Maintenance Command Construction

12. If either a DGN ...STF or RST ...DNY message is received, enter command to remove the suspect pack, replace it, and enter the command to restore it to service.
13. Enter **`DGN::ETSI sqq!`** for the subject ETSI pack.
    - If DGN ...STF message is received, proceed to Step **15.**
    - If DGN ...STF message is not received, enter **`RST::ETSI sqq!`** for the subject ETSI pack.
14. Check for any 48-volt fuse feeding the ECCN on the ED-2C945-30 fuse panel blown (indicator fuse bead extended).
    - If there is a blown fuse, go to *Power Failures*.

15. If not already removed from service, enter **`RMV::CCI s!`** to remove the CCI for the failed side.

    Where: s = Side (0 or 1).

16. Replace CCI pack (BBS1 code) for failed side.
17. Enter **`RST::CCI s!`**.
18. Enter **`DGN::ETSI sqq!`** for subject ETSI pack.
    - If DGN ...STF message is received, continue with Step **19.**
    - If DGN ...STF message is not received, enter **`RST::ETSI sqq!`** for the subject ETSI pack.

19. If there is another pack listed in Table 5-5 for the trouble number, continue with Step **20.**
    - If there is not another pack, proceed to Step **21.**

20. Enter command to remove next pack listed in Table 5-5, replace the pack, and enter command to restore the pack to service considering the following:

    — For DPLL, work on same side of Sync as failed ETSI.

    CAUTION:
    No circuit card nor the SMEM memory card should be physically removed from the frame or inserted into the frame while a frame reset or reboot is in progress.

    — To restore EBX or CPU, reset frame using RESET controls on the status panel.

    — The BTs contain passive components for resistive termination. If suspect, check if they are securely inserted and enter ETSI diagnostic; if secure, replace one at time and reenter diagnostic each time.

    NOTE:
    To prevent alarms, remove the side before replacing an ECCN plug-in (**`RMV::CCI s!`**). Restore the side after the replacement (**`RST::CCI s!`**).

    Repeat from Step **18.**

Table 5-5. Implicated Plug-Ins

Trouble No.	Plug-Ins	Commands
0001	ETSI CCI DPLL (in sync)	**{RMV|RST}::ETSI sqq!** **{RMV|RST}::CCI s!** **{RMV|RST}::SYNC a!**
0002, 0010, 0020, 0040, 0100, 0200, or 0800	ETSI	**{RMV|RST}::ETSI sqq!**
0004	ETSI CCI EBX (in MC) BTs	**{RMV|RST}::ETSI sqq!** **{RMV|RST}::CCI s!** **RMV::MC!**
0008, 0400, or 8000	ETSI CCI	**{RMV|RST}::ETSI sqq!** **{RMV|RST}::CCI s!**
0080 or 1000	ETSI BTs	**{RMV|RST}::ETSI sqq!**

NOTE:
Trouble number 0800 may also indicate a ribbon cable problem.

21. If you are clearing trouble number 0004, proceed to Step **27.**

- If you are not clearing trouble number 0004, check ETSI slot and backplane for damage. If no wiring problem is found, contact technical consultant.

NOTE:
For STF 0100, the port alarm pack identification also identifies the suspect wiring.

Continue for Additional ETSI in Message

22. Notice the suspect ETSI identified by the optional SNN designation in the failed ETSI diagnostic.
23. Enter **`RMV::ETSI sqq!`**.
24. Enter **`RMV::CCI s!`** to remove the side from service. Replace the ETSI.
25. Enter **`RST::CCI s!`** to restore the side to service.
26. Enter **`DGN::ETSI sqq!`** for the ETSI that originally failed.
    - If DGN ...STF message is received, check ETSI slot and check backplane for damage. If no wiring problem is found, contact technical consultant.
    - If DGN ...STF message is not received, enter **`RST::ETSI sqq!`** commands to restore the ETSI packs.

Continue for Trouble No. 0020, 0040, 0800, or 1000

27. If diagnostic trouble 0020 or 0040 is received, continue with Step **28.**
    - If diagnostic trouble 0020 or 0040 is not received, proceed to Step **30.**
28. Locate data byte 04 and convert it to binary as follows:
    — Work with each digit of the data byte individually.
    — Convert each hexadecimal digit to the 4-place binary number equivalent. Hex numbers run 1 through 9 and a through f (for 10 through 16); for example, hex 5 = 0101 binary.
29. The resulting 16-bit binary number represents the ETSIs in the frame, with ETSI 16 on the left and 1 on the right. Identify each suspect ETSI which is indicated by a 1 in the 16-bit binary number.
30. See Notes 1 and 2. Select one of the implicated plug-ins and enter command to remove that ETSI and unplug it. Enter **`DGN::ETSI sqq!`** for the original ETSI. Repeat as necessary for each of the suspect ETSIs.

NOTE 1:
To prevent alarms, remove the side before replacing ETSI (**`RMV::CCI s!`**). After replacement, restore the side to enable ETSI diagnostic and restoral (**`RST::CCI s!`**).

NOTE 2:
The implicated ETSIs are either the ones identified by data 04 in Step 28 or all the remaining ones if none were identified by data 04.

31. If DGN ...ATP (or CATP) was received when one of the implicated ETSIs was unplugged, replace ETSI found to be causing the failure and install ETSIs that were unplugged. Enter **`RST::ETSI sqq!`** commands to restore ETSI packs.

    - If the DGN ...ATP (or CATP) was not received, continue with Step **32**.

32. If there is another pack listed in Table 5-5 for the trouble number, continue with Step **33.**

    - If there is not another pack, contact technical consultant.

33. Enter command to remove next pack listed in Table 5-5, replace the pack, and enter command to restore the pack to service considering the following:

    — For DPLL, work on same side of sync as failed ETSI.

    — To restore EBX or CPU, reset frame using RESET controls on the status panel.

    — The BTs contain passive components for resistive termination. If suspect, check to see if they are securely inserted and enter ETSI diagnostic; if secure, replace one at a time and reenter diagnostic each time.

    NOTE:
    To prevent alarms, remove the side before replacing an ECCN plug-in (**`RMV::CCI s!`**). Restore the side after the replacement (**`RST::CCI s!`**).

34. Enter **`DGN::ETSI sqq!`**.

    - If DGN ...STF message is received, repeat from Step **32**.
    - If DGN ...STF message is not received, enter **`RST::ETSI sqq!`** for the subject ETSI pack.

Clear Failed TSI Diagnostic

1. If the alarm cutoff is not already operated, enter **`UTL::ACO!`**.
2. If the subject TSI (time slot interchange) has not been removed from service (RMV TSI COMPL or RST TSI DNY in printout), enter **`RMV::TSI sft!`**

   Where: sft = Failed TSI number.

3. Replace the TSI pack (TM660 code) named in the failed diagnostic message.
4. Enter **`DGN::TSI sft!`**

   Where: sft = Failed TSI number which consists of Side (0 or 1), From-unit (1 through 6), and To-unit (1 through 6). For example, TSI 013 is on side 0 and receives data from unit 1 and connects to unit 3.

   - If DGN ...STF message is not received, proceed to Step **10**.

5. Locate the trouble number which appears immediately after STF in the diagnostic message.
   - If none of the following trouble numbers are received (01B0, 0540, 05B0, or any starting with 014), check connector pins at failed TSI slot and check backplane for damage. If no wiring trouble is found, contact technical consultant.

6. Enter command to remove the CCNI for the failed side as follows: **`RMV::CCNI s!`**

   where: s = Side (0 or 1).

7. Replace that CCNI pack (UM30 code).
8. Enter **`RST::CCNI s!`**.
9. Enter **`DGN::TSI sft!`** to diagnose TSI that originally failed.
   - If DGN ...STF message is received, check connector pins at failed TSI slot and check backplane for damage. If no wiring trouble is found, contact technical consultant.
10. Enter command to restore subject TSI pack to service as follows: **`RST::TSI sft!`**.
    - If trouble persists, contact technical consultant.

Clear Failed NPC (FTU) Diagnostic

1. If the alarm cutoff is needed, enter **`UTL::ACO!`**. If the command is ineffective, press the **ACO** button on the DACS II status panel.
2. Enter **`DGN::NPC <npc No.>!`** where the NPC number is the same one given in the failed diagnostic message.
   - If DGN ...STF message is received, continue with Step **3.**
   - If DGN ...STF message is not received, proceed to Step **12.**

   NOTE:
   The diagnostic includes looped tests that check the NPC transmission paths and tests that check the facility performance monitoring.

3. In order to see if the ECCN packs are affecting the failure, configure the ECCN to the other side as follows:
   - Enter **`UTL::QRY,STR,XC a!`** for each side (a = 0,1) and determine the active side from output (rightmost data byte equals 05 for in-service and active).
   - Enter **`UTL::QRY,ALL,COMMON!`** to verify that packs on the inactive side are not failed because switching to a failed side could cause loss of service.
   - If the inactive side is not failed, enter **`CFR::XC a!`** (for inactive side) to switch ECCN sides.
4. Enter **`DGN::NPC <npc No.>!`** where the NPC number is the same one given in the failed diagnostic message.
   - If DGN ...STF message is received, proceed to Step **10**.
   - If DGN ...STF message is not received, continue with Step **5**.
5. Enter **`RMV::UNIT [q]q,FC sb!`** for the same unit ([q]q), inactive side, and module (b) in the unit, replace that FC pack, and enter **`RST::UNIT [q]q,FC sb!`**.
6. At low traffic time, enter **`CFR::XC a!`** (for inactive side) to switch to other ECCN side.

7. Enter **DGN::NPC <npc No.>!** where the NPC number is the same one given in the failed diagnostic message.
   - If DGN ...STF message is received, continue with Step **8**.
   - If DGN ...STF message is not received, proceed to Step **12**.

8. Perform the appropriate action as follows:
   - If the original failure occurred immediately after a cross-connection was entered, find the implicated ETSI. The ETSI number (sqq) consists of side (opposite - original side) and the unit number associated with the FROM and TO sides of the cross-connection. Enter **RMV::ETSI sqq!**, replace the ETSI pack, and enter **RST::ETSI sqq!**.
   - If failure cannot be related to cross-connection, enter commands to individually remove and restore the ETSIs on the inactive side and look for failed diagnostics.

9. Enter **DGN::NPC <npc No.>!** where the NPC number is the same one given in the failed diagnostic message.
   - If DGN ...STF message is received, continue with Step **10**.
   - If DGN ...STF message is not received, proceed to Step **12**.

CAUTION:
When an NPC is removed, service is interrupted on all the cross-connected circuits of that NPC and trunk conditioning is sent on the channels. Contact special service customers and replace plug-ins quickly.

10. When the other NPC on the affected dual card (for example, DDC) can be removed from service, enter command to remove the other NPC as follows: **RMV::NPC <npc No.>[,INCL]!**.

    Where:
    <npc No.> = NPC number, either extended (for example, [0]001) or hierarchical (for example, 01101).
    INCL = Optional, needed to remove NPC with red circuits and CUS circuits. Enter **UTL::QRY,MARK <npc No.>!** to see if the NPC has red or CUS circuits.

11. Replace the pack for the two affected NPCs.

12. If needed (see Note), enter **`RST::NPC <npc No.>[-<range>]!`** for the subject NPC and for the other NPC on the pack if that NPC was also removed.

NOTE:
The NPC restoral is needed if the NPC was removed from service (manually or autonomously as part of error recovery) or if a previous restore command was denied because of a failed diagnostic.

- If DGN ...STF message is received, check connector pins at plug-in slot and check backplane for damage. If no wiring problem is found, contact technical consultant.
- If RST ...COMPL message is received, this procedure is completed.
- If RST ...DNY message is received, find the meanings of the condition codes in *Command Denials*.

Clear Failed DSPU NPC Diagnostic

NOTE:
The DSPU NPC diagnostic runs continuity tests between the DSPU and the ECCN. These tests actually involve accessing timeslots on an NPC in the unit and checking the connection through the cables and the ECCN. Similarly, when the ETSI for the unit was diagnosed, the interconnection between it and the other ETSIs was tested.

1. If the alarm cutoff is needed, enter **`UTL::ACO!`**. If the command is ineffective, press the **ACO** button on the DACS II status panel.
2. Notice which NPC number and side (0 or 1) are named in the failed diagnostic message.

   NOTE:
   Each DSP position consists of a pair of NPCs and the pair is addressed in commands by the first NPC of the pair. The DSP positions are duplicated on the sides of the DSPU so that service will be switched to the mate when an NPC fails or is removed.

3. If the subject NPC has not been removed from service (RMV COMPL or RST DNY in printout), enter
   `RMV::NPC <npc No.>,SIDE s[,INCL]!`

   Where:
   <npc No.> = NPC number, either extended (for example, [0]001) or hierarchical (for example, 01101).
   s = Side (0 or 1).
   INCL = Optional, needed to remove NPC with cross-connected red circuits, and subrate circuits with established channels.

4. Enter **`DGN::NPC <npc No.>,SIDE s!`** for subject NPC number and side.
   - If DGN ...STF message is received, continue with Step **5.**
   - If DGN ...STF message is not received, proceed to Step **15.**
5. Enter **`RMV::CCI s!`** or **`RMV::CCNI s!`** (whichever is appropriate) for the same side as the failed DSP NPC. This prevents an alarm (and DSP removal) on other DSPs. Even though the ECCN side is not active, if it is in-service, a glitch on the bus can trigger the alarm.
6. Replace the DSP plug-in for the NPCs (for example, DMB) on the side.

7. Enter **RST::CCI s!** or **RST::CCNI s!** (whichever is appropriate) to restore the network side to service.
8. Enter **DGN::NPC <npc No.>,SIDE s!** for subject NPC number and side.
   - If DGN ...STF message is received, continue with Step **9.**
   - If DGN ...STF message is not received, proceed to Step **15.**
   - If message gives a trouble number in the range STF 0F03 through 0F06 and optional second line with UPN and XPN numbers, proceed to Step **13.**
9. Enter **RMV::UNIT [q]q,DSPI!**, replace DSPI, and enter **RST::UNIT [q]q,DSPI!**.
10. Enter **DGN::NPC <npc No.>,SIDE s!** for subject NPC number and side.
    - If DGN ...STF message is received, continue with Step **11**.
    - If DGN ...STF message is not received, proceed to Step **15**.
11. Enter **RMV::UNIT [q]q,UC!**, replace CPU, and enter **RST::UNIT [q]q,UC!**.
12. Enter **DGN::NPC <npc No.>,SIDE s!** for subject NPC number and side.
    - If DGN ...STF message is received, continue with Step **13**.
    - If DGN ...STF message is not received, proceed to Step **15**.
13. Perform one of the following (use appropriate commands for the type of frame):
    — If the original failure occurred immediately after a cross-connection was entered, try replacing the involved ETSIs/TSIs. Enter **RMV::ETSI sqq!** or **RMV::TSI sft!**, replace the ETSI/TSI pack, and enter **RST::ETSI sqq!** or **RST::TSI sft!**. The involved ETSI(s)/TSI(s) are those on the same side as the NPC and the unit(s) containing the NPC(s) in the cross-connection.

    — If failure cannot be related to cross-connection, enter commands to individually remove and restore the ETSIs/TSIs on the inactive side and look for failed diagnostics.

14. Enter **`DGN::NPC <npc No.>,SIDE s!`** for subject NPC number and side.

    - If DGN ...STF message is received, obscure problem; contact technical consultant. After trouble is cleared, enter command to restore NPCs to service.
    - If DGN ...STF message is not received, continue with Step **15**.
    - If message gives a trouble number in the range STF 0F03 through 0F06 and optional second line with UPN and XPN numbers, proceed to Step **16.**

15. Enter **`RST::NPC <npc No.>,SIDE s!`** for the first NPC (if NPC pair) and side.

    - If RST ...COMPL message is received, this procedure is completed.
    - If RST ...DNY message is received, find the meanings of the condition codes in *Command Denials*.

16. From Table 5-6, identify the faulty cable connecting to the subject NPC by the UPN (unit plug number) and XPN (ECCN plug number) named in the message. Notice that the ECCN plug number includes the unit number.

Table 5-6. Cable Identification

Unit Plug	ECCN Plug	Side	Direction	Involved DSP Plug-In
P1	P<unit>A	0	Receive	1st & 2nd DSP
P2	P<unit>E	0	Transmit	1st & 2nd DSP
P3	P<unit>B	0	Receive	3rd & 4th DSP
P4	P<unit>F	0	Transmit	3rd & 4th DSP
P5	P<unit>C	0	Receive	5th & 6th DSP
P6	P<unit>G	0	Transmit	5th & 6th DSP
P7	P<unit>D	0	Receive	7th & 8th DSP
P8	P<unit>H	0	Transmit	7th & 8th DSP
P10	P<unit>A	1	Receive	1st & 2nd DSP
P11	P<unit>E	1	Transmit	1st & 2nd DSP
P12	P<unit>B	1	Receive	3rd & 4th DSP
P13	P<unit>F	1	Transmit	3rd & 4th DSP
P14	P<unit>C	1	Receive	5th & 6th DSP
P15	P<unit>G	1	Transmit	5th & 6th DSP
P16	P<unit>D	1	Receive	7th & 8th DSP
P17	P<unit>H	1	Transmit	7th & 8th DSP

17. Replace (or have repaired) the cable identified above. The unit and ECCN plug numbers are stamped alongside the connectors on the ECCN panel; see Figure 5-5.

18. Enter **`RST::NPC <npc No.>,SIDE s!`** for the first NPC (if NPC pair) and side.

    - If DGN ...STF message is received (see Note), obscure problem; contact technical consultant. After trouble is cleared, enter command to restore NPCs to service.

      NOTE:
      The diagnostic reports one cable problem at a time; so if different UPN and XPN numbers occur, clear that trouble before contacting the technical consultant.

    - If RST ...COMPL message is received, this procedure is completed.
    - If RST ...DNY message is received, find the meanings of the condition codes in *Command Denials*.

(LEFT SIDE OF ECCN PANEL)

	P3A	P3B	P3C	P3D	P3E	P3F	P3G	P3H	
	P4A	P4B	P4C	P4D	P4E	P4F	P4G	P4H	
	P6A	P6B	P6C	P6D	P6E	P6F	P6G	P6H	
	P9A	P9B	P9C	P9D	P9E	P9F	P9G	P9H	
	P10A	P10B	P10C	P10D	P10E	P10F	P10G	P10H	
	P12A	P12B	P12C	P12D	P12E	P12F	P12G	P12H	
	P15A	P15B	P15C	P15D	P15E	P15F	P15G	P15H	
	P16A	P16B	P16C	P16D	P16E	P16F	P16G	P16H	
BOTTOM	P17A	P17B	P18A			P19			TOP
	P14A	P14B	P14C	P14D	P14E	P14F	P14G	P14H	
	P13A	P13B	P13C	P13D	P13E	P13F	P13G	P13H	
	P11A	P11B	P11C	P11D	P11E	P11F	P11G	P11H	
	P8A	P8B	P8C	P8D	P8E	P8F	P8G	P8H	
	P7A	P7B	P7C	P7D	P7E	P7F	P7G	P7H	
	P5A	P5B	P5C	P5D	P5E	P5F	P5G	P5H	
	P2A	P2B	P2C	P2D	P2E	P2F	P2G	P2H	
	P1A	P1B	P1C	P1D	P1E	P1F	P1G	P1H	

(RIGHT SIDE OF ECCN PANEL)

Figure 5-5. Cable Connectors on ECCN Panel

Primary Memory (PMEM) Card Failure Recovery Procedure

The recovery procedure when a PMEM card failure occurs is as follows:

1. Perform the following diagnostic tests on both the PMEM and SMEM cards:

   a. Do the card diagnostic test, craft code X'0004.

   b. Do the validate data base test, craft code X'0010.

   c. Validate the boot block, craft code X'0020.

   d. Validate executable header, craft code X'0040.

   e. Validate executables, craft code X'0080.

   Several possible cases can result from this set of tests that lead to different actions to resolve the problems:

   a. If the PMEM card fails card diagnostics and the SMEM card passes all tests, then go to Step 2.

   b. If the PMEM card succeeds on the card diagnostic test, but fails any of the other tests, while the SMEM card succeeds on all tests, then go to Step 3.

   c. If the PMEM and SMEM card both succeed on the card diagnostic tests, but both fail on one of the other diagnostic tests, then go to Step 4.

   d. If the SMEM card fails card diagnostics and the PMEM card passes all tests, then go to Step 5.

   e. If the SMEM card passes card diagnostics, but fails any of the other tests, while the PMEM card succeeds on all tests, then go to Step 6.

2. Replace the PMEM card (Figure 8-2) with the card currently in the SMEM slot by doing the following (PMEM card is suspected to be defective):

   a. Place the frame into MCOND before physically removing the the CPU2 pack by entering the following command:

      RST::MC,MCOND!

      The frame will deny this command if it is already in MCOND.

   b. Place the ESD grounding strap on your wrist and physically remove the CPU2 circuit pack while the MC is out-of-service..

   c. Replace the PMEM card with the card currently in the SMEM slot.

d. Insert a spare memory card into the SMEM slot.

e. Physically insert the CPU2 pack into the frame.

f. On the Status Panel, hold the RESET ENABLE switch to ON and momentarily press the RESET button.

g. The System should be brought into service with the correct version of the executables and database. If the boot completes successfully and the database is correct, discard the bad PMEM card and continue with Step 7.

   If PMEM fails to boot, run diagnostics on the PMEM card. The card diagnostic tests (craft code X'0004) will most likely fail, because the problem is most likely a PMEM card connector problem and the CPU2 board itself should be replaced. The system should be rebooted with the PMEM and SMEM cards in their original slots but with a new CPU2 pack.

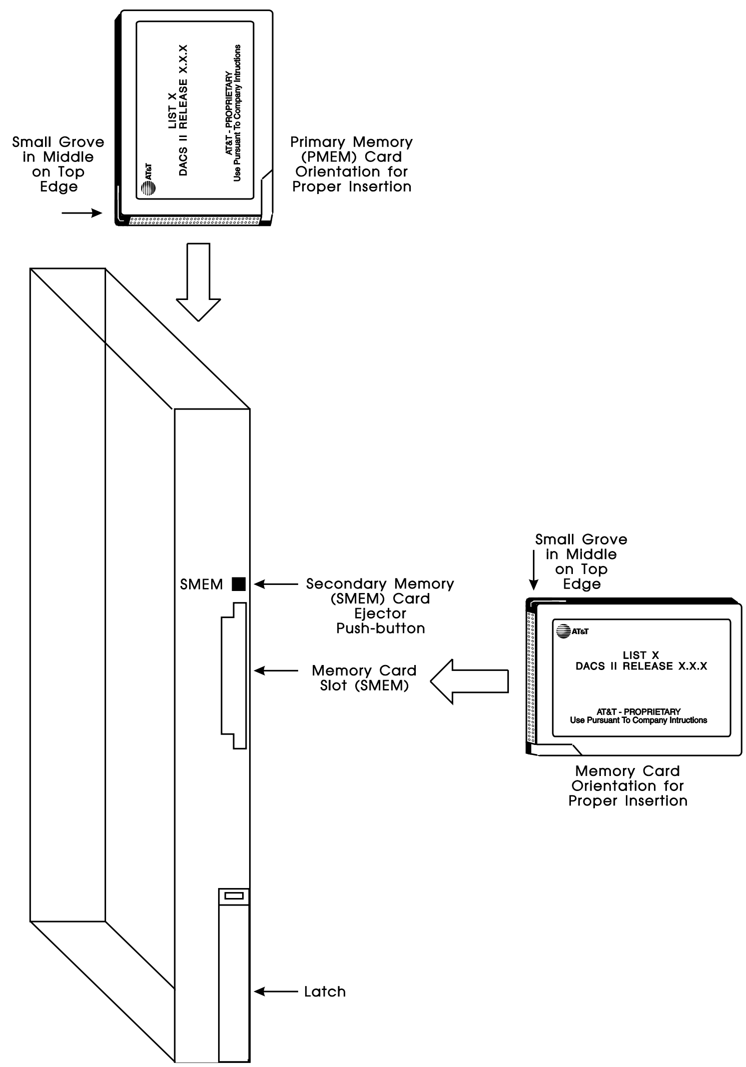

Figure 5-6. Memory Card Locations on CPU2

3. Replace the PMEM card (Figure 8-2) with the card currently in the SMEM slot by doing the following (PMEM card is suspected to contain corrupted executables or database):
   a. Place the frame into MCOND before physically removing the the CPU2 pack by entering the following command:

      `RST::MC,MCOND!`

      The frame will deny this command if it is already in MCOND.
   b. Place the ESD grounding strap on your wrist and physically remove the CPU2 circuit pack while the MC is out-of-service.
   c. Replace the PMEM card with the card currently in the SMEM slot.
   d. Insert a spare memory card into the SMEM slot.
   e. Physically insert the CPU2 pack into the frame.
   f. On the Status Panel, hold the RESET ENABLE switch to ON and momentarily press the RESET button.
   g. The system should be brought into service with the correct version of the executables and database. If the boot completes successfully and the database is correct, continue with Step 7. (The old PMEM card may be recycled as a future SMEM card.)

4. Replace the PMEM card (Figure 8-2) with the most recently archived memory card by doing the following (PMEM and SMEM cards are suspected to contain corrupted executables or database):
   a. Place the frame into MCOND before physically removing the the CPU2 pack by entering the following command:

      `RST::MC,MCOND!`

      The frame will deny this command if it is already in MCOND.
   b. Place the ESD grounding strap on your wrist and physically remove the CPU2 circuit pack while the MC is out-of-service.
   c. Replace the PMEM card with the most recently archived memory card.
   d. Insert a spare memory card into the SMEM slot.
   e. Physically insert the CPU2 pack into the frame.
   f. On the Status Panel, hold the RESET ENABLE switch to ON and momentarily press the RESET button.
   g. The System should be brought into service with the correct version of the executables and a valid but most likely not current database. If the boot completes successfully, continue with Step 7. (The PMEM card and the SMEM card may be recycled as future SMEM cards.)

5. Replace the SMEM card (Figure 8-3) with a spare memory card or with an older archive card that may be recycled. (SMEM card is suspected to be defective.):

    a. Remove the SMEM card physically from the CPU2 card. (Since the card has been found to be defective by the system, it must already be logically removed from the system.)

    b. Insert the spare memory card physically into the SMEM slot.

    c. Discard the bad SMEM card and continue with Step 7.

6. The SMEM card is good but has bad information on it.
   Restore the SMEM card:

   NOTE:
   The PMEM contents are copied onto the SMEM card when SMEM is restored. Each card is then a ‘‘mirrored image’’ of the other.

   `RST::SMEM,BKGRND!`

   If the command is denied because of bad or mismatching information on the SMEM card with the message:

   ```
   Warning: The SMEM Card being restored has the following problems!
   <message describing the problem>
       If YOU STILL WISH TO PROCEED, USE FRC OPTION
   ```

   Then use the command with the **`FRC`** option:

   `RST::SMEM,FRC,BKGRND!`

   You will get a response:

   ```
   ARE YOU SURE? (YES/NO)
   ```

   Answer YES and the restore operation should complete. Then go to Step 8.

7. To restore the SMEM card, enter the following command:

   NOTE:
   The PMEM contents are copied onto the SMEM card when SMEM is restored. Each card is then a ‘‘mirrored image’’ of the other.

   `RST::SMEM,BKGRND!`

8. If there is now a replacement card in the PMEM slot, then the PMEM may not contain the latest db changes, depending on which replacement card was used. Any changes not present need to be re-done.

9. Create a new archive copy if needed (archived copy was used to replace the PMEM). Refer to the "Database Archive Procedure" (Volume 1).

Clear Failed Link Diagnostic

1. If the alarm cutoff is not already operated, enter **`UTL::ACO!`**. If the command is ineffective, press the **ACO** button on the DACS II status panel.
2. Repeat the diagnostic for the failed link (which is named in the original failed DGN message). Enter the command from another link as follows: **`DGN::LINK j!`**

   Where: j = Link number (1 through 6).

3. If DGN LINK ...STF 0300 message is received, it means that the clock signal is not received on the synchronous link. So, verify wiring connections to the link at the back of the frame.
   - If DGN LINK ...STF message is not received, there is no problem at this time. If intermittent trouble recurs and another DACS II link is available, move the data link connections to the next link and set the link parameters.
4. Enter the diagnostic command for other links to determine if CI, ECI, or HECI must be replaced.
5. If DGN LINK ...STF message is received for any other link, enter **`RMV::MC!`**.
   - If DGN LINK ...STF message is not received for any other link, proceed to Step **8**.
6. Replace the CI, ECI, or HECI (high-speed) pack, whichever is installed in the MC, with the same type.
7. On the DACS II status panel, hold the **RESET ENABLE** switch to **ON** and momentarily press the **RESET** button.
8. If another DACS II link is available, move the data link connections from the failed link to the next available link and set the link parameters.
9. Make a record of the failed link stating that the CI, ECI, or HECI pack in the main controller must be replaced (using the method in this procedure) if the failed link will be needed or at the time of the next reset of the MC.

Clear Failed DS3 FLI or MXR Diagnostic

NOTE:
This procedure is used primarily for diagnostic failures encountered during turnup (service restoral denied). Almost always, the failed diagnostic implicates the subject pack, but an associated DS3 plug-in can also be implicated. These associated plug-ins are named in the error recovery ANALYSIS REPORT for in-service failures.

1. If the alarm cutoff is not already operated, enter **`UTL::ACO!`**. If the command is ineffective, press the **ACO** button on the DACS II status panel.
2. Enter **`UTL::QRY,PSTATE,UNIT [q]q!`** ([q]q = unit 1 through 16) and use Table 5-7 to determine the protection status of the packs.

   NOTE:
   The output message reads as follows: (1) the protection MMFG is listed first on the left, and (2) for each MMFG, the top code is the MXR maintenance status, next down is the MIU (if any) status, next is the MMFG protection status, and last, the protection availability.

   CAUTION:
   When there is service on the DS3U or HDS3U, forcing the removal of an entity by the use of MMFG FRC keyword or removing MMFG service to enable FLI removal could result in loss of service.

3. If the subject entity has not been removed from service (RMV COMPL or RST DNY in printout), enter required RMV command for that failed entity per Figure 5-7. Remove MMFG for failed MXR.

   NOTE:
   The removal of an MMFG (for MXR or HMXR) or FLI will cause a protection switch. If protection is not available, the RMV command will be denied.

   NOTE:
   If the mate FLI is out-of-service, the remaining FLI can only be removed if all the following are true: no NPCs grown on MXR or HMXR, no service MXRs or HMXRs grown, protection MIU not grown, and no MMFGs in-service.

Table 5-7. Maintenance and Protection Keywords

Keyword	Meaning
Maintenance Status	
IS	In-Service
ISF	In-Service, but Failed and Pested
OOS	Out-Of-Service
UEQD	Unequipped
Protection Status	
SLT	Protection MMFG/FLI Selected
USLT	Protection MMFG/FLI Unselected
SALW	MMFG Is Carrying Service and Switching Is Allowed
SINH	MMFG Is Carrying Service and Switching Is Inhibited
MPALW	Manual Protection Switch Active and Auto Switchback Allowed
APALW	Auto Protection Switch Active and Auto Switchback Allowed
MPINH	Manual Protection Switch Active and Auto Switchback Inhibited
APINH	Auto Protection Switch Active and Auto Switchback Inhibited
(dashes)	Service MMFG Not Equipped
Protection Availability	
AVL	Available for Switching
NVL	Not Available for Switching
(dashes)	MMFG Not Selected for Service

4. Replace the plug-in named in the failed diagnostic message.
5. Enter the DGN command for the same plug-in per Figure 5-7. The NPCs on an MXR or HMXR are diagnosed when the MXR or HMXR is diagnosed.
   - If DGN ...STF message is received, continue with Step **6.**
   - If DGN ...STF message is not received, enter RST command for subject pack per Figure 5-7. For MXR or HMXR, restore MMFG. This procedure is completed.

verb::<CP identification>[,option]!

{RMV::	SYNC a!	a	= 0 or 1
/RST::	SYNC a,TLI n[,SSP b]!	n	= 1-4; b = sync port (0 or 1)
/DGRTH::	CCI s!	s	= side 0 or 1
/DGN::}	CCNI s!	s	= side 0 or 1
	ETSI sqq!	qq	= unit 1-16
	TSI sft!	f	= unit (receiving from) (1-6)
	CCB sf!	t	= unit (transmitting to) (1-6)
	ETSIS,ECCN s,ALL!		For all ETSIs on the side
	TSIS,CCN s,ALL!		For all TSIs on the side
	UNIT [q]q,UC!	[q]q	= unit (1-16)
	UNIT [q]q,{FTMI d|DSPI}!	d	= module interface for units 1-4
	UNIT [q]q,FC sd!	sd	= FC side (0,1) and FC No. (1-4)
	UNIT [q]q,FLI k!	k	= service (S) or protection (P)
	UNIT [q]q,FMT s!	s	= side (0,1)
	UNIT [q]q,MMFG c	c	= DS3 group (1-6,P)
	[,FRC][,INCL]!	FRC	= forces remove with no prot. switch
		INCL	= removes/restores MXR NPCs
	NPC <npc No.>[,SIDE s]!	<npc No.>	= NPC number
		s	= SIDE for DSPU
	LINK j!	j	= link 1-6
DGN::	UNIT [q]q,MXR c!	c	= DS3 group (1-6,P)
	UNIT [q]q,MIU c!	c	= DS3 group (1-6,P)

NOTE: Removing the NPC is service affecting.

Figure 5-7. Maintenance Command Construction

6. If you are working with either a failed MXR (HMXR) or MIU diagnostic, continue with Step **8.**
7. If you are not working with either of those diagnostics, there is an obscure problem; contact technical consultant.
8. Locate the trouble number which appears immediately after STF in the diagnostic message.
9. If you have the following trouble number: 0010 (for DGN MXR (HMXR)), 0300 (for DGN MIU), or 0301 (for DGN MIU), continue with Step **10.**
   - If you do not have one of those trouble numbers, there is an obscure problem; contact technical consultant.
10. If you have MXR (HMXR) trouble number 0010, determine from PSTATE query which FLI is SLT (selected). Enter RMV command for the selected FLI per Figure 5-7. This will cause any service to switch to the mate FLI and allow you to replace the implicated FLI.

11. If you have MIU trouble number 0300 or 0301, enter the RMV command for the associated MMFG per Figure 5-7. This will cause any service to switch to the mate MMFG and allow you to replace the implicated MXR (HMXR).

12. Replace the implicated pack and enter the RST command for the same plug-in per Figure 5-7. If MXR (HMXR) was replaced, restore the MMFG for the MXR (HMXR).

13. Enter DGN command for the original failed plug-in per Figure 5-7.

    - If DGN ...STF message is received, there is an obscure problem; contact technical consultant.
    - If DGN ...STF message is not received, continue with Step **14.**

14. Enter RST command for subject pack per Figure 5-7. For MXR (HMXR), restore MMFG.

    - If RST ...COMPL message is received, this procedure is completed.
    - If RST ...DNY message is received, find the meanings of the condition codes in *Command Denials*.

Clear Failed DS3 FMT or HFMT Diagnostic

NOTE:
The FMT (HFMT) diagnostic runs continuity tests between the DS3U (HDS3U) and the ECCN. These tests actually involve accessing time slots on an NPC in the unit and checking the connection through the cables and the ECCN. Similarly, when the ETSI for the unit was diagnosed, the interconnection between it and the other ETSIs was tested.

1. If the alarm cutoff is not already operated, enter **`UTL::ACO!`**. If the command is ineffective, press the **ACO** button on the DACS II status panel.
2. Check the trouble printout for ERR ESR messages and RMV COMPL messages.

   NOTE:
   When the FMT (HFMT) fails and is removed from service, service is switched to the other side of the CCN/ECCN and to the FMT (HFMT) pack on the other side.

   NOTE:
   If the FMT (HFMT) on one side is already failed and the FMT (HFMT) on the remaining side fails, that remaining FMT (HFMT) will not be removed from service (COND 19 DNY). It will be pested. The first failure must be cleared to allow the other FMT (HFMT) to be removed.

3. If the subject entity has not been removed from service (RMV COMPL in printout), enter **`RMV::UNIT qq,FMT s!`** (where qq is the unit number and s is the FMT (HFMT) side).
   - If remove command was denied (COND 19), continue this procedure with the FMT (HFMT) on the other side which has been removed from service.
4. Replace the FMT (HFMT) named in the failed diagnostic message. To obtain the coordinate location of the FMT (HFMT) in the frame, enter **`UTL::LOC,UNIT [q]q,FMT s!`**.
5. Enter **`DGN::UNIT qq,FMT s!`** for the same FMT plug-in.
   - If DGN ...STF message is received, continue with Step **6.**

- If DGN ...STF message is not received, enter **`RST::UNIT qq,FMT s!`** to restore the subject FMT (HFMT) to service. This procedure is completed.
- If DGN DNY (or CATP) is received because continuity tests were omitted (see Table 5-8), proceed to Step **11**.

6. If the DGN FMT (HFMT) message shows trouble number STF 0F05 or 0F07 and an optional second line with UPN and XPN numbers, proceed to Step **12.**
   - If the DGN FMT (HFMT) message shows trouble number STF 0F0D, proceed back to Step **4** and replace the FMT (HFMT) pack.
   - If the message does not show those trouble numbers, continue with Step **7.**
7. If there is an ESR ANALYSIS REPORT message which lists other suspect plug-ins, continue with Step **8.**
   - If there is not an ESR ANALYSIS REPORT with other plug-ins, there is an obscure problem; contact technical consultant.
8. Enter the command to remove the plug-in listed in the ESR ANALYSIS REPORT from service per Figure 5-8 and replace that plug-in.
9. Enter the command to restore the same plug-in (from above) to service per Figure 5-8.

```
verb::<CP identification>[,option]!

{RMV::      SYNC a!                             a  =  0 or 1
/RST::      SYNC a,TLI n[,SSP b]!               n  =  1-4; b = sync port (0 or 1)
/DGRTH::    CCI s!                              s  =  side 0 or 1
/DGN::}     CCNI s!                             s  =  side 0 or 1
            ETSI sqq!                          qq  =  unit 1-16
            TSI sft!                            f  =  unit (receiving from) (1-6)
            CCB sf!                             t  =  unit (transmitting to) (1-6)
            ETSIS,ECCN s,ALL!                         For all ETSIs on the side
            TSIS,CCN s,ALL!                           For all TSIs on the side
            UNIT [q]q,UC!                    [q]q  =  unit (1-16)
            UNIT [q]q,{FTMI d|DSPI}!            d  =  module interface for units 1-4
            UNIT [q]q,FC sd!                   sd  =  FC side (0,1) and FC No. (1-4)
            UNIT [q]q,FLI k!                    k  =  service (S) or protection (P)
            UNIT [q]q,FMT s!                    s  =  side (0,1)
            UNIT [q]q,MMFG c                    c  =  DS3 group (1-6,P)
             [,FRC][,INCL]!                   FRC  =  forces remove with no prot. switch
                                             INCL  =  removes/restores MXR NPCs
            NPC <npc No.>[,SIDE s]!     <npc No.>  =  NPC number
                                                s  =  SIDE for DSPU
            LINK j!                             j  =  link 1-6
DGN::       UNIT [q]q,MXR c!                    c  =  DS3 group (1-6,P)
            UNIT [q]q,MIU c!                    c  =  DS3 group (1-6,P)
```

NOTE: Removing the NPC is service affecting.

Figure 5-8. Maintenance Command Construction

10. Enter **`DGN::UNIT qq,FMT s!`** for the same FMT (HFMT) plug-in.
    - If DGN ...STF message is received, there is an obscure problem; contact technical consultant.
    - If DGN ...STF message is not received, enter **`RST::UNIT qq,FMT s!`** to restore the subject FMT to service. This procedure is completed.

11. Refer to Table 5-8 and, if diagnostic continuity tests must be run, perform corrective action per the table. Repeat Step **10** to reenter diagnostic.

Table 5-8. Cable Test Denial Codes

Code	Explanation	Corrective Action
C3	Cable tests are not run when CFT code is included in DGN command.	Reenter command without CFT code.
C4	Cable tests cannot be run if all ETSI time slots are mapped.	Verify that ETSI for unit is installed/ in-service. Cross-connections would have to be disconnected from the unit to run cable tests.
C5	No available NPCs in unit to run tests	At least one NPC in the unit must be installed/in-service to run tests. Grow and restore NPC if necessary.
C6	No available time slots on in-service NPCs.	Either another NPC must be added or cross-connections must be disconnected from the unit.
C7	No available time slots on in-service DMBs.	Either another DMBs must be added or cross-connections must be disconnected from the unit.
C8	No available time slots on in-service DS3 NPCs.	Either another DS3 NPC must be added or cross-connections must be disconnected from the unit.
C9	Cable tests omitted because there is not an in-service NPC and thus no available time slots.	Grow and restore another NPC in the unit.

12. Enter the command to remove the ETSI pack for the unit from the service per Figure 5-8. Replace the ETSI pack and enter the command to restore the pack in service per Figure 5-8.

13. Enter **`DGN::UNIT qq,FMT s!`** for the same FMT plug-in.

    - If the DGN FMT (HFMT) message shows trouble number STF 0F05 or 0F07 and an optional second line with UPN and XPN numbers, continue with Step **14.**
    - If the DGN ...ATP message is received, proceed to Step **16.**

NOTE:
The diagnostic reports one cable problem at a time; so if different UPN and XPN numbers occur, clear that trouble before contacting technical consultant.

14. From Table 5-9, identify the faulty cable connecting to the subject DS3U (HDS3U) by the UPN (unit plug number) and XPN (ECCN plug number) named in the message. Notice that the ECCN plug number includes the unit number.

15. Replace (or have repaired) the cable identified above. The ECCN plug numbers are stamped alongside the connectors on the ECCN panel; see Figure 5-9. The cable leads and terminal numbering on the connector plugs are identified in SD-96699-01.

Table 5-9. FMT (HFMT) Cable Identification

Unit Plug	ECCN Plug	Direction	Involved FMT
P1	P<unit No.>A	Receive	0
P2	P<unit No.>E	Transmit	0
P3	P<unit No.>B	Receive	0
P4	P<unit No.>F	Transmit	0
P5	P<unit No.>C	Receive	0
P6	P<unit No.>G	Transmit	0
P7	P<unit No.>D	Receive	0
P8	P<unit No.>H	Transmit	0
P10	P<unit No.>A	Receive	1
P11	P<unit No.>E	Transmit	1
P12	P<unit No.>B	Receive	1
P13	P<unit No.>F	Transmit	1
P14	P<unit No.>C	Receive	1
P15	P<unit No.>G	Transmit	1
P16	P<unit No.>D	Receive	1
P17	P<unit No.>H	Transmit	1

16. Enter **`RST::UNIT [q]q,FMT s!`** to restore the subject FMT (HFMT).

- If RST ...DNY message is received, find the meanings of the condition codes in *Command Denials*.

(LEFT SIDE OF ECCN PANEL)

	P3A	P3B	P3C	P3D	P3E	P3F	P3G	P3H	
	P4A	P4B	P4C	P4D	P4E	P4F	P4G	P4H	
	P6A	P6B	P6C	P6D	P6E	P6F	P6G	P6H	
	P9A	P9B	P9C	P9D	P9E	P9F	P9G	P9H	
	P10A	P10B	P10C	P10D	P10E	P10F	P10G	P10H	
	P12A	P12B	P12C	P12D	P12E	P12F	P12G	P12H	
	P15A	P15B	P15C	P15D	P15E	P15F	P15G	P15H	
	P16A	P16B	P16C	P16D	P16E	P16F	P16G	P16H	
BOTTOM	P17A	P17B	P18A			P19			TOP
	P14A	P14B	P14C	P14D	P14E	P14F	P14G	P14H	
	P13A	P13B	P13C	P13D	P13E	P13F	P13G	P13H	
	P11A	P11B	P11C	P11D	P11E	P11F	P11G	P11H	
	P8A	P8B	P8C	P8D	P8E	P8F	P8G	P8H	
	P7A	P7B	P7C	P7D	P7E	P7F	P7G	P7H	
	P5A	P5B	P5C	P5D	P5E	P5F	P5G	P5H	
	P2A	P2B	P2C	P2D	P2E	P2F	P2G	P2H	
	P1A	P1B	P1C	P1D	P1E	P1F	P1G	P1H	

(RIGHT SIDE OF ECCN PANEL)

Figure 5-9. Cable Connectors on ECCN Panel

Clear Failed CCB Diagnostic

Overview: This procedure deals with a failed CCB (cross-connect buffer) diagnostic. When a CCB pack fails, the associated unit FC packs and network TSI packs may also be taken out-of-service autonomously; so, utility queries are used to check for associated packs that must be restored to service. Conversely, a failure of a TSI on one of the CCB ports can cause the CCB to fail its diagnostic. When that happens, the accompanying ERR, ESR ...CCB message is used to identify the failed TSI.

1. If the alarm cutoff is not already operated, enter **`UTL::ACO!`**. If the command is ineffective, press the **ACO** button on the DACS II status panel.
2. If the CCB has not been removed from service (RMV CCB COMPL or RST CCB DNY in printout), enter **`RMV::CCB sf!`**

   Where:
   s = Side (0 or 1)

   f = CCB number (1 through 6).

3. Enter **`RMV::TSIS,UNIT q,CCN s!`** with the same unit and side as the failed CCB.
4. Locate trouble number that appears after the DGN ...STF keyword in the trouble printout.
   - If trouble number 0200 or 0300 is received, continue with Step **5.**
   - If other trouble number is received, proceed to Step **7.**

   NOTE:
   The STF 0200 and 0300 failures indicate a port alarm received from an associated TSI which can be failed or just unplugged.

5. Enter **`RST::CCB sf!`** for the subject CCB.
6. Enter **`RST::TSI sft!`** for each TSI associated with the subject CCB. If any diagnostic fails, replace that TSI pack and restore the replacement.

   Proceed to Step **15.**

7. Replace CCB pack (UM26 code) identified in the failed diagnostic message. There are six CCB slots on each side of the cross-connect network, one for each DACS II unit.
8. Enter **`DGN::CCB sf!`**
   - If DGN ...STF message is not received, proceed to Step **15.**
9. Enter **`RMV::CCNI s!`** where: s = failed side (0 or 1).
10. Replace the CCNI pack (UM30 code) for the same CCN side.
11. Enter **`RST::CCNI s!`** where: s = side 0 or 1.
12. Enter **`DGN::CCB sf!`**
    - If DGN ...STF message is NOT received, proceed to Step **15.**
13. Locate the ERR ESR CCB message that appears in the original trouble printout and the eight raw data bytes in that message. The data bytes are on the second line of the output message.
    - If none of the first 3 data bytes have nonzero characters, check CCB slot and backplane for damage. If no wiring problem is found, contact technical consultant.
    - If any of the first 3 data bytes equal 0100 or 0200, there is a timing signal loss or clock error at the CCB. Check the backplane wiring for bent pins or broken leads at the CCB. If no wiring problem exists, check trouble printout for SYNC messages.
    - If any of the first 3 data bytes have some other nonzero value, use Table 5-10 to determine the related TSI From-Unit identification from one of the first 3 data bytes (referred to as data1, data2, and data3).

    NOTE:
    The To-Unit identification and side for the complete TSI "stf" number are already known from the failed CCB. The bus numbers refer to the connections to the 4 FTMs or DSPU ports.

Table 5-10. TSI Ports on CCB

Byte	Specific Position Value	TSI From-Unit ID
ESR0 (data 1)	xx8x	2 (bus 1)
	xx4x	1 (bus 1)
	xx2x	6 (bus 0)
	xx1x	5 (bus 0)
	xxx8	4 (bus 0)
	xxx4	3 (bus 0)
	xxx2	2 (bus 0)
	xxx1	1 (bus 0)
ESR1 (data 2)	xx8x	4 (bus 2)
	xx4x	3 (bus 2)
	xx2x	2 (bus 2)
	xx1x	1 (bus 2)
	xxx8	6 (bus 1)
	xxx4	5 (bus 1)
	xxx2	4 (bus 1)
	xxx1	3 (bus 1)
ESR2 (data 3)	xx8x	6 (bus 3)
	xx4x	5 (bus 3)
	xx2x	4 (bus 3)
	xx1x	3 (bus 3)
	xxx8	2 (bus 3)
	xxx4	1 (bus 3)
	xxx2	6 (bus 2)
	xxx1	5 (bus 2)

14. Enter **`RMV::TSI sft!`** for that TSI, replace it, and enter **`RST::TSI sft!`**.
15. Enter **`RST::CCB sf!`** for the subject CCB.
16. Enter **`UTL::QRY,OOS,UNIT q!`** and **`UTL::QRY,OOS,COMMON!`** and check the unit FC and network TSI portions to determine if any are removed from service.

    Where: q = Involved DACS II unit (1 through 6).

17. If any FCs are out-of-service, enter command to restore each one as follows: **`RST::UNIT q,FC sf!`**.

    Where:
    q = Unit number (1 through 6)
    sf = FC number consisting of side (0 or 1) and FC number in unit.

18. If entire network side is out-of-service, enter the command **`RST::TSIS,CCN s,UNIT q!`** for the subject side and unit; otherwise, enter command to restore each TSI as follows, **`RST::TSI sft!`**.

Controller and Link Troubles

6

Contents

6 Controller and Link Troubles

This chapter contains the procedures to clear various main controller troubles including the communication interface (for administrative link).

NOTE:
If you already have isolated the trouble to one of the troubles in this chapter, proceed directly to the procedure for that trouble; otherwise, go to *Trouble Identification* to first isolate the trouble.

The following equipment considerations pertain to the controller and link troubles.

- The trouble-clearing in this chapter involves the replacement of the main controller plug-ins. If the main controller is still operative, it must be removed from service before making the replacement. When the replacement is plugged in, the frame may be automatically reset. However, the manual reset is always used to ensure uniform completion conditions.
- The frame reset is referred to as a cold boot of the frame circuits and memories; whereas, the boot command is referred to as a warm boot. Both these operations can take from 3 minutes to over 30 minutes depending on how the frame is equipped and the source of the boot (PMEM or SMEM). In-progress messages will be issued every 20 seconds.

Clear Processor Failure Alarm

1. If a reset is in progress, wait to see if the LED goes off after the reset completes. If the LED remains lighted, this trouble procedure is applicable. The processor failure is lighted during the frame reset sequence.
2. If the alarm cutoff is not operated, try pressing the **ACO** button on the DACS II status panel.
3. Check the power units located in the MC (main controller) for a lighted failure LED on any power unit.
   - If an LED is lighted, replace the power unit and close the latch/switch.
   - If an LED is not lighted, proceed to Step **6**.
4. If the LED on the replacement lights, clear wiring trouble between the associated 48-volt fuse and the power unit per SD-96699-01.
5. On the status panel, hold the **RESET ENABLE** switch to **ON** and momentarily press the **RESET** button.
   - If the reset completes and the LED goes out, you have completed this procedure.
   - If the LED is lighted, contact technical consultant for assistance in clearing the trouble.
6. Check printout for recent ERR SOFTWARE message.
   - If recent ERR SOFTWARE message occurred, refer to *Software Error* to clear the error.
   - If recent ERR SOFTWARE message did not occur, continue with Step **7**.
7. Check to see if MC is in maintenance condition (MCOND ...COMPL in printout).
   - If MC is in MCOND state, continue with Step **8**.
   - If MC is not in MCOND state, proceed to Step **10**.
8. Check printout to locate ERR message for MC, PMEM, or SMEM.
9. Enter DGN command for that entity (for example, DGN::MC!).
   - If DGN ...STF message is received, go to Section 5.1 to clear the failed diagnostic.

10. On the DACS II status panel, hold the **RESET ENABLE** switch to **ON** and momentarily press the **RESET** button.
    - If the FAILURE alarm goes off after the reset sequence completes, you have completed this procedure.
    - If the FAILURE alarm does not go off, check printout for MC packs named (**CPU2, CI, EBX,** and the **EMTC**) in an output error message.
11. If any MC pack is named, replace that pack.
    - If MC pack is not implicated, contact technical consultant for assistance.
12. On the status panel, hold the **RESET ENABLE** switch to **ON** and momentarily press the **RESET** button.
    - If processor LED goes off after the reset completes, you have completed this procedure.
    - If processor LED does not go off, repeat the sequence to replace the next MC pack in an output message until all the MC packs have been replaced.
13. If the trouble persists after all the MC packs have been replaced, check for backplane wiring or plug-in connector trouble.
    - If no pack or wiring trouble is found, contact technical consultant for assistance in clearing the trouble.

Clear Frame Startup Trouble

Overview: This procedure is used when the DACS II reset operation fails. During the reset, the controller packs (CI, MP, and MTC) and the frame unit UCs are initialized, internal communication networks are established, and programs are transferred from the PMEM or SMEM to the respective packs. Depending on the degree to which the frame is equipped, the reset can take up to 30 minutes (from memory card) to complete. The RST MC command initiates the same operations as the frame reset except that the unit UCs are not rebooted.

NOTE:
The terminal must be set at 1200 baud rate to read the information as it scrolls on the screen.

1. If there has been recent installation or maintenance activity on the backplane, check behind the MC to verify that wiring loops are installed at connectors CPU2 and CI. Be careful when removing the metal shield so as not to damage other wiring. The wiring loops (green wires) are on plugs at the CPU2 and CI connectors which are at the bottom center of the MC backplane (on the CEF).
2. At back of frame, disconnect the administrative link cables (except link 1) from the main controller and tag them for correct installation after the trouble is cleared.
3. Retry the reset as follows. On the DACS II status panel, hold **RESET ENABLE** switch to **ON** and momentarily press the **RESET** button.
   - If reset does not proceed beyond CI/ECI/HECI startup, replace the CI, ECI, or HECI, whichever is installed in the MC, with the same type and reset the frame again.
   - If any STARTUP STF message is received, replace the implicated pack as follows:
     - For MP, replace CPU2 (TM778) in main controller.
     - For CI/ECI, replace CI (TM658C), ECI (TM736C), or HECI (TM762).
     - For EBX, replace EBX (UM71) or BX2 for non-CEF (UM72).
     - For EMTC or MTC, replace EMTC (UM75) or MTC plug-in.

- If the reset completes with no conditions (COND), no error explanations, you have completed this procedure. Reconnect link cables.
- If the reset completes with conditions (COND), with error explanations, go to Section 7.2 to clear reset completed conditionally.
- If **BOOT FAILED; BAD BOOT DEVICE** message is received, refer to Section 6.4 to clear the trouble.
- If **SOFTWARE ID BLOCK CHECK FAILED** message is received, proceed to Step **6**.
- If **BOOT IN PROGRESS (continues for more than 45 minutes)** message is received, continue with Step **4**.
- If **other** message is received, check the trouble printout for other messages. If there are no other messages or trouble indications to work with, contact technical consultant.

4. Attempt to clear the trouble by replacing the circuit packs listed below (which have not already been replaced) one at a time and by checking the reset sequence. If software is being loaded from SMEM, try using the other source memory card and resetting the frame.
   - For MP, replace CPU2 (TM778) in main controller.
   - For CI/ECI, replace CI (TM658C), ECI (TM736C), or HECI (TM762).
   - For EBX, replace EBX (UM71) or BX2 for non-CEF (UM72).
   - For EMTC or MTC, replace EMTC (UM75) or MTC plug-in.
5. If trouble persists or other trouble messages are received, contact regional technical consultant for assistance in clearing the trouble.

6. From Table 6-1, determine the meaning of the condition (COND) code in the trouble message.

Table 6-1. Software ID Condition Codes

Code	Meaning
20	Software ID block cannot be read
21	Software ID block failed comparison

7. If you suspect that the wrong memory card was installed, install the correct memory card as shown in the following steps.

   a. Place the ESD grounding strap on your wrist and physically remove the CPU2 circuit pack.

   b. Replace the failed PMEM memory card with the most recent SMEM memory card (this may be the one currently installed in the SMEM slot on the CPU2).

   c. Insert a spare memory card in the SMEM slot.

   d. Physically insert the CPU2 back into the slot.

   e. On the Status Panel, hold the **RESET ENABLE** switch to **ON** and momentarily press the **RESET** button.

   f. To restore the SMEM card, enter the following command:

   `RST::SMEM,BKGRND`

Clear RESET TOD/DATE Message

Overview: This procedure deals with clearing ALM RESET TOD/DATE messages which indicate that the TOD (time of day) or date or both have been adjusted after a frame reset or MC restoral. The date is recovered from the SMEM and the time is obtained from the real-time clock in the CI, ECI, or HECI pack. When these RESET messages are accompanied by a minor alarm, it indicates that the recovered values are suspect and must be set manually. The date must always be set because the SMEM may not be up-to-date.

1. If the alarm cutoff is needed because of the ALM RESET message, enter **`UTL::ACO!`**.
2. Locate the system time and date that appear on the line following the <Date ...year> <Time ...day> explanatory line. The format of the date is modayr and the format of the time is hrmnsc.
3. Check these times against the actual times.

   NOTE:
   Enter **`UTL::QRY,DATE!`** to display the time again.

4. Does either time or date need to be reset?
   - If the time needs to be reset, enter **`UTL::TOD hhmmss!`** to set the correct time.

     Where:
     hh = Hour (00 through 23)
     mm = Minutes (00 through 59)
     ss = Seconds (00 through 59).

   - If the date needs to be reset, enter **`UTL::DATE {moda[ce]yy|ddmm[ce]yy}[,FORMAT ggg][,INT bb]!`** to set the correct date.

     Where:
     dd = Day (01 through 31)
     mm = Month (01 through 12)
     ce = Optional, for different century
     yy = Last 2 digits of year (00 through 99, default is 86)
     ggg = MDY for month, day, year format or DMY for day, month, year format.
     INT bb = Optional, to set interval at which the date will be printed, 01, 02, 04, 06, 08, 12, or 24 hours (default).

Clear Overload Message

1. If UNIT [q]q,UC OVERLOAD wording appears in the message, verify that the UBX pack is installed in the unit.
   - If UNIT [q]q,UC OVERLOAD wording does not appear in the message, proceed to Step **4**.
2. Enter **`RST::UNIT [q]q,UC!`** to restore subject unit.

   Where: [q]q = Unit number (1 through 16) named in OVERLOAD message.
   - If DGN ...STF message is received, refer to *Manual Diagnostic Failures* to clear the trouble.
   - If OVERLOAD UNIT or RL response is obtained again when frame is used, replace UBX plug-in, and enter **`RST::UNIT [q]q,UC!`**.
   - If OVERLOAD UNIT or RL response is not obtained again when frame is used, you have completed this procedure.
3. If trouble persists, check unit backplane and pins, and contact technical consultant if no wiring trouble is found.
4. If MJ and processor FAILURE LEDs are lighted on the DACS II status panel, refer to Section 6.1.
   - If those LEDs are not lighted, continue with Step **5**.
5. Determine which pack is implicated from the MP or CI designation in the OVERLOAD message. The MP designation means the CPU2 in the main controller and the CI means the CI in the main controller. The status panel FAILURE LED (which has its own trouble-shooting procedure) will be lighted with the OVERLOAD MC message.
6. Enter **`RMV::MC!`**. If command cannot be completed, continue with Step **7**.
7. Replace the MC pack implicated from the OVERLOAD message.
8. On the DACS II status panel, hold the **RESET ENABLE** switch to **ON** and momentarily press the **RESET** button.
   - If the trouble is cleared, this procedure is completed.
   - If the trouble persists, contact technical consultant for assistance.

Clear Inoperative Terminal (System Hung)

NOTE:
If trouble is found in any of the preliminary checks, discontinue the procedure.

1. Make the following checks:
   — Terminal connected to power outlet and power switch on.
   — Terminal connected to TTY connector at DACS II, either directly or via data sets.
   — Terminal passes its own self-tests.
   — Terminal is properly optioned and set to the proper baud rate for the link to which it is connected.

2. Verify that the correct ED-2C646-30 adapter is used to connect the data link to the DACS II.
   — Use a G1 (group 1) or G14 adapter for any interface via data sets (asynchronous or synchronous).
   — Use a G2 or G15 adapter for a direct TTY or CRT terminal (without data sets).
   — Use a G3 or G8 adapter for local operations systems such as SARTS (Switched Access Remote Test System) or TABS (telemetry asynchronous block serial) protocol link (asynchronous 4-wire – data only without data sets).
   — Use a G9 adapter for a link to CIU (craft interface unit) for *SLC*® Series 5 carrier. This is for an asynchronous link.

   NOTE:
   The G1 and G2 adapters interoperate with RS232C per EIA Pub. 12 and give maximum receiver margin and minimum pulse distortion. The G14 and G15 adapters contain termination and biasing networks to detect disconnected or unpowered RS232C equipment. The G1 and G2 adapters are recommended for use in normal installations where the equipment remains powered up.

3. Determine if the terminal will work with the printer shut off (failed printer can hang up the terminal); also, reset the terminal by turning it off, then on again.

4. If other links to DACS II are working, from another link, enter
   `UTL::QRY,STR,LINK j[mm]!`

   Where:

   j = Suspected link
   mm = Optional virtual circuit (synchronous).

   - If other links to DACS II are not working, proceed to Step **10**.

5. Read the output message per Figure 6-1 to verify that the link baud rate matches the terminal and to check other link status. Mismatched baud rates cause garbled characters to be printed.

   - If the link baud rate does not match the terminal baud rate, enter **`ADD::LINK j,PTCOL {S|T},BAUD bb[,ALM k][,BS e][,INIT]!`** and you have completed this procedure. (Refer to Section 6.8 for the procedure to establish the link.)

ASYNCHRONOUS

M...UTL QRY STR LINK j PTCOL S 2LN MSG:
STATUS bb e k q m p x hh COMPL

SYNCHRONOUS

PACKET LAYER FORMAT

M...UTL QRY STR LINK j[mm]PTCOL X 4 LN MSG:
STATUS bb e k m p hh
LNKL <X.25 LINK LAYER parameters> <frame addressing>
PKTL <X.25 PACKET LAYER parameters> <VC ranges (ppss)> <VC grps (gghh)>

LINK LAYER FORMAT

M...UTL QRY STR LINK j PTCOL X 4 LN MSG:
STATUS bb e k m FFFF hh
LNKL <X.25 LINK LAYER parameters> <frame addressing>
PKTL T20 R20 <VC ranges> <VC groups>

PTCOL = link protocol (Snider/X.25)

<X.25 Link Layer Parameters>
k T1 T3 N2

<X.25 Packet Layer Parameters>
T20 R20
W P T20 T22 T23 T25 T26 R20 R22 R23 R25 (for Virtual Circuit, e.g., 501)

STATUS:

e = 0 for true backspace or 1 for underscore backspace or dash (—) for synchronous. link (no backspace option).
m = 0 (idle), 1 (input message), or 2 (output message)
bb = Baud rate (03, 06, 12, 24, 48, or 96) or 00 for synchronous link (baud not detectable)
FFFF = For X.25 links, when a specific virtual circuit number is NOT entered, the protocol field is 4 HEX characters (16 bits of information), each bit representing a specific virtual circuit. Each HEX character can contain a value from 0 - F. All zeros indicates all 16 virtual circuits are active. All ones indicates all 16 virtual circuits are not active.
hh = 03 (hardware in-service) or 04 (hardware out-of-service)
k = 1 (link alarm defined as minor) or 2 (defined as major)
q = ENQ/ACK protocol 0 disabled, 1 enabled (default)
x = XON/XOFF protocol 0 disabled (default), 1 enabled.
ppss = Number of permanent and switched virtual circuits (00-16)
gghh = Permanent and switched virtual circuit groups (00-15)

Figure 6-1. Link Status Register

6. Enter **`DGN::LINK j!`** (where **`j`** is the original link that failed).
   - If DGN LINK ...STF message is received, refer to *Manual Diagnostic Failures* to clear link diagnostic failure.
7. If other links are working, try removing the inoperative link and restoring it to service again as follows:
   `RMV::LINK j!` and **`RST::LINK j!`**
8. On suspect link, try entering **`UTL::QRY,WHO!`** to see if DACS II can now execute commands.
   - If DACS II can execute commands, this procedure is completed.
9. If the inoperative link uses data sets, check data sets by connecting to a different link (if one is available and correctly provisioned in the data base). Alternatively, you can try replacing the data set. Data set specifications are found in the information notes of SD-96699-01.
10. At back of the frame, disconnect the administrative link cables (except link 1) from the main controller and tag them for correct installation after the trouble is cleared.
11. On the DACS II status panel, hold the **RESET ENABLE** switch to **ON** and momentarily press the **RESET** button. Watch for messages to see if the reset completes.
    - If the link is now operative, this procedure is completed.
12. Proceed as follows:
    - If DACS II is responding with **RL**, go to Section 6.7.
    - If DACS II is not responding at all (no character echo), replace the CI, ECI, or HECI pack in the MC.
    - If trouble persists, replace each of the following plug-ins one at a time and check if the link is operative after the reset completes.
      - — For MP, replace CPU2 (TM778) in main controller.
      - — For EBX, replace EBX (UM71) or BX2 (UM72).
      - — For EMTC or MTC, replace EMTC (UM75) or MTC plug-in.
    - If trouble persists, contact technical consultant for assistance.

Clear Repeated RL Command Response

1. If **RL** appears on the command line after the command is entered, reenter the command. If RL is received again, enter **`UTL::QRY,WHO!`** to see if trouble persists with different command.
   - If RL persists, continue with Step **2**.
   - If the trouble goes away, you have completed this procedure.
2. Check processor FAILURE LEDs status.
   - If MJ and processor FAILURE LEDs are lighted on the DACS II status panel, refer to Section 6.1.
3. Check printout for OVERLOAD message.
   - If OVERLOAD message is present on the printout, refer to Section 6.5.
4. On DACS II status panel, hold the **RESET ENABLE** switch to **ON** and momentarily press the **RESET** button.
   - After the reset completes, if DACS II can execute commands, this procedure is completed.
   - After the reset completes, if DACS II cannot execute commands, contact technical consultant for assistance.

Establish Administrative Link at DACS II

Overview: This procedure is used to prepare DACS II links for connections. There are six links available for connection of terminal equipment and operations systems. With the ECI (TM736C), links 5 and 6 are synchronous links using X.25 protocol (through level 3) at rates up to 9.6 kb/s. The HECI (high-speed, TM762) extends the rate up to 56 kb/s. Up to 16 virtual circuits can be established on each synchronous link. The characteristics of each link can be changed from the defaults provided by DACS II using the ADD commands herein. The ECI or HECI is required for TABS (telemetry asynchronous block serial) links.

1. If data sets (such as 202T) are required for remote connections or for equipment more than 50 feet (RS-232C specification) or 2000 feet (RS-449 specification, 1200 baud) away, verify that data sets have been installed. Data set specifications are given with the information notes in SD-96662-01.
2. Connect data link cable (for example, M25B) to the TTY connector for the link (behind DACS II main controller). No adapter is required for RS-449 format, but ED-2C646-30 adapters are required for RS-232C format as follows:
   - Use a G1 (group 1) or G14 adapter for any interface via data sets (asynchronous or synchronous).
   - Use a G2 or G15 adapter for a direct TTY or CRT terminal (without data sets).
   - Use a G3 or G8 adapter for local operations systems such as SARTS (Switched Access Remote Test System) or TABS (telemetry asynchronous block serial) protocol link (asynchronous 4-wire – data only without data sets).
   - Use a G9 adapter for a link to CIU (craft interface unit) for *SLC*® Series 5 carrier. This is for an asynchronous link.

NOTE:
The G1 and G2 adapters interoperate with RS232C per EIA Pub. 12 and give maximum receiver margin and minimum pulse distortion. The G14 and G15 adapters contain termination and biasing networks to detect disconnected or unpowered RS232C equipment. The G1 and G2 adapters are recommended for use in normal installations where the equipment remains powered up.

3. What type of link is being established?
   - If **ASYNCHRONOUS**, continue with Step **4.**
   - If **TABS**, proceed to Step **5.**
   - If **SYNCHRONOUS**, proceed to Step **6.**

4. Enter the appropriate command to initialize the link or make changes:
   `ADD::LINK j,PTCOL S[,BAUD bb][,ALM k][,BS e]`
   `[,ENQ q][,XON][,INIT]!`
   or **`ADD::LINK j,PTCOL {S|M}[,ALM k][,INIT]!`**

   Where:

   j = Physical link number (1 through 6)

   S|M = Asynchronous Snider (S) protocol or Modified (M) Snider for *SLC* Series 5 carrier system; only one of the 6 links can be set for modified Snider.

   bb = Baud rate; 03, 06, 12, 24, 48, or 96 for rate of 300, 600, 1200, 2400, 4800, or 9600; default is 1200

   k = Alarm class; k = 2 for major alarm for link hardware failure, or k = 1 for minor alarm (default)

   e = Backspace; e = 1 for backspace indicated by underscore or e = 0 to actually move cursor backward for backspace (default)

   ENQ q = To enable/disable ENQ/ACK acknowledgement protocol to match terminal requirement; q = 0 to disable or x = 1 enable (default).

   XON x = To allow use of CTRL S and CTRL Q commands to temporarily stop and start long output messages; x = 0 to disable (default) or x = 1 to enable.

   INIT = Optional, to initialize all parameters to default values except for those parameters entered in the command.

   Proceed to Step **10.**

5. Enter the following commands to make required settings:

   `ADD::LINK j,PTCOL T,BAUD bb!`

   `ADD::LINK j,APPL {ASCS|ASCD|PM}[,L2AD aa][,POLL ttt]!`

   Where:

j	=	Physical link number (3 or 4)
T	=	TABS protocol
bb	=	Baud rate (24 for 2400)
ASCS, ASCD, or PM	=	Selects application as follows: alarm surveillance and control summary or detailed, or performance monitoring.
ttt	=	Optional, to specify polling time as follows: 001 through 255 for ASCS or ASCD applications.
aa	=	Optional, to specify Layer 2 address (00 through 31).

   Proceed to Step **10**.

6. To initialize the link or change alarm class, enter **`ADD::LINK j,PTCOL X[,ALM k][,INIT]!`**

   Where:

j	=	Physical link number (5 or 6)
PTCOL X	=	X.25 synchronous link protocol
k	=	Alarm class; 2 for major alarm for link hardware failure or 1 for minor alarm (default)
INIT	=	Optional, to initialize all parameters to default values except for those parameters entered in the command.

7. Enter **`UTL::QRY,STR,LINK j[mm]!`** to see the existing (or default) link parameter values (see Table 6-2). The link must be removed from service to change parameters. See Figure 6-2.

8. To enter different **data layer** values, list the subject parameter followed by the value (for example, K-5). Enter the command as follows: **`ADD::LINK j[mm][,<param> <value>,...][,FRMAD {A|B}]!`**

   Where:

j	=	Physical link number (5 or 6)
mm	=	Permanent virtual circuit (01 through 16) on same link
<param> <value>	=	**Data layer** parameter (K, T1, T3, N2) and value obtained from associated portion of Table 6-2
FRMAD {A|B}	=	Frame address in X.25 layer; default is A.

9. To enter different **packet layer** values, list the subject parameter followed by the value (for example, R20-nn) and use commas to separate parameter entries. Enter the command as follows:
   ADD::LINK j[mm][,<param> <value>,...][,VC(ppss,gghh)]!

   Where:

   j = Physical link number (5 or 6)

   mm = Permanent virtual circuit (01 through 16) on same link

   <param> = One of the **packet layer** parameters of Table 6-2 for which different values are to be specified; identified by designation (for example, T20)

   <value> = Value of named parameter

   ppss = Virtual circuit ranges (00 through 16) for permanent (pp) and switched (ss) VCs; defaults are pp = 08 and ss = 08

   gghh = Virtual circuit groups (00 through 15) for above ranges; defaults are gg = 00 and hh = 00.

10. If denial COND 04 (link out-of-service) is received, enter **RST::LINK j[mm]!** and reenter the ADD command. Denial COND 03 means that the link must first be removed from service to change parameters.

11. Verify that any administrative terminal to be connected to the link is set to the following major characteristics: Full Duplex, 7/8-Bit ASCII, Even Parity, Answerback (if link is provisioned for ENQ/ACK) and same Baud Rate. Complete terminal specifications are found in the information notes of SD-96658-01.

12. If you are adding the link to service, enter **RST::LINK j[mm]!** to complete this procedure. Procedures to change the link language, NPC addressing, and output message screening are contained in *Provisioning*, Volume I.

ASYNCHRONOUS

M...UTL QRY STR LINK j PTCOL S 2LN MSG:
STATUS bb e k q m p x hh COMPL

SYNCHRONOUS

PACKET LAYER FORMAT

M...UTL QRY STR LINK j[mm]PTCOL X 4 LN MSG:
STATUS bb e k m p hh
LNKL <X.25 LINK LAYER parameters> <frame addressing>
PKTL <X.25 PACKET LAYER parameters> <VC ranges (ppss)> <VC grps (gghh)>

LINK LAYER FORMAT

M...UTL QRY STR LINK j PTCOL X 4 LN MSG:
STATUS bb e k m FFFF hh
LNKL <X.25 LINK LAYER parameters> <frame addressing>
PKTL T20 R20 <VC ranges> <VC groups>

PTCOL = link protocol (Snider/X.25)

<X.25 Link Layer Parameters>
k T1 T3 N2

<X.25 Packet Layer Parameters>
T20 R20
W P T20 T22 T23 T25 T26 R20 R22 R23 R25 (for Virtual Circuit, e.g., 501)

STATUS:

e = 0 for true backspace or 1 for underscore backspace or dash (—) for synchronous. link (no backspace option).
m = 0 (idle), 1 (input message), or 2 (output message)
bb = Baud rate (03, 06, 12, 24, 48, or 96) or 00 for synchronous link (baud not detectable)
FFFF = For X.25 links, when a specific virtual circuit number is NOT entered, the protocol field is 4 HEX characters (16 bits of information), each bit representing a specific virtual circuit. Each HEX character can contain a value from 0 - F. All zeros indicates all 16 virtual circuits are active. All ones indicates all 16 virtual circuits are not active.
hh = 03 (hardware in-service) or 04 (hardware out-of-service)
k = 1 (link alarm defined as minor) or 2 (defined as major)
q = ENQ/ACK protocol 0 disabled, 1 enabled (default)
x = XON/XOFF protocol 0 disabled (default), 1 enabled.
ppss = Number of permanent and switched virtual circuits (00-16)
gghh = Permanent and switched virtual circuit groups (00-15)

Figure 6-2. Link Status Register

Table 6-2. Synchronous Link Level Parameters

Parameter Designation	Meaning	Value Range	Default
Data Layer Values			
N2	Frame Transmission Attempts	2 through 16	7
K	Window Size	1 through 7	7
T1	Acknowledgment Timer	2 through 20 seconds	3
T3	Idle Channel Timer	4 through 120 seconds	26
Packet Layer Values			
W	Window Size	1 through 7	2
P	Packet Size	128 through 512 octets	128
R20	Restart Retries	1 through 10	1
R22	Reset Retries	1 through 3	1
R23	Clear Retries	1 through 10	1
R25	Data Retransmissions	0 through 3	0
T20	Restart Timer	10 through 180 seconds	180
T22	Reset Timer	10 through 180 seconds	180
T23	Clear Timer	10 through 180 seconds	180
T25	Data Acknowledgment Timer	10 through 200 seconds	200
T26	Interrupt Confirmation Timer	10 through 180 seconds	180

Note: The following timers are not supported by DACS II:

T2 - Built-in to the XPC-MC 68605 chip of the ECI, time is 0.3 seconds and cannot be changed with the software.

T4 - Inactive link timer.

T21 - Call request response timer for SVCs.

Data Base Troubles

7

Contents

7 Data Base Troubles

This chapter deals with two major troubles: clearing the denial of the backup memory transfers and clearing the conditional (with errors) completion of the main controller reset or the utility boot command.

The following items, on the maintenance considerations, are presented here as trouble-clearing tips:

- Problems may occur that suggest the PMEM card is defective or the PMEM card has corrupted executables or data base information on it. The following procedures outline the steps that should be followed to diagnose the problem and the appropriate actions to be taken, based on the results of the diagnostics.
- Before MC or EFC plug-ins are replaced, the MC must be removed from service.
- Some problems will cause the MC or EFC to go to the MCOND (maintenance condition) autonomously. While in the MCOND, the MC will be in the required state to process main controller maintenance commands. Commands directed to the peripheral units will be denied. After the trouble is cleared (or the particular backup transfer is completed), the restore MC command or hard reset is used to exit the MCOND.

Clear BMTR DNY Trouble

Supplemental Information - Replace PMEM Card

The procedure to diagnose and replace the PMEM card is as follows:

1. Perform the following diagnostic tests on both the PMEM and SMEM cards:

    a. Do the card diagnostic test, craft code X’0004.

    b. Do the validate data base test, craft code X’0010.

    c. Validate the boot block, craft code X’0020.

    d. Validate executable header, craft code X’0040.

    e. Validate executables, craft code X’0080.

    Several possible cases can result from this set of tests that lead to different actions to resolve the problems:

    a. If the PMEM card fails card diagnostics and the SMEM card passes all tests, then go to Step 2.

    b. If the PMEM card succeeds on the card diagnostic test, but fails any of the other tests, while the SMEM card succeeds on all tests, then go to Step 3.

    c. If the PMEM and SMEM card both succeed on the card diagnostic tests, but both fail on one of the other diagnostic tests, then go to Step 4.

    d. If the SMEM card fails card diagnostics and the PMEM card passes all tests, then go to Step 5.

    e. If the SMEM card passes card diagnostics, but fails any of the other tests, while the PMEM card succeeds on all tests, then go to Step 6.

2. Replace the PMEM card (Figure 8-2) with the card currently in the SMEM slot by doing the following (PMEM card is suspected to be defective):

    a. Place the frame into MCOND before physically removing the the CPU2 pack by entering the following command:

    `RST::MC,MCOND!`

    The frame will deny this command if it is already in MCOND.

    b. Place the ESD grounding strap on your wrist and physically remove the CPU2 circuit pack while the MC is out-of-service..

c. Replace the PMEM card with the card currently in the SMEM slot.

d. Insert a spare memory card into the SMEM slot.

e. Physically insert the CPU2 pack into the frame.

f. On the Status Panel, hold the RESET ENABLE switch to ON and momentarily press the RESET button.

g. The System should be brought into service with the correct version of the executables and database. If the boot completes successfully and the database is correct, discard the bad PMEM card and continue with Step 7.

   If PMEM fails to boot, run diagnostics on the PMEM card. The card diagnostic tests (craft code X’0004) will most likely fail, because the problem is most likely a PMEM card connector problem and the CPU2 board itself should be replaced. The system should be rebooted with the PMEM and SMEM cards in their original slots but with a new CPU2 pack.

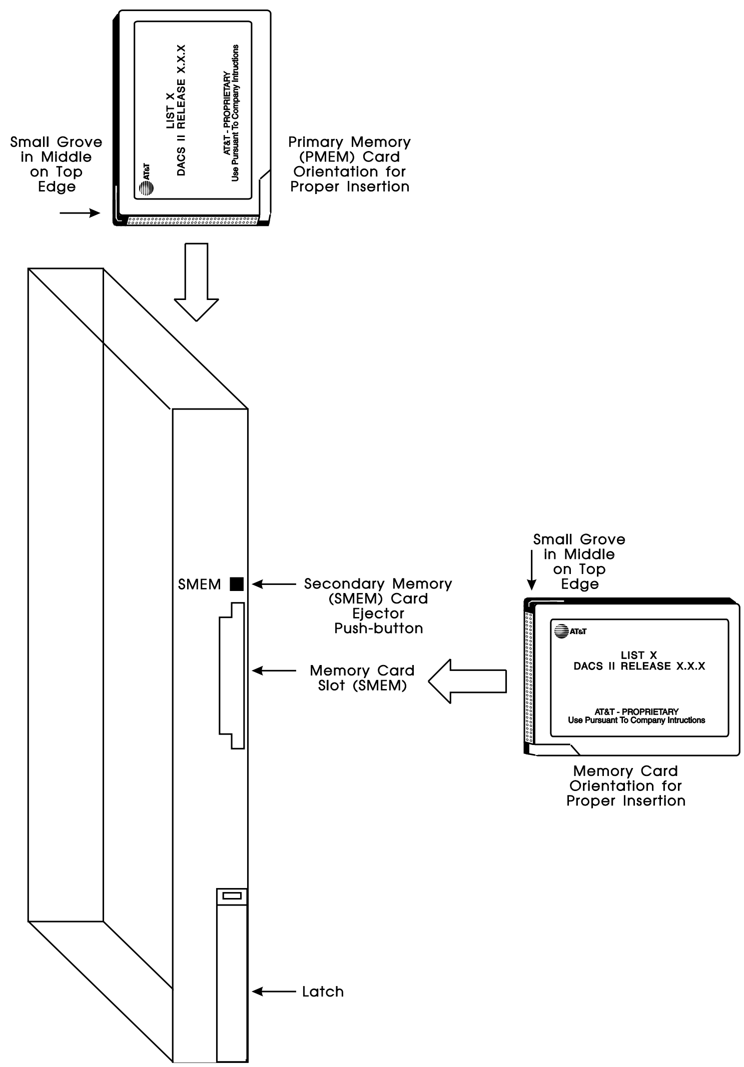

Figure 7-1. Memory Card Locations on CPU2

3. Replace the PMEM card (Figure 8-2) with the card currently in the SMEM slot by doing the following (PMEM card is suspected to contain corrupted executables or database):
   a. Place the frame into MCOND before physically removing the the CPU2 pack by entering the following command:

      RST::MC,MCOND!

      The frame will deny this command if it is already in MCOND.
   b. Place the ESD grounding strap on your wrist and physically remove the CPU2 circuit pack while the MC is out-of-service.
   c. Replace the PMEM card with the card currently in the SMEM slot.
   d. Insert a spare memory card into the SMEM slot.
   e. Physically insert the CPU2 pack into the frame.
   f. On the Status Panel, hold the RESET ENABLE switch to ON and momentarily press the RESET button.
   g. The system should be brought into service with the correct version of the executables and database. If the boot completes successfully and the database is correct, continue with Step 7. (The old PMEM card may be recycled as a future SMEM card.)
4. Replace the PMEM card (Figure 8-2) with the most recently archived memory card by doing the following (PMEM and SMEM cards are suspected to contain corrupted executables or database):
   a. Place the frame into MCOND before physically removing the the CPU2 pack by entering the following command:

      RST::MC,MCOND!

      The frame will deny this command if it is already in MCOND.
   b. Place the ESD grounding strap on your wrist and physically remove the CPU2 circuit pack while the MC is out-of-service.
   c. Replace the PMEM card with the most recently archived memory card.
   d. Insert a spare memory card into the SMEM slot.
   e. Physically insert the CPU2 pack into the frame.
   f. On the Status Panel, hold the RESET ENABLE switch to ON and momentarily press the RESET button.
   g. The System should be brought into service with the correct version of the executables and a valid but most likely not current database. If the boot completes successfully, continue with Step 7. (The PMEM card and the SMEM card may be recycled as future SMEM cards.)

5. Replace the SMEM card (Figure 8-3) with a spare memory card or with an older archive card that may be recycled. (SMEM card is suspected to be defective.):

   a. Remove the SMEM card physically from the CPU2 card. (Since the card has been found to be defective by the system, it must already be logically removed from the system.)

   b. Insert the spare memory card physically into the SMEM slot.

   c. Discard the bad SMEM card and continue with Step 7.

6. The SMEM card is good but has bad information on it.
   Restore the SMEM card:

   NOTE:
   The PMEM contents are copied onto the SMEM card when SMEM is restored. Each card is then a ‘‘mirrored image’’ of the other.

   `RST::SMEM,BKGRND!`

   If the command is denied because of bad or mismatching information on the SMEM card with the message:

   ```
   Warning: The SMEM Card being restored has the following problems!
   <message describing the problem>
       If YOU STILL WISH TO PROCEED, USE FRC OPTION
   ```

   Then use the command with the **`FRC`** option:

   `RST::SMEM,FRC,BKGRND!`

   You will get a response:

   `ARE YOU SURE? (YES/NO)`

   Answer YES and the restore operation should complete. Then go to Step 8.

7. To restore the SMEM card, enter the following command:

   NOTE:
   The PMEM contents are copied onto the SMEM card when SMEM is restored. Each card is then a ‘‘mirrored image’’ of the other.

   RST::SMEM,BKGRND!

8. If there is now a replacement card in the PMEM slot, then the PMEM may not contain the latest db changes, depending on which replacement card was used. Any changes not present need to be re-done.

9. Create a new archive copy if needed (archived copy was used to replace the PMEM). Refer to the "Database Archive Procedure" (Volume 1).

Trouble Clearing Procedure

1. To transfer the database or executables between the memory cards via the BMTR command, the frame must be in maintenance condition (MCOND); PMEM and SMEM must be in-service. When transferring information from SMEM to PMEM, the user must have restricted maintenance (RMON) privileges. For **`BMTR`** from RAM to MEM the frame must be in-service.

   If necessary—
   Enter **`RST::MC,MCOND!`** to go to MCOND and log on as user DAX or user with RMON enabled.

2. Reenter the BMTR command that was denied.

3. If BMTR ...DNY message is received again, proceed to Step **4.**

   - If denial message is not received, then take no further action; trouble or DACS II condition that prevented first transfer attempt is not present at this time. If the MC is in MCOND, enter RST::MC to exit maintenance condition.

4. Locate the denial condition (COND) code in the message and refer to Table 7-1 for the meaning of the code.

   NOTE:
   Anytime the BMTR command is reentered and a different denial is received in the procedure, return here to clear the new denial.

5. Which denial code appears in the BMTR output message?

   - If **COND 8B**, continue with Step **6.**
   - If **COND 8C** or **96**, proceed to Step **8.**
   - If **COND 85, 86, or 8D**, proceed to Step **14.**
   - If **COND 8E, 8F, 90, 95**, proceed to Step **23.**
   - If **COND 84, 93, or 94**, proceed to Step **28.**
   - If **COND 97**, proceed to Step **32.**
   - If **COND 20, 21, or 84**, proceed to Step **35.**
   - If **COND 99 or A5**, proceed to Step **37.**
   - If **COND 92 or E7**, proceed to Step **40.**

Table 7-1. Condition Codes (BMTR)

Code	Meaning
20	Software ID block cannot be read
21	Software ID block failed comparison
84	Trouble occurred while accessing SMEM; SMEM set to safe
85	Trouble occurred while accessing PMEM
86	Source does not contain information
8B	Frame not in-service
8C	MP or unit RAM error
8D	PMEM error (data base OP-CL-RD-WR-SK)
8E	Data base cannot send/receive mail
8F	Cannot lock/unlock RAM data base
90	Data base cannot access slave mailbox
92	Can't mount or unmount PMEM
93	SMEM not present
94	SMEM is not restored
95	Invalid option, mailbox, or flag
96	Unit is out-of-service
97	Entity cannot be addressed in configuration
98	Checksum verification failed
99	SMEM has old generic journal files
A5	SMEM software features do not match PMEM
E7	PMEM not restored

6. Enter the following:

   `RST::MC!`

7. Reenter the **`BMTR`** command.

   - If the command completes successfully, this procedure is completed.
   - If the same denial is received, contact technical consultant.

For COND 8C or 96, Continue:

8. Attempt to locate failed pack or out-of-service unit using the following commands:

   `DGN::MP!`
   `DGN::UNIT [q]q,UC!` (where [q]q = unit number 1 through 16)

   - If commands are denied because MC is out-of-service, enter **`RST::MC!`**.

9. Enter **`UTL::QRY,ALL!`** and check for failed and out-of-service MC packs and UCs.

   NOTE:
   The conditions are indicated by the presence of a "1" in the out-of-service, failed, and pested columns for each pack. Unequipped NPCs are indicated by dashes.

10. If you are clearing COND 96 and have units out-of-service, enter command(s) to restore service as follows: **`RST::UNIT [q]q,UC!`**.

11. If you received DGN ...STF message for MP or UNIT UC, refer to *Manual Diagnostic Failures* to clear the particular failed diagnostic.

12. If the MC is in-service, enter **`UTL::BOOT,FRAME!`**. If the MC is out-of-service, operate the reset on the status panel as follows: hold the **RESET ENABLE** switch to **ON** and momentarily press the **RESET** button.

    NOTE:
    The boot updates all the frame memories from the PMEM; this operation can take as long as 15 minutes to complete.

13. If reset was just performed and the copy is between PMEM and SMEM— Enter the following commands:

    `RST::MC,MCOND!`

    `RST::SMEM!`

    - Reenter the BMTR command.
    - If the same denial is received, contact technical consultant.

For COND 85, 86, or 8D, Continue:

14. Enter **`RST::PMEM!`** to ensure the PMEM is restored.
    - If RST ...DNY message is received, find the meanings of the condition codes in *Command Denials* (Supplemental Information - Replace PMEM Card).

15. Reenter the BMTR command that was originally denied.
    - If COND 85 or 8D is received again, proceed to "Supplemental Information - Replace PMEM Card."
    - If COND 86 is received again, proceed to "Supplemental Information - Replace PMEM Card."
    - If the BMTR command completes successfully—
      Enter **`RST::MC!`** to exit the maintenance condition. This procedure is completed.

16. If SMEM is the source for the BMTR command and "COND 86" is received—
    Place the ESD grounding strap on your wrist and replace the SMEM card with the most recent archived copy.
17. Renter the BMTR command that was orginally denied.
    - If problem persists contact technical consultant.
    - If BMTR command completes, proceed with next step.

18. Enter the following command:

    RMV::SMEM
19. Place the ESD grounding strap on your wrist and physically remove the archived card from the SMEM slot.
20. Insert spare card into the SMEM slot.
21. On the DACS II status panel, hold the **RESET ENABLE** switch to **ON** and momentarily press the **RESET** button.
22. Any DB changes that were not present on the archived memory card, must be redone.

For COND 8E, 8F, 90, or 95, Continue:

23. Check printout for ERR SOFTWARE messages that name the SMEM or PMEM.
24. Enter **`DGN::MC!`**.
25. If you have any failed diagnostics, go to *Manual Diagnostic Failures* to clear the particular failed diagnostic.
26. On the DACS II status panel, hold the **RESET ENABLE** switch to **ON** and momentarily press the **RESET** button.
    - If RESET ...COMPL (with no COND) is received, continue with next step.
    - If RESET ...COMPL (with COND) is received, go to Section 7.2.
27. Reenter the BMTR command that was denied.
    - If the command is completed, this procedure is completed. If the MC is in MCOND, enter **`RST::MC!`** to exit the maintenance condition.
    - If the same denial is received, contact technical consultant.

For COND 84, 93, or 94, Continue

28. Perform the following to ensure that the SMEM is installed and powered up:
    - Verify that the SMEM is installed.
    - Enter **`RST::SMEM!`** to power up SMEM and place it in-service.

29. Reenter the original BMTR command that was denied.
    - If the command is denied again, continue with the next step:
    - If BMTR ...DNY message is not received when original BMTR command is reentered, this procedure is completed.

      Enter **`RST::MC`** to restore equipment.

30. The craft person should run the following diagnostic tests on the SMEM card:
    a. Do the card diagnostic test, craft code X'0004.
    b. Do the validate data base test, craft code X'0010.
    c. Validate the boot block, craft code X'0020.
    d. Validate executable header, craft code X'0040.
    e. Validate executables, craft code X'0080.

    a. If the SMEM card fails card diagnostics, place the ESD grounding strap on your wrist and replace the the SMEM card and discard the original SMEM card.
    b. If the SMEM card succeeds on the card diagnostics tests, but failed any other test, place the ESD grounding strap on your wrist and replace the SMEM card (this card can be recycled for future use).

31. Reenter the BMTR command that was denied.
    - If the command is completed, this procedure is completed. Enter **`RST::MC!`** to exit the maintenance condition.
    - If the same denial is received, contact technical consultant.

For COND 97, Continue

32. The configuration information on the SMEM does not match the frame configuration. Enter **`UTL::QRY,CNFGR!`** and check the software serial number in the configuration file. This is the number in the SS column of the output message.

    NOTE:
    The software serial number in the configuration information designates the data bases on SMEM for use in a particular frame. A SMEM from storage may have the default (arbitrary) serial number.

33. If the correct SMEM is not installed, place the ESD grounding strap on your wrist and install it.
34. Reenter the BMTR command that was denied.
    - If the command is completed, this procedure is completed. Enter **`RST::MC!`** to exit the maintenance condition.
    - If the same denial is received, contact technical consultant.

For COND 20 or 21, Continue:

35. If the correct SMEM is not installed, place the ESD grounding strap on your wrist and install it.
36. Reenter the BMTR command that was denied.
    - If the same denial is received, contact technical consultant.
    - If the denial message is not received, this procedure is completed.

For COND 99 or A5, Continue:

37. The wrong memory card is installed in the SMEM slot. The COND 99 indicates that it is an old memory card that contains previous software information, and COND A5 indicates that the SMEM card contains a different feature package.
38. Place the ESD grounding strap on your wrist and install the correct SMEM card.
39. Reenter the BMTR command that was denied.
    - If the command is completed, enter **`RST::MC!`** to exit the maintenance condition, this procedure is completed.
    - If the same denial is received, contact technical consultant.

For COND 92 or E7, Continue:

40. Enter command to restore PMEM to service, **`RST::PMEM!`**.
    - If RST ...DNY message is received, find the meanings of the condition codes in *Command Denials*.
41. Reenter BMTR command that was denied.
    - If the same denial is received, contact technical consultant.
    - If the denial message is not received, enter **`RST::MC!`** to exit the maintenance condition, this procedure is completed.

Clear Reset, Boot, RST MC Conditional Completion

Overview: This procedure is used to respond to a conditional (with errors) completion of a frame reset, the BOOT FRAME command (boot), or the RST MC command. Frequently, the conditional completion will put the MC in MCOND for entry of maintenance commands only; full command capability is returned when the trouble is cleared and the RST MC completes. During a reset, the controller packs (CI and MP) and the frame unit UCs are initialized, internal communications are established, the PMEM and SMEM cards are powered up, and programs are transferred from the PMEM or SMEM to respective packs. The RST MC command performs the same operations as the reset except that the main controller plug-ins are not initialized.

PMEM Card Replacement Procedure

The procedure to replace a memory card is as follows:

1. Perform the following diagnostic tests on both the PMEM and SMEM cards:

   a. Do the card diagnostic test, craft code X'0004.

   b. Do the validate data base test, craft code X'0010.

   c. Validate the boot block, craft code X'0020.

   d. Validate executable header, craft code X'0040.

   e. Validate executables, craft code X'0080.

   Several possible cases can result from this set of tests that lead to different actions to resolve the problems:

   a. If the PMEM card fails card diagnostics and the SMEM card passes all tests, then go to Step 2.

   b. If the PMEM card succeeds on the card diagnostic test, but fails any of the other tests, while the SMEM card succeeds on all tests, then go to Step 3.

   c. If the PMEM and SMEM card both succeed on the card diagnostic tests, but both fail on one of the other diagnostic tests, then go to step 4.

2. Replace the PMEM card (Figure 7-3) with the card currently in the SMEM slot by doing the following (PMEM card is suspected to be defective):

   a. Place the ESD grounding strap on your wrist and physically remove the CPU2 circuit pack.

   b. Replace the PMEM card with the card currently in the SMEM slot.

   c. Insert a spare memory card into the SMEM slot.

   d. Physically insert the CPU2 pack into the frame.

   e. On the Status Panel, hold the RESET ENABLE switch to ON and momentarily press the RESET button.

   f. The System should be brought into service with the correct version of the executables and database. If the boot completes successfully and the database is correct, discard the bad PMEM card and continue with Step 5.

      If the boot fails, run diagnostics on the PMEM card. The card diagnostic tests (craft code X'0004) will most likely fail, because the problem is most likely a PMEM card connector problem and the CPU2 board itself should be replaced. The system should be rebooted with the PMEM and SMEM cards in their original slots but with a new CPU2 pack.

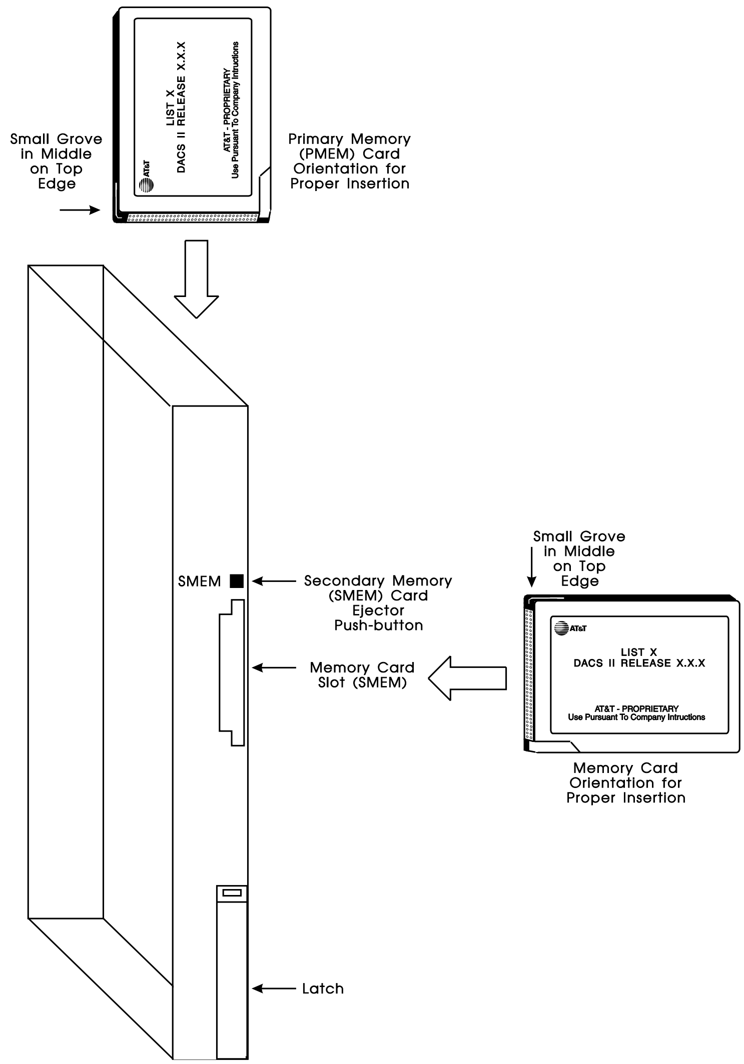

Figure 7-2. Memory Card Locations on CPU2

3. Replace the PMEM card (Figure 7-3) with the card currently in the SMEM slot by doing the following (PMEM card is suspected to contain corrupted executables or database):
   a. Place the ESD grounding strap on your wrist and physically remove the CPU2 circuit pack.
   b. Replace the PMEM card with the card currently in the SMEM slot.
   c. Insert a spare memory card into the SMEM slot.
   d. Physically insert the CPU2 pack into the frame.
   e. On the Status Panel, hold the RESET ENABLE switch to ON and momentarily press the RESET button.
   f. The system should be brought into service with the correct version of the executables and database. If the boot completes successfully and the database is correct, continue with step 5. (The PMEM card may be recycled as a future SMEM card.)

4. Replace the PMEM card (Figure 7-3) with the most recently archived memory card by doing the following (PMEM and SMEM cards are suspected to contain corrupted executables or database):
   a. Place the ESD grounding strap on your wrist and physically remove the CPU2 circuit pack.
   b. Replace the PMEM card with the most recently archived memory card.
   c. Insert a spare memory card into the SMEM slot.
   d. Physically insert the CPU2 pack into the frame.
   e. On the Status Panel, hold the RESET ENABLE switch to ON and momentarily press the RESET button.
   f. The System should be brought into service with the correct version of the executables and a valid but most likely not current database. If the boot completes successfully, continue with Step 5. (The PMEM card and the SMEM card may be recycled as future SMEM cards.)

5. To restore the SMEM card—
   Enter the following command:

   NOTE:
   The PMEM contents are copied onto the SMEM card when the SMEM is restored. Each card is then a ‘‘mirrored image’’ of the other.

   `RST::SMEM,BKGRND`

6. The replacement card now in the PMEM slot, may not contain the latest db changes, depending on which replacement card was used. Any changes not present need to be re-done.
7. Create a new archive copy if needed (archived copy was used to replace the PMEM),
   Refer to the "Database Archive Procedure" (Volume 1).

Trouble Clearing Procedure

1. Locate the COND code in the RESET, BOOT FRAME, or RST MC message.

   NOTE:
   The message shows one trouble at a time (the first one found). If other troubles exist, a different condition code will occur after the reset or restore is repeated. **If a different code occurs, go to Step 2 to clear that code.**

2. Which condition code is given in the RESET, RST MC, or BOOT message?
   - If **COND 46 (configuration file)**, contact technical consultant. This condition code can be caused by the interaction of trouble-clearing operations with the existing trouble conditions; the technical consultant will need to reconstruct the sequence that led to the trouble.
   - If **COND 47 (data base)**, proceed to Step **4**.
   - If **COND 48 (journal)**, continue with Step **3**.
   - If **COND 49 (unit)**, proceed to Step **9**.
   - If **COND 4B (RST MC, SMEM source)**, proceed to Step **11**.
   - If **COND 4C (fail to boot CI)**, proceed to Step **13**.

   For COND 48, Continue

3. If conditional completion was received as part of doing CFR FRAME or using the DLT FPKG command, there is a discrepancy between the journal files in the working RAM and the PMEM.

   - Enter **`RST::MC,NOJRNL!`** to clear the problem.

     If command completed successfully the procedure is complete.

     Otherwise continue with next step.

     NOTE:
     A database problem on PMEM is suspected.

For COND 47, Continue

4. ***Comment:*** This step and the next step are an attempt to restore the PMEM database from the SMEM database that currently resides in the frame.

   a. If the MC is not in MCOND—
   Enter the following:

   RST::MC,MCOND

   b. If SMEM and/or PMEM is not in service—
   Enter the following command(s):

   RST::PMEM
   RST::SMEM

   c. Logon as user DAX or user with RMON enabled—

   d. Enter **`UTL::BMTR,FROM SMEM,TO PMEM!`** to copy the data base information onto the PMEM.

   - If BMTR ...DNY message is received from the transfer, go to Section 7.1.

5. On the DACS II status panel, hold the **RESET ENABLE** switch to **ON** and momentarily press the **RESET** button.

   - If RESET ...COMPL (with no COND) message is received, this procedure is completed.

   - If RESET ...COMPL (with same COND) message is received, continue with the next step.

     Comment: The SMEM card also contains the suspected database problem.

   - If the RESET completed with different error message return to Step 2.

6. Obtain the archived flash card (containing the database)—
   Place the ESD grounding strap on your wrist and install it in the SMEM slot.

7. ***Comment:*** This step and the next step are an attempt to restore the PMEM database from the archived SMEM database.

   a. If the MC is not in MCOND—
      Enter the following:

      RST::MC,MCOND

   b. If SMEM and/or PMEM is not in service—
      Enter the following command(s):

      RST::PMEM
      RST::SMEM

   c. Logon as user DAX or user with RMON enabled—

   d. Enter **`UTL::BMTR,FROM SMEM,TO PMEM!`** to copy the data base information onto the PMEM.

   - If BMTR ...DNY message is received, go to Section 7.1.
   - If BMTR command completes successfully—
     Place the ESD grounding strap on your wrist and replace the "archive" SMEM card with a spare SMEM card. (Return the archive flash card to it’s storage location.)

8. On the DACS II status panel, hold the **RESET ENABLE** switch to **ON** and momentarily press the **RESET** button.

   - If RESET ...COMPL (with no COND) message is received, this procedure is completed.

     NOTE:
     Any DB changes that were not present on the archived memory card, must be redone.

   - If the RESET completed with different error message return to Step 2.
   - If RESET ...COMPL (with same COND) message is received, contact technical consultant.

For COND 49, Continue

9. Enter **`UTL::QRY,ALL!`** to find the unit UC which is out-of-service. The subject unit may have been removed by error recovery.

10. Enter **`RST::UNIT [q]q,UC!`** to restore the same unit.
    - If DGN ...STF message is received, go to Section 5.9 to clear failed unit UC diagnostic.
    - If the command is completed, this procedure is completed.

For COND 4B, Continue

11. The error condition indicates that the boot from the PMEM failed and that the SMEM was used as the source for the boot.
12. Replace the DACS II PMEM (Refer to "Supplemental Information - Replace PMEM Card").

For COND 4C, Continue

13. Replace the CI, ECI, HECI plug-in whichever is installed in the main controller.
14. On the status panel, hold the **RESET ENABLE** switch to **ON** and momentarily press the **RESET** button.
    - If RESET ...COMPL (with no COND) message is received, this procedure is completed.
    - If RESET ...COMPL (with COND) message is received, contact technical consultant.

Frame Audits

8

Contents

Frame Audits

8

Clear FRADTS FRCMP Message

Overview: This procedure deals with frame comparison type frame audit messages. These messages result when there is a difference in the data contained in the UC or pack memory and the MP memory. The FRADTS test number identifies what data is in question, and the message data bytes give which pack and what values are in the data bases. The boot operation (the entire frame, the unit UC restore, or pack restore) is used to bring the UC or pack memory into agreement with the PMEM. When doing corrective action, remember that booting the frame can take as long as 30 minutes to complete, and removing an NPC causes all of its channels to be taken out of service.

NOTE:
Although you will want to take notice of all FRADTS messages, you generally do not need to perform corrective action unless the same message recurs. **Provisioning commands that are not followed by a boot can cause FRADTS messages with test numbers in the 220 to 237 range.**

1. Locate the following in the trouble message: the test number which appears after the FRADTS keyword and the data bytes after the test number. These data bytes are referred to as dn through d0 in left-to-right order.

   The following lists the frame audits in numerical ascending order along with the table number the associated corrective action appears in:

Frame Audit	Table #
002	8-1
003	8-1
004	8-1
005	8-1
006	8-1
007	8-1
008	8-1
009	8-4
00A	8-4
00B	8-4
00C	8-4
011	8-1
012	8-1
013	8-1
014	8-1
015	8-1
016	8-1
017	8-1
018	8-1
019	8-2
01A	8-2
01B	8-2
01C	8-2
01D	8-2
021	8-1
022	8-1
023	8-1
024	8-1
025	8-1
026	8-1
027	8-1
028	8-1
029	8-1
033	8-3
034	8-3
035	8-3
036	8-3
037	8-3
038	8-3
039	8-3
03B	8-4

Frame Audit	Table #
03C	8-4
03D	8-4
03E	8-4
03F	8-4
040	8-3
041	8-3
042	8-3
043	8-4
044	8-4
045	8-4
046	8-4
047	8-4
048	8-4
049	8-4
04A	8-4
04B	8-4
04C	8-4
04D	8-4
050	8-3
052	8-3
055	8-3
056	8-3
057	8-3
058	8-3
059	8-3
05A	8-3
05B	8-3
05C	8-3
060	8-3
061	8-3
062	8-3
063	8-3
064	8-3
065	8-3
066	8-3
069	8-3
06A	8-3
06B	8-3
06C	8-3
06D	8-3
06E	8-3
06F	8-3

Frame Audit	Table #
070	8-3
071	8-3
072	8-3
073	8-3
074	8-3
076	8-3
077	8-3
078	8-3
079	8-3
07A	8-3
07B	8-3
07C	8-3
07D	8-3
07E	8-3
07F	8-3
080	8-3
081	8-3
084	8-3
102	8-1
103	8-1
104	8-1
105	8-1
106	8-1
112	8-1
113	8-1
114	8-1
115	8-1
116	8-1
121	8-1
122	8-1
123	8-1
125	8-1
126	8-1
127	8-1
128	8-1
131	8-1
132	8-1
133	8-1
135	8-1
136	8-1
150	8-1
151	8-1
152	8-1
154	8-1
155	8-1
156	8-1

Frame Audit	Table #
157	8-1
160	8-1
161	8-1
162	8-1
163	8-1
164	8-1
165	8-1
166	8-1
167	8-1
168	8-1
171	8-2
172	8-2
173	8-2
174	8-2
205	8-1
207	8-1
208	8-1
209	8-1
210	8-1
211	8-1
215	8-1
216	8-1
217	8-1
218	8-1
220	8-2
221	8-2
222	8-2
223	8-2
224	8-2
225	8-2
226	8-2
227	8-2
228	8-2
229	8-2
230	8-2
231	8-2
232	8-2
233	8-2
234	8-2
235	8-2
236	8-2
237	8-2
238	8-2
239	8-2
240	8-3

Frame Audit	**Table #**
241	8-3
242	8-3
250	8-3
251	8-3
253	8-4
254	8-4
255	8-4
256	8-4
257	8-4
258	8-4
259	8-4
25A	8-4
25B	8-4
25C	8-4
25D	8-4
25E	8-4
25F	8-4
260	8-4
261	8-4
262	8-4
263	8-4
264	8-4
265	8-4
270	8-5
271	8-5
272	8-5
273	8-5
274	8-5
275	8-5
276	8-5
277	8-5
278	8-5
279	8-5
27A	8-5
27B	8-5
27C	8-5
27D	8-5
27E	8-5
27F	8-5
280	8-5
281	8-5
282	8-5
283	8-5
284	8-5
285	8-5
286	8-5

287	8-5
288	8-5

Frame Audit	Table #
289	8-5
28A	8-5
28B	8-5
28C	8-5
28D	8-5
28E	8-5
28F	8-5
290	8-5
291	8-5
292	8-5
293	8-5
294	8-5
295	8-5
296	8-5
297	8-5
298	8-5
299	8-5
29A	8-5
29B	8-5
29C	8-5
29D	8-5
29E	8-5
29F	8-5
2A0	8-5
2A1	8-5
2A2	8-5
2A3	8-5
2A4	8-5
2A5	8-5
2A6	8-5
2A7	8-5
2A8	8-5
2A9	8-5
2AA	8-5
2AB	8-5
301	8-1
302	8-1
303	8-1
305	8-1
306	8-1
307	8-1
308	8-1
310	8-1
311	8-1
312	8-1
313	8-1

Frame Audit	Table #
314	8-1
315	8-1
316	8-1
317	8-1
320	8-4
321	8-4
322	8-4
323	8-4
324	8-4
325	8-4
326	8-4
327	8-4
328	8-4
329	8-4
32A	8-4
32B	8-4
32C	8-4
32D	8-4
32E	8-4
32F	8-4
330	8-4
331	8-4
332	8-4
333	8-4
334	8-4
335	8-4
336	8-4

2. Refer to Table 8-1, 8-2, 8-3, 8-4, or 8-5 to perform corrective action and consider the following:
   - — If a facility NPC must be removed from service, all channels on that NPC will be out-of-service until the NPC is restored to service (restore operation completes).
   - — For a FRADTS on an NPC or facility, the NPC number is determined by converting the HEX pack value to decimal. See Figure 8-1 for an example and Table 8-6 for hexadecimal numbers from 1 to 160. To get the NPC number in other units, add 160 for each proceeding unit.
3. If the FRADTS recurs and the unit controller has not already been removed and restored, enter **`RMV::UNIT [q]q,UC!`** and **`RST::UNIT [q]q,UC!`**.
4. If the FRADTS message recurs and the frame has not already been booted, enter **`UTL::BOOT,FRAME!`**.
5. If any FRADTS number recurs, contact technical consultant for assistance.

WARNING:
When performing the prescribed corrective actions, remember that removing an NPC from service causes all of its channels to be taken out of service. This action should only be performed during non-peak traffic hours.

Table 8-1. Equipage/Provisioning

ttt =	Pack	Data Bytes*	Corrective Action
002 003 007 032	FTMI FC UNIT DSPI	d5=unit No. d4=pack No. (NPCs - HEX No.)†	Enter **RMV::UNIT [q]q,UC!** and **RST::UNIT [q]q,UC!**
008	ECCN/ CCN	d4=ECCN side (0,1)	Enter **RMV::CCI s!** and **RST::CCI s!**
011	NPC	d5=unit No. d4=NPC No. (HEX No.)†	Enter **RMV::NPC <npc No.>!** and **RST::NPC <npc No.>!**
021 022 023 024	CCN CCNI CCB TSI	d5=side (00 or 01) d4=pack No. TSI=d5,d4,d3	(1) Remove and restore any pack on subject side (2) Enter **UTL::BOOT,FRAME!**
025	CCN	d5=side (00 or 1)	Enter **UTL::BOOT,FRAME!**
205 207 208 209	FTMI FC NPC NPC	d5=unit No. d4=pack No. (01-04) (NPCs=HEX No.)†	(1) Enter RMV and RST commands for subject pack (2) Look for DGN-STF (3) If recurs, enter **RMV::UNIT [q]q,UC!** and **RST::UNIT [q]q,UC!**
210	FC	d3=side, d4=FTMI d5=unit No.	Enter **RMV::UNIT [q]q,FC sf!** and **RST::UNIT [q]q,FC sf!**
301	CCN Group	d5=side	Remove and restore any pack on side. If side is active, go to other side first (**CFR::XC a!**)
302 303	TSI CCB	TSI=d5,d4,d3 d5=side, d4=CCB No.	Enter commands to RMV and RST subject pack
308	LINK	d5=link No. (01-06)	Enter commands to remove and restore link

* The data bytes occur in the following left-to-right order: d5 d4 d3 d2 d1 d0.

† To obtain NPC number, convert HEX digits to decimal.

Continued on next page

Table 8-1. ***Continued***

ttt =	Data Bytes*	Corrective Action
004,005,006	d5=Unit No. d4=FTMI No. (01-04)	(1) Enter **RMV::UNIT [q]q,UC!** and **RST::UNIT [q]q,UC!** (2) If recurs, enter **UTL::BOOT,FRAME!**
012,013,014, 015,016,017 018	d5=Unit No. d4=NPC No. (HEX 01-A0)†	(1) Enter **RMV::UNIT [q]q,UC!** and **RST::UNIT [q]q,UC!** (2) Enter **RMV::NPC <npc No.>!** and **RST::NPC <npc No.>!**
026-029	d5=ECCN side (0,1)	Enter **RMV::ETSI sqq!** and **RST::ETSI sqq!**
211,215, 216,217, 218	d5=Unit No. d4=NPC No.	(1) Enter **RMV::NPC <npc No.>!** and **RST::NPC <npc No.>!** (2) If recurs, remove 2 NPCs, reseat pack, and restore
102,103,104, 105,106,112, 113,114,115, 116,125,126, 127,128,135, 136,154,155 156,157		Enter **UTL::BOOT,FRAME!**
121,122,123, 131,132,133, 150,151,152, 160,161,162, 163,164,165, 166,167,168	d5=Unit No. d4=NPC No.	Enter **RMV::UNIT [q]q,UC!** and **RST::UNIT [q]q,UC!**
305,306,307, 310,311,312, 313,314,315	d5=SYNC side (0,1) d4=TLI No. (01-04) (except for ttt=305, 312, 313, 314)	(1) If TLI is named, remove and restore SYNC TLI (2) Enter **ULT::QRY,STATE,SYNC!** and look for SOURCE TLI,MATE (3) Enter **RMV::SYNC a!** and **RST::SYNC a!** (byte d5=sync side)
316,317	d5=ECCN side (0,1)	Enter **RMV::CCI s!** and **RST::CCI s!**

* The data bytes occur in the following left-to-right order: d5 d4 d3 d2 d1 d0.
† To obtain NPC number, convert HEX digits to decimal.

Table 8-2. Facility Error Thresholds

ttt =	Data Bytes*	Corrective Action
171,172,173 174	d5=Unit No. d4=NPC No.	Enter **RMV::NPC <npc No.>!** and **RST::NPC <npc No.>!**
019,01A,01B 01C,01D	d5=Unit No. d4=NPC No.†	Enter **RMV::UNIT [q]q,UC!** and **RST::UNIT [q]q,UC!**
220,221,222,223,224, 225,226,227,228,229, 230,231,232,233,234, 235,236,237,238,239,	d5=Unit No. d4=NPC No.†	Enter **RMV::NPC <npc No.>!** and **RST::NPC <npc No.>!**

* The data bytes occur in the following left-to-right order: d5 d4 d3 d2 d1 d0.
† To obtain NPC number, convert HEX digits to decimal.

Table 8-3. Subscriber Carrier and Subrate Data

ttt =	Data Bytes*	Corrective Action
033,034,035,036, 037,038,039,042, 050,052,250,251	d5=Unit No. d4=NPC (for 251)	Enter **RMV::UNIT [q]q,UC!** and **RST::UNIT [q]q,UC!**
055,056,057,058 059,060,061,062 063,064,065,066 086,089-093,095	d5=Unit No. d4=RT/DL (coded - internal number)	Enter **RMV::UNIT [q]q,UC!** and **RST::UNIT [q]q,UC!**
05A	d0=Unit No.	Enter **RMV::UNIT [q]q,UC!** and **RST::UNIT [q]q,UC!**
05B	d0-1(frame), 2(unit) 3(channel) or 4(time slot) d3=NPC No. (if applicable) d4=Unit No. (if applicable)	Enter **RMV::UNIT [q]q,UC!** and **RST::UNIT [q]q,UC!**
05C	d0-d5=not used	Enter **UTL::BOOT,FRAME!**
069-074, 076-081,084	d4=MJU/SRM/chan. No. d1=NPC No.	(1) Enter **RMV::NPC <npc No.>,SIDE s!** and **RST::NPC <npc No.>,SIDE s!**
240,241,242	d4=Unit No. d5=NPC No.	Enter **RMV::NPC <npc No.>!** and **RST::NPC <npc No.>!**

* The data bytes occur in the following left-to-right order: d5 d4 d3 d2 d1 d0.

Table 8-4. DS3 Feature

ttt =	Data Bytes*	Corrective Action
009,00A, 00B,00C	d4=Entity No. d5=Unit No.	**RMV::UNIT [q]q,UC!** **RST::UNIT [q]q,UC!**
03B,03C,03D, 03E,03F	d4=Entity No. d5=Unit No.	**RMV::UNIT [q]q,UC!** **RST::UNIT [q]q,UC!**
040,041,042, 043,044,045 046,047	d4=Entity No. d5=Unit No.	**RMV::UNIT [q]q,UC!** **RST::UNIT [q]q,UC!**
253,254,255, 256,257,258, 259,25A,25B, 25C,25D,25E, 25F	d4=Entity No. d5=Unit No.	**RMV::UNIT [q]q,UC!** **RST::UNIT [q]q,UC!**
048,049,04A, 04B,04C,04D 260,261,262 263,264,265	d5=Unit No.	**RMV::UNIT [q]q,UC!** **RST::UNIT [q]q,UC!**
323,324,325, 326,327,328, 329,32A	d4=MXR No. d5=Unit No.	**RMV::UNIT [q]q,UC!** **RST::UNIT [q]q,UC!**
320,321,322 32B,32C,32D, 32E,32F,330, 331,332,333, 334,335,336	d4=NPC No. d5=Unit No.	**RMV::UNIT [q]q,UC!** **RST::UNIT [q]q,UC!**

* The data bytes occur in the following left-to-right order: d5 d4 d3 d2 d1 d0.

Table 8-5. Performance Monitoring

ttt=	Data Bytes*	Corrective Action
270,271,272,273, 274,275,276,277, 278,279,27A,27B, 27C,27D,27E,27F, 280,281,282,283, 284,285,286,287, 288,289,28A,28B, 28C,28D,28E,28F,	d0 Long ANSI threshold in hardware d1 Long ANSI threshold in hardware d2 Long ANSI threshold in hardware d3 Long ANSI threshold in hardware d4 Long ANSI threshold in database d5 Long ANSI threshold in database d6 Long ANSI threshold in database d7 Long ANSI threshold in database d8 NPC number d9 UNIT number	(1) Verify the threshold value in the database is correct. (2) Enter **`UTL::BOOT,FRAME`**
290,291,292,293, 294,295,296,297, 298,299,29A,29B, 29C,29D,29E,29F, 2A0,2A1,2A2,2A3, 2A4,2A5,2A6,2A7, 2A8,2A9,2AA,2AB	d0 Long 30-channel threshold value d1 Long 30-channel threshold value d2 Long 30-channel threshold value d3 Long 30-channel threshold value d4 Long 30-channel threshold value d5 Long 30-channel threshold value d6 Long 30-channel threshold value d7 Long 30-channel threshold value d8 NPC number d9 UNIT number	(1) Verify the threshold value in the database is correct. (2) Enter **`UTL::BOOT,FRAME`**

Powers of 16 = 16^3 16^2 16^1 16^0

Example: Hex = 005A
Decimal Number = (0 x 16^3)
+ (0 x 16^2)
+ (5 x 16^1)
+ (A x 16^0), where 16^0 = 1

0s = (0 x 0) = 0
5 = (5 x 16) = 80
A = + (A x 1) = 10, where A = 10
Decimal Number = 90
(NPC Number = 90 + 1 because internal count started with 0)

Hex Characters: = A = 10, B =11, C = 12, D = 13, E = 14, F = 15

Figure 8-1. Hexadecimal-to-Decimal Conversion Example

Table 8-6. Hexadecimal Numbers

(1) 01	(21) 15	(41) 29	(61) 3D	(81) 51	(101) 65	(121) 79	(141) 8D
02	16	2A	3E	52	66	7A	8E
03	17	2B	3F	53	67	7B	8F
04	18	2C	40	54	68	7C	90
05	19	2D	41	55	69	7D	91
06	1A	2E	42	56	6A	7E	92
07	1B	2F	43	57	6B	7F	93
08	1C	30	44	58	6C	80	94
09	1D	31	45	59	6D	81	95
(10) 0A	(30) 1E	(50) 32	(70) 46	(90) 5A	(110) 6E	(130) 82	(150) 96
0B	1F	33	47	5B	6F	83	97
0C	20	34	48	5C	70	84	98
0D	21	35	49	5D	71	85	99
0E	22	36	4A	5E	72	86	9A
0F	23	37	4B	5F	73	87	9B
10	24	38	4C	60	74	88	9C
11	25	39	4D	61	75	89	9D
12	26	3A	4E	62	76	8A	9E
13	27	3B	4F	63	77	8B	9F
(20) 14	(40) 28	(60) 3C	(80) 50	(100)64	(120) 78	(140) 8C	(160) A0

Clear FRADTS DGN Trouble

1. Check FRADTS message for MC keyword (FRADTS MC DGN).
   - If MC keyword is in the message, continue with Step **2**.
   - If not, from Table 8-7 determine which circuit failed the FRADTS diagnostic using the circuit abbreviation and data in the output message.
2. Enter the diagnostic command from Table 8-8 for the circuit named in the FRADTS message. The abbreviations for the circuits in the table match the message keywords.
3. If DGN ...STF message is received, refer to the procedure in *Manual Diagnostic Failures* to clear the trouble.
   - If the message is not received, there is no hardware trouble at this time; the autonomous diagnostic may have resulted from an error situation that cleared up.

Table 8-7. Circuit Pack Identification

Circuit	3-Digit Field (eee)	Data Byte (d0)
ETSI	eee = side (000.001)	d0 = left,right=from,to
SYN (SYNC)	= side	= 00
UFC (FC)	= unit (001-016)	= 00
FTM (FTMI)	= unit	= FTMI No. (01-04)
ECCN (CCI)	= CCI (000/001)	= 00
NPC	= NPC (001-640)	= 00
LNK (LINK)	= link (001-006)	= 00
TLI	= sync side (00/001)	= TLI No. (01-04)
CRO	= sync side	= TLI No. (03)
UNI (UNIT)	= unit (001-016)	= 00
DSP (DSPI)	= DSPU	= not used
FMT 0qs	= unit (q) and side (s)	= not used
CCB	= side	= CCB No. (01-06)
CCN(CCNI)	= CCNI (000/001)	= 00
FLI 0qk	= unit (q) and side (k)	= not used
MXR 0qc	= unit (q) and MXR (c)	= not used
MIU 0qc	= unit (q) and MIU (c)	= not used

Table 8-8. Diagnostic Commands

Circuit (Abbrev.)	Command
BX	DGN::MC!
MTC (MT)	DGN::MC!
CI	DGN::CI!
PMEM	DGN::PMEM!
SYNC	DGN::SYNC a!
CRO	DGN::SYNC,TLI 3,CRO!
TLI	DGN::SYNC a,TLI n!
UC	DGN::UNIT [q]q,UC!
FTMI	DGN::UNIT [q]q,FTMI d!
DSPI	DGN::UNIT [q]q,DSPI!
FC	DGN::UNIT [q]q,FC sb!
CCI	DGN::CCI s!
ETSI	DGN::ETSI sqq!
CCNI	DGN::CCNI s!
CCB	DGNCCB!
TSI	DGN::TSI sft!
NPC	DGN::NPC <npc No.>[-<range>],[SIDE s][,INCL]!
SMEM	DGN::SMEM!
LINK	DGN::LINK j!
FMT	DGN::UNIT [q]q,FMT s!
FLI	DGN::UNIT [q]q,FLI {S|P}!
MXR	DGN::UNIT [q]q,MXR c!
MIU	DGN::UNIT [q]q,MIU c!

Clear FRADTS BMCMP Trouble

Overview: LOOK AT STEPS 1 AND 2 BEFORE READING THIS OVERVIEW. This procedure deals with the BMCMP type of frame audit which results because there is a difference between the MP memory data base and the PMEM data base. If the message data bytes show that the RAM is not corrupted, the discrepancy will be cleared with the next automatic transfer from RAM to PMEM. However, if the RAM data is invalid, either an immediate BOOT is needed or, if an automatic transfer has already placed the data onto the PMEM, the corrupted PMEM trouble will have to be cleared.

1. Look at the value of data bytes d5 through d1 which are the five bytes just ahead of the COMPL in the FRADTS message.
2. If these bytes equal FF, immediately enter **`UTL::BOOT,FRAME!`**.

   NOTE:
   The FF bytes indicate that the RAM data is invalid. Entering the BOOT will update the RAM data base from the PMEM and will resolve the problem provided the automatic transfer from RAM to PMEM has not already occurred. This automatic transfer occurs approximately every 15 minutes, and if it occurred, the PMEM has been corrupted which will result in another trouble message and error recovery (ERR message).

   - If these bytes do not equal FF, the discrepancy may be temporary until the next automatic transfer (unless it can be done manually by a command). If the message recurs, there may be a problem; contact technical consultant for assistance.

Software Error

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Software Error

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Clear ERR SOFTWARE Message

Overview: This procedure checks the results of the software error recovery action and gives the meanings of the error types. Unless the message indicates that it is only a REPORT, the recovery action will occur autonomously and will correct the problem via a command abort, a boot, a processor removal, the MC going to MCOND, or the processor being "parked" in the inoperative state. The only manual operations required are to: respond to MP, CI, or UC removals/parking, reset/boot failures, and reenter commands that were aborted. If error recurs, the DACS II may escalate the recovery operation. For example, if entry of a command reveals the error and brings a boot, the next occurrence may bring a circuit removal.

1. In the message lines of the ERR SOFTWARE message, note the ACTION that was autonomously initiated. The PROC (process) named in the message is the one that found the error. Table 9-1 gives the meaning of the ERROR TYPE that is named in the message.
2. Check the output message to see which autonomous recovery action is reported.
   - If **PARK MC/CI** or **PARK UC**, continue with Step **3.**
   - If **CDBOOT**, proceed to Step **4.**
   - If **MCOND**, proceed to Step **5.**
   - If some **other action**, proceed to Step **6.**

3. For PARK MC/CI, hold the **RESET ENABLE** switch to **ON** and momentarily press the **RESET** button on the DACS II status panel. For PARK UC, enter **`RST::UNIT [q]q,UC!`** for the unit number (1 through 16).

4. If MC RESET COMPL message (with no COND code) or RST UC COMPL message is received, proceed to Step **11**.

   - If MC RESET COMPL message (with COND code) is received, refer to *Data Base Troubles* to clear the trouble.
   - If MC RESET stopped is received, refer to *Controller and Link Troubles* to clear the trouble.
   - If DGN ...STF message is received for restore UC, refer to *Manual Diagnostic Failures* to clear the diagnostic trouble.
   - If other denial message is received for restore UC, find the meanings of the condition codes in *Command Denials*.

5. Enter **`DGN::MC!`** or separately diagnose the MP.

   NOTE:
   The MC MCOND message in the printout shows that the MC is in the maintenance condition. Commands that were aborted when the software error was detected must be reentered after the trouble is cleared.

   - If DGN ...STF message is received, refer to *Manual Diagnostic Failures* to clear the failed diagnostic.
   - If DGN ...STF message is not received, proceed to Step **12.**

6. Check associated messages in printout to determine whether initial autonomous action was completed or denied. If denied, check if some other action resulted.

   - If MP was removed (RCY REMOVE MP) or parked, continue with Step **7.**
   - If not, proceed to Step **8.**

7. If MC was removed, enter **`RST::MC!`**. If MC was parked, reset frame using the **RESET ENABLE** switch and the **RESET** button on DACS II status panel. Then proceed as follows:

   - If **RST MC COND code**, refer to *Data Base Troubles* to clear the trouble.
   - If **reset startup diagnostic or boot fails**, refer to *Controller and Link Troubles* to clear the trouble.
   - If **other response**, proceed to Step **10.**

8. Check for DGN ...STF messages in the recovery sequence, enter **`UTL::QRY,ALL,COMMON!`**, and check the output for failed plug-ins (indicated by 1s in the failed position of the out-of-service, failed, pested groupings for the plug-ins).
9. If the recovery ACTION from the ERR SOFTWARE message is listed below, perform the corrective action:
   - REMOVE - Replace failed plug-in and enter command to restore plug-in to service per Figure 9-1.
   - WMBOOT - If the action was denied, enter **`UTL::BOOT,FRAME!`**.
   - HWBOOT - If the action was denied, enter the command to restore the plug-in to service per Figure 9-1.
   - REPORT - Respond to the COND completion or denial of the command that brought the ERR SOFTWARE message.

verb::<CP identification>[,option]!

{RMV::	SYNC a!	a	= 0 or 1
/RST::	SYNC a,TLI n[,SSP b]!	n	= 1-4; b = sync port (0 or 1)
/DGRTH::	CCI s!	s	= side 0 or 1
/DGN::}	CCNI s!	s	= side 0 or 1
	ETSI sqq!	qq	= unit 1-16
	TSI sft!	f	= unit (receiving from) (1-6)
	CCB sf!	t	= unit (transmitting to) (1-6)
	ETSIS,ECCN s,ALL!		For all ETSIs on the side
	TSIS,CCN s,ALL!		For all TSIs on the side
	UNIT [q]q,UC!	[q]q	= unit (1-16)
	UNIT [q]q,{FTMI d|DSPI}!	d	= module interface for units 1-4
	UNIT [q]q,FC sd!	sd	= FC side (0,1) and FC No. (1-4)
	UNIT [q]q,FLI k!	k	= service (S) or protection (P)
	UNIT [q]q,FMT s!	s	= side (0,1)
	UNIT [q]q,MMFG c	c	= DS3 group (1-6,P)
	[,FRC][,INCL]!	FRC	= forces remove with no prot. switch
		INCL	= removes/restores MXR NPCs
	NPC <npc No.>[,SIDE s]!	<npc No.>	= NPC number
		s	= SIDE for DSPU
	LINK j!	j	= link 1-6
DGN::	UNIT [q]q,MXR c!	c	= DS3 group (1-6,P)
	UNIT [q]q,MIU c!	c	= DS3 group (1-6,P)

NOTE: Removing the NPC is service affecting.

Figure 9-1. Commands to Restore Plug-Ins

10. If the corrective action is completed, proceed to Step **13.**
    - If not, continue with Step **11.**

11. If the ERROR TYPE is listed below, perform the additional corrective action (if not already done autonomously) as follows:
    - CHECKSUM/DBCHECKSUM - Repeated errors on same processor indicate a failure or PMEM corruption.
    - HARDWARE - Look for ERR HARDWARE messages or other pack failure messages.
    - EXCESSIVE INT - If trouble recurs (processor parked), notify technical consultant.
    - RAMTEST - If trouble recurs (processor removed), replace the associated pack (MP, EBX, BX, CI, or UC) and enter command to restore MC or UC processor.

12. If the additional corrective action is completed, continue with Step **13.**
    - If not, refer trouble to technical consultant who will use the raw data bytes to further analyze the trouble.

13. Reenter the command that brought the ERR SOFTWARE message. This command will have either been aborted, denied, or have a conditional completion.

    NOTE:
    FRADTS messages may also occur because of discrepancies that result if BMTR ...RAM to PMEM preceded a boot.

14. If the command is completed, you have completed this procedure.
    - If the command is not completed, refer trouble to technical consultant who will use the raw data bytes to further analyze the trouble.

Table 9-1. Software Error Explanation

Error Type	Explanation
JOURNAL	Failure to record command on PMEM journal.
DATABASE	Failure of software to access data base.
PMEM	Failure of software to access PMEM.
SMEM	Failure of software to access SMEM.
COMMUNICATIONS	Process-to-process communications failure.
CPUDGN	Failure of CPU diagnostic.
MACHINE	Operating system error.
PROGRAM	Internal program failure or error.
CHECKSUM	Memory failure/corruption.
RECOVERY	Recovery-to-recovery problem.
REMOTE PROGRAM	Program error encountered on other processor local process report.
EXCESSIVE INT	Internal problem was causing repeated error handling; so, MC or UC was parked.
RAMTEST	Processor RAM failed test and was removed.
HARDWARE	Hardware write failed; possible hardware failure.
Action	**Explanation**
RSCOLDBT	Super cold boot.
REPORT	Report only; no action taken.
HWBOOT	Hardware boot from existing data base.
WMBOOT	Boot of data base from PMEM and boot hardware (warm boot).
CDBOOT	Boot entire processor data base and executables and boot processor hardware.
REMOVE	Remove named processor from service.
MCOND	Place MC in maintenance condition.
PARK	Park named processor in inoperative state.

Command Denials

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Command Denials

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Clear Command Denials

1. If you have one of the following word strings in the denial message, read the associated information and perform corrective action to obtain command completion.

   - **INACT** - The INACT message indicates that the command is invalid with the feature package being used.
   - **BAD SYNTAX** - Determine the portion of the command that was in error from the designator (BAD VERB/FRM ERR/SEQ ERR) in the message and reenter the command with the correct information. If you do not understand how to correctly construct the command, you can get on-screen help using the help routine (initiated by entering a question mark, ?).

     NOTE:
     The DACS II indicates where the input error occurred, by placing = signs around the word or portion in the echoed command.

   - **ERR, ABT** - Reenter the command; a transient frame condition may have caused the command to be aborted. If the command is aborted again, check the printout to find associated trouble messages.
   - **MC OOS** - The MC (main controller) must be restored to service to execute the command.

- **MCOND** - The MC is in the maintenance condition, and only commands which are considered frame maintenance commands can be used.
- **MC INSERVICE -** The MC must be in the maintenance condition to execute certain PMEM and SMEM commands.
- **MPDBASE** - The main processor data base is not loaded.
- **RESTRICTED, STOPPED** - Only users who have been assigned the use of restricted maintenance commands can use the command. The use of this set of commands is enabled by the frame administrator who enters the ADD command with option RMON for the user.

2. If you received a subrate data denial message string, check Table 10-1 for additional information.
3. If you received a COND cc DNY message, find the meaning of the COND code in Table 10-2.

   NOTE:
   Since only the last 2 digits of the condition code appear in the message, some of the codes have multiple meanings. If any meaning in Table 10-2 is not appropriate for the command that was denied, check the other meanings.

4. Command denials can be categorized under common causes. Check the following descriptions and, if applicable, perform corrective action to obtain command completion.
   - **Input Error -** Check each field of the command entry on the screen or printout against the documented command to find the error.
   - **Not Equipped, Not In-Service, or Failed** - The named equipment is not grown (equipped) or in-service to support the execution of the command. The commands to grow and restore the plug-in to service are covered in provisioning in Volume 1, and procedures to clear failed plug-in and trouble messages are in this trouble-clearing volume.
   - **Incorrect NPC/Channel Number** - Check each side of the cross-connect command to find incorrect numbers that are already assigned or assigned differently. There are query commands in the cross-connect procedures to obtain information about existing connections on the frame.
   - **Invalid Parameters** - Check each field of the command entry against the documented command to determine which keyword is incorrectly used.

- **Boot Failed** - This is a specific restore command denial. Reenter the restore plug-in command and subsequent diagnose command in an effort to get a DGN ...STF message for which there is trouble clearing in the respective trouble-clearing chapter. If no DGN ...STF message is obtained but the denial persists, replace the plug-in to be restored.

Table 10-1. Subrate Denial Strings

Message String	Corrective Action
Exceeds Limit of 21	Only 21 MJUs can be disconnected at one time. Split the MJUs to be disconnected into smaller groups.
INCL Required for All Subrate Circuits	This is a precaution to ensure that data customers are informed of maintenance action. Verify that you are addressing the correct channel and notify customers if you are going to remove service.
OLD Channel Not Established to Subrate Feature	The addressed channel has not been established to subrate with SECH command.
OLD Channel Has Associated Parity Channel	The PCH [ppp] option must be used to indicate the next or particular parity channel.
New Channel Not Same As Old	The new channel was established to Subrate differently (DS0A or DS0B). Check channel entries.
Exceeds EC/SRM/MJU Capacity	For EC, use ECLOC query to find which is being used (SRM or MJU); enter command to change ECLOC. For SRM/MJU, the next plug-in is required for more capacity.
MPTM Keyword Disallowed	The MPTB keyword is only valid for multipoint junction unit circuit.
MA Field Does Not Exist	The MJU entered in the MA field does not exist.
ALL Keyword Is Not Specified	The ALL must be used when there are branches. Verify command entry.
Associated with RT Digroups	An NPC entered in the command is associated with *SLC*® Carrier System; channels for these are entered as virtual channels on the DGA NPC, which allows channels 1 through 96 to be addressed on one NPC.

Table 10-2. Frame Denials

cc	*Explanation*
00	No conditions
01	Assignment of single priority to multiple SSPs Backup required before executing this command Invalid range for specified NPC type No FADs were activated by link n No test ports were activated by link n Subject entity is equipped
02	Invalid NPC type for AIS insertion

cc	*Explanation*
	Manual Pending is Active
	One or more FADs could not be released
	One or more test ports could not be released
	Subject entity is not equipped
03	DS3U NPC already In-Service
	No RDC or CUS circuits and INCL keyword used
	Subject entity is in service
	This NPC type does not allow unframed Clear-DS1
04	MONDAT keyword is invalid for this feature
	No NPC's out of service and OOS keyword used
	Subject entity is out of service
	This NPC type does not allow Payload
05	Invalid parameter combination
	Invalid use of CONV keyword
	Subject entity is pested
	This NPC type does not allow unframed Clear-DS1
06	Device failed to format
	Invalid range for specified FROM NPC type
	Mismatch between MXR and MIU HDW types
07	Device failed to initialize
	Invalid range for specified TO NPC type
	Mismatch between MXR and NPC types
08	Cannot remove own link
	Invalid FROM NPC type for AIS insertion
	Mismatch between service MXR and protection MXR types
09	Invalid TO NPC type for AIS insertion
	Last link in service
	Wrong MXR type grown for this MIU
0A	All CBTYPE NPCs out of service or failed
	DGN on subject entity failed
	Minor Slip threshold disabled before Major Slip threshold
0B	Another signal already active prevents this signal from being sent
	BOOT on subject entity failed
	Invalid CEPT NPC
0C	DGN on subject entity denied
	PM scheduling report is already inhibited for this entity
	The MONDAT and MONTIM parameters can not both be specified
0D	PM scheduling report is already allowed for this entity
	Unpesting error registers for subj. entity failed
0E	No equalization for CEPT FTMI
	Only one parameter is allowed
	The specified parameter is not applicable to operation mode of the RT
0F	Frame time is not set
	Side specified for non-duplicated NPC
10	NPC out of service or failed
	RT's alarm exists
	Unit is not equipped

cc	*Explanation*
11	NPC not equipped PMEM type no longer supported UC is out of service
12	Active CCN side not IS or failed or pested or hardware OOS First and Last NPCs are outside unit boundary UC is in service but failed
13	FTMI is not equipped First and Last NPCs are outside a module boundary UNIT not equipped, not in service, or failed
14	1 hr >= 24 hr for DM opt CCB not eqd, not IS, or failed or inactive side CCB not eqd or not IS FTMI is out of service OFFSET range is invalid
15	15 min >= 24 hr for SERS opt FTMI not equipped, not in service, or failed NPC is unequipped
16	15 min >= 24 hr for ERS opt FC not eqd, not IS, or failed or inactive side FC not eqd or not IS FC not eqd, not IS, or failed or inactive side FC not eqd or not IS Only up to 4 historical data registers are allowed SYNC TB is not equipped
17	15 min >= 24 hr for US opt Command did not execute for any entity specified in the command SYNC is out of service TSI not eqd, not IS, or failed or inactive side TSI not eqd or not IS
18	15 min >= 24 hr for SLIP opt CCNI is out of service DSPI not equipped, not in service, or failed DSPI not in service or failed Exceeded limit of reports with accum. interval of 15 min. or less
19	Exceeded maximum limit of PM reports Mate CCN side is out of service Test ports must be on CAS
1A	Mate SYNC is out of service Report already exists Required FLI not equipped, not in service, or failed The facility parameter not programmable for specified x or z parameter
1B	CCN side s is in service Historical data can not be specified Required MXR not equipped, not in service, or failed Two digroups from same bank added to different FTMIs
1C	CCN side s is out of service Reqd FMT not eqd,not IS,or failed,or inact side FMT not eqd, or not IS
1D	Level field is not allowed Required MIU not equipped, not in service, or failed
1E	Customer control or red circuit exists Monitored Date field is not allowed

cc *Explanation*

Monitored Date field is not allowed
1F FTMI is in service but failed
Scheduled reporting for this npc is inhibited
20 Line format types are incompatible
Only DAILY for accumulation interval is allowed
Only DAILY for accumulation interval is allowed
Option rr/m has not been set up on 2nd database
Software Identification Block is not readable
21 Minor >= major for SLIP opt
Only 15MIN for accumulation interval is allowed
Only 15MIN for accumulation interval is allowed
Software Identification Block failed comparison
Trunk conditioning is invalid
22 FMC cannot be cross-connected in this format
FTMI is PESTED
Minor <= major for BER opt
Release number mismatch
23 Minor >= major for COFA opt
No PM data available
No PM data available
Point number mismatch
24 Monitored Time field is not allowed
Monitored Time field is not allowed
PDI Version number mismatch
Unit type error
25 Accumulation Interval field is missing
FTMI type error
Invalid FPI value
26 Feature deactivation would leave system with core software
NPC type error
27 Disable not allowed - supports another feature
Illegal connectivity specified
Only historical data can be specified
28 Connectivity contains unequipped units
Feature is active
Scheduling report could not be found
29 Feature not enabled
IW is UMUX (18) but NPC not type DE4yz
This signal is already being sent
2A DMI combined with T1DM
Database not loaded
Deny Clear-2MB for Alternate Maps
Incorrect pack type in slot
2B Bit c not settable
Database corrupt
Maj|Min BER threshold is 7, but not in T1DM or Fe mode
Reading Feature Package Id from PMEM failed

cc	*Explanation*
2C	Write to CPR failed Writing Feature Package Id to PMEM failed not allowed for clear 2MB
2D	RTF keyword is used without DGA TS0 is crossconnected to TS0
2E	RTF keyword and the operation mode does not match bit value not allowed for NPC type
2F	Channels assigned, cannot be grown as test port TS0 connected to nonTS0 in Mode 2 - "a" should be "-" or equal to "b" The RT id entered is not a retrofit one
30	NPC not provisioned for CAS No signals active Termination is already assigned Unit is not FTU type
31	Accumulation Interval field is not allowed Failed to switch SYNC side NPC not provisioned for NSA
32	Bit 3 provisioned for use as RAI3 Termination is under test Threshold value is out of range
33	Bit 4 provisioned for use as RAIS NPC not DA or TA type. Termination is a test port Wrong TLI type
34	NPC type option xyz is unassigned NPC type option xyz is unassigned or invalid for feature package Termination is under customer control (CUS)
35	Invalid use of INCL keyword NPC has active circuit Termination is protected (RDC) The mate FLI is OOS and Protection MIU is equipped
36	DSPI not equipped INCL keyword needed when restricted Insertion Word specified TD on one(both) sync(s) is not equipped or not in-service Termination is not connected as indicated The mate FLI is OOS and Protection MXR is IS
37	DSPI out-of-service Major/Minor BER threshold value is invalid for SLC NPCs Selected FLI has LOC with at least one inservice MXR The mate FLI is OOS and at least one Service MXR is equipped Two confs. were prev. connected or the concat. cause BRD-BBL loop
38	Deny SP Type NPCs for Alternate Maps FC not equipped The selected FLI is IS and Pested and at least 1 Service MXR is eqd Unselected FLI has LOS with at least one inservice MXR
39	An autonomous switch is in progress MXR LOS with unselected FLI

cc	*Explanation*
	Not enough TSIs for CCB test
	Signaling state of the trunk failed for the channel
3A	Bit 4 provisioned for use as RBER
	Invalid FPI value
	Invalid poll time
	No unmapped slots on a bus
3B	Bit 5 provisioned for use as SFI
	Not valid for frame administrator
	Unspecified L2 address
3C	Bits 3 through 8 are provisioned for Transmic 1G
	Duplicate L2 address
	TS0 specified with width not 1
3D	Alarm bits cannot be passed through or inverted
	Illegal test access mode for TS0
	No mapped slots on a tsi
3E	DSPI failed
	Mapped slots exist on a tsi
	TS16 specified for test with width not 1
3F	Conference exists in a DMB
	G4 to G4.1 retrofit failed
	Illegal test access mode for TS16
40	CCN denied request
	FC out of service
	Not enough DSPPs are equipped
	Only one channel allowed to have this language
	Signaling processing is not activated for the channel
	The service FLI is out of service or pested (TOSRVC option)
41	Failed to boot subject CCN side
	Language "F" provisioned for this channel
	Not enough DSPPs are in service
	The protection FLI is out of service or pested (TOPRTN option)
42	Change not valid
	DSPP not in service, or failed
	RST failed to boot program
	The service FLI is already selected (TOSRVC option)
43	(NPC) Hardware mismatch
	RST failed to boot DB
	The protection FLI is already selected (TOPRTN option)
	Trying to change in NTR direction
44	Invalid direction specified for NTST TLA/TLR
	NPC not IU/TI type
	Service MXR is not equipped
45	A DMB on the UNIT is OOS
	IU/TI type NPC failed
	NPC not provisioned as DGA
	Service MXR is out of service
46	Failed to boot CONF file

cc	*Explanation*
	NPC Failed or Out of Service
	Service MIU is out of service
	virtual SLC NPC not provisioned
47	Failed to boot DB
	IU/TI type NPC
	Invalid channel number
	Protection MXR is out of service
48	Bad PRIM X'efgh values
	Failed to boot journal--recurrence indicates database corruption
	Invalid SLC Mode-III channel number
	Protection MIU is not equipped
49	FAC keyword is invalid for this feature
	Failed to boot unit
	Protection MIU is out of service
	test group unequipped
4A	PRIM keyword is invalid for this feature
	Red circuit, INCL not entered
	SMEM error, boot from PMEM
	The protection MMFG is serving another facility
	channel part of a TP or TG
4B	Customer controlled circuit, INCL not entered
	PMEM error, boot from SMEM
	The Service MMFG is already under protection
	The common bit(s) is(are) not set in both FAC & PRIM
	channel already under test
4C	BCON BBL has one or more legs under test
	Both FAC and PRIM values(keywords) are required
	Failed to boot CI
	The Service MMFG is not under protection
4D	DSPI is in service
	Gateway test access not supported
	MP database not consistent with Configuration file
	The switch is allowed (not inhibited)
4E	IW option is not allowed for new type of Clear-DS1 NPC
	RTBC conference exists
	The switch is already inhibited
4F	BER must not be less than 4 for Clear DS1
	NPC is not part of a one-way connection
	inconsistent BCON width for test access
50	CPR in buffer overflow condition
	Can't run test on active side
	Invalid MIU/MXR type specified
	Trunk conditioning doesn't match that of conference
	invalid channel designation for BCON
51	C-bit modify function is disabled
	CUS flag doesn't match that of conference
	General boot failure (vanilla flavor)

cc	*Explanation*
	TG width incompatible with circuit
	The pair MXR is not equipped
52	CPR is not equipped
	Database is empty
	FDL selected with width not 1
	RDC flag doesn't match that of conference
	The MMFG is protected
53	CPR is out of service
	Database is not empty
	TO side of two-way to be converted is not an FTU NPC
	The associated MMFG is under protection (for Service MIUs)
	inconsistent HUB width for specified TG
54	Conversion leg is terminated
	Cross-connect to CPR is required
	The MIU is already equipped
	invalid mode for TLA/TLR
55	Invalid CFT code
	Some associated NPCs are equipped
	Width of existing two way does not match conference width
	circuit already terminated
56	FROM is a two-way and no CONV specified
	The MXR is in service
	Unrunnable CFT code
	circuit not terminated
57	Designated TG or circuit to be tested in process of being rolled
	FROM is not a backbone leg
	SIDE must be specified for subrate NPC
58	DSPU is not equipped
	NPC is OOS for a TGR command and OOS keyword not specified
	SLC 96 MD 1 RT DGP requires mate NPC to be unequipped
	Specified width does not match existing conference width
59	DSPU unit controller is out of service
	Invalid TC specification
	NTR invalid since existing conference is not already NTR
	Number of DGPs on each unit is limited to 32
5A	DSPU unit controller is failed
	LPD invalid since existing conference is not already LPD
	NPC not in service or failed
5B	C-bit modify function is active
	TO is not a leg of this/any conference
	channel is OCON in opposite direction
5C	Can't disconnect return leg unless entire conference disconnected
	Inconsistent or invalid circuit type for Nx64Kbit TA
	NPC providing timing to inservice SSP
5D	Inconsistent Signaling on CEPT NPCTGs
	Sync source NPC is not inservice
	TO is the backbone leg of a conference

cc	*Explanation*
5E	Sync source NPC is not equipped TO is a part of the same conference as a previous TO invalid test access mode
5F	Conference is NTR: has no switchable return leg input channel out of range (SLC not supported)
60	Conference is LPD: has no switchable return leg Selectable AIS not valid for specified NPC(s) type User macro/map space is full circuit contains mapped channels for HUB request
61	All NPC(s) are either not valid or not grown System macro/map space is full TO is already the return leg not all FROM channels on same NPC
62	File is being accessed IU type NPC(s) cannot be provisioned for Minor Alarm Invalid channel number NPC type mismatch None of the designated NPCTG(s) are equipped
63	File already exists NPC is a DGP NPC is a channelized NPC None of the designated TG(s) are equipped
64	File doesn’t exist/can’t be accessed Frame is not in MCOND NPC is a non-channelized NPC NPC is already grown and added as SLC digroup TG width too large for single NPCTG
65	Another NPC is grown and added as this digroup Command invalid while backup in progress Ending channel is out of range Link being used is not Link 1
66	DGP designated to bank without data link Map/macro file write deferred until backup is completed TG number previously assigned User login-id is not DAX
67	DGA is not added Improper roll command sequence NPC(s) actual type incompatible with TYPE keyword and/or alarm type User logged off during session
68	Incorrect language/addressing mode NDL option is used without DGA NEW NPC already cross-connect or mapped channel(s) on new
69	Incorrect number of parameters Mapped parity channel(s) on new Use of this NPC is RESERVED for SLC 96 MD 1
6A	NPC type is not DS type New in CGA or PBA

cc	*Explanation*
	No macro is currently executing
6B	Invalid line number
	No mapped channel on old
	Operation mode and digroup name don’t match
6C	File is empty
	Framing format, digroup name & operational mode don’t match
	Old and new chan on same NPC and within the range
6D	Counting sequence and operational mode don’t match
	One NPC is a non-channelized type and the other is not
6E	DGA with NDL option is not provisioned with D4 or ESF framing format
	No edit session active
	Old or new is a non-channelized type in a DS0 command
6F	Adding two digroups from one bank on same DDC
	The OLD or NEW NPC is already being rolled.
	The session is terminated due to maintenance operation
70	Digroups from same bank have different modes
	NPC invalid type
	One of the FAR end channels is being rolled
	Some circuits not activated,cleared or pictured
	Try to add a BBL to VC,but the VC already has backbone
71	Digroups from same bank have different counting sequence
	NPC is a Facility Access Digroup
	The reference map does not exist
	Try to delete a BBL leg from VC;however, VC has no BBL leg
	Unmapped channel(s) on old
72	Digroups from same bank are added to two different FTUs
	Invalid test mode for an unmapped test session
	One of the far NPC(s) is SLC
	The NPC of VC BBL leg doesn’t match that in the input command
	The map is not valid
73	Both sides of CCN are OOS
	Channel has a FAR, which is within the range
	Invalid PWR/MISC alarm level
	Invalid test mode for a one-way test session
	The first channel of VC BBL leg doesn’t match that in the input command
74	At least one UC is OOS or At least one UC is failed
	Old and new are the same NPC in a DS1 command
	PWR/MISC alarm is specified to a digroup other than DGA
	Try to delete a BRD leg from VC; however, VC has no BRD leg
75	At least one UC is not the correct type
	Old and new channels have not been paired by a BCAST command.
	Test session already exists
	The input BRD leg is not in VC
76	AIS not entered for SPLTE/SPLTF/SPLTEF/LOOPE/LOOPF
	Alarm option and bank mode don’t match
	Channel or NPC not bridged
	The first channel of VC BRD leg doesn’t match that in the input command

cc	*Explanation*
77	Obsolete circuit type Tried to disconnect a nonexisting VC Unassigned operational mode
78	Protection switch process failed Ranges of old and new do not match Try to operate a ONE-WAY conference with a TWO-WAY input command
79	DCTN conference channel cannot be rolled DGA/DGP of RT/DL Mode I must be assigned to one DDC NPC is not a Facility Access Digroup Try to operate a TWO-WAY conference with an ONE-WAY input command
7A	Mode I RT/DL IDs don’t match for DGA/DGP on same DDC NPC is not an E-end Testport/testgroup channel cannot be rolled The NPC to delete has not been previously added to map
7B	Channel out of bound in a BCON/v.c Invalid change from previous mode Other NPC on this DDC not the same digroup for Mode I DGA/DGP
7C	Different DSxyz types are used for DGA/DGP on same DDC for Mode I Logical conflicts found in the map NPC is not a F-end Parity channel out of bound on new
7D	Can’t start new session - previous session still verifying Not first channel in a BCON/virtual conf The NDL options are different for DGA’s on the same DDC for Mode I
7E	Bank id number not found Framed/Unframed clear 2Mbit/s NPC invalid for Automatic CRC-4 Insufficient data for setting up a conference
7F	NPC is not added No OOS keyword is given for out-of-service NPC Unframed clear 2Mbit/s NPC invalid for TS0 processing
80	Database conference width does not match the range in input command Framed/Unframed clear 2Mbit/s NPC invalid for Transmic 1G, 2G Inconsistent channel range width NPC number and bank id don’t match Some TSIs to degrow are in service
81	Conference Port is currently registered to a different channel Frame ID is protected Framed/Unframed clear 2Mbit/s NPC invalid for Firmware Timing Invalid input BBL as fmd in ONE-WAY command NPC number and digroup name don’t match
82	Can not use 12-th TP when NPCTP is in the T1DM or DMI mode DL ffff is used w/ operational mode other than Mode I Invalid input BRD as tmd in ONE-WAY command Unframed clear 2Mbit/s NPC invalid for Bit 4 used as RA IS/RBER
83	Attention: preceding ccode 83 is an anomaly - see problem list Conference Port is already registered to the same group of channels Invalid input BBL in terminated TWOWAY/ONEWAY command

cc	*Explanation*
	Language is not allowed
	NPC type is inconsistent with FTMI type
	Option not programmable for this NPC type
84	Channel(s) is already registered
	Incompatible types of NPCs in a DDC
	Mate NPC is not equipped
	NPC is non-channelized
	Problem occurred while accessing SMEM or unformatted SMEM
	Trying to add or delete a leg when a conference is under test
85	IW not allowed to be specified in Clear 2Mbit/s
	Input BRD (BBL) has same NPC and channel as BBL (BRD)
	NPC has been designated as NPCTP
	New bank id is an assigned one
	Problem occurred while accessing PMEM
	Using the 24th channel of a T1DM NPC
86	Attempt to remove DGA w/o INCL keyword or prior prot. sw. request
	NPC is NPCTG and chan 24 is used in a TG;Can't change to T1DM or DMI
	NPC number out of range
	Source does not contain requested information
	Using the 24th channel of a DMI NPC
87	Copy source NPC is not equipped
	DGP is protecting a primary digroup
	NPC as 12th test port can not change to DMI nor T1DM
	Old_tape is a special install tape
88	Conference port is not registered
	NPC is not a NPCTP
	Report interval is not an integral number of accumulation interval
	SMEM is a normal SMEM
89	Can't delete because not all associated NPCs of the RT are entered
	Conference port is currently connected
	Interval is not valid/not available
	Interval is not valid/not available
	NPC is not designated for this NPCTP/NPCTG
	Problem occurred while accessing BOTH_MEM
8A	Mismatch between channel 0 crossconnect and keywords
	NPCTP is not grown
	x & z parameters on DSxyz are inconsistent
8B	Channels and conference port do not match
	Digroup name and bank id don't match
	PMEM not in service or not ready
	Test port is not idle or frame is not inservice
8C	DB MP or units ram error
	Digroup is protected
	The two FADS entered are not associated with one another.
8D	Clear gateway test access disallowed.
	DB PMEM error OP-CL-RD-WR-SK
	RT/DL has unrestored DGA

cc	*Explanation*
8E	Attempt to add to a null transmitting port DB can't send or receive mail DGA protected; use INCL to remove, or unswitch protection No mapped circuit under test; emode/fmode can't be changed.
8F	Can't lock or unlock ram database NPC not deleted Number of transmitting ports does not match existing conference One-way circuit under test; emode can't be changed.
90	Can't mount or unmount BOTH_MEM DB can't get the slave mail box Invalid change parameter combinations NDL option is specified for DGA The total number of receiving ports specified exceeds the max. emode/fmode can't be changed under current test mode.
91	Can't mount or unmount SMEM Can't mount or unmount password recovery card Duplicate ports specified Option not programmable for this NPC type SR NPC was specified - not allowed Sync is not configured yet
92	Boot TLI failed Can't mount or unmount PMEM Transmitting port cannot be dropped
93	All digroups not out of service PA NPC threshold already in inhibit mode SMEM is not present TB type in hardware mismatches DB The conference does not exist
94	Conference port is not in conference circuit Mate RT/DL mode is different PA NPC threshold already in allow mode SMEM unit is not restored
95	Invalid option,mailbox or flag Range overlapping between FROM and TO or between two TOs TG East/West type inconsistent with each other or circuit
96	Conference already exists Subject PWR to be cleared is not failed Unit(s) OOS, and additional backup required incompatible HUB feature types
97	Conference port cannot be dropped out of conference by switch command Entity can't be addressed in this configuration User quit the menu option LOCAL already exists
98	Checksums verification failed Error in input Test Port release failed Unable to verify Configuration file since MP DB not loaded

cc	*Explanation*
	option REMOTE already exists
99	G1 SMEM for SMEM->PMEM w/journals
	No Facility Line Interface (FLI) is In Service
	Unit type (xyz) not supported
	can’t change option, protection switch is active
9A	Formatter (FMT) on active CCN side is Out-Of-Service
	can’t change option, inhibition is active
	hub id not set when MJU pack grown
9B	INCL must be specified for SRDC ckts
	Termination is under test or is a test port or group
	The MXR is not grown
9C	Parity channel cannot be within the range of a DS0 command.
	SRDC timeslots are allocated on this NPC
	The MMFG is already In-Service
9D	Attempt to remove a Service MIU which is under protection
	NPC containing channel 000 is invalid type.
	current hub id specified in command
9E	MONDAT set to ALL is not allowed
9F	MONTIM set to ALL is not allowed
	current error corrector pack type specified in command
A0	Illegal LEG LEG combination
	No SAFE alarm for DGP
	Not a CRO TLI
	TS16 specified for CAS TG
	The selected MXR associated with the NPC is Out-Of-Service
A1	CRO type TLI (SSP portion not required)
	Illegal BBL BBL combination
	Loop back inhibited for digroup
	NPC has been designated as NPCTG
	The parameter specified does not match with the NPC type
	The selected MXR associated with the NPC is In-Service but failed
A2	All channels assigned, cannot be grown as NPCTG
	Illegal BRD BRD combination
	SSP number is illegal
	The requested digroup is carrying service
	The selected MIU associated with the NPC is Out-Of-Service
A3	Channels assigned, cannot be grown as test group
	Illegal SYM BRD combination
	LLB not initiated
	SSP number required
	The selected MIU associated with the NPC is In-Service but failed
	Transmic 1G NPC designated as SYNC source invalid
A4	Both syncs are in-service
	Firmware timing invalid for Transmic 1G NPC
	Illegal BRD SYM combination
	NPC is not a NPCTG
	The MXR diagnostics failed

cc	*Explanation*
A5	(Timing Distributor) TLI is not equipped AIS keyword incompatible with NPC type Autonomous loopback is active on DGA FPI on SMEM does not match one on PMEM Illegal BBL SYM combination Test group is not idle or frame is not In Service
A6	Deny SLC for Alternate maps Illegal SYM BBL combination Invalid switch request for DCLU Test group release failed The MIU diagnostics failed
A7	Deny non-channelized NPCs for Alternate Maps LEG mode was assigned to a DSPU-type NPC on the input NPC has been designated as NPCTP Sync 0 is not in-service The MIU boot failed
A8	A DMB mode was assigned to a FTU-type NPC on the input NPCTG not grown Sync 1 is not in-service The MMFG is Out Of Service
A9	Both syncs are out-of-service Circuits TCONed itself cannot be UTST Cross-connect not consistent with feature package INCL not specified and at least one NPC In Service No unmapped time slot Trying to add a BBL to a DMB conference that already has one
AA	DSPP pack UC Failed or Out of Service NPC is NPCTG, changing to CAS/NSA is not allowed Range entered without FRC keyword Syncs are equipped Trying to add a broadcast leg to a conference set up as SYM
AB	Bad sync mode DSPP pack FTMI Failed or Out of Service FRC specified for protection, and service MMFG is In Service Trying to add a SYM leg to conference set up as broadcast
AC	DSPP pack NPC Failed or Out of Service No protection is available for the Service MMFG Timing Extractor type TLI (need SSP info) Trying to add a BBL leg to a conference set up as SYM
AD	Not Timing Extractor type TLI (not SSP) The Protection MMFG is selected, and auto. switchback is unavailable
AE	A subrate circuit pack is specified in the command line MXR is failed NPC used as a timing reference Wrong TLI type (need CRO grow command)
AF	3 Timing Distributor type TLIs are equipped Delete or change a leg from a conference that has no leg

cc	*Explanation*
	MIU is failed
	Number of SLC RT’s on each unit is limited to 80
B0	Bad use of INCL, cannot override the current state of the conference
	Combination of bit g (b7) and h (b8) is invalid
	FLI is out of service
	Unit 1 denied request
B1	Bad use of INCL, cannot use keyword on conf.-to-conf. connection
	FMT is out of service
	Illegal priority value
	Unit 2 denied request
B2	Illegal SSP type (not same as other SSPs)
	MXR is out of service
	Transmission parameters in command will not change existing settings
	Unit 3 denied request
B3	MIU is already in service
	Trying to change level out on BRD leg
	Unit 4 denied request
	X option is illegal
B4	NPC is channelized type
	Trying to change level in on BBL leg
	Unit 5 denied request
	Y option is illegal
B5	CPR circuit pack specified in the command
	NPC is a test port
	Unit 6 denied request
	Z option is illegal
B6	C-bit operations are enabled
	Sync architecture is same
	TO side is not a DMB type NPC
	The MXR boot failed
B7	Cannot perform DMB CHG on input direction F
	No DSP unit equipped
	Some TLIs are still equipped
	The associated MXR is In-Service but pested
B8	CRO is still equipped
	Cannot perform DMB CHG on input direction T
	No CBTYPE NPC equipped
B9	Cannot perform DMB CHG on input direction B
	No CBTYPE NPC capacity remaining
	Timing Extractor type TLIs are present
BA	Inactive side NPC out of service and inactive side in service
	TLI 3 or 4 still equipped
BB	Timeslot channel numbering not allowed with CAS
BC	DGA and DGB must be specified together in the command
	SSP with 0 priority present
BD	DGC and DGD must be specified together in the command
	Looped Circuit Access not allowed

cc	*Explanation*
	SSP with non 0 priority present
BE	Hardware mismatch or not present NPC type option Y is invalid for SLC-96 NPC
BF	MIU is not equipped Sync mode is same
C0	Cannot perform DMB CHG on input direction L NPC addressing scheme selected is not allowed in the configuration file Sync stratum is same
C1	Cannot perform DMB CHG on input direction G Stratum not allowed
C2	Cannot perform DMB CHG on input direction A ETSI cannot be initialized when ECCN side is OOS or inservice but pested SSP type(options) same
C3	Can't perform DMB CHG because NTR flag set on FROM side Wrong SSP type(Timing Extractor type) XMIT continuity test won't be run: CFT code specified
C4	Can't perform DMB CHG because NTR flag set on TO side Sync architecture different XMIT continuity test won't be run: no XMIT timeslots available
C5	Option NOT leg can not appear with F, T, or B RCV continuity test won't be run: no available inservice NPCS for FC/FMT Some priority values required
C6	No available timeslots on any of the inservice NPCS associated with FC/FMT Option NOT leg is not a FTU leg Some priority values not required
C7	Option NOT leg is not in conference Priority values are same RCV continuity test won't be run: no DMB timeslots available
C8	Exceeded depth limit of 6 on broadcast conference concatenation RCV continuity test won't be run: at least one timeslot in use Sync pack denied command
C9	CATP due to skipping continuity test for FMT In-service NPC change not allowed Syncs failed to cross couple The INCL keyword is needed for DGA
CA	Connectivity can not be specified for CEF unit Mate sync pack denied command New NPC same as existing one No protection switch is currently active
CB	NPC parameter only valid with TU type TLI Protection entity out of service or failed Skip error summary since adjacent pack not in service or pested Sync not completely reset
CC	NPC is still provisioned to provide sync timing Protection entity is unequipped RCV continuity test won't be run: SYNC OOS or pested
CD	Data link failed

cc	*Explanation*
	NPC not designated as sync timing source
	Subject NPC does not support CEPT BER feature
CE	CCI is out of service
	Far end failed to respond
	NPC already allocated as sync timing source
CF	MIU is out of service
	NPC already grown as non-synchronization source
	SYNC is inservice but failed
D0	Command is Frame administrator (DAX) only.
	FROM NPC is not provisioned as DGA
D1	CCI is not present
	Cannot create any more users
	Protection switch existing is autonomous
	TO NPC is not provisioned as DGA
D2	ETSI is not present
	Protection switching is already inhibited
	User has been created
D3	CCNI is inservice but failed
	Corresponding NPC for FROM virtual channel is not provisioned
	Protection switching is already allowed
	User does not exist
D4	A user is already logged in on the link/vc
	Active CCN side is out of service
	CCI is inservice but failed
	Corresponding NPC for TO virtual channel is not provisioned
D5	Boot in progress, can't service request
	CCB is not equipped
	No user is logged in on the link/vc
D6	CCB is out of service
	Incorrect or missing password
	Invalid FROM channel number
D7	CCB is inservice but failed
	Cannot execute privileged command
	Invalid TO channel number
D8	Cannot remove Frame administrator
	ETSI is not equipped
D9	ETSI is out of service
	Invalid FROM channel number range
	User has logged in somewhere
DA	ETSI is inservice but failed
	Invalid TO channel number range
	User is not logged in
DB	FC is inservice but failed
	User still owns files
DC	A loopback is active on the FROM termination
	No zeros allowed for DAX privilege
DD	A loopback is active on the TO termination

cc	*Explanation*
	FMT is in service but failed
	Password recovery card is not READ-only
DF	Command and protocol are inconsistent
	FLI is inservice but failed
	Unmatched channel range
E0	Bad FAC value entered
	ETSI not equipped, not in service, or failed
	Hardware database mismatch
	Unmatched channel range involving SLC Mode III termination
E1	A locally switched channel is specified as BBL, LEG, or BRD
	No Memory Backup Has Been Scheduled
	Virtual circuit is not specified for X.25 link
E2	Attempt to one way cross-connect a locally switched channel
	Invalid link number specified
E3	Attempt to broadcast a locally switched channel
	Can’t Use LCN 0/LGN 0 - designated as a supervisory channel only
	Invalid keyword(s) combination specified
	One way unassigned channel/NPC in QRY,TO
E4	Broadcast unassigned channel/NPC in QRY,TO
	Invalid NPC addressing scheme specified
	NPC already has Equipment Loopback
	RT-DCLU cross-connect with different ids
E5	Adding DL DGP forbidden for SLC 96 MD 1
	Invalid combination of "x" and "z" values
	No user/link needs to be changed
	RT-DCLU cross-connect with different channel number
E6	Cross-connect a non Mode I channel to DCLU
	DB SMEM error OP-CL-RD-WR-SK
	No DL digroups can be added until the associated RT bank is created
E7	Cross-connect a non SLC channel to DCLU
	Invalid combination of "x" and "y" values
	PMEM not restored
E8	Other FLI is OOS
	SC invalid for cross-connection specified
E9	MUX or TRB invalid for cross-connection specified
	There are no INS MXRs to run test on
EA	AIS invalid for cross-connection specified
	XON/XOFF flow control is supported only on Snider link
EB	ENQ/ACK flow control is supported only on Snider link
	NAM invalid for cross-connection specified
EC	Invalid channel 000 cross-connection specified
ED	Invalid channel 031 cross-connection specified
	OLD termination is not mapped
EE	Trunk type is not allowed in the circuit specified
EF	Invalid circuit type
	SSC circuit pack is still equipped; pull-out/remove SSC
	Software does not contain Enhanced CEPT feature

cc	*Explanation*
F0	Clock absent for XPC to loop back Range not allowed for circuit type SSC Diagnostic Failure
F1	File has already been cleared PMEM and SMEM synchronization fail Parameter only valid with PA, PB, or PC type NPCs
F2	Invalid NPC number specified Not a DACS II compatible Flash Card
F3	Flash Card is empty Maximum number of CPRs have already been grown for this unit
F4	OLD and NEW channels cannot be the same PMEM and SMEM are different
F5	Conference first channel doesn't match input Flash Card is not present INCL keyword needed to perform this command
F6	Flash Card is bad Leg type mismatch T1DM or DMI mode and channel 24 is connected
F7	Can't mount or unmount old_tape Corresponding NPC for virtual channel is not provisioned OLD data channel cannot be parity channel type
F8	OLD and NEW Data and Parity channels partially overlap Old_tape is not present
F9	Cannot clear journals for OOS unit Mate NPC (DGA/DGP) is in service Old_tape unit is not restored
FA	Bad old_tape DB generic SSC software out of date The mode of the RT is not applicable
FB	Old_tape with journal PMEM verification failed
FC	Invalid executable on card Superuser logged on ZBTSI option is only valid with the ESF mode
FD	Command not allowed Line Loop Back is active NPC range crosses unit boundary Problem occurred while accessing old_tape
FE	AIS entered for MONE/MONF/MONEF/SPLTA/SPLTB/SPLTAB Change to non-ESF digroup with 16-state cross-connect Fail transfer DB from old_tape to SMEM
FF	Change to T1DM digroup with cross-connect that is not TRSP DB retrofit fail Termination is in process of being rolled

cccc	*Explanation*
0000	No conditions
0001	CEC bit on PRISM not cleared
0002	Firmware error
0003	Transmit underrun threshold exceeded
0004	Bad EMXR Acknowledgement
0005	Timeout while waiting for msg from EMXR
0006	RAM data error
0007	Invalid code checksum
0008	Error in PRISM register
0009	Error in HSCC register
000A	EPROM checksum error
000B	Timer 1 error
000C	Timer 2 error
000D	DUART error
000E	MIU access error
000F	CPU internal bus error
0010	CPU parallel bus parity error
0011	CPU serial bus parity error
0012	FLI register bit stuck
0013	FLI lock and key alarm
0014	MXR DS3 loss of signal
0015	MXR unknown error
0020	BX Access Error
0021	BX Ram Parity Over Low Byte
0022	BX Ram Parity Over High Byte
0023	Fan Bank Zero Error Flag
0024	D5 Spare Bit Error
0025	Fan Bank One Error Flag
0026	D7 Spare Bit Error
0027	BX stuck summary bit
0028	Unknown interrupt from BX
0029	Error from side 0 bus extension
002A	Error from side 1 bus extension
002B	Unknown interrupt from MTC
002C	MTC stuck summary bit
002D	Unused bits on MTC pack
002E	Error due to unused bit
002F	Error due unknown reasons
0030	Power Failure
0031	Sanity Time-out
0032	BX stuck CCNI summary bit
0033	FMT TF control bus error
0034	MXR M23 summary stuck error
0035	FMT multiple TF network data error
0036	FMT single TF network data error
0037	FMT TF device or clock receiver error
0038	FMT multiple TF clock error

cccc	*Explanation*
0039	FMT single TF sync error
003A	FMT multiple TF sync error
003B	FLI access error
003C	FLI communication link error
003D	DPC ROM error
003E	DPC loss of timing
003F	OOS RAM test ran while IS
0040	Bus Error Alarm
0041	CIA Device Error
0042	CIB Device Error
0043	CIC Device Error
0044	Pack can’t be accessed
0045	Loss of timing alarm
0046	Chip ID Comparison
0047	Data Strobe Signal
0048	Address Parity Error
0049	FC Stuck Bit on FTMI
004A	DDC Stuck Bit on FTMI
004B	FTMI lost clock
004C	FC can’t be accessed
004D	Timer Error
004E	Circuit ID Error
004F	Transmit Formatter Error
0050	Receiver Formatter Error
0051	Sanity Timer Interrupt
0052	RF bus error
0053	NPC bus error
0054	NPC can not be accessed
0055	NPC is alarming on FC
0056	Facility Processor Sanity Error
0057	SYNC Error
0058	Channel controller loss of clock
0059	Channel controller frame sync error
005A	CC configuration register error
005B	CC instruction ram error
005C	CC parity error
005D	CC transmit data error
005E	CC receiver data error
005F	CC exercise error
0060	CC summary bit error
0061	Hard RAM error
0062	Hard ROM check error
0063	Hard Error stuck bit
0064	Transceiver A stuck bit
0065	Transceiver A transmit slip
0066	Transceiver A Error
0067	Transceiver B stuck bit

cccc	*Explanation*
0068	Transceiver B transmit slip
0069	Transceiver B Error
006A	Circuit ID Error
006B	Facility errors
006C	NPC address parity error
006D	DSPI access error (e.g. pack not there)
006E	DSPI bus data parity error
006F	DSPI bus address parity error
0070	DMB access error (e.g. pack not there)
0071	DMB serial access error (pack not there)
0072	DMB parallel access error
0073	DMB bits stuck in exercise register
0074	DMB data processing error
0075	Multiple data parity error, CCB problem
0076	DMB clock error
0077	Multiple clock errors, CCB/SYNC problem
0078	DMB FIFO error
0079	Possible power failure on side
007A	DMB control memory error 0 (used for trans)
007B	DMB control memory error 1 (used for trans)
007C	Control Memory 0 control ram parity error
007D	Control Memory 1 control ram parity error
007E	Control Memory 0 control interface error
007F	Control Memory 1 control interface error
0080	Control Memory 0 loss of sync error
0081	Control Memory 1 loss of sync error
0082	Control Memory 0 DMB input data parity error
0083	Control Memory 1 DMB input data parity error
0084	DMB conference error 0 (used for trans)
0085	DMB conference error 1 (used for trans)
0086	Conference 0 control interface error
0087	Conference 1 control interface error
0088	Conference 0 control ram parity error
0089	Conference 1 control ram parity error
008A	Conference 0 DMB input data parity error
008B	Conference 1 DMB input data parity error
008C	Conference 0 DMB device (chip) error
008D	Conference 1 DMB device (chip) error
008E	Bad Ram Data in DMB device (bits alarms)
008F	Bad Ram Data in DMB device (bits alarms)
0090	CCNI access error (cannot access pack)
0091	High data byte bus parity error
0092	Low data byte bus parity error
0093	Address bus parity error
0094	Autonomous switch enable error
0095	Bus status register parity error
0096	CCNI stuck register bit, summary set, no other alarms

cccc	*Explanation*
0097	MXR communication link error
0098	CPR serial access error
0099	CPR clock error
009A	CPR processor interface failure
009B	CPR input data interface error
009C	CPR D-Bit interface parity error
009D	CPR control memory failure
009E	CPR control memory or state machine failure
009F	CPR FIFO FRDY/FFULL stuck bit
00A0	CCB packid error, wrong pack, can't read pack
00A1	CCB sync pulse error
00A2	CCB clock error
00A3	CCB input port alarm error
00A4	CCB zero bit is stuck at 1
00A5	Corresponding CCNI bit is stuck
00A6	MXR channel controller transmit data error
00A7	MXR channel controller receiver data error
00A8	MXR channel controller exercise error
00A9	MXR channel controller stuck bit error
00AA	MXR transceiver framer error
00AB	MXR transceiver receive sync error
00AC	MXR transceiver transmitter error
00AD	MXR M23 device error
00AE	MXR M12 device error
00AF	MXR M12 summary stuck error
00B0	Pack id error, can't read pack
00B1	TSI stuck bit, summary bit set, no devices alarming
00B2	TSI device error
00B3	TSI device id error, cannot read device
00B4	Illegal exercise bits set
00B5	Bus address error
00B6	Device clock error
00B7	Device control ram parity error
00B8	Output data parity error (from an FTM)
00B9	Corresponding CCNI bit is stuck
00BA	FLI loss of clock
00BB	FLI loss of signal
00BC	FLI circuit id error
00BD	FLI frame sync or internal error
00BE	FLI address bus parity error
00BF	MJU serial access error
00C0	MJU clock error
00C1	MJU processor interface failure
00C2	MJU input data interface failure
00C3	MJU error correction circuitry failure
00C4	MJU control memory failure
00C5	MJU output block failure

cccc	*Explanation*
00C6	MJU sampling circuitry failure
00C7	MJU control memory or state machine failure
00C8	SRM serial access error
00C9	SRM clock error
00CA	SRM processor interface failure
00CB	SRM input data interface failure
00CC	SRM error correction block failure
00CD	SRM control memory failure
00CE	SRM multiplexor block failure
00CF	SRM output block failure
00D0	CPU RAM Parity error
00D1	Source of error is unknown
00D2	Source of error was not found
00D3	Stuck bit in register
00D4	Bad UBX pack
00D5	Illegal/unknown condition code
00D6	MIU communication link error
00D7	FMT communication link error
00D8	MXR ROM error
00D9	MXR LCA error
00DA	MXR queue overflow
00DB	MXR channel controller loss of clock
00DC	MXR channel controller frame sync error
00DD	MXR channel controller configuration register error
00DE	MXR channel controller instruction ram error
00DF	MXR channel controller parity error
00E0	Hardware database mismatch
00E1	Hardware Failure
00E2	Hardware Boot Failed
00E3	Can't access link
00E4	Transmit Time-out
00E5	Receiver Time-out
00E6	softerr failure which forces link removal
00E7	Unit could not be reset
00E8	Unit failed sanity check
00E9	failure to insert TCC
00EA	failure to remove TCC
00EB	failed to switch CCN sides
00EC	NPC's facility queue overflow condition
00ED	Duplex entity failed diagnostics
00EE	Lost Clear-To-Send signal on X.25 links
00EF	Frame Audit reboot DDC failure
00F0	FMT access error
00F1	FMT timing error
00F2	FMT link id error
00F3	FMT bus timeout
00F4	FMT serial address parity error

cccc	*Explanation*
00F5	FMT 0-4TF timing error
00F6	FMT 0-4TF timing error
00F7	FMT error summary 1 stuck bit
00F8	FMT timing error, RF data parity
00F9	FMT error summary 2 stuck bit
00FA	FMT lock override, active select or kill parity
00FB	FMT FIFO or control PROM error
00FC	FMT RF control bus error
00FD	FMT RF port and monitor alarms
00FE	FMT RF port alarm; no monitor alarms
0101	CCI pack is not present
0102	Can’t communicate to CCI pack(incorrect version number)
0103	CCI pack’s summary is set but has no errors
0104	CCIERR bit is stuck in system status reg
0105	TSIERR bit is stuck in system status reg
0106	PUERR bit is stuck in system status reg
0107	Bus Terminator pack is not present
0108	The 32 MHz clock is out of lock
0109	CCI 240 sync is misaligned with frame sync
010A	CCI loss of 240 Frame Sync
010B	CCI loss of 8 KHz Frame Sync
010C	CCI detected Address Parity error
010D	CCI detected low byte data parity error
010E	CCI detected high byte data parity error
010F	CCI -5.2 power supply has failed
0110	CCI detected Bus Status Parity error
0111	CCI Peripheral Unit Alarm
0112	SYNC summary is set on CCI circuit pack
0120	ETSI pack is not present
0121	Can’t communicate to ETSI pack (incorrect version number)
0122	ETSI pack’s summary is set on CCI but has no errors
0123	ETSI loss of 32.768 MHz clock
0124	ETSI loss of 240 frame sync
0125	ETSI Rcv MDX summary stuck bit
0126	ETSI control RAM summary stuck bit
0127	ETSI TX MDX summary stuck bit
0128	ETSI loss of Vdd (3.3v) power
0129	Peripheral unit port alarm (RCV MDX)
012A	Receive MDX data source time slot parity error
012B	Receive MDX sync error
012C	Receive MDX address parity error
012D	Receive MDX write data parity error
012F	Receive MDX can’t be accessed (incorrect chip Id
0130	Transmit MDX data parity error
0131	Transmit MDX data source time slot parity error
0132	Transmit MDX sync error
0133	Transmit MDX address parity error

cccc	*Explanation*
0134	Transmit MDX write data parity error
0135	Transmit MDX can't be accessed (incorrect chip Id
0137	Control RAM parity error
0138	Control RAM sync alarm
0139	Control RAM port alarm
013A	Control RAM BIST flag is set
013B	Data RAM BIST flag is set
013C	Control RAM address parity error
013D	Control RAM write data parity error
013E	Control RAM device can't be accessed (incorrect chip Id)
013F	Control RAM circuit pack parity
0140	Control RAM device is in reset state
0141	Control RAM port alarm summary is stuck
0142	ETSI TRD3ST exercise bit is set
0143	ETSI ready high error on CCI
0144	ETSI ready time-out error on CCI(ETSI can't be accessed)
0145	Control RAM stuck bit error
016D	Invalid FPA state
016E	Invalid DDC pack id
01E1	MXR access error (can't access pack)
01E2	MXR hard error stuck bit
01E3	MXR facility error stuck bit
01E4	MXR pack is in reset state
01E5	MXR PIF Bus Parity Error
01E6	MXR loss of clock from unselected FLI
01E7	MXR 45MHz is not phase locked to system clock
01E8	MXR firmware error
01E9	MXR HSCC device error
01EA	MXR PIF I/O device error
01EB	MXR M13 summary stuck bit error
01EC	MXR transceiver summary stuck bit error
01ED	MXR program error
01EF	MXR RAM error
01F0	EMXR Timer error
01F1	EMXR DUART error
01F2	MIU got reset
01F3	Timeout for Yellow Inhibit/Enable Request
01F4	Queue overflow error
01F5	Packet layer parameters are mismatched between DACS II and the network
01F6	Failed to write XPC register
01F7	Transmit time-out because Clear To Send lost
01F8	R20 counter reaches limit
01F9	T3 timer expires
01FA	Too many interrupts or illegal interrupt from XPC
E000	CCNI summary bit set; no more info
E001	Sync says its down
E002	Sync says its time base is down

cccc	*Explanation*
E003	SYNC autonomously restarted itself
E004	MP-SYNC communications failure
E100	Unknown DPLL error
E101	ROM checksum error
E102	RAM data error, RAM address line stuck
E103	Phase/frequency output latch error
E104	Loss of energy on output of frequency synth.
E105	Loss of energy on output of phase shifter
E106	Loss of energy on generated SYNC pulse
E107	Loss of energy on time base strobe signal
E108	Interrupt controller error
E109	Interrupt holding register error
E10A	Uart error
E10B	Control data readable output latch error
E200	Unknown time base error
E201	Time base loss of energy detector
E202	TB i/o err. cant read TB packid or oven monitor
E203	Time base frequency drift
E204	Both syncs time base oven is cold
E205	Time base oven is cold
E300	Unknown PLL error,link went down before reading status
E301	PLL end of range
E302	PLL excessive phase error (125 uSec out of phase)
E303	PLL real time violations
E304	PLL fast start time out
E305	PLL end of range implicating TL
E400	Unknown mate error, link went down before read status
E401	Mate out of service
E402	Mate sync hardware error
E403	Cross couple loss of energy
E404	Cross couple loss of energy
E405	Mate link down
E406	Cross couple real time violation
E407	Cross couple fast lock range
E408	Cross couple frequency offset error
E409	Cross couple out of lock
E500	TLI error, link went down before status read
E501	TLI hardware error
E600	TL error reported, unknown
E601	TL out of service or loss of signal
E602	Timing Extractor type TLI has hardware problem
E603	Timing Extractor type TLI has autobaud failure
E700	CRO error, unknown due to link, SYNC error
E701	CRO loss of energy detected SYNC error
E702	CRO loss of energy CRO error
E703	CRO frequency offset
E704	CRO declared OOS

cccc	*Explanation*
E805	TL error cleared
E806	TLI error cleared
EF00	Unknown what sync switched to
EF01	SYNC switched to NORMAL mode
EF02	SYNC switched to HOLDOVER
EF03	SYNC switched to FAST mode
EF04	SYNC switched TLIs/SSPs
EF05	SYNC switched to cross couple

Glossary

A

ABT
Abort

ACO
Alarm Cutoff

Active
For duplicated entities, the entity is providing service rather than operating in hot standby.

AI
Alarm Interface

AIS
Alarm Indication Signal (also known as all 1s signal)

Alarm Delay
The alarm delay (in seconds) for software-detected alarm conditions. Initial value is 20 seconds.

Alarm Indication Signal (AIS)
A signal transmitted downstream to indicate that network transmission line failures were detected upstream.

All Ones Signal
Another name for DS1 Alarm Indication Signal (AIS). It is defined to contain all ones in the terminal-to-terminal mode.

ALM
Alarm

Alphanumeric Characters
Letters and digits.

Alternate Mark Inversion (AMI)
A DS1 line code in which alternate one bits are positive and negative, but zero substitution is not used.

AMI
Alternate Mark Inversion

ANSI
American National Standards Institute

AS&C
Alarm Surveillance and Control

ASCII Character
Letters, digits, and symbols used in the American Standard Code for Information Interchange.

ATAG
Autonomous Message Tag

ATP
All Tests Passed

Attribute
Alarm indication level: major, minor, or no alarm.

AUD
Audit

Autolock
When the system autolocks and entity, it switches to protection and forbids return to the working entity even if the trouble clears. This is usually caused by multiple protection switches on that entity in a short time period.

Autolock Number of Switches
This parameter is the number of times that the system restores an entity to service (after intermittent failures) in a given autolock switching interval before the entity is autolocked.

Autolock Release Time
The number of hours between times when the system automatically releases autolock.

Autolock Switching Interval
An interval in minutes (see Autolock Number of Switches).

Autonomous
Done automatically by the system without any manual intervention from the user.

Autoprovisioned
Put in the provisioned state automatically by the system.

B

B3Zs
Bipolar with 3-zero substitution, a DS3 line code.

B8ZS
Bipolar Eight Zero Substitution

Baud Rate
Transmission data rate (bits per second) on an administrative link.

BBL
Backbone Leg

BC
Bus Controller

BCON
Broadcast Cross-Connect

BDIS
Broadcast Disconnect

BER
Bit Error Rate

BER Metric
Specifies the metric for calculating bit error rate at a DS3 interface port. Options are bipolar variations (BPV) or parity (PTY). (Initial value is BPV).

Bipolar Violation
A violation of the alternating +1, -1 pattern in a 3-level code.

Bit Error Rate Threshold
3 stands for 0.001, 6 stands for 0.000001.

Blue Code
Same as AIS

BMTR
Back-up Memory Transfer

Boot
To transfer contents of a Memory Card into the system's working memory and system hardware. The contents of a Memory Card can include both system software and database.

BOS
Bit Oriented Signaling

BPV
Bipolar Violation

BRD
Broadcast Leg

Broadcast
Form a bridge connection.

BSRF
Basic Synchronization Reference Facility

BT
Bus Terminator

BX
Bus Extender

Byte
Usually refers to a group of eight consecutive binary digits, but sometimes used for bit groups of other sizes.

C

CAS
Channel Associated Signaling

CATP
Conditional All Tests Passed

CBIT
A DS3 line code in which parity checks on blocks of data are used to detect bits in error.

CCB
Cross-Connect Buffer

CCI
Clock and Control Interface

CCIS
Common Channel Interoffice Signaling

CCITT
International Telephone and Telegraph Consultative Committee

CCN
Cross-Connect Network

CCNI
Cross-Connect Network Interface

CEF
Capacity Expansion Frame

CFA
Carrier Failure Alarm

CFR
Synchronizer Configuration

CGA
Carrier Group Alarm

CHG
Change

CI
Communications Interface

CIU
Craft Interface Unit

Clear (CL)
An alarm condition no longer exists.

CLF
Carrier Line Failure

CMAP
Channel Map

COFA
Change-Of-Frame-Alignment

Condition
The type of alarm indication.

CP
Circuit Pack

CPR
C-Bit Processor

CPU
Central Processing Unit

CRC
Cyclic Redundancy Checking

CRO
Clock Reference Oscillator

Cross-Connect
A piece of hardware used to interconnect line-terminating equipment, multiplexers, and other equipment.

Cross-Connection
An interconnection between two specified NPC channels.

Crosstalk
A signal induced into one transmission line from another transmission line.

CRT
Cathode Ray Tube

CSS
Controlled Slip Seconds

CTAG
Correlation Tag

Current Value
In the dialog mode, it indicates that the current value of a parameter is used by the system unless you direct otherwise.

CV
Coding Violations

D

DACS
Digital Access and Cross-Connect System

Database
A record of the system configuration and status. It contains cross-connections, status of entities and transmission lines, performance monitoring threshold values and collected data.

DATS
Digital Access Test Set

DC
Digroup Circuit or Direct Current

DCC
Disconnect Code

DCLU
Digital Carrier Line Unit

DDC
Dual Digroup Circuit

DDS
Digital Data System

Default
A value the system automatically uses for a parameter if you do not specify a value.

Delimiter
A colon, comma, or space used to separate two parameters in a command or message.

Demultiplexer
A device used with a multiplexed signal for recovering signals contained within it and restoring the distinct individual channels of these signals.

DFB
Dual Fuse Board

Diagnose
Test an entity.

DIF
DACS Interface Module

DL
Data Link

DLC
Digital Loop Carrier

DM
Dual Multiplexer

DMA
Deferred Maintenance Alarm

DMAP
Digroup Map

DMB
Digital Multipoint Bridge

DMI
Digital Multiplex Interface

DMM
Digital Multimeter

DOTS
Digital Office Timing Supply

DPC
Dual Primary Circuit

DPLL
Digital-Phase Locked Loop

Driven
A driven port is being monitored, and a good signal is expected.

DS0
Digital Signal Level 0 (64-kb/s)

DS1
Digital Signal Level 1 (1.544-Mb/s)

DS1 Data Rate
The DS1 Data Rate is calculated as follows:
DS1 = (24 Channels x 8 bit/sample + 1 frame bit) x 8000 samples/sec
DS1 = 193 x 8000 = 1.544 Mb/s

DS1 Port
A DS1 port in either a DS1 interface module or a DS3 interface module.

DS3
Digital Signal Level 3

DS3U
DS3 Unit

DSP
Digital Signal Processor

DSPC
Digital Signal Processor Circuit

DSPI
Digital Signal Processor Interface

DSPU
Digital Signal Processor Unit

DSU
Data Service Unit

DSX
Digital Signal Cross-Connect

DTAC
Digital Test Access Connector

Duplex Entity
A pair of entities in which one is active and the other is in hot standby (clock generators).

Duplicated Entity
A pair of entities in which one is active and the other is in hot standby (for example, the Synchronizer Cross-Connect (SXC) circuit packs).

E

E1 Data Rate
The E1 Data Rate is calculated as follows:
E1 = (32 Channels x 8 bit/sample) x 8000 samples/sec
E1 = 256 x 8000 = 2.048 Mb/s

NOTE:
With this data rate, 30 channels carry traffic and two channels are reserved; one channel contains framing information and the other channel contains signaling information.

E2A
Type of Alarm Telemetry

EBX
Expanded Bus Extender

ECCN
Expanded Cross-Connect Network

Echo
Display of keystrokes entered from a terminal (passwords are not echoed).

ECI
Enhanced Communications Interface

EDDC
Enhanced Dual Digroup Circuit

EDPC
Enhanced Dual Primary Circuit

EER
Excessive Error Rate

EFC
Extended Frame Controller

EIA
Electronic Industries Association

EID
Entity Identification

EMC
Electromagnetic Compatibility

EMIU
Expanded Multiple Interface Unit

EMTC
Expanded Maintenance Circuit

Enter
Provision an entity by a command, not automatically by the system.

Entity
A specific piece of hardware (such as the Main Controller (MC) or Network Processing Circuit (NPC)) that has been assigned a name and is recognized by the system.

Entity Identifier
The name used by the system to refer to an entity.

Equalizer
A circuit adjustment used to maintain signal strength between desired limits.

Equipped
The entity is entered in the system database via a user provisioning command.

ER
Error Rate

ERS
Errored Seconds

ES
Errored Seconds

ESD
Electrostatic Discharge

ESF
Extended Superframe

ESR
Error Source Register

ESR1
Error Source Register 1

ESR2
Error Source Register 2

ETSI
European Telecommunication Standardization Institute

F

FAL
Fuse Alarm Lamp

FAS
Frame Alignment Signal

FC
Format Converter

FDL
Facility Data Link

Fe
Extended Superframe Format

FEBE
Far-End Block Error

FELP
Far End Loopback

FES
Far-End Errored Seconds

FLI
Facility-Line Interface

FMAC
Facility Maintenance and Administration Center

FMT
Formatter

Forced
A traffic-carrying entity (either service or protection) has been deliberately locked into a service providing state by manual command despite being bad.

FPA
Feature Package A

FPB
Feature Package B

FPC
Feature Package C

FRADT
Frame Audit

FRER
Framing Bit Error

Fs
Fx Framing Format

FSES
Far-End Severely Errored Seconds

FTM
Facility Terminating Module

FTU
Facility Terminating Unit

FUAS
Far-End Unavailable Seconds"

FW
Framing Word

G

Grooming
Rearrangement of DS1 signals in DS3 signals.

H

HDB3
High Density Bipolar 3 Zero Substitution

HDS3U
DS3 Hybrid Unit.

Header
The first line of a message.

Header Date
Specifies the current date as YYMMDD, where YY is the last two digits of the year, MM is the month, and DD is the day of the month.

Header Time
Specifies the current time of day as HHMMSS, where HH is the hour (00 to 23), MM is the minutes, and SS is the seconds.

HECI
High-Speed Enhanced Communications Interface

HFMT
Hybrid Formatter.

Hierarchy
An orderly ranking or sequence of elements, such as that of menus presented at a terminal.

Hit
A disruption of service that lasts for less than 1 second. See Outage.

HMXR
Hybrid Multiplexer.

Hot Standby
An entity ready for fast, automatic placement into operation to replace an active entity.

HUBID
Hub Identifier

I

ICLD
Idled

Idle
An output port is idle if it is not cross-connected to an input port.

Idle Channel
A channel on an NPC that has not been cross-connected.

IFTU
Integrated Facility Terminating Unit

In Service
The entity is performing normal service functions, either active or standby.

ISX
Integral Shelf Cross-Connect

ITU-TSS
International Telecommunication Union-Telecommunication Standardization Sector

J

Jitter
Short term variations in the phase of a digital signal.

K

kb/s or kbit/s
Kilobit Per Second

kHz
Kilohertz

L

LAN
Local Area Network

LBO
Line Build-Out

LED
Light-Emitting Diode

LFA
Loss of Frame Alignment

LILB
Line Interface Loopback

Link ID
The location and type of a user interface link.

LLB
Line Loopback

LMA
Loss of Multiframe Alignment

Location
The specific entity involved.

Loopback
A circuit arrangement that causes a received signal to be returned to its source.

LOS
Loss of Signal

M

M13
A standard format used for DS3 signals

Maintenance
The entity has been locked into a non-service providing state by a manual command.

Maintenance Condition (MCOND)
MCOND is a condition in which the Main Controller (MC) is isolated from system hardware in order for the user to perform memory transfer operations. Placing the MC in MCOND is non-service affecting. When the MC is in the MCOND service state, the system software and database are not transferred to the Memory Cards. The Maintenance Condition enables the user to transfer database and/or system software among the Memory Cards and the MC's Random Access Memory (RAM) in a controlled manner via user commands. The MCOND service state is also used to perform system software upgrades.

Mapped
Cross-connected.

Mb
Megabit

Mb/s or Mbit/s
Megabit Per Second

MBER
Minor Bit Error Rate

MC
Main Controller

MCOND
Maintenance Condition

MCP
Main Controller Peripheral

MEMA
Memory Card Slot A

MEMB
Memory Card Slot B

Memory Location
Specifies the equipment, DS1 interface port, or DS3 MUX port location associated with a memory type.

MER
Multiframe Error

MI
Maintenance Information

MIU
Multipoint Interface Unit

MJU
Mutlipoint Junction Unit

MMFG
Multiplexer-MIU Functional Group or HMXR-MIU Functional Group

MML
HuMan-Machine Language

MP
Main Processor

MPDIS
Multipoint Disconnect

MPM
Multipoint Mode

MTC
Maintenance Circuit

MXR
Mutliplexer

N

NA
No acknowledgement

NDL
No Data Link

NEBS
Network Equipment Building Systems

Network Element
A DACS II ISX system is a network element.

NFW
Not Framing Word

NG
No Good

NOBBL
No Backbone Leg

Notification Code
The notification code for alarm and status conditions, which include: MJ - major alarm; MN - minor alarm.

NPC
Network Processing Circuit

NPCTG
Network Processing Circuit Test Group

NPCTP
Network Processing Circuit Test Port

NSA
Nonsignaling Associated

NZCS
No Zero Code Suppression

O

OA&M
Operation, Administration and Maintenance

OCNT
One-Way Cross-Connect, Terminated

ODIS
One-Way Disconnect

OFS
Out-Of-Frame Seconds

OCON
One-Way Cross-Connect

OOS
See Out-of-service.

OS
Operations System

Out Of Service (OOS)
The entity is not providing its normal service function (removed from service) either because of a system problem or because it has been removed from service manually.

Outage
A disruption of service that lasts for more than one second. See Hit.

P

Parity Check
To determine whether a block of digital data has been corrupted in transmission, you can use an even-parity format in which an extra bit is added to the block at the transmitter if necessary so that the block always contain an even number of one bits. A parity-checking circuit at the receiving end can determine whether an error has occurred in transmission. An odd-parity format can also be used for the same purpose.

PBA
Primary Block Alarm

PBC
Primary Block Circuit

PBF
Primary Block Failure

PBX
Private Branch Exchange

PCM
Pulse Code Modulation

PCMCIA
Personal Computer Memory Card International Association

PDS
Program Documentation Standards (Language)

PF
Printout Follows

PFW
Pseudo-Frame Word

PLL
Phase-Locked Loop

PMA
Prompt Maintenance Alarm

PNI
Packet Network Interface

POTS
Plain Old Telephone Service

Primary Line
The second line in an output message.

Program
The software that directs the operation of the main controller and other frame elements.

Protocol
Detailed format and procedures used for transmitting digital data.

Protocol Type
Indicates the protocal supported on the interface link.

Provisioned
The entity has been configured by the user and entered into the system database and is ready to be restored to service.

PU
Power Unit

Pulse Code Modulation (PCM)
The process by which analog signals are sampled, quantized, and coded into a digital bit stream.

PVC
Permanent Virtual Circuit

R

R16
Remote Alarm Indication in TS16

RAI
Remote Alarm Indication

RAIS
Remote Alarm Indication Signal

RAM
Random Access Memory

RBER
Remote Bit Error Rate

RDC
Red Circuit

REER
Remote Bit Error

Released
If an input port, it is not under test access; if an output port, it is not cross-connected to an input port under test access.

RL
Retry later

RMS-D
Remote Measurement System - Digital

RMS-I
Remote Measurement System - International

Rollover
Operation used when the transmission facility between the system and an upstreamsystem is to be replaced.

RT
Remote Terminal

RTS
Remote Test System

RTS-5A
Remote Test System 5a

S

SAP
Status and Alarm Panel

SARTS
Switched Access Remote Test System

SCC
Subrate Cross-Connect

SCCSAI
Switching Control Center System Asynchronous Interface"

SECH
Subrate Establish Command

SERS
Severely Errored Seconds

SID
Source Identifier

SNIDER
Protocol (message format) used on asynchronous administrative links.

Software ID
Gives the software version information for a system: g - is a one-digit number giving the software release; i - is a two-digit number giving the issue; r- is a one-digit number giving the point release.

SPU
Synchronizer Power Unit

SRM
Subrate Multiplexer

SSC
Secondary Storage Controller

SSP
Select Synchronization Port

Standby
Entity is one of a duplicated pair, but not providing service. It is ready to be used to replace a similar entity either by protection or by duplex switching.

State
The state of an entity indicates whether it is defective or normal, whether it is ready for normal use, etc.

Subrate
In the digital data system, a data bit rate that is either 2.4, 4.8, or 9.6 kb/s.

SVC
Switched Virtual Circuit

SYNC
Synchronizer

Synchronizer Cross Connect
A dual function circuit pack that performs both synchronization and cross-connect functions.

System Executables
The software that directs the operation of the Main Controller (MC) and other system entities.

T

T1DM
T1 Data Multiplexer

TABS
Telemetry Asynchronous Block Signal

TAD
Test Access Digroup

TB
Time Base"

TC
Trunk Conditioning

TCNT
Two-Way Cross-Connection, Terminated

TD
Timing Distributor

TDIS
Two-Way Disconnection

TDM
Time Division Multiplexed

Test Access
A mode of operation that provides full access to the circuit under test but does not interfere with any other cross-connections that have been established.

Test Mode
Specifies the Test Access Mode

TG
Test Group

TID
Target Identifer

TLA
Terminate and Leave Activate

TLI
Timing Link Interface

TLP
Transmission Level Point

TLR
Terminate and Leave Release

TP
Test Port

TPR
Test Port Release

TSI
Time Slot Interchange

TTY
Teletypewriter Terminal

UAC
Unassigned Channel Code

U

UAS
Unavaillable Seconds

UATC
Unavailable Time Count

UBX
Unit Bus Extender

UC
Unit Controller

UMC
Unassigned Multiplexer Code

V

VC
Virtual Circuit

Z

ZBTSI
Zero Byte Time Slot Interchange

ZCS
Zero Code Suppression

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