MX2820
System Manual

Document Number: 61186003L1-1D
October 2007

Trademarks

Any brand names and product names included in this document are trademarks, registered trademarks, or trade names of their respective holders.

To the Holder of the Document

The contents of this document are current as of the date of publication. ADTRAN® reserves the right to change the contents without prior notice.

In no event will ADTRAN be liable for any special, incidental, or consequential damages or for commercial losses even if ADTRAN has been advised thereof as a result of issue of this publication.

901 Explorer Boulevard
P.O. Box 140000
Huntsville, AL 35814-4000
(256) 963-8000

Copyrights

Revision History

Document Revision	Date	Description of Changes
A	September 2003	Initial release
B	November 2004	Add STS-1; Clock Module; IP Forwarding; Service States (in TL1 Reference Guide); ±24VDC SCU; ±24VDC M13 MUX; Renumber Section 5 for growth
C	March 2005	Add revision details for ±24 VDC and –48 VDC modules; Update Installation Guidelines; Add Radius Documentation
D	October 2007	Add 1186003L3; SSH; RoHS Compliance

Conventions

The following typographical conventions are used in this document:

This font indicates a cross-reference link.

This font indicates screen menus, fields, and parameters.

THIS FONT indicates keyboard keys (ENTER, ESC, ALT). Keys that are to be pressed simultaneously are shown with a plus sign (ALT+X indicates that the ALT key and X key should be pressed at the same time).

This font indicates references to other documentation and is also used for emphasis.

`This font` indicates on-screen messages and prompts.

`This font` indicates text to be typed exactly as shown.

This font indicates silk-screen labels or other system label items.

This font is used for strong emphasis.

NOTE

Notes inform the user of additional, but essential, information or features.

CAUTION

Cautions inform the user of potential damage, malfunction, or disruption to equipment, software, or environment.

WARNING

Warnings inform the user of potential bodily pain, injury, or death.

Compliance

For detailed compliance information, refer to the compliance notice packaged with the specific product.

RoHS Complaint

This issue of this document includes RoHS compliant products. The products listed in the following table meet the EU's RoHS Directive 2002/95/EC and/or applicable exemptions. See www.adtran.com for further information on RoHS/WEEE.

ADTRAN Non-RoHS Compliant	ADTRAN RoHS Compliant	Description
1186001L1	1186001E1	MX2820 19-inch Chassis
1186001L2	1186001E2	MX2820 23-inch Chassis
1186002Lx	1186002Ex	M13 MUX Module
1186003Lx	1186003Ex	System Controller Unit (SCU)
1186004Lx	N/A	Clock Module
1186005Lx	N/A	STS-1 MUX Module

Training

ADTRAN offers training courses on our products. These courses include overviews on product features and functions while covering applications of ADTRAN product lines. ADTRAN provides a variety of training options, including customized training and courses taught at our facilities or at customer sites.

For inquiries concerning training, contact ADTRAN:

Training Phone: 800-615-1176, ext. 6996

Training Fax: 256-963-6217

Training Email: training@adtran.com

About this Manual

This manual provides a complete description of the MX2820 system and system software. The purpose of this manual is to provide the technician, system administrator, and manager with general and specific information related to the planning, installation, operation, and maintenance of the MX2820 system. This manual is arranged so that needed information can be quickly and easily found. The following is an overview of the contents.

IXL-001 Task Index List

This section provides a list of sections having step-by-step instructions for installing, maintaining, provisioning, and upgrading the MX2820 system.

Contents

This section provides a detailed list of the sections, headings, figures, and tables.

Section 1 System Description

This section provides managers with an overview of the MX2820 system.

Section 2 Engineering Guidelines

This section provides information to assist network designers with incorporating the MX2820 system into their networks.

Section 3 Application Guidelines

This section provides information on specific MX2820 system wiring applications.

Section 4 Site Preparation

This section provides information for Central Office (CO) engineers who will prepare the CO for a MX2820 installation.

Section 5 User Interface Guide

This section provides network engineers, planners, and designers, who need detailed information about the MX2820 menu tree, instructions on how to obtain status and statistical information, instructions on how to perform system utilities, and information about the types of loopback circuits supported.

Section 6 Non-Trouble Clearing Procedures

This section provides the tasks for installing and powering up the MX2820 shelf and System Controller Unit, and provides the tasks for installing and powering up the Multiplexer modules.

Section 7 Detailed Level Procedures

This section provides the detailed level procedures called out in *Section 6, Non-Trouble Clearing Procedures*.

Section 8 Trouble Analysis Procedures

This section provides information to assist in locating and identifying alarm conditions.

Appendix A Abbreviations and Acronyms

Appendix B Warranty

IXL-001
Task Index List

Find the Required Task in the List Below:	For details, refer to:
Acceptance Test	
MX2820 Acceptance Test Procedure	DLP-601
MUX Module Acceptance Test Procedure	DLP-602
STS-1 MUX Acceptance Test Procedure	DLP-603
Provisioning	
Logging on to the System	DLP-716
Set TIRKS Parameters for the SCU	DLP-717
Provision Network Management Settings	DLP-718
SCU Provisioning (System Management)	NTP-005
Enable or Disable Smart Start	DLP-729
Provision DS3/DS2 Network	DLP-730
Set Date and Time	DLP-731
SCU Provisioning (System Security)	NTP-006
Provision SNMP Management Options	DLP-732
Create User Account	DLP-733
Set Security Options	DLP-734
Set Terminal Automatic Logoff	DLP-735
Change Password	DLP-736
Provision DSX-1 (T1/E1) Interface	DLP-737
Provision MUX Module Protection	DLP-738
Provision MUX Module Loopback Timeout	DLP-739
Provision STS-1 Network	DLP-741
Provision VT/Port (T1/E1) Interface	DLP-742
Provision Clock Module	DLP-743
Provision Clock Module Protection	DLP-744
Provision RADIUS	DLP-745
Maintenance	
MX2820 Troubleshooting Guide	TAP-100
Software Upgrade	
Code Upgrade Using TFTP	DLP-700
Code Upgrade Using YModem	DLP-701

Contents

Figures

Tables

This page is intentionally blank.

Section 1
System Description

This section provides a system description for network designers who are incorporating an system into their network.

Contents

Figures

Tables

INTRODUCTION

This section of the ADTRAN MX2820 System Manual is designed for use by network engineers, planners, and designers who are upgrading a communications network. It contains general information and describes system components, system connectivity, and system modules.

SYSTEM OVERVIEW

The ADTRAN MX2820 high-density M13/STS-1 multiplexer system offers bandwidth consolidation at a low cost in a dense rackmount chassis. The MX2820 gives customers the ability to easily install M13 or STS-1 modules on an “as needed” basis by simply inserting additional modules.

- The MX2820 system demultiplexes a DS3 or STS-1 input signal into DSX-1 or E1 output signals.
- The MX2820 system multiplexes DSX-1 or E1 input signals into DS3 or STS-1 output signals.

In areas where multiple M13/STS-1 modules are needed, the MX2820 system frees up valuable rack space with a high-density chassis. The MX2820 system with a 19-inch chassis houses up to 14 MUX modules to provide seven redundant M13/STS-1 modules in 2U rack units of space. The MX2820 system with a 23-inch chassis houses up to 18 MUX modules to provide nine redundant M13/STS-1 modules in 2U rack units of space.

The MX2820 MUX modules are capable of combining independent T1s, E1s, or T1s and E1s on the same DS3/STS-1 signal. Each pair of MUX modules provides built-in 1:1 redundancy on the DS1 and DS3/STS-1 circuits. Advanced diagnostics include CSU loopbacks, NIU loopbacks, Far-End Alarm Channel (FEAC) loopbacks, C-bit loopbacks, and built-in BERT (Bit Error Rate Testing) capabilities.

As with all ADTRAN products, the MX2820 system offers comprehensive management options. It features a VT100 terminal interface for configuration, loopbacks, and performance monitoring. The MX2820 system has an integrated 10/100Base-T Ethernet port to support IP-based management applications including TL1, SNMP, Telnet, and SSH.

Features and Benefits

The MX2820 high density M13/STS-1 multiplexer system provides the following features:

- Affordable DS3/STS-1 bandwidth consolidation
- Built-in 1:1 redundancy
- System Controller Unit (SCU) for centralized management
- Single IP address per shelf
- Interbank communications capability to address multiple shelves with a single IP via an RS-485 daisy chain communication link between shelves
- Capable of backhauling multiple service types (T1/E1)
- TL1, SNMP, Telnet, and SSH management
- X.25 capability for TL1 sessions

- Local and network timing
- Provides powering options for –48 VDC or ±24 VDC systems
- 19-inch or 23-inch versions available
- Industry-leading 10-year warranty
- NEBS Level 3, UL 60950, GR-1089-CORE compliant

SYSTEM COMPONENTS

The MX2820 system provides the following shelf units:

- 19-inch shelf (P/N 1186001L1)
- 23-inch shelf (P/N 1186001L2)

The MX2820 shelf can accommodate the following units:

- M13 MUX module (P/N 1186002Lx)
- SCU (P/N 1186003Lx)
- STS-1 Clock module (P/N 1186004L1)
- STS-1 MUX module (P/N 1186005L1)

NOTE

Part numbers appended Lx indicates any available number in the List series.

NOTE

This reference guide is also used for the coinciding RoHS products not specifically mentioned. The RoHS part number uses an “E” or “G” instead of an “L” in the part number.

MX2820 Shelf (19-inch or 23-inch)

This system consists of either a 19-inch wide or 23-inch wide by 3.5-inch high (2U) shelf. The 19-inch shelf can house seven redundant pairs of M13 or STS-1 MUX modules. The 23-inch shelf can house nine redundant pairs of M13 or STS-1 MUX modules. Each M13 or STS-1 pair provides equipment protection only. Three additional slots are available to house common modules. One slot houses the SCU, which is used for system management. The other two slots house redundant Clock Modules.

The shelf backplane provides connectivity between external interfaces and the SCU, and provides connectivity between the SCU and the MUX modules.

General Features

The MX2820 shelves provide the following features:

- RJ-45 connector used as 10/100Base-T Ethernet port for Telnet, TL1, SNMP, TFTP, and SSH
- DB-25 connector used as an RS-232 interface for synchronous X.25
- Wire-wrap posts used as an RS-485 interface for daisy chaining to multiple MX2820 shelves
- Wire-wrap posts used as alarm relay contacts for Critical, Major, and Minor alarms
- Wire-wrap posts used as environmental alarm inputs: ACO, AUX1, AUX2, AUX3A and AUX3B
- Barrier strip connector to connect frame ground and redundant VDC power (–48 or ±24 VDC as appropriate)
- Backplane supports communication between the SCU, the MUX modules, and two Clock Modules
- DSX-1 level access is provided through FutureBus connectors
- DSX-3 level access is provided through BNC connectors
- 2U-high shelf mounts in 19-inch and 23-inch racks
- Operates over temperature range of –40°C to +50°C (no fans); –40°C to +65°C (with fans)
- Wire-wrap posts for external redundant BITS clocks

Figure 1-1 shows the front and rear views for a MX2820 19-inch shelf.

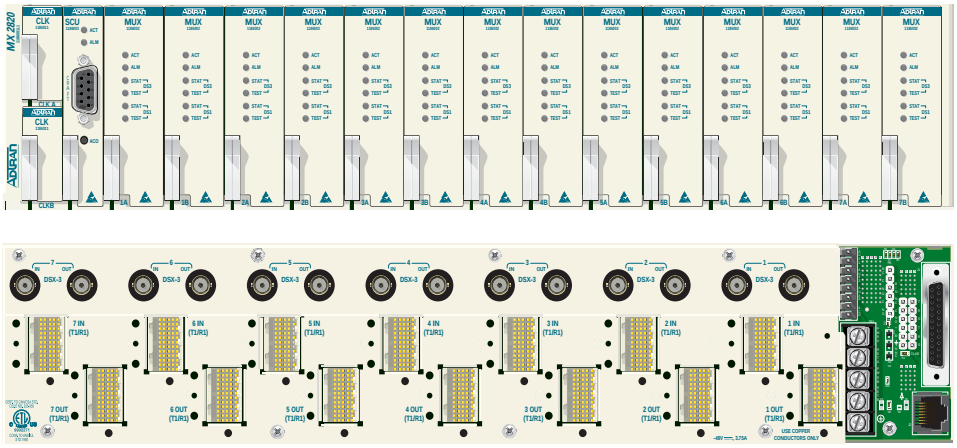


Figure 1-1. MX2820 19-inch Shelf (Front and Rear View)

Figure 1-2 shows the front and rear views for a MX2820 23-inch shelf.

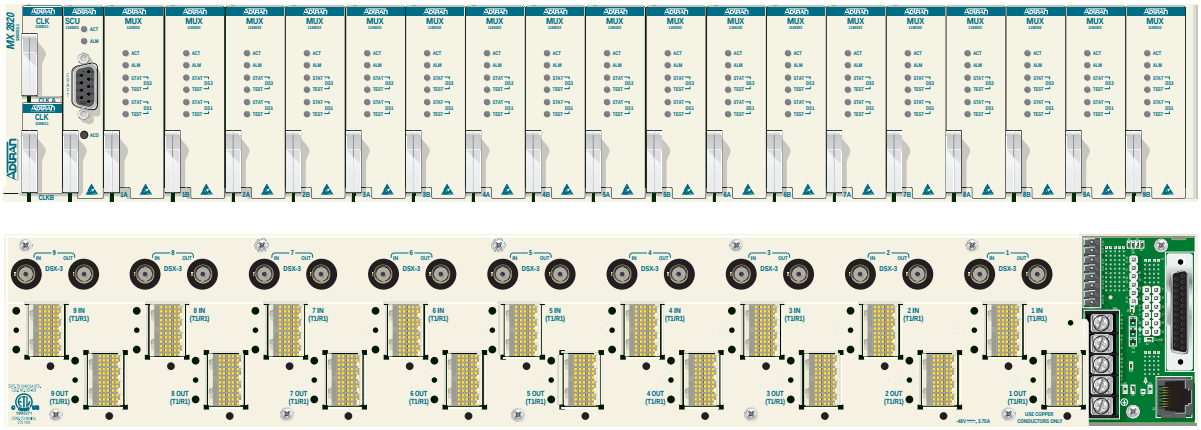


Figure 1-2. MX2820 23-inch Shelf (Front and Rear View)

System Modules

System Controller Unit

- P/N 1186003L1 for –48 VDC (revision T and earlier)
- P/N 1186003L1 for –48 VDC or ±24 VDC (revision U and later)
- P/N 1186003L2 for –48 VDC or ±24 VDC
- P/N 1186003L5 for –48 VDC
- P/N 1186003E1 for –48 VDC or ±24 VDC

NOTE

To determine the revision indicator, locate the sticker with the 8 or 15-character serial number and UPC label. The revision indicator is the leftmost character on that label. The revision indicator is separated from the serial number by a series of blank spaces.

The System Controller Unit (SCU) provides the user interface and the network management interface for the MX2820 system. The user can provision and monitor the MUX modules either locally or remotely via the SCU. Figure 1-3 shows the MX2820 SCU front panel.

Figure 1-3. MX2820 SCU Front Panel

The MX2820 SCU provides the following features:

- Manages RJ-45 10/100Base-T Ethernet port for SNMP, TFTP, Telnet, and SSH access
- Interbank communications capability to address multiple shelves with a single IP via an RS-485 daisy chain communication link between shelves
- One IP address per shelf
- X.25 capability for TL1 sessions
- Four simultaneous Telnet or SSH logins
- Manages DB-9 RS-232 interface for an asynchronous craft interface
- Supports flash upgrades via TFTP and YModem
- Displays Activity (ACT) and Alarm (ALM) status via front panel LEDs
- Maintains system alarm logs
- Allows manual suppression of active alarms by pressing the front panel Alarm Cutoff (ACO) switch
- Supports three auxiliary inputs from wire-wrap posts on the backplane
- Supports cadenced alarm signal from the MX2820 fan unit on AUX3 input
- Power A/B detection
- Controls common, normally open, and normally closed relay contacts for Critical, Major, and Minor alarms
- NEBS Level 3, UL 60950, GR-1089-CORE compliant
- Operates over temperature range of –40°C to +50°C (no fans), –40°C to +65°C (with fans)
- Derives power from redundant VDC supplied to the shelf

SCU Front Panel LEDs

Table 1-1 provides a description of each LED state for the SCU.

Table 1-1. MX2820 SCU LED Descriptions

LED	State	Description
ACT	Solid Green	Everything is OK and operating normally
	Alternating Green/Amber	Everything is OK and console is open
	Solid Red	Self-test failed
	Solid Amber	Software update is in progress
	Alternating Red/Amber	Self-test failed and console is open
	Flashing Red	SCU Module has failed
ALM	Solid Green	No critical, major, or minor alarms in progress
	Flashing Red	Critical alarm in progress
	Solid Red	Major or minor alarm in progress
	Flashing Amber	Critical alarm was highest priority alarm suppressed by ACO
	Solid Amber	Major or minor alarm was highest priority alarm suppressed by ACO

M13 MUX Module

- P/N 1186002L1 for –48 VDC (revision K and earlier)
- P/N 1186002L1 for –48 VDC or ±24 VDC (revision L and later)
- P/N 1186002L2 for –48 VDC or ±24 VDC
- P/N 1186002L5 for –48 VDC or ±24 VDC
- P/N 1186002E1 for –48 VDC or ±24 VDC

The M13 MUX module acts as a multiplexer/de-multiplexer, accepting a single DS3 input signal and provides 28 DSX-1 or 21 E1 output signals and vice-versa. The MX2820 system allows two M13 MUX modules for each DS3 signal which provides a 1:1 redundant system. Each M13 MUX pair communicates with each other to share provisioning information and the presence of signals and trouble conditions. Each M13 MUX pair communicates with the MX2820 SCU for alarm reporting and performance monitoring. Figure 1-4 shows the MX2820 M13 MUX front panel.

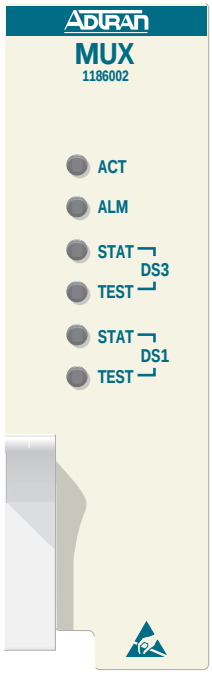


Figure 1-4. MX2820 M13 MUX Module Front Panel

The MX2820 M13 MUX module provides the following features:

- Built-in 1:1 equipment redundancy
- Multiplexes 28 DSX-1 (or 21 E1 channels) into a DS3 signal
- De-multiplexes a DS3 signal into 28 DSX-1 or 21 E1 channels as allowed by DS2 framing
- Supports the M13 or C-Bit parity DS3 formats
- B3ZS line code compatible
- Automatic DS3 Line Build Out (LBO) and receive equalization

- Detects and indicates DS3 alarm and loopback conditions
- Local or loop timing modes
- Operates over temperature range of –40°C to +50°C (no fans), –40°C to +65°C (with fans)
- Manual and remote-initiated line and terminal loopback modes
- Reports alarms to SCU
- Supports downloading of FLASH program data from the SCU
- Front panel indication of Active, Alarm, DS3, and DS1 status
- NEBS Level 3, UL60950, GR-1089-CORE compliant
- Hot swappable
- Derives power from redundant VDC supplied to the shelf
- Simplified configuration through the VT100 terminal menu structure

M13 MUX Front Panel LEDs

Table 1-2 provides a description of each LED state for the Active M13 MUX module.

Table 1-2. MX2820 M13 MUX LED Descriptions

LED	State	Description
ACT	Solid Green	Everything is okay and operating normally
	Alternating Green/Amber	Normal and console open
	Solid Red	Self-test failed
	Solid Amber	Software update in progress
	Alternating Red/Amber	Self-test failed and console open
	Flashing Red	MUX Module has failed
ALM	Solid Green	No critical, major, or minor alarms
	Solid Red	Major or minor alarm in progress
	Flashing Red	Critical alarm in progress
DS3 STAT	Solid Green	Normal (DS3 okay)
	Solid Red	AIS, OOF, RAI, Idle alarms
	Flashing Red	DS3 LOS or DS3 failure (critical)
	One-second Red	A single DS3 line code violation or burst of DS3 line code violations just occurred
	Alternating Red/Green	DS3 XCV threshold exceeded

Table 1-2. MX2820 M13 MUX LED Descriptions (Continued)

LED	State	Description
DS3 TEST	Off Solid Amber Flashing Amber	No DS3 tests in progress Locally-originated test Remote-originated test
DS1 STAT	Off Solid Green Solid Red Flashing Red One-second Red Alternating Red/Green	All DS1s are disabled Enabled DS1s normal (all okay) Non-critical DS1 alarm in progress DS1 LOS on some enabled line (critical DS1 alarm; non-critical system alarm) Single code violation or burst of code violations just occurred in some RX DS1 DS1 XCV threshold exceeded
DS1 TEST	Off Solid Amber Flashing Amber	No DS1 tests in progress Locally-originated test Remote-originated test

Clock Card

- P/N 1186004L1

The MX2820 Clock Card is a plug-in card which generates a timing signal synchronized to either of two external BITS clock references. If both BITS clock references fail, the Clock Card will meet SONET Minimum Clock (SMC) holdover requirements to produce the clock reference. This signal may be used by any one of the MX2820 STS-1 MUX modules to synchronize their STS-1 transmit signals. One Clock Card is required to support the STS-1 application when an external BITS clock reference is used. Two Clock Cards provide 1:1 redundancy in the MX2820 system.

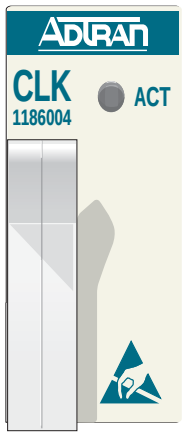


Figure 1-5. MX2820 Clock Card, –48 VDC

The MX2820 Clock Card has the following Features:

- Provides a redundant SMC source with clock holdover to any MX2820 STS-1 MUX
- Communicates to the redundant Clock Card though an asynchronous data link directly between the two cards
- Provides another direct link to the redundant card for protection management
- Maintains full duplex link to the SCU for management, alarm notification, and card provisioning
- Displays status using a single front panel LED
- Operates over temperature range of: 0°C to +50°C (with fans)
- Supports downloading of FLASH program data to the active and protection card simultaneously or individually
- Meets NEBS Level 3 requirements
- Interfaces to backplane via 24-pin Future Bus connector
- Supports TL1 and SNMP in the MX2820 system

NOTE

The MX2820 has two power options: –48VDC or ±24 VDC. The Clock Card operates at –48VDC *only*. Do not deploy a ±24 VDC system if Clock Cards are deployed for STS-1 MUX timing.

Clock Card Front Panel LEDs

Table 1-3 provides a description of the front panel LED.

Table 1-3. MX2820 Clock Card Front Panel LEDs

LED	State	Description
LED Status for Active Clock Card		
ACT	Green Flashing Amber Red Amber Red (Slow Flashing) Red (Fast Flashing)	Normal (all OK) Console open Major or minor alarm present Software update in progress Clock Card has failed Critical alarm present
LED Status for Standby Clock Card		
ACT	Flashing Green Amber Flashing Red	Normal (all OK) Software update in progress Self-test failure

STS-1 MUX

- P/N 1186005L1

The MX2820 STS-1 MUX is a multiplexer unit that plugs into an MX2820 chassis. The MX2820 STS-1 MUX interfaces to a standard STS-1 signal from the network to provide 28 DSX-1 or 21 E1 outputs on the terminal side through the demapping of 28 VT1.5s or 21 VT2s. Two MX2820 MUX cards are used together to provide a redundant STS-1 multiplexer circuit. The MX2820 STS-1 MUX provides 1:1 redundancy and meets the requirements for NEBS Level 3.

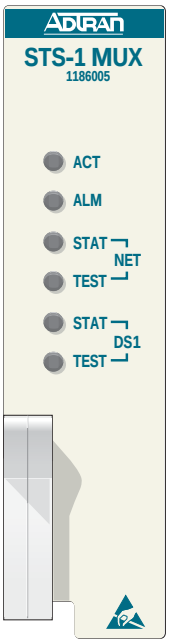


Figure 1-6. MX2820 STS-1 MUX, –48 VDC

The MX2820 STS-1 MUX has the following Features:

- Affordable STS-1 bandwidth consolidation
- Up to 9 redundant STS-1s in 2U of space
- Built-in 1:1 STS-1 and DS1 redundancy
- Backhaul multiple service types (T1/E1)
- TL1, SNMP, Telnet, and SSH management
- Operates over temperature range of: 0°C to +50°C (with fans)
- Locally powered –48 VDC

NOTE

The MX2820 has two power options: –48VDC or ±24 VDC. The STS-1 MUX operates at –48VDC *only*. Do not deploy a ±24 VDC system if STS-1 MUXes are to be deployed.

STS-1 MUX Front Panel LEDs

Table 1-4 provides a description of the front panel LEDs.

Table 1-4. MX2820 STS-1 MUX Front Panel LEDs

LED	State	Description
LED Status for Active MUX		
ACT	Green Alternating Green/Amber Red Amber Alternating Red/Amber Flashing Red	Normal (all OK) Normal and console open Self-test failed Software update in progress Software update in progress and console open STS-1 MUX Module has failed
ALM	Green Red Flashing Red	No critical, major, or minor alarms Major or minor alarm in progress Critical alarm in progress
NET STAT	Green Red Flashing Red Red (Flashing 1 sec per event)	Normal (STS-1 OK) AIS or LOF alarm STS-1 LOS, LOP, or STS-1 failure (critical) Single/Burst STS-1 code violations
NET TEST	Off Amber	No STS-1 tests in progress In test (locally originated)
DS1 STAT	Off Green Red Flashing Red Red (Flashing 1 sec per event) Alternating Red/Green	All DS1s are disabled Enabled DS1s normal (all OK) Noncritical DS1 alarm (CAIS, LAIS) LOS on an enabled line (critical DS1 alarm; noncritical system alarm) Single/Burst RX DS1 code violation DS1 XCV threshold exceeded
DS1 TEST	Off Amber Amber (Flashing)	No DS1 tests in progress In test (locally originated) In test (remotely originated)

Table 1-4. MX2820 STS-1 MUX Front Panel LEDs (Continued)

LED	State	Description
LED Status for Standby MUX		
ACT	Flashing Green Amber Flashing Red	Normal (all OK) Software update in progress Self-test failure
ALM	Off	Permanent state during standby
NET STAT	Off Flashing Red	Normal (STS-1 OK) STS-1 failure
NET TEST	Off	Permanent state during standby
DS1 STAT	Off Flashing Red	Normal (DS1s OK) DS1 failure
DS1 TEST	Off	Permanent state during standby

Bay Configurations

Passive and Forced Air

MX2820 bay configurations are detailed in "Section 2, Engineering Guidelines". Detailed drawings for both passive cooling with heat baffles and forced air cooling with fans are shown in "Section 2". The heat baffles are available to direct heat away from the equipment shelves. Fan modules and filters may be fitted to the heat baffles for improved cooling and density. The heat baffles and fan modules are available for both the 19-inch and 23-inch MX2820 shelves.

Accessory Equipment

Common Accessories for either shelf

Table 1-5 lists the accessories common for either shelf.

Table 1-5. MX2820 Common Accessories

Description	Part Number
Mux Blank Card	1186010L1
Clock Blank Card	1186011L1

19-inch Shelf

The MX2820 system 19-inch shelf allows the use of the accessories shown in Table 1-6.

Table 1-6. 19-inch Shelf Accessories

Assembly	Description	Part Number
Fan and Baffle Assembly	Fan Module	1182006L1
	Fan Heat Baffle	1182005L1
	Fan Filter Housing	1182971L1
	Replacement Filter	1182970L1
Passive Heat Baffle	Newton	0040780114
1U 19-inch Pusher Fan Assembly	Complete Fan Assembly	1184507L1
	Replacement Filter	1184509L1

23-inch Shelf

The MX2820 system 23-inch shelf allows the use of the accessories shown in Table 1-7.

Table 1-7. 23-inch Shelf Accessories

Assembly	Description	Part Number
Fan and Baffle Assembly	Fan Module	1181006L1
	Fan Heat Baffle	1181003L1
	Filter Housing	1181971L1
	Replacement filter	1181970L1
Passive Heat Baffle	Passive Heat Baffle	1180002L1
1U 23-inch Pusher Fan Assembly	Complete Fan Assembly	4186006L1
	Replacement Filter	1186009L1

DSX-1 Cable Assemblies

The MX2820 system allows the use of the cabling accessories shown in Table 1-8.

NOTE

The following definitions apply to the cabling descriptions:
AMP Adapter - cable with female amphenol connector
AMP Patch - cable with male amphenol connector-

Table 1-8. MX2820 Cabling Accessories

Description	Length in feet	Part Number	Overmolded Part Number
DS1 Connector to AMP Adapter	3	1186020L1	1186020L2
DS1 Connector to AMP Adapter	15	1186022L1	1186022L2
DS1 Connector to AMP Adapter	10	–	1186027L2
DS1 Connector to AMP Adapter	25	–	1186028L2
DS1 Connector to AMP Adapter	35	–	1186035L3
DS1 Connector to AMP Patch	3	–	1186024L2
DS1 Connector to AMP Patch	6	1186021L1	1186021L2
DS1 Connector to AMP Patch	10	–	1186026L2
DS1 Connector to AMP Patch	25	1186023L1	1186023L2
DS1 Connector to AMP Patch	35	–	1186035L2
DS1 Connector to AMP Patch	50	–	1186029L2
DS1 Connector to Stub	6	–	1186021L3
DS1 Connector to Stub	25	1186025L1	1186025L2
DS1 Connector to Stub	50	1186050L1	1186050L2
DS1 Connector to Stub	100	1186100L1	1186100L2
DS1 Connector to Stub	150	1186150L1	1186150L2

Note: Custom-length cable assemblies can also be used.

SYSTEM CONNECTIVITY

The shelf backplane contains Input/Output (I/O) connectors, control and signal routing, power input and ground, plus the interconnections between BITS clock cards, MUX cards, and the SCU.

Figure 1-7 shows the MX2820 Multiplexer system with management and network interfaces.

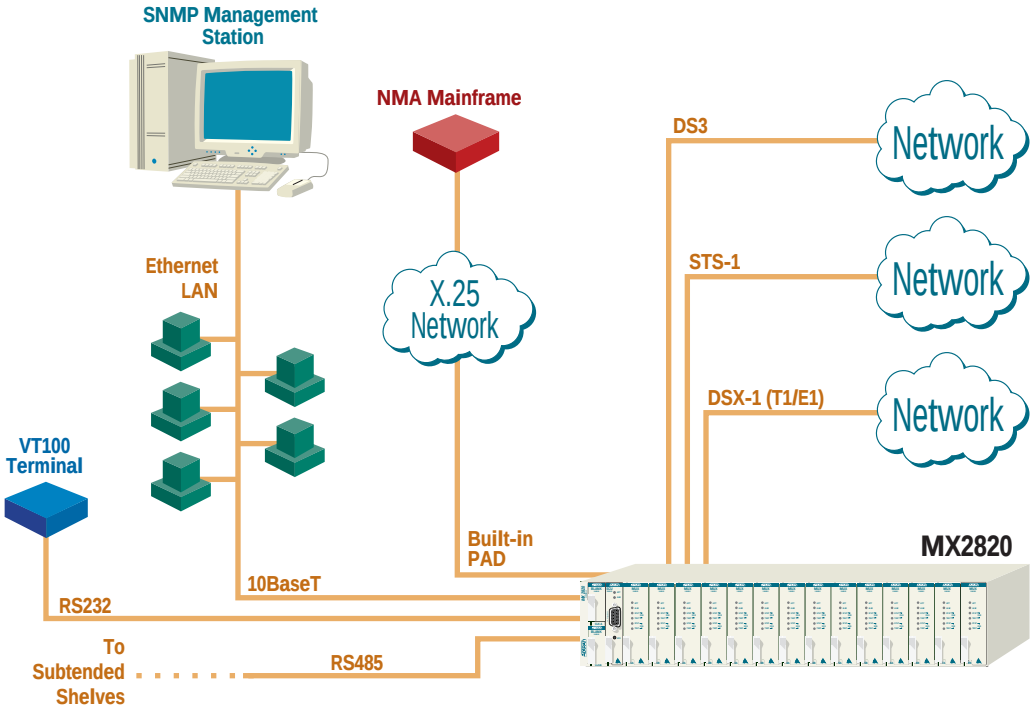


Figure 1-7. MX2820 Multiplexer System Configuration

Power Connections

The MX2820 system is designed to accommodate redundant power configurations. The system operates with either individual supply or both supplies functioning. Dual terminals for DC Voltage (–48 or ±24 VDC) and return are provided.

A Barrier strip connector on the shelf backplane provides the power connections for power and the frame ground. The frame ground connection is routed to the metal MX2820 chassis.

Timing

The MX2820 system operates in local, loop (network), or external (BITS) timing mode. In the local timing mode, an onboard timing reference is provided. In the loop timing mode, the MUX modules synchronize with the received DS3 or STS-1 signal. Because the multiplexing/de-multiplexing process is asynchronous, each DS1 channel maintains its own Transmit and Receive timing.

External timing mode only applies to STS-1 MUX modules and requires an MX2820 Clock module. The STS-1 MUX module synchronizes its STS-1 transmit signal to the DS1 BITS clock signal received at the Clock module.

Network Interfaces

The MX2820 system demultiplexes a DS3 or STS-1 input signal into DSX-1 or E1 output signals.

The MX2820 system multiplexes DSX-1 or E1 input signals into DS3 or STS-1 output signals.

Each MUX module accepts a single DS3 or STS-1 input signal from the network side and provides 28 DSX-1 or 21 E1 outputs. For 1:1 redundant system, the MX2820 system provides two MUX modules for each DS3 or STS-1 signal.

DS3/STS-1 Interface

The MX2820 backplane accommodates each DS3/STS-1 transmit and receive signal via two 75-ohm BNC female connectors.

DSX-1 (T1/E1) Interface

The MX2820 backplane accommodates DSX-1 (T1/E1) Transmit Tip, Transmit ring, Receive Tip, and Receive Ring signals via two FutureBus connectors, one for transmit pairs and one for receive pairs.

Management Interfaces

Craft Port

DB-9 female connector on the SCU front panel provides an RS-232 serial VT100 interface.

Network Management

DB-25 connector on the shelf backplane provides an RS-232 interface for a synchronous X.25 connection.

RJ-45 for 10/100Base-T

RJ-45 female connector on the shelf backplane provides an Ethernet interface to allow Transmission Control Protocol/Internet Protocol (TCP/IP) communication.

RS-485

Wire-wrap posts are used as an RS-485 interface to allow daisy chaining multiple MX2820 shelves.

Alarms

Alarm Relay Contacts

Wire-wrap posts provide alarm relay contacts for Critical, Major, and Minor alarms. Each alarm can be individually wired for Normally Open or Normally Closed.

The Critical alarm relay can be used to indicate loss of power to the shelf.

Environmental Alarm Inputs

Wire-wrap posts provide environmental alarm inputs for ACO, AUX1, AUX2, AUX3A and AUX3B alarms.

For ACO, AUX1, AUX2, and AUX3A, alarms are activated when the circuit between the connecting posts is closed (a short appears across the line).

For AUX3B, an alarm is activated by a cadenced input across the input posts; this input can be used to indicate a fan failure.

This page is intentionally blank.

Section 2
Engineering Guidelines

This section provides Engineering guidelines for network designers who are incorporating an system into their network.

Contents

Figures

Tables

DIMENSIONS OF EQUIPMENT

Table 2-1 provides the dimensions of the MX2820 chassis, heat baffles, fan, and system modules.

Table 2-1. MX2820 Equipment Dimensions and Weights

Part Number	Equipment	(H x W x D)	Weight
Chassis, 19-inch			
1186001L1	MX2820 19-Inch Chassis	3.50” × 17.10” × 13.50”	10.25 lb.
Chassis, 23-inch			
1186001L2	MX2820 23-Inch Chassis	3.50” × 21.22" × 13.50”	12.04 lb.
Fan Assembly, 19-inch MX2820 Chassis (cools up to 3 shelves)			
1182005L1	Total Access 19-Inch Heat Baffle and Fiber Tray	3.97” × 17.47” × 10.13”	6.75 lb.
1182006L1	Total Access 19-Inch Fan Assembly	3.47” × 17.31” × 1.50”	1.85 lb.
1182970L1	Total Access 19-Inch Fan Filter	2.68” × 16.44” × 0.48”	0.30 lb.
1182971L1	Total Access 19-Inch Fan Filter Housing Assembly	2.94” × 17.44” × 0.46”	1.05 lb.
Fan Assembly, 19-inch MX2820 Chassis (one-to-one cooling)			
1184507L1	Fan Assembly	Takes up 1U rack space	7.50 lb.
Fan Assembly, 23-inch MX2820 Chassis (cools up to 3 shelves)			
1181003L1	Total Access 23-Inch Heat Baffle and Fiber Tray	3.97” × 21.42” × 10.25”	6.69 lb.
1181006L1	Total Access 23-Inch Fan Assembly	3.47” × 21.21” × 3.24”	2.44 lb.
1181970L1	Total Access 23-Inch Fan Filter	2.68” × 20.42” × 0.50”	0.31 lb.
1181971L1	Total Access 23-Inch Fan Filter Housing Assembly	2.94” × 21.42” × 0.48”	1.21 lb.
Fan Assembly, 23-inch MX2820 Chassis (one-to-one cooling)			
1186006L1	MX2820 23-Inch Fan Module	Takes up 1U rack space	7.50 lb.
Heat Baffle, Passive Cooling (no fan)			
0040780114	Newton Passive Heat Baffle, 19-Inch	Takes up 1U rack space	1.07 lb.
1180002L1	Passive Heat Baffle, 23-Inch	Takes up 1U rack space	1.30 lb.
Common Modules			
1186003Lx	SCU	3.42” × 0.74” × 9.80”	0.30 lb.
1186004L1	Clock Module	1.50” × 0.74” × 9.80”	0.20 lb.
Multiplexer Modules			
1186002Lx	M13 Multiplexer	3.42” × 0.74” × 9.80”	0.40 lb.
1186005L1	STS-1 Multiplexer	3.42” × 0.74” × 9.80”	0.40 lb.
Accessories			
1186010L1	Blank, MUX Module	3.42” × 1.03” × 2.70”	0.10 lb.
1186011L1	Blank, Clock Module	1.50” × 0.74” × 2.70”	0.05 lb.

Note: x indicates the list version.

SYSTEM POWER REQUIREMENTS

NOTE

Refer to "Section 1, System Description" for voltage requirements of modules within each List series.

Table 2-2 provides the current draw of each module at –48 VDC. For the M13 and STS-1 modules, this measurement was made with all T1s enabled and configured for maximum line length. A QRSS data pattern was utilized.

Table 2-2. Current Draw of Each Module at –48 VDC

Part Number	Equipment	Maximum Current Draw at –48 VDC
Common Modules		
1186003Lx	SCU	68 mA
1186004L1	Clock Module	52 mA
Multiplexer Modules		
1186002Lx	M13 MUX (redundant pair)	340 mA
1186005L1	STS-1 MUX (redundant pair)	332 mA

Note: x indicates the list version.

Table 2-3 provides the current draw of each module at ±24 VDC.

Table 2-3. Current Draw of Each Module at ±24 VDC

Part Number	Equipment	Maximum Current Draw at ±24 VDC
Common Modules		
1186003Lx	SCU	130 mA
1186002Lx	M13 MUX (redundant pair)	720 mA

Note: x indicates the list version.

M13 and STS-1 System Configurations

Table 2-4 provides the current draw for a fully loaded M13 system at –48 VDC for a single 19-inch shelf and a single 23-inch shelf deployment.

Table 2-4. Current Draw at –48 VDC for fully loaded M13 System

Part Number	Description	Quantity	Current Draw	Quantity times Draw	Total Draw
19-inch shelf					
1186003Lx	SCU	1	68 mA	1 × 68 mA	68 mA
1186002Lx	M13 MUX	7 redundant pairs	340 mA	7 × 340 mA	2.38 A
Total Draw in Amps					2.45 A
23-inch shelf					
1186003Lx	SCU	1	68 mA	1 × 68 mA	68 mA
1186002Lx	M13 MUX	9 redundant pairs	340 mA	9 × 340 mA	3.06 A
Total Draw in amps					3.13 A

Note: x indicates the list version.

Table 2-5 provides the current draw for a fully loaded M13 system at ±24 VDC for a single 19-inch shelf and a single 23-inch shelf deployment.

Table 2-5. Current Draw at ±24 VDC for fully loaded M13 System

Part Number	Description	Quantity	Current Draw	Quantity times Draw	Total Draw
19-inch shelf					
1186003Lx	SCU	1	130 mA	1 × 130 mA	130 mA
1186002Lx	M13 MUX	7 redundant pairs	720 mA	7 × 720 mA	5.04 A
Total Draw in Amps					5.17 A
23-inch shelf					
1186003Lx	SCU	1	130 mA	1 × 130 mA	130 mA
1186002Lx	M13 MUX	9 redundant pairs	720 mA	9 × 720 mA	6.48 A
Total Draw in amps					6.61 A

Note: x indicates the list version.

Table 2-6 provides the current draw for a fully loaded STS-1 system at –48 VDC for a single 19-inch shelf and a single 23-inch shelf deployment.

Table 2-6. Current Draw at –48 VDC for fully loaded STS-1 system

Part Number	Description	Quantity	Current Draw	Quantity times Draw	Total Draw
19-inch shelf					
1186003Lx	SCU	1	68 mA	1 × 68 mA	68 mA
1186004L1	Clock Module	2	52 mA	2 × 52 mA	104 mA
1186005L1	STS-1 MUX	7 redundant pairs	332 mA	7 × 332 mA	2.33 A
Total Draw in amps					2.5
23-inch shelf					
1186003Lx	SCU	1	68 mA	1 × 68 mA	68 mA
1186004L1	Clock Module	2	52 mA	2 × 52 mA	104 mA
1186005L1	STS-1 MUX	9 redundant pairs	332 mA	9 × 332 mA	2.99 A
Total Draw in amps					3.16 A

Note: x indicates the list version.

Wire Gauge and Fuse Size

Table 2-7 provides data for determining the wire gauge and fuse size for a fuse panel and MX2820 shelf in the same bay. The recommendations apply to wiring from the shelf to a fuse panel in the same bay.

Table 2-7. Wire Gauge and Fuse Size Recommendations

System Voltage	Recommended Wire Gauge	Recommended Fuse Size
–48 VDC System	14 AWG	8 amps
±24 VDC System	12 AWG	16 amps

POWER DISSIPATION CONSIDERATIONS

Power Dissipation for an MX2820 Shelf

Table 2-8 provides the heat dissipation data for each module at –48 VDC.

Table 2-8. Module Heat Dissipation at –48 VDC

Part Number	Description	Heat Dissipation
Common Modules		
1186003Lx	SCU	3.26 W
1186004L1	Clock Module	2.50 W
Multiplexer Modules		
1186002Lx	M13 MUX (redundant pair)	16.32 W
1186005L1	STS-1 MUX (redundant pair)	15.94 W
Accessories		
1181006L1 (23-inch)	Fan	9.6 W
1182006L1 (19-inch)	Fan	9.6 W
1186006L1 (23-inch)	Pusher Fan	14.4 W
1184507L1 (19-inch)	Pusher Fan	14.4 W

Note: x indicates the list version.

Table 2-9 provides the heat dissipation for a fully loaded M13 system at –48 VDC for a single 19-inch shelf and a single 23-inch shelf deployment.

Table 2-9. Heat Dissipation for Fully Loaded M13 System at –48 VDC

Part Number	Description	Quantity	Heat Dissipation	Quantity times Watts	Total Watts
19-inch shelf					
1186003Lx	SCU	1	3.26 W	1 x 3.26 W	3.26 W
1186002Lx	M13 MUX	7 redundant pairs	16.32 W each	7 x 16.32 W	114.24 W
Total watts					117.50 W
23-inch shelf					
1186003Lx	SCU	1	3.26 W	1 x 3.26 W	3.26 W
1186002Lx	M13 MUX	9 redundant pairs	16.32 W each	9 x 16.32 W	146.88 W
Total watts					150.14 W

Note: x indicates the list version.

Table 2-10 provides the heat dissipation for a fully loaded M13 system at ±24 VDC for a single 19-inch shelf and a single 23-inch shelf deployment.

Table 2-10. Heat Dissipation for Fully Loaded M13 System at ±24 VDC

Part Number	Description	Quantity	Heat Dissipation Watts	Quantity times Watts	Total Watts
19-inch shelf					
1186003Lx	SCU	1	3.12 W	1 x 3.12 W	3.12 W
1186002Lx	M13 MUX	7 redundant pairs	17.28 W each	7 x 17.28 W	120.96 W
Total watts					124.08 W
23-inch shelf					
1186003Lx	SCU	1	3.12 W	1 x 3.12 W	3.12 W
1186002Lx	M13 MUX	9 redundant pairs	17.28 W each	9 x 17.28 W	155.52 W
Total watts					158.64 W

Note: x indicates the list version.

Table 2-11 provides the heat dissipation for a fully loaded STS-1 system at –48 VDC for a single 19-inch shelf and a single 23-inch shelf deployment.

Table 2-11. Heat Dissipation for Fully Loaded STS-1 System

Part Number	Description	Quantity	Heat Dissipation	Quantity times Watts	Total Watts
19-inch shelf					
1186003Lx	SCU	1	3.26 W	1 x 3.26 W	3.26 W
1186004L1	Clock Module	2	2.50 W	2 x 2.50 W	5.00 W
1186005L1	STS-1 MUX	7 redundant pairs	15.94 W each	7 x 15.94 W	111.58 W
Total watts					119.84 W
23-inch shelf					
1186003Lx	SCU	1	3.26 W	1 x 3.26 W	3.26 W
1186004L1	Clock Module	2	2.50 W	2 x 2.50 W	5.00 W
1186002Lx	M13 MUX	9 redundant pairs	15.94 W each	9 x 15.94 W	143.46 W
Total watts					151.72 W

Note: x indicates the list version.

Configuration Guidelines for the MX2820 System

MX2820 systems can be actively cooled with fans or passively cooled by appropriately spacing shelves and incorporating baffles into the bay design. For maximum density, fans are recommended for the MX2820 system.

The following recommendations apply to 19-inch shelves:

- Actively cooled (multiple shelf cooling):
  - Working from the bottom of the bay, install heat baffle and filter assembly (P/N 1182005L1 and 1182971L1).
  - Directly above heat baffle, install up to three MX2820 Chassis (P/N 1186001L1).
  - Directly above the shelves, add a heat baffle, Fan Module, and filter assembly (P/N 1182005L1, 1182006L1, and 1182971L1).
  - Repeat these steps for additional shelves for up to three shelves between Fan Modules. The filter is unnecessary on the heat baffle above the top MX2820 shelf in the rack.
  - Figure 2-1 provides an example.
- Passively cooled:
  - Working from the bottom of the bay, leave a 1U space between the bottom of the rack and the first shelf. Install a MX2820 Chassis (P/N 1186001L1).
  - Leave a 1U space. Install a 1U passive heat baffle (Newton P/N 0040780114).
  - Leave an additional 2U space, (4U total between shelves), and install another MX2820 shelf.
  - Repeat these steps to fill the bay leaving a 2U space above the top-most shelf.
  - Figure 2-2 provides an example.
- Actively cooled (one-to-one pusher fan):
  - Locate at least 3U space in a rack for each MX2820 chassis installation. Install a Fan Module Assembly (P/N 1184507L1) at the bottom of the 3U space.
  - Directly above the fan, install a MX2820 Chassis (P/N 1186001L1).
  - Figure 2-3 provides an example.

The following recommendations apply to 23-inch shelves:

- Actively cooled (multiple shelf cooling):
  - Working from the bottom of the bay, install heat baffle and filter (P/N 1181003L1 and 1181971L1).
  - Directly above heat baffle, install up to three MX2820 shelves (P/N 1186001L2).
  - Directly above the shelves, add a heat baffle, Fan Module, and filter (P/N 1181003L1, 1181006L1, and 1181971L1).
  - Repeat these steps for additional shelves for up to three shelves between Fan Modules. The filter is unnecessary on the heat baffle above the top MX2820 shelf in the rack.
  - Figure 2-1 provides an example.

- **Passively cooled**:
  - Working from the bottom of the bay, leave a 1U space between the bottom of the rack and the first shelf, install a MX2820 shelf (P/N 1186001L2).
  - Leave a 1U space, install a 1U passive heat baffle (P/N 1180002L1).
  - Leave an additional 2U space, (4U total between shelves), and install another MX2820 shelf.
  - Repeat these steps to fill the bay leaving a 2U space above the top-most shelf.
  - Figure 2-2 provides an example.
- **Actively cooled (one-to-one pusher fan)**
  - Locate at least 3U space in a rack for each MX2820 chassis installation. Install a Fan Module Assembly (P/N 1186006L1) at the bottom of the 3U space.
  - Directly above the fan, install a MX2820 Chassis (P/N 1186001L2).
  - Figure 2-3 provides an example.

MX2820 Heat Dissipation and GR-63-CORE

The following guidelines are intended to aid the designer and planner for installations of shelves and meeting NEBS heat release objectives. Since the system supports M13 and STS-1 modules, much forethought should be given to the installation and possible future expansion. Depending on the technology employed, various scenarios and shelf densities can be achieved. Refer to Figure 2-1and Figure 2-2 for examples of frame installations.

NOTE

An MX2820 installation that uses STS-1 modules should be actively cooled.

Telcordia GR-63-CORE specifies the physical protection requirements and objectives for telecommunications equipment. Often referred to as “NEBS” (Network Equipment-Building System), these guidelines have become the de facto standard for U.S. telecommunications equipment and include both requirements and objectives for heat dissipation.

The NEBS requirement is that the heat release of telecommunications equipment be documented. For the system, this is done in the “Power Dissipation for an MX2820 Shelf” section.

Shelf Level

NEBS further provides specific objectives for heat dissipation within a shelf in paragraph O4-12 of GR-63-CORE. For an equipment shelf such as the , the relevant values are as follows in Table 2-12 (from GR-63-CORE Table 4-6).

Table 2-12. Heat Dissipation for Shelf

Heat Release Method	Requirements
Natural convection	740 W/m^2 per meter (20.9 $W/ft^2/ft$) of vertical frame space the equipment uses
Forced-air fans	995 W/m^2 per meter (27.9 $W/ft^2/ft$) of vertical frame space the equipment uses

Frame Level

NEBS provides specific objectives for heat dissipation in a frame in paragraph O4-12 for a frame such as intended for the system. The relevant values are as follows in Table 2-13 (from GR-63-CORE Table 4-6).

Table 2-13. Heat Dissipation for Individual Frame

Heat Release Method	Requirements
Natural convection	1450 W/m^2 (134.7 W/ft^2)
Forced-air fans	1950 W/m^2 (181.2 W/ft^2)

Actively Cooled

Figure 2-1 provides an example of an actively cooled bay installation that contains multiple MX2820 shelves and also meets the NEBS heat release objectives. Based on 30-inch maintenance and 24-inch wiring aisles, 12-inch equipment depth, 5-inch rack extenders, and 26-inch overall equipment width, this example allows for a NEBS heat budget of 1521 watts. Nine 23-inch MX2820 shelves are shown in the bay configuration example.

Passively Cooled

Figure 2-2 provides an example of a passively cooled bay installation that contains multiple 23-inch MX2820 shelves and meets the NEBS heat release objectives. Using the same bay configuration as mentioned for an actively cooled bay installation, this example allows for a NEBS heat budget of 1130 watts.

With this configuration, up to seven 23-inch MX2820 shelves could be mounted in a 7-foot bay.

NEBS recommendations and shelf spacing guidelines should be followed for both actively and passively cooled installations.

Pusher Fan Cooled

The Pusher fan assembly can be used when there is limited rack space (for example, adding a MX2820 system to a rack that is already installed with other equipment). Cooling is provided directly to the MX2820 chassis by the adjacent fan assembly.

NOTE

Higher-density applications can be achieved with rack extenders. In the higher-density applications, as shown in the bay configuration examples, the rack extenders provide additional space for better cable management.

NOTE

If the MX2820 shelf is deployed in racks with other equipment, a heat baffle should be mounted below the MX2820 shelf to provide isolation from heat from the other equipment (with exception of the pusher fan).

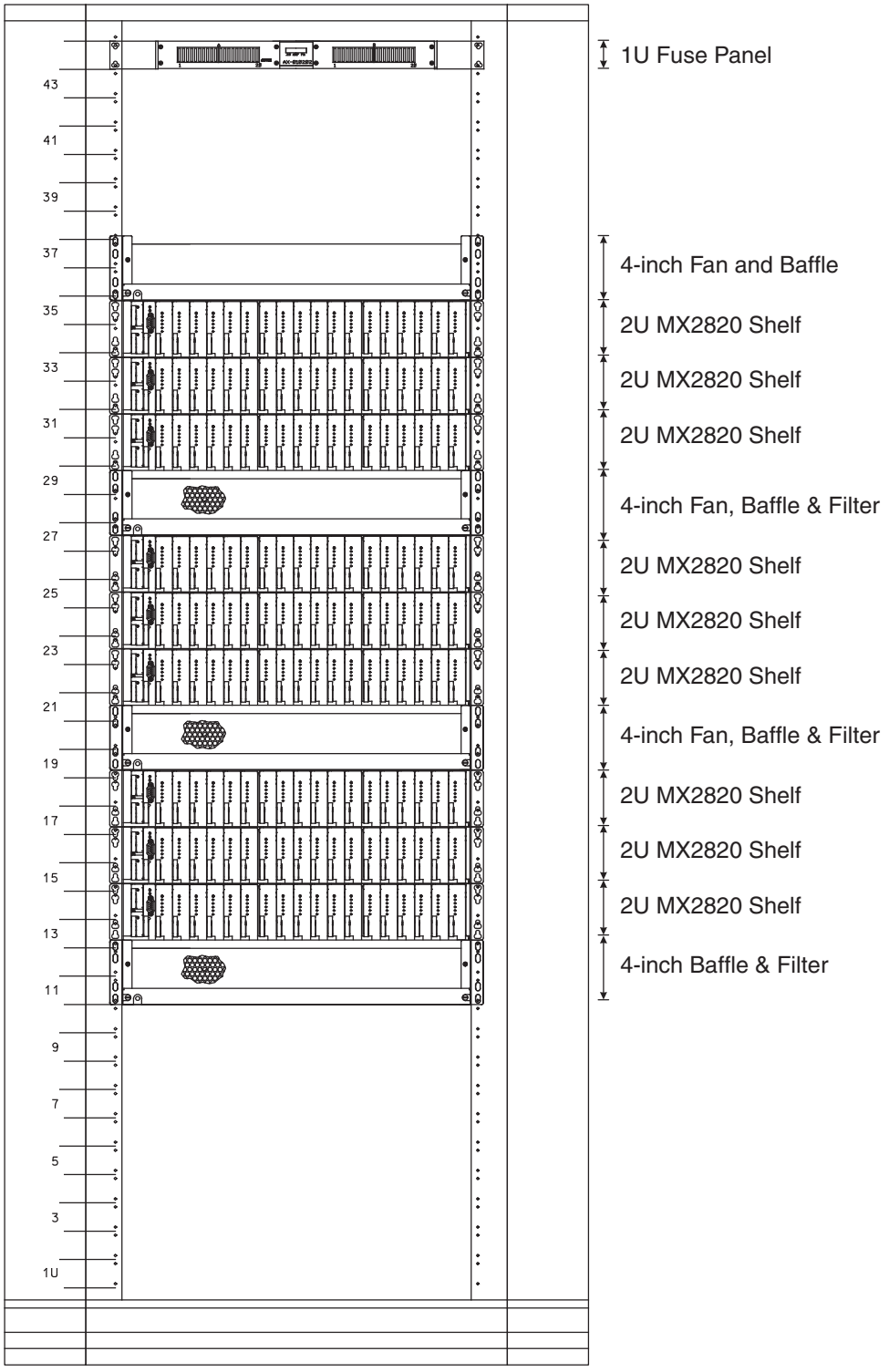


Figure 2-1. 7-foot Bay MX2820 Shelf Installation - Actively Cooled

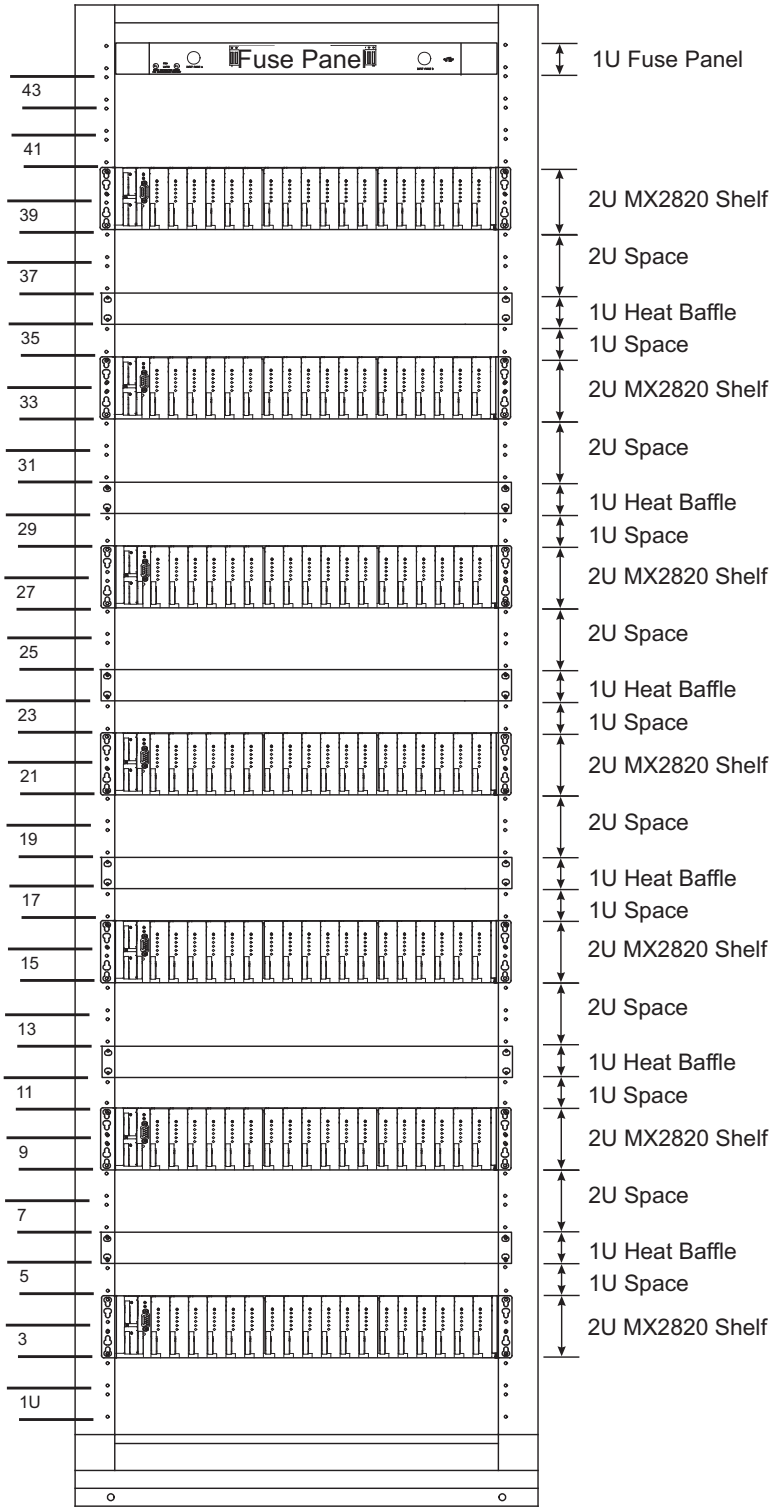


Figure 2-2. 7-foot Bay MX2820 Shelf Installation - Passively Cooled

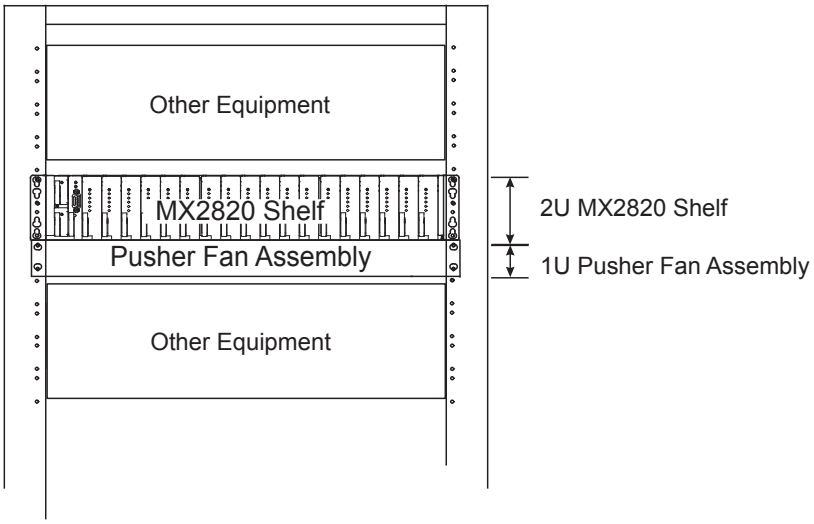


Figure 2-3. MX2820 Installation - Pusher Fan Cooled

MANAGEMENT INTERFACES

Telnet, SNMP, TFTP, and SSH over 10/100Base-T

An RJ-45 connector on the backplane of an MX2820 shelf provides a 10/100Base-T Ethernet interface for the MX2820 system. Through this interface the system connects to an Internet Protocol (IP)/Local Area Network (LAN) host computer. Each MX2820 shelf requires one IP address, which can be provisioned with an MX2820 menu option.

The SCU manages the Ethernet interface for the MX2820 system. The SCU controls Telnet, SNMP, TFTP, and SSH access to each module in the MX2820 shelf.

There is one session reserved for each of the following:

- Craft
- Telnet
- X.25
- RS-485
- SSH

There are also 10 pool sessions that can connect to any of these entities.

NETWORK CONNECTIONS (DS3/STS-1)

CAUTION

DSX-1, DS3/STS-1, and 10/Base-T Ethernet circuits from the MX2820 are not to be connected directly to outside plant facilities.

Cable Specifications

All coaxial cable for the MX2820 DS3 and STS-1 signals should meet the following minimum specification:

- The coaxial cable should have characteristic impedance of 75 ohms.
- Nominal mutual capacitance should not exceed 20.4 *p*F/foot.
- The cable should conform to ANSI standard T1.102 (1993) pulse mask definition. The standard reference cable is “WECO Type 728A” at 450 feet.

Approved cable types include:

- WECO 728A
- Lucent 728B
- Lucent 734A
- Belden 9231
- Belden 1809A

Lucent type 735A cable may be used up to a maximum length of 250 feet.

DSX-1 CONNECTIONS

The DSX-1 (T1/E1) circuits provide connections to DSX-1 cross connects and to other equipment based on how the circuits are to be used for an application.

Table 2-14 provides information that can be used as a guideline when wiring the FutureBus-to-Stub cable.

Table 2-14. Conductor Color Code for All FutureBus-to-Stub Cable Assemblies

Pair Number	Wire Color (Tip)	Wire Color (Ring)
1	White/Blue	Blue/White
2	White/Orange	Orange/White
3	White/Green	Green/White
4	White/Brown	Brown/White
5	White/Slate	Slate/White
6	Red/Blue	Blue/Red
7	Red/Orange	Orange/Red
8	Red/Green	Green/Red
9	Red/Brown	Brown/Red
10	Red/Slate	Slate/Red
11	Black/Blue	Blue/Black
12	Black/Orange	Orange/Black
13	Black/Green	Green/Black
14	Black/Brown	Brown/Black
15	Black/Slate	Slate/Black
16	Yellow/Blue	Blue/Yellow
17	Yellow/Orange	Orange/Yellow
18	Yellow/Green	Green/Yellow
19	Yellow/Brown	Brown/Yellow
20	Yellow/Slate	Slate/Yellow
21	Violet/Blue	Blue/Violet
22	Violet/Orange	Orange/Violet
23	Violet/Green	Green/Violet
24	Violet/Brown	Brown/Violet
25	Violet/Slate	Slate/Violet
26	**White/Blue***	**Blue/White***
27	**White/Orange***	**Orange/White***
28	**White/Green***	**Green/White***

* Bold indicates Blue Binder Group. Pairs 1-25 do not use a binder.

Table 2-15 provides information for the amphenol connector pinout for the FutureBus-to-amphenol cable assemblies.

Table 2-15. Amphenol Pinout for All FutureBus-to-Amphenol Cable Assemblies

Pin	Function		Pin
1	Ring 1	Tip 1	33
2	Ring 2	Tip 2	34
3	Ring 3	Tip 3	35
4	Ring 4	Tip 4	36
5	Ring 5	Tip 5	37
6	Ring 6	Tip 6	38
7	Ring 7	Tip 7	39
8	Ring 8	Tip 8	40
9	Ring 9	Tip 9	41
10	Ring 10	Tip 10	42
11	Ring 11	Tip 11	43
12	Ring 12	Tip 12	44
13	Ring 13	Tip 13	45
14	Ring 14	Tip 14	46
15	Ring 15	Tip 15	47
16	Ring 16	Tip 16	48
17	Ring 17	Tip 17	49
18	Ring 18	Tip 18	50
19	Ring 19	Tip 19	51
20	Ring 20	Tip 20	52
21	Ring 21	Tip 21	53
22	Ring 22	Tip 22	54
23	Ring 23	Tip 23	55
24	Ring 24	Tip 24	56
25	Ring 25	Tip 25	57
26	Ring 26	Tip 26	58
27	Ring 27	Tip 27	59
28	Ring 28	Tip 28	60
29			61
30			62
31			63
32	FGND		64

The information in Figure 2-4 and Table 2-16 may be used to cross-reference the wire color information in Table 2-14 with the pins of the FutureBus connector.

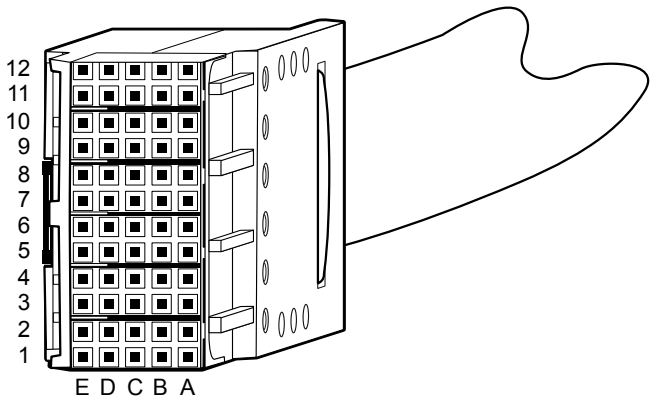


Figure 2-4. FutureBus-to-Stub Cable Connector

Table 2-16. FutureBus Connector Map

Future Bus	A	B	C	D	E
1	Amphenol #28 Green (RNG28)	Amphenol #27 Orange (RNG27)	Amphenol #26 Blue (RNG26)	Amphenol #25 Slate (RNG25)	Amphenol #24 Brown (RNG24)
2	Amphenol #60 White (TIP28)	Amphenol #59 White (TIP27)	Amphenol #58 White (TIP26)	Amphenol #57 Violet (TIP25)	Amphenol #56 Violet (TIP24)
3	Amphenol #23 Green (RNG23)	Amphenol #22 Orange (RNG22)	Amphenol #21 Blue (RNG21)	Amphenol #20 Slate (RNG20)	Amphenol #19 Brown (RNG19)
4	Amphenol #55 Violet (TIP23)	Amphenol #54 Violet (TIP22)	Amphenol #53 Violet (TIP21)	Amphenol #52 Yellow (TIP20)	Amphenol #51 Yellow (TIP19)
5	Amphenol #18 Green (RNG18)	Amphenol #17 Orange (RNG17)	Amphenol #16 Blue (RNG16)	Amphenol #15 Slate (RNG15)	Amphenol #14 Brown (RNG14)
6	Amphenol #50 Yellow (TIP18)	Amphenol #49 Yellow (TIP17)	Amphenol #48 Yellow (TIP16)	Amphenol #47 Black (TIP15)	Amphenol #46 Black (TIP14)
7	Amphenol #13 Green (RNG13)	Amphenol #12 Orange (RNG12)	Amphenol #11 Blue (RNG11)	Amphenol #10 Slate (RNG10)	Amphenol #9 Brown (RNG9)
8	Amphenol #45 Black (TIP13)	Amphenol #44 Black (TIP12)	Amphenol #43 Black (TIP11)	Amphenol #42 Red (TIP10)	Amphenol #41 Red (TIP9)
9	Amphenol #8 Green (RNG8)	Amphenol #7 Orange (RNG7)	Amphenol #6 Blue (RNG6)	Amphenol #5 Slate (RNG5)	Amphenol #4 Brown (RNG4)
10	Amphenol #40 Red (TIP8)	Amphenol #39 Red (TIP7)	Amphenol #38 Red (TIP6)	Amphenol #37 White (TIP5)	Amphenol #36 White (TIP4)
11			Amphenol #3 Green (RNG3)	Amphenol #2 Orange (RNG2)	Amphenol #1 Blue (RNG1)
12	Amphenol #64 Drain Wire		Amphenol #35 White (TIP3)	Amphenol #34 White (TIP2)	Amphenol #33 White (TIP1)

This page is intentionally blank.

Section 3
Application Guidelines

This section provides application guidelines for network designers who are incorporating a system into their network.

Contents

APP-301
Standard DS3-Fed System Application

USAGE

The standard DS3-Fed application for the MX2820 system allows the M13 Multiplexer (MUX) module to accept a single DS3 input signal from the network and provide twenty-eight T1 or twenty-one E1 output signals (or a combination thereof as allowed by DS2 framing) on the terminal (customer) side.

With a 1:1 redundant configuration, two M13 MUX modules can accept a single DS3 signal from the network. Each M13 MUX pair communicates with each other to share information regarding provisioning and the presence of signals and trouble conditions. Each STS-1 MUX will communicate with the MX2820 SCU (1186003L1) with regards to alarm reporting and performance monitoring.

One M13 MUX module, slot A in the MX2820 shelf, is considered the primary (working) unit, and the other M13 MUX module, slot B in the MX2820 shelf, is considered the protect (standby) unit.

DS3 Interface

The MX2820 backplane provides two standard BNC coax female connectors for the M13 MUX module, one for the DS3 transmit path and the other for the DS3 receive path.

The 19-inch shelf provides 14 BNC connectors, and the 23-inch shelf provides 18 BNC connectors.

DS3 Cabling Specifications

Refer to “Section 2, Engineering Guidelines” for cable specifications.

DSX-1 Interface

The MX2820 backplane provides two 60-pin FutureBus connectors for each DSX-1 signal, one for the DSX-1/E1 transmit Tip and Ring pairs, and the other for the DSX-1/E1 Receive Tip and Ring pairs.

DSX-1 Cabling Specifications

Refer to “Section 2, Engineering Guidelines” for cable specifications.

This page is intentionally blank.

APP-302
Standard DS3-Fed System Application

USAGE

The standard STS-1-Fed application for the MX2820 system allows the STS-1 Multiplexer (MUX) module to accept a single STS-1 input signal from the network and provide twenty-eight T1 or twenty-one E1 output signals on the terminal (customer) side.

With a 1:1 redundant configuration, two STS-1 MUX modules can accept a single STS-1 signal from the network. Each STS-1 MUX pair communicates with each other to share information regarding provisioning and the presence of signals and trouble conditions. Each STS-1 MUX will communicate with the MX2820 SCU (1186003L1) with regards to alarm reporting and performance monitoring.

One STS-1 MUX module, slot A in the MX2820 shelf, is considered the primary (working) unit, and the other STS-1 MUX module, slot B in the MX2820 shelf, is considered the protect (standby) unit.

STS-1 Interface

The MX2820 backplane provides two standard BNC coax female connectors for the STS-1 MUX module, one for the STS-1 transmit path and the other for the STS-1 receive path.

The 19-inch shelf provides 14 BNC connectors, and the 23-inch shelf provides 18 BNC connectors.

STS-1 Cabling Specifications

Refer to “Section 2, Engineering Guidelines” for cable specifications.

DSX-1/E1 Interface

The MX2820 backplane provides two 60-pin FCI connectors for each DSX-1 signal, one for the DSX-1/E1 transmit Tip and Ring pairs, and the other for the DSX-1/E1 Receive Tip and Ring pairs.

DSX-1 Cabling Specifications

Refer to “Section 2, Engineering Guidelines” for cable specifications.

This page is intentionally blank.

Section 4
Site Preparation

This section provides Site Preparation guidelines for network designers who are incorporating an system into their network.

Contents

INTRODUCTION

This section of the system manual provides details on how to prepare a Central Office (CO), Multi-Tenant Unit (MTU), or Remote Terminal (RT) to accept the installation of one or more MX2820 shelves. Shelves that are installed in the same bay or in adjacent bays should be engineered together so that they share common feeds for power, timing, and management interfaces as appropriate for the application.

PREREQUISITE PROCEDURES

Before beginning the site preparation, the Site Engineer should review the Engineering Guidelines. Based upon the application, the Site Engineer should specify how the bay holding the shelves should fit into the NEBS lineup for CO, MTU, or RT applications. These considerations include which power, transmission, and clock connections are required for each shelf.

SPACE CONSIDERATIONS

Vertical and Horizontal Space Requirements

For vertical and horitizonal space requirements, refer to the Bay Configurations figures in “Section 2, Engineering Guidelines”.

Use of Horizontal Spaces in a NEBS Lineup

When multiple shelves are to be installed in the same bay, horizontal aisle spacers can be used on both sides of the bay to accommodate the high-wire density of the shelves.

Fitting the Shelf into MTU and RT Applications

For individual shelf applications, the MX2820 shelf occupies 3.5 inches of rack space. Refer to “Section 2, Engineering Guidelines” for heat baffle and fan requirements. All applications should be implemented where there is adequate heat dissipation and available power.

ELECTRICAL CONSIDERATIONS

The MX2820 shelf supports dual-feed –48 VDC or ±24 VDC power inputs.

Power Wiring and Fusing

MX2820 power connections, including return connections, should be provided from the fuse panel using insulated wire and the appropriate fuse (see Table 2-7 on page 2-6). Per application requirements, power can be provided by a –48 VDC or ±24 VDC supply. A separate wire should be run from the fuse panel for each –48 VDC or ±24 VDC input and for each VDC return. Power wire with red insulation is recommended for the voltage feeds, and power wire with black insulation is recommended for the return feeds.

NOTE

Applications which include STS-1 multiplexers should be –48 VDC only.

Fan Module Power

Refer to the appropriate Installation and Maintenance Practice and/or Job Aid for Fan installation.

Frame Ground

Each MX2820 shelf requires a connection to frame ground using the appropriate AWG wire size. See Table 2-7 on page 2-6.

FOLLOW-UP PROCEDURES

Once the Central Office preparation described in this section of the manual is complete, the MX2820 shelves are ready for the installation. “NTP-001, Shelf and SCU Installation” provides the instructions for installing the shelves.

This page is intentionally blank.

Section 5
User Interface Guide

This section provides guidelines for network designers who are incorporating a system into their networks.

Contents

Figures

Tables

This page is intentionally blank.

UIG-500
MX2820 Menu Tree

INTRODUCTION

This subsection provides the menu trees for the MX2820 system.

NOTE

Menu trees in this manual are representative of the List 1 and List 2 modules. Other List series are available. Refer to the Job Aid shipped with those modules for their menu trees.

MX2820 MAIN MENU

Figure 5-1 shows the Main Menu screen for the MX2820 system. User-interface tasks are initiated from the Main Menu. "Section 6, Non-Trouble Clearing Procedures" lists the provisioning tasks for the Network (DS3/STS-1) interface, DSX-1 (T1/E1) interface, and the SCU. "Section 7, Detailed Level Procedures" provides detailed procedural steps for the tasks listed in "Section 6".

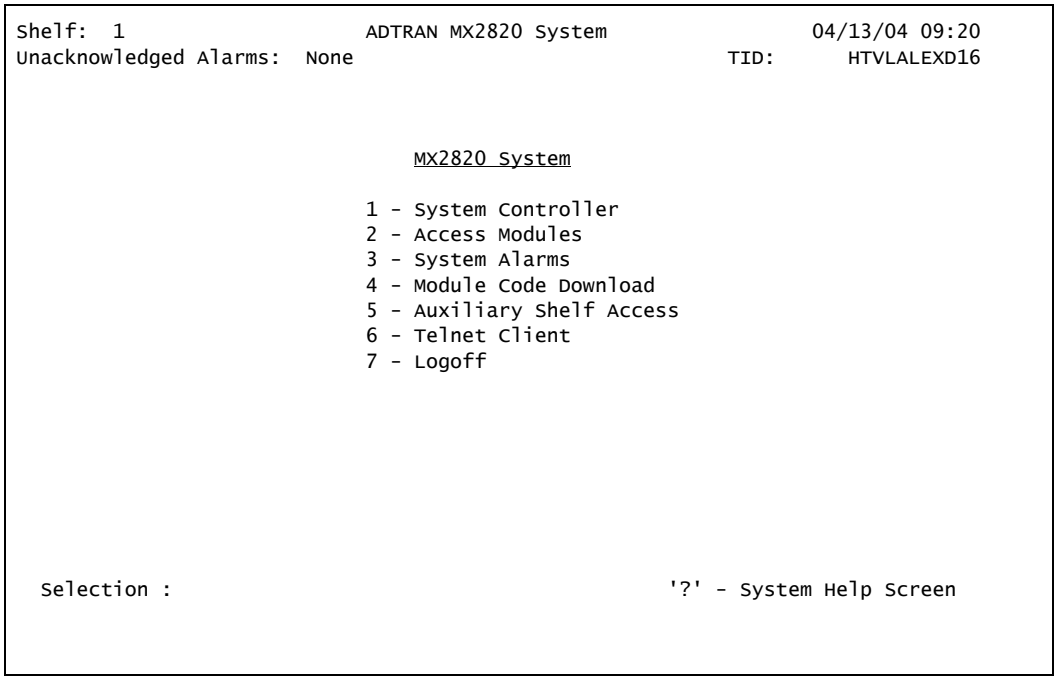


Figure 5-1. MX2820 System Main Menu

SCU MENU TREE

Figure 5-2 shows the menu tree for the MX2820 System Controller Unit (SCU).

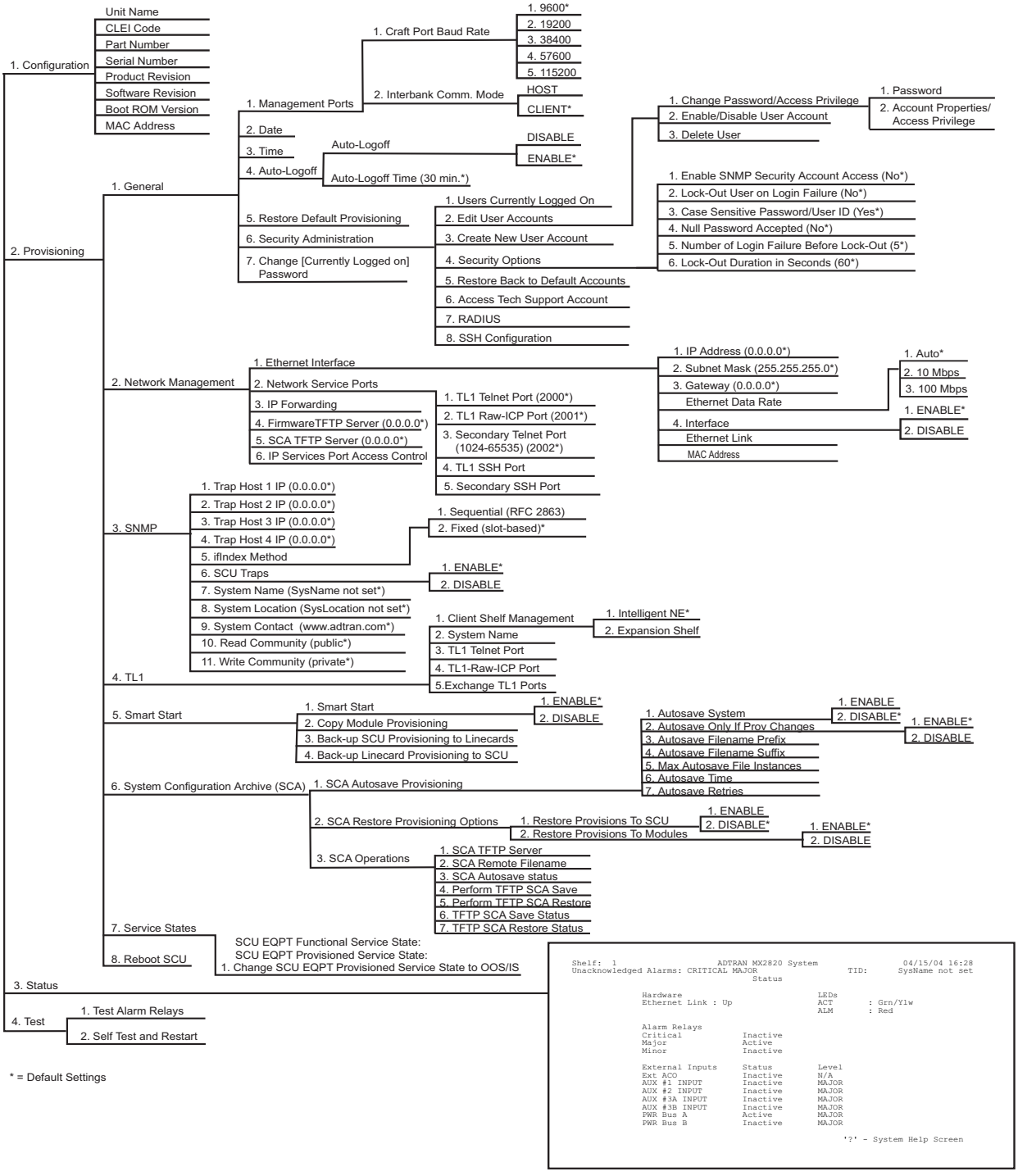


Figure 5-2. MX2820 SCU Menu Tree

M13 MUX MENU TREE

Figure 5-3 shows the menu tree for the MX2820 M13 Multiplexer (MUX) module.

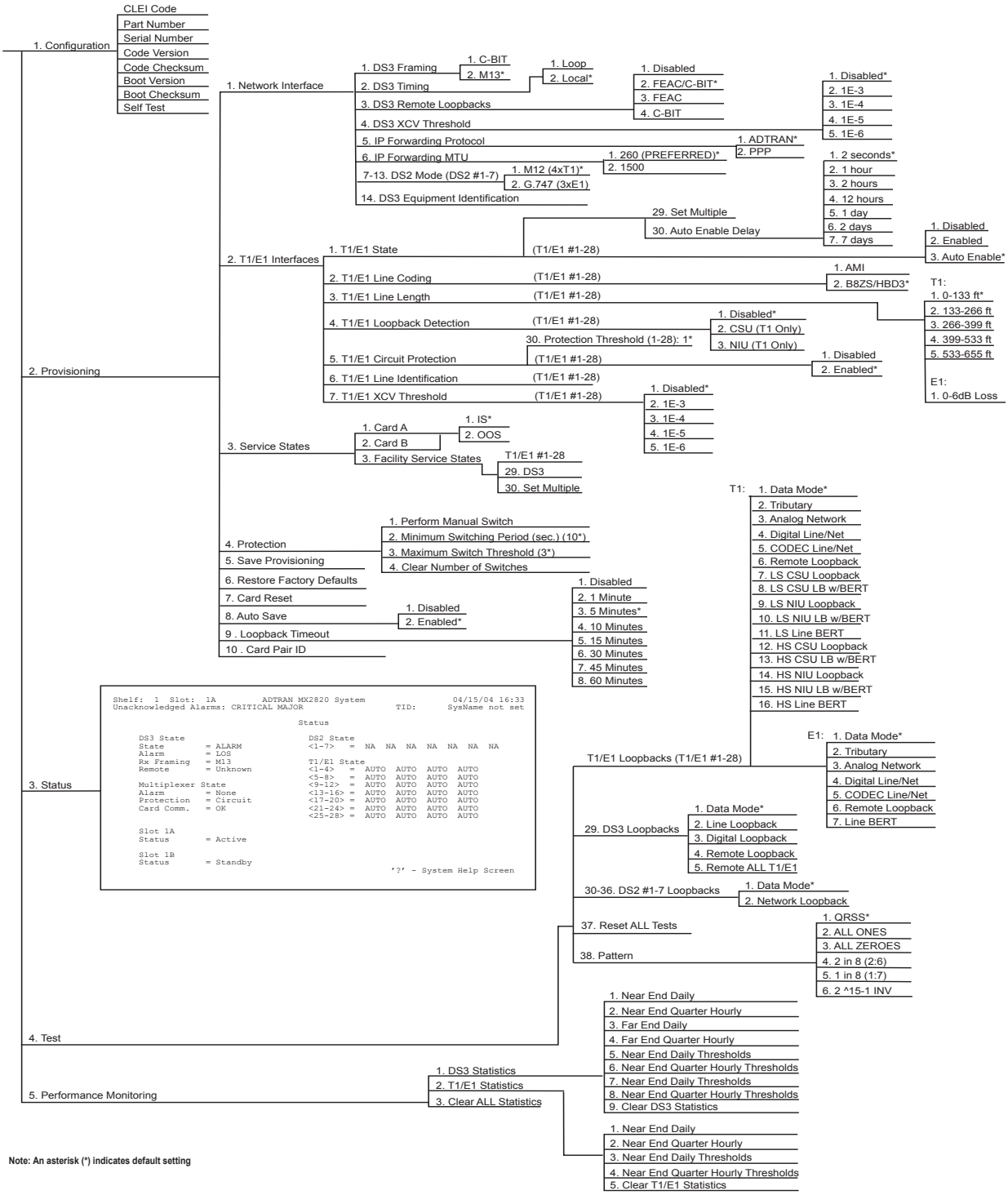
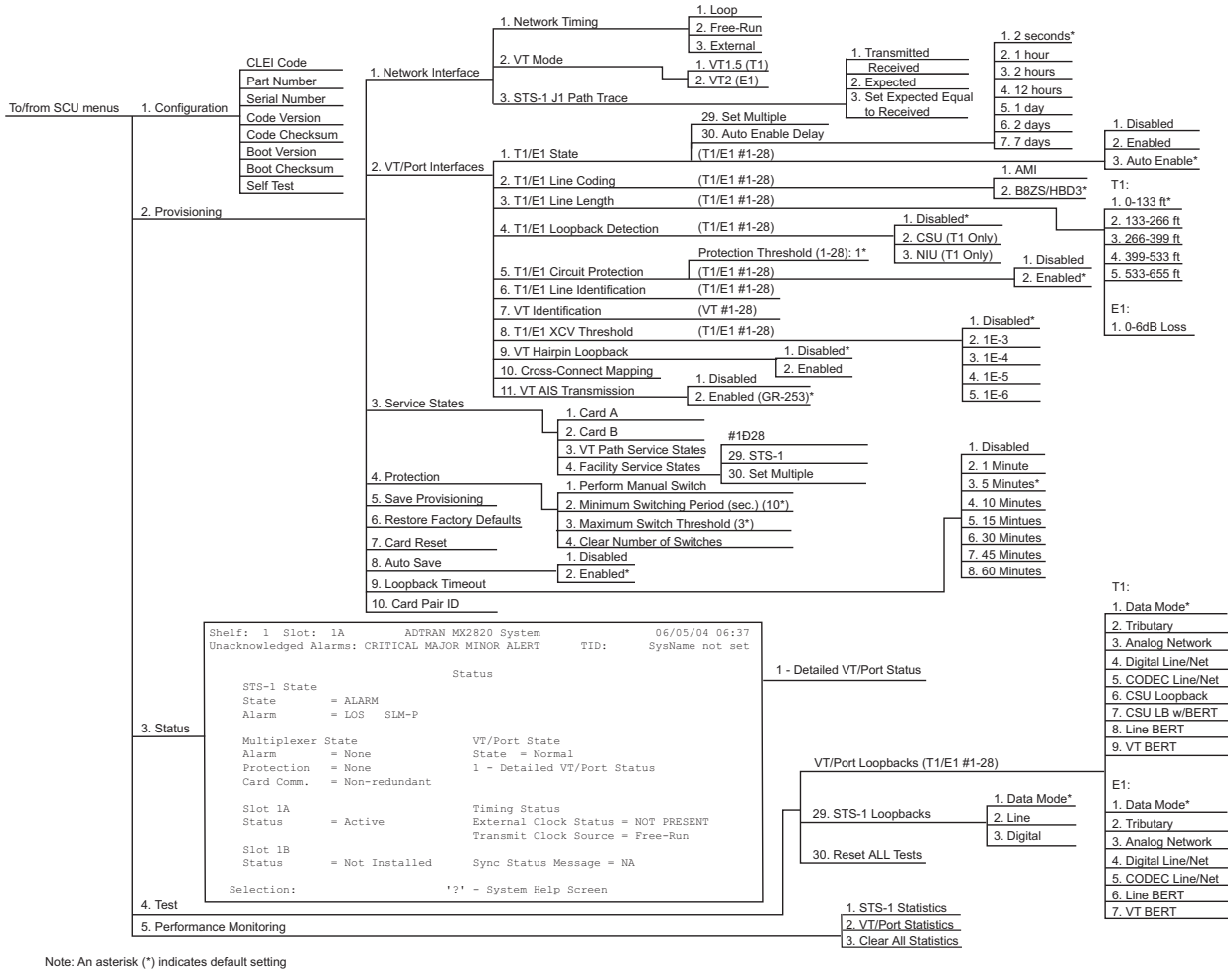


Figure 5-3. MX2820 M13 MUX Menu Tree

STS-1 MUX MENU TREE

Figure 5-4 shows the menu tree for the MX2820 STS-1 MUX module.

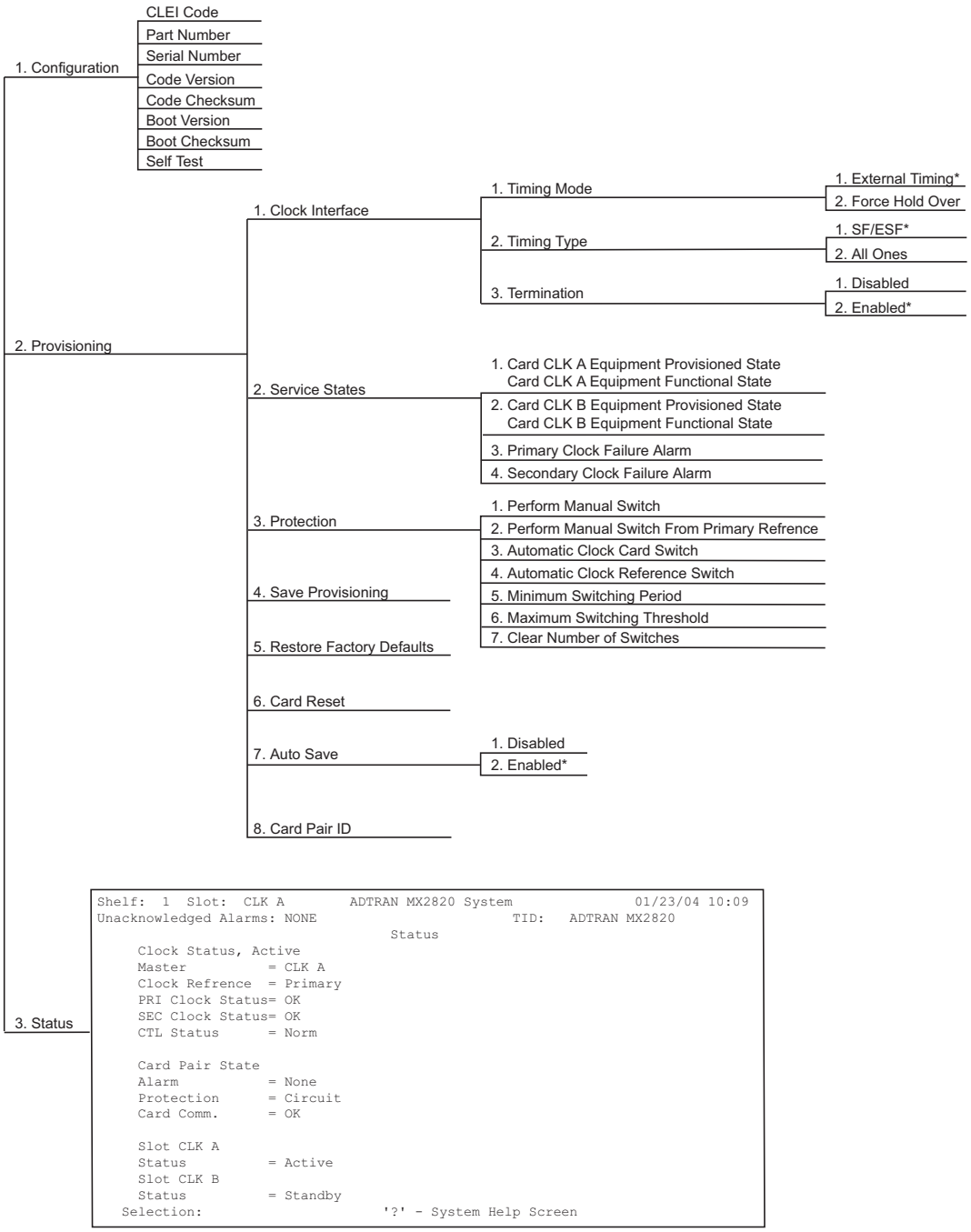


Note: An asterisk (*) indicates default setting

Figure 5-4. MS2820 STS-1 MUX Menu Tree

CLOCK MODULE MENU TREE

Figure 5-5 shows the menu tree for the MX2820 Clock Module.



Note: An asterisk (*) indicates default setting

Figure 5-5. MX2820 Clock Module Menu Tree

UIG-510
Status

INTRODUCTION

This subsection provides the instructions for viewing the status of the following items:

- Shelf alarms
- SCU module alarms
- M13 MUX module alarms
- STS-1 MUX module alarms
- Clock Module alarms

SHELF ALARMS

View the status of shelf alarms by selecting the following options:

- Select **SYSTEM ALARMS**, from the MX2820 Main Menu, and press ENTER.
- Select **SHELF ALARM STATUS**, from the System Alarms menu, and press ENTER.
- Return to the MX2820 Main Menu by pressing ESC until the menu appears.

Figure 5-6 shows an example of the Shelf Alarm screen for a 19-inch shelf.

Menu selections are as follows:

- M displays the Master alarm log.
- S displays the SCU alarm log.
- A number from 1 to 7 (19-inch shelf) or from 1 to 9 (23-inch shelf) displays the alarm log for the M13 or STS-1 MUX module that occupies the slot location.
- C displays the Clock Module log.

```
Shelf:  1                    ADTRAN MX2820 System                 04/21/04 23:05
Unacknowledged Alarms:  None                                TID:          HTVLALEXD16

                            Shelf Alarm Status
          M       Master Log

          S           SCU......... [Major]

          C      A - MX2820 SMC.. [None]         B - ............ [None]

          1      A - MX2820 M13.. [Critical]     B - MX2820 M13.. [None]
          2      A - ............ [None]         B - ............ [None]
          3      A - ............ [None]         B - ............ [None]
          4      A - MX2820 STS1. [None]         B - ............ [None]
          5      A - ............ [None]         B - ............ [None]
          6      A - ............ [None]         B - ............ [None]
          7      A - ............ [None]         B - ............ [None]




  Select Log (M-Master, S-SCU, C-CLK, 1..7):
```

Figure 5-6. Shelf Alarms Status Screen (19-inch shelf)

SCU ALARMS

View the status of SCU alarms by selecting the following options:

- Select **SYSTEM CONTROLLER**, from the MX2820 Main Menu, and press ENTER.
- Select **STATUS**, from the System Controller menu, and press ENTER.
- Return to the MX2820 Main Menu, by pressing ESC until the menu appears.

Figure 5-7 shows the SCU Status screen. The following subsection describes the fields in the External Inputs section.

```
Shelf:  1                    ADTRAN MX2820 System                  04/21/04 23:09
Unacknowledged Alarms:  None                         TID:          HTVLALEXD16
                                    Status

              Hardware                           LEDs
              Ethernet Link : Up                 ACT       : Grn/Ylw
                                                 ALM       : Red

              Alarm Relays
              Critical            Inactive
              Major               Active
              Minor               Inactive

              External Inputs     Status         Level
              Ext ACO             Inactive       N/A
              AUX #1 INPUT        Inactive       MAJOR
              AUX #2 INPUT        Inactive       MAJOR
              AUX #3A INPUT       Inactive       MAJOR
              AUX #3B INPUT       Inactive       MAJOR
              PWR Bus A           Active         MAJOR
              PWR Bus B           Inactive       MAJOR

                                                      '?' - System Help Screen
```

Figure 5-7. SCU Status Screen

External Inputs

The External Inputs section provides the status of environmental alarm connections on the backplane of the MX2820. A description of these is provided in Table 5-1.

Table 5-1. SCU Alarm Status Screen, External Inputs

Input Name	Severity	Description
Ext ACO	N/A	The Alarm Cutoff acknowledges any unacknowledged alarms.
AUX #1, #2	User Definable	These alarms are user definable alarms. The severity as well as the description string can be modified.
AUX #3A	User Definable	When acting as a fan alarm, this input will generate a solid alarm signal which indicates a complete failure of the fan module.

Table 5-1. SCU Alarm Status Screen, External Inputs (Continued)

Input Name	Severity	Description
AUX #3B	User Definable	When acting as a fan alarm, this input will generate a cadenced alarm signal which indicates a partial failure of the fan module.
PWR Bus A	User Definable	This input generates an alarm signal when one of the power supplies fails. When both power supplies fail, a critical alarm will be generated to indicate a complete power failure at the SCU.
PWR Bus B	User Definable	This input generates an alarm signal when one of the power supplies fails. When both power supplies fail, a critical alarm will be generated to indicate a complete power failure at the SCU.

M13 MUX MODULE

View the status of an M13 MUX module by selecting the following options and selecting the number for a slot location:

- Select **ACCESS MODULES**, from the MX2820 Main Menu, and press ENTER.
- Select a number from 1 to 7 (19-inch shelf) or 1 to 9 (23-inch shelf) from the Access Module Menus screen, and press ENTER.
- Select **STATUS**.

Figure 5-8 shows an example of the status for an M13 module in slot location 4. The following subsections provide descriptions of the fields for this Status screen.

```
Shelf:  1  Slot:  4A         ADTRAN MX2820 System                 04/21/04 23:05
Unacknowledged Alarms:  None                              TID:          HTVLALEXD16

                                    Status

     DS3 State                        DS2 State
     State        = ALARM             <1-7>    =  LOF LOF LOF LOF LOF LOF LOF
     Alarm        = LOS
     Rx Framing   = M13                T1/E1 State
     Remote       = Unknown           <1-4>    =  AUTO  AUTO  AUTO  AUTO
                                      <5-8>    =  AUTO  AUTO  AUTO  AUTO
     Multiplexer State                <9-12>   =  AUTO  AUTO  AUTO  AUTO
     Alarm        = None              <13-16>  =  AUTO  AUTO  AUTO  AUTO
     Protection   = Circuit           <17-20>  =  AUTO  AUTO  AUTO  AUTO
     Card Comm.   = OK                <21-24>  =  AUTO  AUTO  AUTO  AUTO
                                      <25-28>  =  AUTO  AUTO  AUTO  AUTO


     Slot 4A
     Status       = Active

     Slot 4B
     Status       = Standby
                                                  '?' - System Help Screen
```

Figure 5-8. M13 MUX Module Status Screen Example

DS3 State

State

This field displays the current state of the DS3 network for the specified M13 MUX module. Table 5-2 lists the possible conditions.

Table 5-2. DS3 State Conditions

Condition	Description
Normal	The MX2820 (M13 MUX module) is ready to pass data.
Alarm	The unit is currently receiving an alarm condition. Table 5-3 lists the alarms.
Test	The unit is currently in test mode.
Alarm/Test	The unit is in an alarm condition and in test mode.

Alarm

This field displays the current alarm condition for the M13 module. Table 5-3 lists the possible alarm conditions.

Table 5-3. DS3 Alarm Conditions

Alarm (Condition)	Description
None	No alarms are currently being received.
RAI	This M13 MUX module is receiving an Remote Alarm Indication (RAI) (yellow) alarm from the network. This alarm is a signal sent back toward the source of a failed transmit circuit. The X-bits (X1 and X2) are set to zero.
LOS	The M13 MUX module has lost the Rx signal.
AIS	The M13 MUX module is receiving an Alarm Indication Signal (AIS) (blue) alarm from the network. AIS alarms occur when consecutive 1010s are received in the information bits. This indicates there is a transmission fault located either at the transmitting terminal or upstream from the transmitting terminal.
LOF	This alarm condition indicates the M13 MUX module detects a framing loss from the network.
XCV	The M13 MUX module is receiving excessive code violations from the network, which are exceeding the threshold set by the XCV Threshold parameter.
TLOS	The transmitter has failed. This alarm condition indicates a Tx loss of signal.
IDLE	The M13 MUX module detects an idle sequence from the network. Service is immediately available for use.

Rx Framing

This field shows the network framing type (C-Bit or M13).

Remote

This field indicates the current state of the remote MX2820 system or terminal equipment (available with C-Bit framing only). Table 5-4 list the possible conditions.

Table 5-4. Remote System (Terminal) Conditions

Condition	Description
Normal	The far-end MX2820 system is not reporting any conditions.
RAI	The far-end unit is receiving an Remote Alarm Indication (RAI) (yellow) alarm from the network. This alarm is a signal sent back toward the source of a failed transmit circuit. The X-bits (X1 and X2) are set to zero.
LOS	The far-end unit has lost the Rx signal. Loss of Signal (LOS).
AIS	The far-end unit is receiving an Alarm Indication Signal (AIS) (blue) alarm condition from the network. AIS alarms occur when consecutive 1010s are received in the information bits. This indicates there is a transmission fault located either at the transmitting terminal or upstream from the transmitting terminal.
LOF	The far-end unit detects a framing loss, Loss of Frame (LOF), from the network.
Idle	The far-end unit detects an idle sequence from the network.
DS3 Eqpt Fail (SA)	The far-end unit or network is reporting a service-affecting (SA) DS3 equipment failure.
DS3 Eqpt Fail (NSA)	The far-end unit or network is reporting a non-service-affecting (NSA) DS3 equipment failure.
Common Eqpt Fail	The far-end unit or network is reporting a non-service-affecting common equipment failure.
Multiple DS1 LOS	The far-end unit is experiencing a loss of signal on multiple DS1s.
Single DS1 LOS	The far-end unit is experiencing a loss of signal on a single DS1.
DS1 Eqpt Fail (SA)	The far-end unit is experiencing a service-affecting DS1 equipment failure.
DS1 Eqpt Fail (NSA)	The far-end unit is experiencing a non-service-affecting DS1 equipment failure.
Unknown	The unit is unable to discern the status of the far-end unit. (Normal state for M13 framing).

Multiplexer State

Alarm

This field displays the current alarm condition for the Multiplexer State. Table 5-5 lists the possible alarm conditions.

Table 5-5. Multiplexer Alarm Conditions

Alarm (Condition)	Description
None	No multiplexer state alarms.
Excessive Switches	This condition indicates the maximum switching threshold has been exceeded.
Switched to Protect	This condition indicates a module switch has occurred.

Protection

This field indicates the current protection mode for the M13 MUX module. Table 5-6 provides the possible state conditions.

Table 5-6. M13 MUX Protection Modes

Mode	Description
Circuit	The unit is in Circuit Protection mode and everything is functioning.
None	One M13 MUX module is installed, or the unit is in Circuit Protection mode, and the secondary module has failed.

Card Comm

This field indicates the current state of the communication link between the two M13 MUX modules. Table 5-7 provides the possible conditions.

Table 5-7. M13 MUX Card Communication State

State	Description
OK	This condition indicates the modules are communicating.
Failure	This condition indicates the modules are not able to communicate with each other.
Non-Redundant	This condition indicates only one module is installed.

Slot #A/#B State

This field indicates the current status of the two MUX modules. Table 5-8 provides the possible states.

Table 5-8. M13 MUX Slot A/B State

State	Description
Not Installed	A MUX module is not installed in this slot.
Standby	The MUX module is ready to pass data, but is currently acting as a backup module.
Active	The MUX module is acting as the primary module.

DS2 State

This field indicates the current state of the seven DS2s. Table 5-9 provides the possible state conditions.

Table 5-9. DS2 State Conditions

Condition	Description
OK	The DS2 is not receiving alarms.
LOF	The unit detects framing loss across the DS2.
RAI	The unit is receiving an RAI (yellow) alarm from the network across a DS2. This alarm is a signal sent back toward the source of a failed transmit circuit. The X-bit is set to zero.
AIS	The unit is receiving an AIS (blue) alarm condition from the network across the DS2. AIS alarms occur when the unit receives unframed all ones.
TST	The DS2 is in test mode.

T1/E1 State

This field indicates the current state of the individual T1s or E1s. Table 5-10 provides the possible state conditions. A DS2 can be divided into three E1s or four T1s. Therefore, some of the fields in the T1/E1 State menus do not apply for an E1 configuration.

Table 5-10. T1/E1 State Conditions

Condition	Description
OK	The T1/E1 is ready to pass data.
OFF	The T1/E1 is configured for disable.
AUTO	The T1/E1 is configured for Auto-Enable.
LOS	The unit has lost the Rx signal on the T1/E1.
XCV	The unit is receiving excessive code violations across the T1/E1, which is exceeding the configured threshold.
TST	The T1/E1 is currently in test mode.
HOT	The T1/E1 transceiver temperature is too high.
LAIS (Loop-side AIS)	The T1/E1 is receiving all ones from the DSX-1 interface.
CAIS (Carrier-side AIS)	The T1 is receiving all ones from the DS3 side of the network.

Acknowledge Alarms (ACO)

The alarms can be acknowledged through the Alarm Cutoff (ACO) button or from the Alarm Status menus.

STS-1 MUX MODULE

View the status of an STS-1 MUX module by selecting the following options and selecting the number for a slot location:

- Select **ACCESS MODULES**, from the MX2820 Main Menu, and press ENTER.
- Select a number from 1 to 7 (19-inch shelf) or 1 to 9 (23-inch shelf), corresponding to the desired
  STS-1 MUX Module, from the Access Module Menus screen, and press ENTER.
- Select **STATUS**.

Figure 5-9 shows an example of the status for an STS-1 module in slot location 4. The following subsections provide descriptions of the fields for this Status screen.

```
Shelf:  1  Slot:  4A          ADTRAN MX2820 System                 04/21/04 23:05
Unacknowledged Alarms:  None                                TID:          HTVLALEXD16

                                    Status

     STS-1 State
     State         = Normal
     Alarm         = None

     Multiplexer State                  VT/Port State
     Alarm         = None               State  = Normal
     Protection    = None               1 - Detailed VT/Port Status
     Card Comm.    = Non-redundant


     Slot 4A                            Timing Status
     Status        = Active             External Clock Status = PRESENT
                                        Transmit Clock Source = Free-Run
     Slot 4B                            Sync Status Message = NA
     Status        = Not Installed


   Selection:                                          '?' - System Help Screen
```

Figure 5-9. STS-1 MUX Module Status Screen Example

STS-1 State

State

This field displays the current state of the STS-1 network for the specified STS-1 MUX module. Table 5-11 lists the possible conditions.

Table 5-11. STS-1 State Conditions

Condition	Description
Normal	The MX2820 (STS-1 MUX module) is ready to pass data.
Alarm	The unit is currently receiving an alarm condition. Table 5-12 lists the alarms.
Test	The unit is currently in test mode.
Alarm/Test	The unit is currently in test mode and is receiving an alarm condition.

Alarm

This field displays the current alarm condition for the STS-1 module. Table 5-12 lists the possible alarm conditions.

Table 5-12. STS-1 Alarm Condition Descriptions

STS-1 Alarm	Definition	Condition Description
LOS	Loss of Signal	The unit has lost the network receive signal.
LOF	Loss of Framing	The unit detects a framing loss from the network.
LOP	Loss of Pointer	The unit is unable to detect a valid pointer in the receive signal.
LOMF	Loss of Multi-Frame	The unit detects loss of H4 multiframe from the network.
AIS-L	Alarm Indication Signal - Line	The unit is receiving a line alarm indication signal (the section terminating equipment generates AIS-L after detecting LOS or LOF).
AIS-P	Alarm Indication Signal - Path	The unit is receiving a line alarm indication signal (AIS-P is defined as all ones in bytes H1, H2, and H3 as well as all ones in the entire STS synchronous payload envelope).
RFI-L	Remote Failure Indication - Line	The unit is receiving a line remote failure indication (RFI-L is declared when the incoming line remote defect indication [RDI-L, “110” pattern in bits 6, 7, and 8 of the K2 line overhead byte] lasts for 2.5 ±0.5 seconds.

Table 5-12. STS-1 Alarm Condition Descriptions (Continued)

STS-1 Alarm	Definition	Condition Description
RFI-P	Remote Failure Indication - Path	The unit is receiving a line remote failure indication (RFI-P is declared when the incoming path remote defect indication [RDI-P, "1" in bit 5 of the G1 path overhead byte for contiguous frames] lasts for 2.5 ±0.5 seconds.
TIM-P	Trace Identifier Mismatch - Path	A received signal label is mismatched if it does not equal the locally provisioned expected value.
UEQ-P	Unequipped - Path	The path is unequipped if it is not provisioned (Byte C2 of the STS path overhead is set to zero).

Multiplexer State

Alarm

This field displays the current alarm condition for the Multiplexer State. Table 5-13 lists the possible alarm conditions.

Table 5-13. STS-1 MUX Alarm Conditions

Alarm (Condition)	Description
None	No multiplexer state alarms.
Excessive Switches	This condition indicates the maximum switching threshold has been exceeded.
Switched to Protect	This condition indicates a module switch has occurred.

Protection

This field indicates the current protection mode for the STS-1 MUX module. Table 5-14 provides the possible state conditions.

Table 5-14. STS-1 MUX Protection Modes

Mode	Description
Circuit	The unit is in Circuit Protection mode and everything is functioning.
None	One STS-1 MUX module is installed, or the unit is in Circuit Protection mode, and the secondary module has failed.

Card Comm

This field indicates the current state of the communication link between the two STS-1 MUX modules. Table 5-15 provides the possible conditions.

Table 5-15. STS-1 MUX Card Communication State

State	Description
OK	This condition indicates the modules are communicating.
Failure	This condition indicates the modules are not able to communicate with each other.
Non-Redundant	This condition indicates only one module is installed.

Slot #A/#B State

This field indicates the current status of the two MUX modules. Table 5-16 provides the possible states.

Table 5-16. STS-1 MUX Slot A/B State

State	Description
Not Installed	A MUX module is not installed in this slot.
Standby	The MUX module is ready to pass data, but is currently acting as backup module.
Active	The MUX module is acting as the primary module.

VT/Port State

This field indicates the current state of the twenty-eight Virtual Tributaries (VT) and the port to which each is mapped. Table 5-17 provides the possible state conditions.

Table 5-17. VT/Port Alarm Condition Descriptions

VT/Port Alarm	Definition	Condition Description
OFF		A VT is equipped but the T1/E1 port is disabled.
OK		The port is in a normal state.
LOS	T1/E1 Loss of Signal	The unit has lost the receive signal on a T1/E1.
CAIS	Carrier Side AIS	The T1 is receiving all ones from the STS side of the network.
LAIS	Loop Side AIS	The T1 is receiving all ones from the DSX-1 interface.
XCV	T1/E1 Excessive Code Violations	The MUX module is receiving excessive code violations, exceeding the threshold set by the user.

Table 5-17. VT/Port Alarm Condition Descriptions (Continued)

VT/Port Alarm	Definition	Condition Description
LOP	VT Path Loss of Pointer	A VT LOP defect is declared when either a valid pointer is not detected in eight consecutive VT superframes, or when eight consecutive VT superframes are detected with the NDF set to “1001” without a valid concatenation indicator. A VT LOP is declared when the VT LOP defect persists for 2.5 ±0.5 seconds.
VAIS	VT Path Alarm Indication Signal	The unit is receiving a VT Path alarm indication signal (VT-Path AIS-P is defined as all ones in bytes V1 and V2, as well as all ones in the entire VT synchronous payload envelope). A VAIS failure is declared when the defect persists for 2.5 ±0.5 seconds.
RFI-V	Remote Failure Indication - VT Path	The unit is receiving a VT Path remote failure indication (RFI-V is declared when the incoming VT Path remote defect indication [VTRDI, “1” in bit 4 of the VT-Path overhead byte, V5, in five contiguous frames] lasts for 2.5 ±0.5 seconds.
SLM-V	Signal Label Mismatch - VT Path	A received signal label is mismatched if it does no equal the locally provisioned value or the value “equipped non-specific”.
UEQ-V	Unequipped - VT Path	The received VT path is unequipped if it is not provisioned (Byte V5 of the received VT path overhead is set to zero).
UEQ	Port Unequipped	The VT is not mapped to a T1/E1 port.
TST	Test	The VT/Port is in test mode.

A Detailed VT/Port Status screen is available from the STS-1 Status screen. Type the numeral 1 in the field labeled **SELECTION** and press ENTER. The screen is illustrated in Figure 5-10.

```
Shelf:  1  Slot:  4A          ADTRAN MX2820 System                 04/22/04 00:04
Unacknowledged Alarms:  None                              TID:          HTVLALEXD16

                          Detailed VT/Port Status

    VT# PORT#                                VT# PORT#
     1  (1 ) = AUTO                           15 (3 ) = AUTO
     2  (5 ) = AUTO                           16 (7 ) = AUTO
     3  (9 ) = AUTO                           17 (11) = AUTO
     4  (13) = AUTO                           18 (15) = AUTO
     5  (17) = AUTO                           19 (19) = AUTO
     6  (21) = AUTO                           20 (23) = AUTO
     7  (25) = AUTO                           21 (27) = AUTO
     8  (2 ) = AUTO                           22 (4 ) = AUTO
     9  (6 ) = AUTO                           23 (8 ) = AUTO
     10 (10) = AUTO                           24 (12) = AUTO
     11 (14) = AUTO                           25 (16) = AUTO
     12 (18) = AUTO                           26 (20) = AUTO
     13 (22) = AUTO                           27 (24) = AUTO
     14 (26) = AUTO                           28 (28) = AUTO


                                                    '?' - System Help Screen
```

Figure 5-10. STS-1 MUX Detailed VT/Port Status Screen

Timing Status

This field indicates the provisioning state of the clock timing. Table 5-18 indicates the External Clock status, while Table 5-19 provide the clock source as it has been provisioned.

Table 5-18. External Clock Status

Condition	Description
Present	The clock signal from Clock Module is detected.
Not Present	The clock signal from Clock Module is *not* detected. NOTE: A flashing "Not Present" text indicates that provisioning of the Clock Module has been set to "**EXTERNAL**", but no clock signal is detected.

Table 5-19. Transmit Clock Source

Condition	Description
Loop	Timing is currently being derived from the STS-1 receive signal.
Free-Run	Transmit timing is currently being derived from an internal ±20ppm (Stratum 4) minimum clock source.
External	Timing is currently being derived from the clock signal from the Clock Module.

Sync Status

Synchronization Status Messages (Table 5-20) provided in the S1 byte can provide the following benefits:

- Automatic reconfiguration of line-timed rings
- Improved reliability of interoffice timing distribution
- Troubleshooting of synchronization-related messages

Table 5-20. Synchronization (Sync) Status

Condition	Description
NA	Not Available
STU	Synchronized - Traceability Unknown
PRS	Stratum 1 Traceable
TNC	Transit Node Clock Traceable
ST2	Stratum 2 Traceable
ST3	Stratum 3 Traceable
SMC	SONET Minimum Clock Traceable
PNO	Provisionable by the Network Operator (user assignable)
DUS	DON'T USE for Synchronization

MX2820 CLOCK MODULE

View the status of an MX2820 Clock module by selecting the following options and selecting the number for a slot location:

- Select **ACCESS MODULES**, from the MX2820 System menu, and press ENTER.
- Type the letter C, corresponding to SMC (clock) and press ENTER.
- Select **STATUS**.

Figure 5-11 shows an example of the Status screen for a Clock module in slot location A. The following subsections provide descriptions of the fields for this Status screen.

```
Shelf:  1  Slot:  CLK A      ADTRAN MX2820 System                 04/22/04 00:08
Unacknowledged Alarms:  None                              TID:          HTVLALEXD16

                                    Status

     Clock Status
     Master             = CLK A
     Clock Reference    = Secondary
     PRI Clock Status   = OK
     SEC Clock Status   = OK
     Clock State        = Norm

     Card Pair State
     Alarm         = None
     Protection    = Circuit
     Card Comm.    = Non-redundant

     Slot CLK A
     Status        = Active

     Slot CLK B
     Status        = Standby
                                                    '?' - System Help Screen
```

Figure 5-11. MX2820 Clock Module Status Screen Example

Clock Status

Master

This field indicates which card of the pair is the active device. Table 5-11 lists the possible indications.

Table 5-21. Clock Master Indications

Indication	Description
CLK A	The Clock module in slot A is active.
CLK B	The Clock module in slot B is active.

Clock Reference

This field indicates which clock input is currently being used to derive timing. Table 5-22 lists the possible indications.

Table 5-22. Clock Reference Indications

Indications	Description
Primary	Clock input A is being used to derive timing.
Secondary	Clock input B is being used to derive timing.

PRI Clock Status

This field displays the current status of the primary clock reference. Table 5-13 lists the possible
conditions.

Table 5-23. Primary Clock Status

Alarm (Condition)	Description
OK	Primary clock source is functioning normally.
FAIL	Primary clock source is unavailable.

SEC Clock Status

This field displays the current status of the secondary clock reference. Table 5-24 provides the possible conditions.

Table 5-24. Secondary Clock Status

Mode	Description
OK	Secondary clock source is functioning normally.
FAIL	Secondary clock source is unavailable.

Clock State

This field indicates the current state of the Clock synchronization circuitry. Table 5-25 provides the possible conditions.

Table 5-25. MX2820 Clock State

State	Description
Reset	The clock synchronization circuitry is being initialized.
Norm	The clock synchronization circuitry is synchronized to the indicated external clock reference.
Hold-over	The clock circuitry is locked and no longer tracking the external clock reference.
Exit Hold-over	A valid clock source is available and the clock sync circuitry is in the process of synchronizing to it.
Exit Hold-over Fast	The clock source went out of valid range and the sync circuitry is attempting to re-synchronize.
Fast	A clock signal is available, but is out of valid range.

Card Pair State

Alarm

This field displays the current alarm condition for the Clock Module Pair State. Table 5-26 lists the possible alarm conditions.

Table 5-26. Clock Alarm Conditions

Alarm (Condition)	Description
None	This condition indicates that there are no clock state alarms.
Excessive Switches	This condition indicates the maximum switching threshold has been exceeded.
Switched to Protect	This condition indicates a module switch has occurred.

Protection

This field indicates the current protection mode for the Clock module. Table 5-27 provides the possible state conditions.

Table 5-27. Clock Module Protection Modes

Mode	Description
Circuit	The unit is in Circuit Protection mode and everything is functioning.
None	One Clock Module is installed, or the unit is in Circuit Protection mode, and the secondary card has failed.

Card Comm

This field indicates the current state of the communication link between the two Clock modules. Table 5-28 provides the possible conditions.

Table 5-28. Clock Module Communication State

State	Description
OK	This condition indicates the cards are communicating.
Failure	This condition indicates the cards are not able to communicate with each other.
Non-Redundant	This condition indicates only one card is installed.

Slot CLK A/Slot CLK B Status

This field indicates the current status of the two Clock Modules. Table 5-29 provides the possible states.

Table 5-29. Slot Clock A/B State

State	Description
Not Installed	A Clock Module is not installed in this slot.
Standby	The Clock Module is ready, but is currently acting as a backup unit.
Active	The Clock Module is acting as the primary unit.

UIG-520
M13 MUX PM Statistics

INTRODUCTION

This subsection provides the instructions to access Performance Monitoring (PM) screens to allow the following:

- Viewing PM statistics for the near-end of the DS3 network
- Viewing PM statistics for the far-end of the DS3 network
- Viewing PM statistics for the individual T1/E1 circuits
- Setting PM threshold levels
- Enabling or disabling threshold alarms

These functions are performed from the DS3 Statistics screen.

ACCESSING THE DS3 STATISTICS SCREEN

To access the DS3 PM Statistics screen, select the options from each screen listed and then press ENTER:

1. Select **ACCESS MODULES** from the MX2820 Main Menu.
2. Select a number from 1 to 7 for a 19-inch shelf or 1 to 9 for a 23-inch shelf from the Access Module Menus.
3. Select **PERFORMANCE MONITORING** from the Access Modules Main Menu.
4. Select **STATISTICS** from the Performance Monitoring menu.

Figure 5-12 and Figure 5-13 show examples of the Performance Monitoring menu and DS3 Statistics screen.

```
Shelf:  1  Slot:  4A         ADTRAN MX2820 System                 04/15/04 02:44
Unacknowledged Alarms: None                                 TID:      HTVLALEXD16




                          Performance Monitoring

                          1 - DS3 Statistics
                          2 - T1/E1 Statistics
                          3 - Clear ALL Statistics









   Selection:                                        '?' - System Help Screen
```

Figure 5-12. Performance Monitoring Menu

```
Shelf:  1  Slot:  4A         ADTRAN MX2820 System                 04/15/04 02:44
Unacknowledged Alarms: None                                 TID:      HTVLALEXD16


                               DS3 Statistics

                       1 - Near End Daily
                       2 - Near End Quarter Hourly

                       3 - Far End Daily
                       4 - Far End Quarter Hourly

                       5 - Near End Daily Thresholds
                       6 - Near End Quarter Hourly Thresholds

                       7 - Far End Daily Thresholds
                       8 - Far End Quarter Hourly Thresholds

                       9 - Clear DS3 Statistics



   Selection:                                        '?' - System Help Screen
```

Figure 5-13. DS3 PM Statistics Menu

VIEWING DS3 PM STATISTICS

To view DS3 PM statistics, perform the following steps on each screen:

1. Select the desired option, by number, from the menu and then press ENTER.
2. Return to a previous screen by pressing ESC until the desired screen appears.

The timeframe and direction are selected from this screen.

Examples of the DS3 PM Statistics screens are shown in the following section.

DS3 Near-End Daily Statistics

DS3 near-end daily statistics are maintained for the current 24-hour period and the seven previous days.

Figure 5-14 shows an example of the DS3 Near-End Daily screen.

```
Shelf:  1  Slot:  4A          ADTRAN MX2820 System                 04/15/04 02:44
Unacknowledged Alarms: None                                  TID:       HTVLALEXD16

                      DS3 Statistics - Near End Daily
          Current    09/11     09/10     09/09     09/08     09/07     09/06     09/05
CV-L            0        0         0         0         0         0         0         0
ES-L            0        0         0         0         0         0         0         0
SES-L           0        0         0         0         0         0         0         0
LOSS-L          0        0         0         0         0         0         0         0

CVP-P           0        0         0         0         0         0         0         0
ESP-P           0        0         0         0         0         0         0         0
SESP-P          0        0         0         0         0         0         0         0
UASP-P          0        0         0         0         0         0         0         0

CVCP-P          0        0         0         0         0         0         0         0
ESCP-P          0        0         0         0         0         0         0         0
SESCP-P         0        0         0         0         0         0         0         0
UASCP-P         0        0         0         0         0         0         0         0

SAS-P           0        0         0         0         0         0         0         0

                                                    '?' - System Help Screen
```

Figure 5-14. DS3 Near-End Daily PM Statistics

DS3 Near-End Quarter Hourly Statistics

DS3 near-end quarter-hourly statistics are maintained for the current 15-minute interval and the completed 96 previous 15-minute intervals (providing a 24-hour history). A total is also provided that represents the sum of the previous 96 15-minute intervals.

Figure 5-15 shows an example of the DS3 Near-End Quarter Hourly screen.

```
Shelf:  1  Slot:  4A          ADTRAN MX2820 System                  04/15/04 02:44
Unacknowledged Alarms: None                                    TID:      HTVLALEXD16

                  DS3 Statistics - Near End Quarter Hourly
          Current    Total    23:45    23:30    23:15    23:00    22:45    22:30
CV-L            0        0        0        0        0        0        0        0
ES-L            0        0        0        0        0        0        0        0
SES-L           0        0        0        0        0        0        0        0
LOSS-L          0        0        0        0        0        0        0        0

CVP-P           0        0        0        0        0        0        0        0
ESP-P           0        0        0        0        0        0        0        0
SESP-P          0        0        0        0        0        0        0        0
UASP-P          0        0        0        0        0        0        0        0

CVCP-P          0        0        0        0        0        0        0        0
ESCP-P          0        0        0        0        0        0        0        0
SESCP-P         0        0        0        0        0        0        0        0
UASCP-P         0        0        0        0        0        0        0        0

SAS-P           0        0        0        0        0        0        0        0

Select Interval: (B) to go Back.                      '?' - System Help Screen
```

Figure 5-15. DS3 Near-End Quarter Hourly PM Statistics

DS3 Far-End Daily Statistics

DS3 far-end daily statistics are maintained for the current 24-hour period and the seven previous days.

Figure 5-16 shows an example of the DS3 Far-End Daily screen.

NOTE

These statistics do not apply if the DS3 Framing is set to M13.

```
Shelf:  1  Slot:  4A          ADTRAN MX2820 System                 04/15/04 02:44
Unacknowledged Alarms: None                                   TID:      HTVLALEXD16

                        DS3 Statistics - Far End Daily
          Current    09/11     09/10     09/09     09/08     09/07     09/06     09/05
CVCP-P          0        0         0         0         0         0         0         0
ESCP-P          0        0         0         0         0         0         0         0
SESCP-P         0        0         0         0         0         0         0         0
UASCP-P         0        0         0         0         0         0         0         0

                                                        '?' - System Help Screen
```

Figure 5-16. DS3 Far-End Daily PM Statistics

DS3 Far-End Quarter Hourly Statistics

DS3 far-end quarter-hourly statistics are maintained for the current 15-minute interval and the completed 96 previous 15-minute intervals (providing a 24-hour history). A total is also provided that represents the sum of the previous 96 15-minute intervals.

Figure 5-15 shows an example of the DS3 Far-End Quarter Hourly screen.

NOTE

These statistics do not apply if the DS3 Framing is set to M13.

```
Shelf:  1  Slot:  4A          ADTRAN MX2820 System                 04/15/04 02:44
Unacknowledged Alarms: None                                  TID:      HTVLALEXD16

                  DS3 Statistics - Far End Quarter Hourly
          Current    Total    23:45    23:30    23:15    23:00    22:45    22:30
CVCP-P          0        0        0        0        0        0        0        0
ESCP-P          0        0        0        0        0        0        0        0
SESCP-P         0        0        0        0        0        0        0        0
UASCP-P         0        0        0        0        0        0        0        0









Select Interval: (B) to go Back.                      '?' - System Help Screen
```

Figure 5-17. DS3 Far-End Quarter Hourly PM Statistics

DS3 PM Near-End Parameter Descriptions

Table 5-30 provides DS3 PM near-end parameter descriptions.

Table 5-30. DS3 PM Near-End Parameter Descriptions

DS3 PM Parameter	Definition	Description
Line		
CV-L	Code Violation - Line	This parameter indicates the number of Bipolar Violations (BPVs) and Excessive Zeros (EXZs) that have occurred.
ES-L	Errored Second - Line	This parameter indicates the number of seconds in which one or more Coding Violations (CVs) or one or more Loss-of-Signal (LOS) defects occurred.
SES-L	Severely Errored Second - Line	This parameter indicates the number of seconds with 45 or more BPVs and EXZs, or one or more LOS defects.
LOSS-L	Loss of Signal Second - Line	This parameter indicates the number of seconds for which one or more LOS defects occurred.
Path		
CVP-P	Code Violation, P-Bit Parity - Path	This parameter indicates the number of P-Bit parity errors that have occurred. This count is not incremented when UAS are counted.
ESP-P	Errored Second, P-Bit Parity- Path	This parameter indicates the number of seconds with one or more P-Bit parity errors, one or more SEF defects, or one or more Alarm Indication Signal (AIS) defects. This count is not incremented when Unavailable Seconds (UAS) are counted.
SESP-P	Severely Errored Second, P-Bit Parity - Path	This parameter indicates the number of seconds with 45 or more P-Bit parity errors, one or more SEF defects, or one or more AIS defects. This count is not incremented when UAS are counted.
UASP-P	Unavailable Second, P-Bit Parity - Path	This parameter indicates the number of seconds that the DS3 path is unavailable. UASP-P accumulates at the onset of 10 contiguous SESP-Ps and stop accumulating at the onset of 10 contiguous seconds without SESP-Ps.
CVCP-P	Code Violation, CP-Bit Parity - Path	This parameter indicates the number of CP-Bit parity errors that have occurred. This count is not incremented when UAS are counted.
ESCP-P	Errored Second, CP-Bit Parity - Path	This parameter indicates the number of seconds with one or more CP-Bit parity errors, one or more SEF defects, or one or more AIS defects. This count is not incremented when UAS are counted.

Table 5-30. DS3 PM Near-End Parameter Descriptions (Continued)

DS3 PM Parameter	Definition	Description
SESCP-P	Severely Errored Second, CP-Bit Parity - Path	This parameter indicates the number of seconds with 45 or more CP-Bit parity errors, one or more SEF defects, or one or more AIS defects. This count is not incremented when UAS are counted.
UASCP-P	Unavailable Second, CP-Bit Parity - Path	This parameter indicates the number of seconds that the DS3 path is unavailable. UASCP-P accumulates at the onset of 10 contiguous SESCP-Ps and stop accumulating at the onset of 10 contiguous seconds without SESCP-Ps.
SAS-P	Severely Errored Frame/AIS Second - Path	This parameter indicates the number of seconds with one or more SEF defects of one or more AIS defects.

DS3 PM Far-End Parameter Descriptions

Table 5-31 provides DS3 PM far-end parameter descriptions that apply to C-Bit Framing only.

Table 5-31. DS3 PM Far-End Parameter Descriptions (C-Bit Framing Only)

DS3 PM Parameter	Definition	Description
Path		
CVCP-PFE	Code Violation, CP-Bit Parity - Path	This parameter indicates the number of CP-Bit parity errors that have occurred. This count is not incremented when UAS are counted.
ESCP-PFE	Errored Second, CP-Bit Parity - Path	This parameter indicates the number of seconds with one or more CP-Bit parity errors, one or more SEF defects, or one or more Alarm Indication Signal (AIS) defects. This count is not incremented when UAS are counted.
SESCP-PFE	Severely Errored Second, CP-Bit Parity - Path	This parameter indicates the number of seconds with 45 or more CP-Bit parity errors, one or more SEF defects, or one or more AIS defects. This count is not incremented when UAS are counted.
UASCP-PFE	Unavailable Second, CP-Bit Parity - Path	This parameter indicates the number of seconds that the DS3 path is unavailable. UASP-PFE accumulates at the onset of 10 contiguous SESCP-PFEs and stop accumulating at the onset of 10 contiguous seconds without SESCP-PFEs.

SETTING DS3 THRESHOLDS AND ENABLING ALARMS

Set the thresholds and enable or disable associated alarms from the DS3 Statistics screen.

DS3 Near-End Daily Thresholds and Alarms

To set a DS3 Near-End Daily threshold level and alarm, select **NEAR END DAILY THRESHOLDS**, by number, from the menu and then press ENTER.

Figure 5-18 shows an example of the Near-End Daily Thresholds menu screen.

```
Shelf:  1  Slot:  4A          ADTRAN MX2820 System                  04/15/04 02:44
Unacknowledged Alarms: None                                   TID:       HTVLALEXD16

                 DS3 Statistics - Near End Daily Thresholds
                                        Threshold          Alarm
                   1 - CV-L       :         387       Disabled
                   2 - ES-L       :          25       Disabled
                   3 - SES-L      :           4       Disabled
                   4 - LOSS-L     :           2       Disabled
                   5 - CVP-P      :         382       Disabled
                   6 - ESP-P      :          25       Disabled
                   7 - SESP-P     :           4       Disabled
                   8 - UASP-P     :          10       Disabled
                   9 - CVCP-P     :         382       Disabled
                  10 - ESCP-P     :          25       Disabled
                  11 - SESCP-P    :           4       Disabled
                  12 - UASCP-P    :          10       Disabled
                  13 - SAS-P      :           2       Disabled

                  14 - Restore ALL DS3 and DS1 Threshold Defaults
                  15 - Enable ALL DS3 and DS1 Threshold Alarms
                  16 - Disable ALL DS3 and DS1 Threshold Alarms
  Selection:                                          '?' - System Help Screen
```

Figure 5-18. DS3 Near-End Daily Thresholds

The menu screen for the selected PM parameter appears. The user is then able to set the threshold to the desired level and enable/disable an alarm to be issued once that threshold is exceeded.

NOTE

Options at the bottom of the menu are used to restore *all* DS3 and DS1 defaults.

DS3 Near-End Quarter Hourly Thresholds and Alarms

Select **NEAR END QUARTER HOURLY THRESHOLDS** from the DS3 Statistics menu screen, and press ENTER.

Figure 5-19 shows an example of the Near End Quarter Hourly Thresholds menu screen.

```
Shelf:  1  Slot:  4A          ADTRAN MX2820 System                  04/15/04 02:44
Unacknowledged Alarms: None                                   TID:      HTVLALEXD16

            DS3 Statistics - Near End Quarter Hourly Thresholds
                                    Threshold          Alarm
                  1 - CV-L      :         387       Disabled
                  2 - ES-L      :          25       Disabled
                  3 - SES-L     :           4       Disabled
                  4 - LOSS-L    :           2       Disabled
                  5 - CVP-P     :         382       Disabled
                  6 - ESP-P     :          25       Disabled
                  7 - SESP-P    :           4       Disabled
                  8 - UASP-P    :          10       Disabled
                  9 - CVCP-P    :         382       Disabled
                 10 - ESCP-P    :          25       Disabled
                 11 - SESCP-P   :           4       Disabled
                 12 - UASCP-P   :          10       Disabled
                 13 - SAS-P     :           2       Disabled

                 14 - Restore ALL DS3 and DS1 Threshold Defaults
                 15 - Enable ALL DS3 and DS1 Threshold Alarms
                 16 - Disable ALL DS3 and DS1 Threshold Alarms
   Selection:                                        '?' - System Help Screen
```

Figure 5-19. DS3 Near-End Quarter Hourly Thresholds

The menu screen for the selected PM parameter appears. The user is then able to set the threshold to the desired level and enable/disable an alarm to be issued once that threshold is exceeded.

NOTE

Options at the bottom of the menu are used to restore *all* DS3 and DS1 defaults.

DS3 Far-End Daily Thresholds and Alarms

Select **FAR END DAILY THRESHOLDS** from the DS3 Statistics menu screen, and press ENTER.

Figure 5-20 shows an example of the Far-End Daily Thresholds menu screen.

```
Shelf:  1  Slot:  4A          ADTRAN MX2820 System                 04/15/04 02:44
Unacknowledged Alarms: None                                  TID:      HTVLALEXD16

                 DS3 Statistics - Far End Daily Thresholds
                                        Threshold          Alarm
                   1 - CVCP-P    :          382        Disabled
                   2 - ESCP-P    :           25        Disabled
                   3 - SESCP-P   :            4        Disabled
                   4 - UASCP-P   :           10        Disabled

                   5 - Restore ALL DS3 and DS1 Threshold Defaults
                   6 - Enable ALL DS3 and DS1 Threshold Alarms
                   7 - Disable ALL DS3 and DS1 Threshold Alarms









   Selection:                                        '?' - System Help Screen
```

Figure 5-20. DS3 Far-End Daily Thresholds

The menu screen for the selected PM parameter appears. The user is then able to set the threshold to the desired level and enable/disable an alarm to be issued once that threshold is exceeded.

NOTE

Options at the bottom of the menu are used to restore *all* DS3 and DS1 defaults.

DS3 Far-End Quarter Hourly Thresholds and Alarms

Select **FAR END QUARTER HOURLY THRESHOLDS** from the DS3 Statistics menu screen.

Figure 5-21 shows an example of the Far-End Quarter Hourly Thresholds menu screen.

```
Shelf:  1  Slot:  4A          ADTRAN MX2820 System                 04/15/04 02:44
Unacknowledged Alarms: None                                  TID:      HTVLALEXD16

             DS3 Statistics - Far End Quarter Hourly Thresholds
                                    Threshold          Alarm
                  1 - CVCP-P    :         382       Disabled
                  2 - ESCP-P    :          25       Disabled
                  3 - SESCP-P   :           4       Disabled
                  4 - UASCP-P   :          10       Disabled

                  5 - Restore ALL DS3 and DS1 Threshold Defaults
                  6 - Enable ALL DS3 and DS1 Threshold Alarms
                  7 - Disable ALL DS3 and DS1 Threshold Alarms









   Selection:                                        '?' - System Help Screen
```

Figure 5-21. DS3 Far-End Quarter Hourly Thresholds

The menu screen for the selected PM parameter appears. The user is then able to set the threshold to the desired level and enable/disable an alarm to be issued once that threshold is exceeded.

NOTE

Options at the bottom of the menu are used to restore *all* DS3 and DS1 defaults.

VIEWING T1/E1 PM STATISTICS

To access the T1/E1 Statistics screen, select the options from each screen listed and then press ENTER:

1. Select **ACCESS MODULES** from the MX2820 Main Menu.
2. Select a number from 1 to 7 for a 19-inch shelf or 1 to 9 for a 23-inch shelf, from the Access Module Menus, and press ENTER.
3. Select **PERFORMANCE MONITORING** from the Access Module Main Menu.
4. Select **T1/E1 STATISTICS** from the Performance Monitoring menu.

From the T1/E1 Statistics menu screen, options are available to view PM data, set threshold levels, and enable or disable alarms. Refer to the applicable subsection for additional information.

Figure 5-22 shows an example of the T1/E1 Statistics menu screen.

```
Shelf:  1  Slot:  4A          ADTRAN MX2820 System                  04/15/04 02:44
Unacknowledged Alarms: None                                   TID:      HTVLALEXD16


                                T1/E1 Statistics

                          1 - Near End Daily
                          2 - Near End Quarter Hourly

                          3 - Near End Daily Thresholds
                          4 - Near End Quarter Hourly Thresholds

                          5 - Clear T1/E1 Statistics









   Selection:                                          '?' - System Help Screen
```

Figure 5-22. T1/E1 Statistics Menu

T1/E1 Near-End Daily Statistics

NOTE

T1/E1 near-end daily statistics are maintained for the current 24-hour period and the seven previous days.

Select **NEAR END DAILY** from the T1/E1 Statistics screen.

Each T1/E1 line displays either **CLEAR** or **PM DATA**. **CLEAR** indicates all PM statistics for that T1/E1 line are zero. **PM DATA** indicates PM statistics for that T1/E1 line are non-zero.

The menu screen for the T1/E1 circuits appears. Figure 5-23 shows an example.

```
Shelf:  1  Slot:  4A          ADTRAN MX2820 System                 04/15/04 02:44
Unacknowledged Alarms: None                                  TID:      HTVLALEXD16

                    T1/E1 Statistics - Near End Daily

            1  - T1 #1   [Clear]            15 - T1 #15  [Clear]
            2  - T1 #2   [Clear]            16 - T1 #16  [Clear]
            3  - T1 #3   [Clear]            17 - T1 #17  [Clear]
            4  - T1 #4   [Clear]            18 - T1 #18  [Clear]
            5  - T1 #5   [Clear]            19 - T1 #19  [Clear]
            6  - T1 #6   [Clear]            20 - T1 #20  [Clear]
            7  - T1 #7   [Clear]            21 - T1 #21  [Clear]
            8  - T1 #8   [Clear]            22 - T1 #22  [Clear]
            9  - T1 #9   [Clear]            23 - T1 #23  [Clear]
            10 - T1 #10  [Clear]            24 - T1 #24  [Clear]
            11 - T1 #11  [Clear]            25 - T1 #25  [Clear]
            12 - T1 #12  [Clear]            26 - T1 #26  [Clear]
            13 - T1 #13  [Clear]            27 - T1 #27  [Clear]
            14 - T1 #14  [Clear]            28 - T1 #28  [Clear]



  Selection:                                        '?' - System Help Screen
```

Figure 5-23. T1/E1 Circuits Menu

Figure 5-24 (see Figure 5-25 for P/N 1186002L3) shows an example of the near-end daily statistics for the T1 #1 circuit.

```
Shelf:  1  Slot:  4A          ADTRAN MX2820 System                 04/15/04 02:44
Unacknowledged Alarms: None                                  TID:       HTVLALEXD16

                     T1/E1 Statistics - Near End Daily

                                    T1 #1

          Current    09/16     09/15     09/14     09/13     09/12     09/11     09/10
CV-L            0        0         0       N/A       N/A       N/A       N/A       N/A
ES-L            0        0         0       N/A       N/A       N/A       N/A       N/A
SES-L           0        0         0       N/A       N/A       N/A       N/A       N/A
LOSS-L          0        0         0       N/A       N/A       N/A       N/A       N/A

AISS-P          0        0         0       N/A       N/A       N/A       N/A       N/A

                                                        '?' - System Help Screen
```

Figure 5-24. T1 #1 Near-End Daily Statistics (Example)

```
Shelf:  1  Slot:  4A          ADTRAN MX2820 System                 04/15/04 02:44
Unacknowledged Alarms: None                                  TID:       HTVLALEXD16

                     T1/E1 Statistics - Near End Daily

                              T1 #1 - AUTO (Unframed)

          Current    09/16     09/15     09/14     09/13     09/12     09/11     09/10
CV-L            0        0         0       N/A       N/A       N/A       N/A       N/A
ES-L            0        0         0       N/A       N/A       N/A       N/A       N/A
SES-L           0        0         0       N/A       N/A       N/A       N/A       N/A
LOSS-L          0        0         0       N/A       N/A       N/A       N/A       N/A

CV-P            0        0         0       N/A       N/A       N/A       N/A       N/A
ES-P            0        0         0       N/A       N/A       N/A       N/A       N/A
SES-P           0        0         0       N/A       N/A       N/A       N/A       N/A
UAS-P           0        0         0       N/A       N/A       N/A       N/A       N/A

AISS-P          0        0         0       N/A       N/A       N/A       N/A       N/A

                                                        '?' - System Help Screen
```

Figure 5-25. T1 #1 Near-End Daily Statistics (Example) - For P/N 1186002L3 Only

T1/E1 Near-End Quarter Hourly Statistics

NOTE

T1/E1 near-end quarter-hourly statistics are maintained for the current
15-minute interval and the completed 96 previous 15-minute intervals (providing a 24-hour history). A total is also provided that represents the sum of the previous 96 15-minute intervals.

Select **NEAR END QUARTER HOURLY** from the T1/E1 Statistics screen, and select a desired T1/E1 circuit.

Figure 5-26 (see Figure 5-27 for P/N 1186002L3) shows an example of the near-end quarter-hourly statistics for the T1 #1 circuit.

```
Shelf:  1  Slot:  4A          ADTRAN MX2820 System                 04/15/04 02:44
Unacknowledged Alarms: None                                 TID:       HTVLALEXD16

                 T1/E1 Statistics - Near End Quarter Hourly

                                      T1 #1

          Current     Total     19:45     19:30     19:15     19:00     18:45     18:30
CV-L            0         0         0         0         0         0         0         0
ES-L            0         0         0         0         0         0         0         0
SES-L           0         0         0         0         0         0         0         0
LOSS-L          0         0         0         0         0         0         0         0

AISS-P          0         0         0         0         0         0         0         0




Select Interval: (B) to go Back.                        '?' - System Help Screen
```

Figure 5-26. T1 #1 Near-End Quarter Hourly Statistics (Example)

```
Shelf:  1  Slot:  4A          ADTRAN MX2820 System                  04/15/04 02:44
Unacknowledged Alarms: None                                  TID:       HTVLALEXD16

                  T1/E1 Statistics - Near End Quarter Hourly

                              T1 #1 - AUTO (Unframed)

           Current     Total     19:45     19:30     19:15     19:00     18:45     18:30
CV-L             0         0         0         0         0         0         0         0
ES-L             0         0         0         0         0         0         0         0
SES-L            0         0         0         0         0         0         0         0
LOSS-L           0         0         0         0         0         0         0         0

CV-P             0         0         0         0         0         0         0         0
ES-P             0         0         0         0         0         0         0         0
SES-P            0         0         0         0         0         0         0         0
UAS-P            0         0         0         0         0         0         0         0

AISS-P           0         0         0         0         0         0         0         0



Select Interval: (B) to go Back.                        '?' - System Help Screen
```

Figure 5-27. T1 #1 Near-End Quarter Hourly Statistics (Example) - For P/N 1186002L3 Only

T1/E1 PM Parameter Descriptions

Table 5-32 provides T1/E1 PM parameter descriptions.

Table 5-32. T1/E1 PM Parameter Descriptions

T1/E1 PM Parameter	Definition	Description
CV-L	Code Violation - Line	This parameter indicates the number of Bipolar Violations (BPVs) that have occurred.
ES-L	Errored Seconds - Line	This parameter indicates the number of seconds for which one or more Coding Violations (CVs), or one or more Loss of Signal (LOS) defects occurred.
SES-L	Severely Errored Seconds - Line	This parameter indicates the number of seconds with 1544 or more BPVs or one or more LOS defects.
LOSS-L	Loss of Signal Second - Line	This parameter indicates the number of seconds for which one or more LOS defects occurred.
AISS-P	AIS Second - Path	This parameter indicates the number of seconds for which one or more AIS defects occurred.

Table 5-32. T1/E1 PM Parameter Descriptions (Continued)

T1/E1 PM Parameter	Definition	Description
For P/N 1186002L3 Only:		
CV-P	Code Violation - Path	SF Mode: This parameter indicates the number of frame synchronization bit errors that have occurred during the accumulation period. ESF Mode: This parameter indicates the number of CRC-6 errors that have occurred during the accumulation period.
ES-P	Errored Seconds - Path	SF Mode: This parameter indicates the number of seconds containing any of the following: • FE (Frame bit Error). This parameter indicates the occurrence of a frame bit error in the received frame bit pattern. • CS (Controlled Slip) Event. This parameter indicates the replication of deletion of the 192 payload bits of a DS1 frame by the receiving unit. • SEF (Severely Errored Frame) Defect. This parameter indicates that two or more frame bit errors are detected in a window. • AIS (Alarm Indication Signal) Defect. This parameter indicates the detection of an unframed signal with a 1s density of at least 99.9% for a time. ESF Mode: This parameter indicates the number of seconds containing any of the following: • CRC-6 (Cyclic Redundancy Check) Error. This parameter indicates the existence of a CRC-6 code that is not identical to the corresponding locally calculated code. • CS Event • SEF Defect • AIS Defect
SES-P	Severely Errored Seconds - Path	SF Mode: This parameter indicates the number of seconds with 8 or more FE events or one or more SEF or AIS defects. ESF Mode: This parameter indicates the number of seconds with 320 or more CRC-6 errors or one or more SEF or AIS defects.
UAS-P	Unavailable Seconds - Path	This parameter indicates the number of seconds for which the DS1 path contains 10 contiguous SESs.

SETTING T1/E1 THRESHOLDS AND ENABLING ALARMS

Set the thresholds and enable or disable associated alarms from the T1/E1 Statistics screen.

T1/E1 Near-End Daily Thresholds and Alarms

Select **NEAR END DAILY THRESHOLDS** from the T1/E1 Statistics screen.

Figure 5-28 (see Figure 5-29 for P/N 1186002L3) shows an example of the Near-End Daily Thresholds menu.

```
Shelf:  1  Slot:  2A          ADTRAN MX2820 System                  04/15/04 02:44
Unacknowledged Alarms:                                        TID:       HTVLALEXD16

                T1/E1 Statistics - Near End Daily Thresholds
                                      Threshold          Alarm
                   1 - CV-L      :         387       Disabled
                   2 - ES-L      :          25       Disabled
                   3 - SES-L     :           4       Disabled
                   4 - LOSS-L    :          10       Disabled
                   5 - AISS-P    :          10       Disabled

                   6 - Restore ALL DS3 and DS1 Threshold Defaults
                   7 - Enable ALL DS3 and DS1 Threshold Alarms
                   8 - Disable ALL DS3 and DS1 Threshold Alarms









   Selection:                                          '?' - System Help Screen
```

Figure 5-28. T1/E1 Near-End Daily Thresholds

```
Shelf:  1  Slot:  2A          ADTRAN MX2820 System                  04/15/04 02:44
Unacknowledged Alarms:                                        TID:       HTVLALEXD16

                T1/E1 Statistics - Near End Daily Thresholds
                                        Threshold          Alarm
                   1 - CV-L       :         387        Disabled
                   2 - ES-L       :          25        Disabled
                   3 - SES-L      :           4        Disabled
                   4 - LOSS-L     :          10        Disabled
                   5 - CV-P       :         387        Disabled
                   6 - ES-P       :          25        Disabled
                   7 - SES-P      :           4        Disabled
                   8 - UAS-P      :           2        Disabled
                   9 - AISS-P     :          10        Disabled

                  10 - Restore ALL DS3 and DS1 Threshold Defaults
                  11 - Enable ALL DS3 and DS1 Threshold Alarms
                  12 - Disable ALL DS3 and DS1 Threshold Alarms




   Selection:                                          '?' - System Help Screen
```

Figure 5-29. T1/E1 Near-End Daily Thresholds - For P/N 1186002L3 Only

Input the desired PM parameter, and press ENTER.

The menu for the selected PM parameter displays. The user is then able to set the threshold to the desired level and enable/disable an alarm to be issued once that threshold is exceeded.

NOTE

Options at the bottom of the menu are used to restore *all* DS3 and DS1 defaults.

T1/E1 Near-End Quarter Hourly Thresholds and Alarms

Select **NEAR END QUARTER HOURLY THRESHOLDS** from the T1/E1 Statistics screen.

Figure 5-30 (see Figure 5-31 for P/N 1186002L3) shows an example of the Near-End Quarter Hourly Thresholds menu screen.

```
Shelf:  1  Slot:  4A          ADTRAN MX2820 System                  04/15/04 02:44
Unacknowledged Alarms: None                                  TID:      HTVLALEXD16

           T1/E1 Statistics - Near End Quarter Hourly Thresholds
                                    Threshold          Alarm
                  1 - CV-L      :         387       Disabled
                  2 - ES-L      :          25       Disabled
                  3 - SES-L     :           4       Disabled
                  4 - LOSS-L    :          10       Disabled
                  5 - AISS-P    :          10       Disabled

                  6 - Restore ALL DS3 and DS1 Threshold Defaults
                  7 - Enable ALL DS3 and DS1 Threshold Alarms
                  8 - Disable ALL DS3 and DS1 Threshold Alarms









   Selection:                                        '?' - System Help Screen
```

Figure 5-30. T1/E1 Quarter Hourly Thresholds Screen

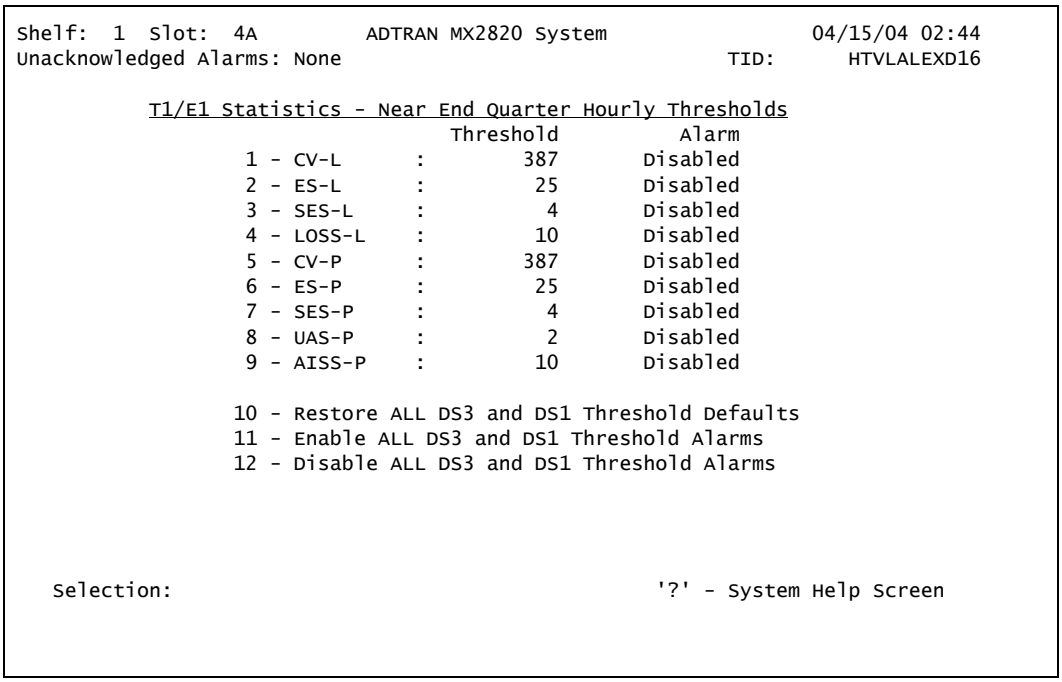


Figure 5-31. T1/E1 Quarter Hourly Thresholds Screen - For P/N 1186002L3 Only

Select the desired PM parameter, and press ENTER. The menu for the selected PM parameter appears. The user is then able to set the threshold to the desired level and enable/disable an alarm to be issued once that threshold is exceeded.

NOTE

Options at the bottom of the menu are used to restore *all* DS3 and DS1 defaults.

CLEAR ALL STATISTICS

To clear all DS3 and DS1 PM statistics, perform the following steps:

1. Access the desired MUX Module Main Menu.
2. Select the **PERFORMANCE MONITORING** option
3. Select **CLEAR ALL STATISTICS** from the top-level Performance Monitoring menu.
4. Input a Y to confirm or input N to leave the menu without clearing the statistics, and press ENTER.
5. Return to the MX2820 Main Menu by pressing ESC until the menu appears.

UIG-525
STS-1 MUX PM Statistics

INTRODUCTION

This subsection provides the instructions to access Performance Monitoring (PM) screens to allow the following:

- Viewing PM statistics for the near-end of the STS-1 network
- Viewing PM statistics for the far-end of the STS-1 network
- Viewing PM statistics for the individual VT/Port circuits
- Setting PM threshold levels
- Enabling or disabling threshold alarms

These functions are performed from the STS-1 Statistics screen.

ACCESSING THE STS-1 PM STATISTICS SCREEN

To view STS-1 PM statistics, select the options from each screen listed and then press ENTER:

1. Select **ACCESS MODULES** from the MX2820 Main Menu.
2. Select a number from 1 to 7 for a 19-inch shelf, or 1 to 9 for a 23-inch shelf, associated with an STS-1 MUX, and press ENTER. The Access Modules Main Menu appears.
3. Select **PERFORMANCE MONITORING** from the STS-1 MUX Main Menu.
4. Select **STS-1 STATISTICS**, from the Performance Monitoring menu.

Figure 5-32 and Figure 5-33 show examples of the Performance Monitoring menu and STS-1 Statistics screen.

```
Shelf:  1  Slot:  4A          ADTRAN MX2820 System                 04/15/04 17:30
Unacknowledged Alarms: None                                  TID:      HTVLALEXD16




                          Performance Monitoring

                          1 - STS-1 Statistics
                          2 - VT/Port Statistics
                          3 - Clear ALL Statistics









   Selection:                                          '?' - System Help Screen
```

Figure 5-32. Performance Monitoring Menu

```
Shelf:  1  Slot:  4A          ADTRAN MX2820 System                 04/15/04 17:31
Unacknowledged Alarms: None                                  TID:      HTVLALEXD16


                             STS-1 Statistics

                       1 - Near End Daily
                       2 - Near End Quarter Hourly

                       3 - Far End Daily
                       4 - Far End Quarter Hourly

                       5 - Near End Daily Thresholds
                       6 - Near End Quarter Hourly Thresholds

                       7 - Far End Daily Thresholds
                       8 - Far End Quarter Hourly Thresholds

                       9 - Clear STS-1 Statistics


   Selection:                                          '?' - System Help Screeneen
```

Figure 5-33. STS-1 PM Statistics Menu

VIEWING THE STS-1 PM STATISTICS

To view STS-1 PM statistics, perform the following steps on each screen:

1. Select the desired option, by number, from the menu and then press ENTER.
2. Return to a previous screen by pressing ESC until the desired screen appears.

The timeframe and direction are selected from this screen.

Examples of the STS-1 PM Statistics screens are shown in the following section.

STS-1 Near-End Daily Statistics

STS-1 near-end daily statistics are maintained for the current 24-hour period and the seven previous days.

Select **NEAR END DAILY** from the STS-1 Statistics menus screen.

Figure 5-34 shows an example of the STS-1 Statistics - Near-End Daily screen.

```
Shelf:  1  Slot:  4A          ADTRAN MX2820 System                  04/15/04 17:36
Unacknowledged Alarms: None                                  TID:       HTVLALEXD16

                        STS-1 Statistics - Near End Daily
          Current    04/14     04/13     04/12     04/11     04/10     04/09     04/08
CV-L            3        0         5         0         0         0         0         0
ES-L            1        0         2         0         0         0         0         0
SES-L           0        0         0         0         0         0         0         0
UAS-L           0        0         0         0         0         0         0         0

CV-S            3        0         8         0         0         0         0         0
ES-S            1        0        34         0         0         0         0         0
SES-S           0        0        32         0         0         0         0         0
SEFS-S          0        0        32         0         0         0         0         0

CV-P            3        0        14         0         0         0         0         0
ES-P            1        0         2         0         0         0         0         0
SES-P           0        0         0         0         0         0         0         0
UAS-P           0        0         0         0         0         0         0         0
PPJC-P          0        0         0         0         0         0         0         0
NPJC-P          0        0         0         0         0         0         0         0

                                                    '?' - System Help Screen
```

Figure 5-34. STS-1 Near-End Daily PM Statistics

STS-1 Near-End Quarter Hourly Statistics

STS-1 near-end quarter-hourly statistics are maintained for the current 15-minute interval and the completed 96 previous 15-minute intervals (providing a 24-hour history). A total is also provided that represents the sum of the previous 96 15-minute intervals.

Select **NEAR END QUARTER HOURLY** from the STS-1 Statistics screen.

To view an earlier period in the 24-hour history, press B. The previous six 15-minute statistics will display. The screen will update with a new option: **(F) TO GO FORWARD**.

Figure 5-35 shows an example of the STS-1 Near-End Quarter Hourly screen.

```
Shelf:  1  Slot:  4A          ADTRAN MX2820 System                 04/15/04 17:43
Unacknowledged Alarms: None                                  TID:       HTVLALEXD16

                  STS-1 Statistics - Near End Quarter Hourly
          Current    Total    17:15    17:00    16:45    16:30    16:15    16:00
CV-L            0        3        0        0        0        0        0        0
ES-L            0        1        0        0        0        0        0        0
SES-L           0        0        0        0        0        0        0        0
UAS-L           0        0        0        0        0        0        0        0

CV-S            0        3        0        0        0        0        0        0
ES-S            0        1        0        0        0        0        0        0
SES-S           0        0        0        0        0        0        0        0
SEFS-S          0        0        0        0        0        0        0        0

CV-P            0        3        0        0        0        0        0        0
ES-P            0        1        0        0        0        0        0        0
SES-P           0        0        0        0        0        0        0        0
UAS-P           0        0        0        0        0        0        0        0
PPJC-P          0        0        0        0        0        0        0        0
NPJC-P          0        0        0        0        0        0        0        0

Select Interval: (B) to go Back.                      '?' - System Help Screen
```

Figure 5-35. STS-1 Near-End Quarter Hourly PM Statistics

STS-1 Far-End Daily Statistics

STS-1 far-end daily statistics are maintained for the current 24-hour period and the seven previous days.

Select **FAR END DAILY** from the STS-1 Statistics menus screen.

Figure 5-36 shows an example of the STS-1 Far-End Daily screen.

```
Shelf:  1  Slot:  4A          ADTRAN MX2820 System                  04/15/04 17:44
Unacknowledged Alarms: None                                    TID:      HTVLALEXD16

                        STS-1 Statistics - Far End Daily
          Current    04/14    04/13    04/12    04/11    04/10    04/09    04/08
CV-L            3        0       10        0        0        0        0        0
ES-L            1        0        2        0        0        0        0        0
SES-L           0        0        0        0        0        0        0        0
UAS-L           0        0        0        0        0        0        0        0

CV-P            3        0       21        0        0        0        0        0
ES-P            1        0        2        0        0        0        0        0
SES-P           0        0        0        0        0        0        0        0
UAS-P           0        0        0        0        0        0        0        0

                                                    '?' - System Help Screen
```

Figure 5-36. STS-1 Far-End Daily PM Statistics

STS-1 Far-End Quarter Hourly Statistics

STS-1 far-end quarter-hourly statistics are maintained for the current 15-minute interval and the completed 96 previous 15-minute intervals (providing a 24-hour history). A total is also provided that represents the sum of the previous 96 15-minute intervals.

Select **FAR END QUARTER HOURLY** from the STS-1 Statistics screen.

To view an earlier period in the 24-hour history, press B. The previous six 15-minute statistics will display. The screen will update with a new option: **(F) TO GO FORWARD**.

Figure 5-37 shows an example of the STS-1 Statistics - Far-End Quarter Hourly screen.

```
Shelf:  1  Slot:  4A          ADTRAN MX2820 System                 04/15/04 17:44
Unacknowledged Alarms: None                                  TID:       HTVLALEXD16

                    STS-1 Statistics - Far End Quarter Hourly
           Current     Total     17:15     17:00     16:45     16:30     16:15     16:00
CV-L             0         3         0         0         0         0         0         0
ES-L             0         1         0         0         0         0         0         0
SES-L            0         0         0         0         0         0         0         0
UAS-L            0         0         0         0         0         0         0         0

CV-P             0         3         0         0         0         0         0         0
ES-P             0         1         0         0         0         0         0         0
SES-P            0         0         0         0         0         0         0         0
UAS-P            0         0         0         0         0         0         0         0









Select Interval: (B) to go Back.                        '?' - System Help Screen
```

Figure 5-37. STS-1 Far-End Quarter Hourly PM Statistics

STS-1 PM Near-End Parameter Descriptions

Table 5-33 provides a description of the STS-1 PM near-end parameters that appear on the screens.

Table 5-33. STS-1 PM Near-End Parameter Descriptions

Parameter	Definition	Description
Section		
CV-S	Code Violation - Section	This parameter indicates the number of coding violations encountered at the Section Layer.
SEFS-S	Severely Errored Framing Seconds-Section	This parameter indicates the number of seconds that contain one or more SEF events - only counted at the Section Layer.
ES-S	Errored Seconds - Section	This parameter indicates the number of seconds with one or more coding violations or one or more incoming defects (SEF, LOS) at the Section Layer.
SES-S	Severely Errored Seconds - Section	This parameter indicates the number of seconds with x or more coding violations at the Section Layer, or a second during which at least one or more incoming defects at the Section Layer has occurred (Values of x vary dependent upon the line rate and the Bit Error Rate).
Line		
CV-L	Code Violation - Line	This parameter indicates the number of coding violations encountered at the Line Layer.
ES-L	Errored Second - Line	This parameter indicates the number of seconds with one or more coding violations or an incoming defect (AIS-L) at the Line Layer.
SES-L	Severely Errored Seconds - Line	This parameter indicates the number of seconds with x or more coding violations at the Line Layer, or a second during which at least one or more incoming defects at the Line Layer has occurred (Values of x vary dependent upon the line rate and the Bit Error Rate).
UAS-L	Unavailable Seconds - Line	This parameter indicates the time in seconds that the Line Layer has been unavailable for data delivery.
Path		
CV-P	Coding Violations - Path	This parameter indicates the number of coding violations encountered at the Path Layer.
ES-P	Errored Seconds - Path	This parameter indicates the number of seconds with one or more coding violations or one or more incoming defects (SAIS-P, LOP, UNEQ-P) at the Path Layer.

Table 5-33. STS-1 PM Near-End Parameter Descriptions (Continued)

Parameter	Definition	Description
SES-P	Severely Errored Seconds - Path	This parameter indicates the number of seconds with x or more coding violations at the Path Layer, or a second during which at least one or more incoming defects at the Path Layer has occurred (Values of x vary dependent upon the line rate and the Bit Error Rate).
UAS-P	Unavailable Seconds - Path	This parameter indicates the time in seconds that the Path Layer has been unavailable for data delivery.
PPJC-P	Positive Pointer Justification Count - STS Path Detected	This parameter indicates the increment count of the detected pointer.
NPJC-P	Negative Pointer Justification Count - STS Path Detected	This parameter indicates the decrement count of the detected pointer.

STS-1 PM Far-End Parameter Descriptions

Table 5-34 provides STS-1 PM far-end parameter descriptions.

Table 5-34. STS-1 PM Far-End Parameter Descriptions

Parameter	Definition	Description
Line		
CV-L	Code Violation - Line	This parameter indicates the number of coding violations encountered at the Line Layer.
ES-L	Errored Second - Line	This parameter indicates the number of seconds with one or more coding violations or an incoming defect (AIS-L) at the Line Layer.
SES-L	Severely Errored Seconds - Line	This parameter indicates the number of seconds with x or more coding violations at the Line Layer, or a second during which at least one or more incoming defects at the Line Layer has occurred (Values of x vary dependent upon the line rate and the Bit Error Rate).
UAS-L	Unavailable Seconds - Line	This parameter indicates the time in seconds that the Line Layer has been unavailable for data delivery.
Path		
CV-P	Coding Violations - Path	This parameter indicates the number of coding violations encountered at the Path Layer.

Table 5-34. STS-1 PM Far-End Parameter Descriptions (Continued)

Parameter	Definition	Description
ES-P	Errored Seconds - Path	This parameter indicates the number of seconds with one or more coding violations or one or more incoming defects (SAIS-P, LOP, UNEQ-P) at the Path Layer.
SES-P	Severely Errored Seconds - Path	This parameter indicates the number of seconds with x or more coding violations at the Path Layer, or a second during which at least one or more incoming defects at the Path Layer has occurred (Values of x vary dependent upon the line rate and the Bit Error Rate).
UAS-P	Unavailable Seconds - Path	This parameter indicates the time in seconds that the Path Layer has been unavailable for data delivery

STS-1 Alarm Condition Descriptions

Table 5-35 provides STS-1 Alarm Condition descriptions.

Table 5-35. STS-1 Alarm Condition Descriptions

STS-1 Alarm	Definition	Condition Description
LOS	Loss of Signal	This condition indicates the unit has lost the network receive signal.
LOF	Loss of Framing	This condition indicates the unit detects a framing loss from the network.
LOP	Loss of Pointer	This condition indicates the unit is unable to detect a valid pointer in the receive signal.
LOMF	Loss of Multi-Frame	This condition indicates the unit detects loss of H4 multiframe from the network.
AIS-L	Alarm Indication Signal - Line	This condition indicates the unit is receiving a line alarm indication signal (the section terminating equipment generates AIS-L after detecting LOS or LOF).
AIS-P	Alarm Indication Signal - Path	This condition indicates the unit is receiving a line alarm indication signal (AIS-P is defined as all ones in bytes H1, H2, and H3 as well as all ones in the entire STS synchronous payload envelope).
RFI-L	Remote Failure Indication - Line	This condition indicates the unit is receiving a line remote failure indication (RFI-L is declared when the incoming line remote defect indication [RDI-L, “110” pattern in bits 6, 7, and 8 of the K2 line overhead byte] lasts for 2.5 ±0.5 seconds.

Table 5-35. STS-1 Alarm Condition Descriptions (Continued)

STS-1 Alarm	Definition	Condition Description
RFI-P	Remote Failure Indication - Path	This condition indicates the unit is receiving a line remote failure indication (RFI-P is declared when the incoming path remote defect indication [RDI-P, “1” in bit 5 of the G1 path overhead byte for contiguous frames] lasts for 2.5 ±0.5 seconds.
TIM-P	Trace Identifier Mismatch - Path	This condition indicates a received signal label is mismatched and does not equal the locally provisioned expected value.
UEQ-P	Unequipped - Path	This condition indicates the path is unequipped and is not provisioned (Byte C2 of the STS path overhead is set to zero).

STS-1 Near-End Daily Thresholds and Alarms

1. Select **NEAR END DAILY THRESHOLDS**, from the STS-1 Statistics screen.

Figure 5-38 shows an example of the Near-End Daily Thresholds menu screen.

```
Shelf:  1  Slot:  4A          ADTRAN MX2820 System                  04/16/04 09:02
Unacknowledged Alarms: None                                   TID:      HTVLALEXD16

                 STS-1 Statistics - Near End Daily Thresholds
                                      Threshold          Alarm
                   1 - CV-L      :         382       Disabled
                   2 - ES-L      :          25       Disabled
                   3 - SES-L     :           4       Disabled
                   4 - UAS-L     :          10       Disabled
                   5 - CV-S      :         382       Disabled
                   6 - ES-S      :          25       Disabled
                   7 - SES-S     :          10       Disabled
                   8 - SEFS-S    :           4       Disabled
                   9 - CV-P      :         382       Disabled
                  10 - ES-P      :          25       Disabled
                  11 - SES-P     :           4       Disabled
                  12 - UAS-P     :          10       Disabled
                  13 - PPJC-P    :           5       Disabled
                  14 - NPJC-P    :           5       Disabled
                  15 - Restore ALL STS-1, VT, and DS1 Threshold Defaults
                  16 - Enable ALL STS-1, VT, and DS1 Threshold Alarms
                  17 - Disable ALL STS-1, VT, and DS1 Threshold Alarms
   Selection:                                          '?' - System Help Screen
```

Figure 5-38. STS-1 Near-End Daily Thresholds

2. Input the number of the desired PM parameter, and press ENTER.

The menu screen for the selected PM parameter appears. The user is then able to set the threshold to the desired level and enable/disable an alarm to be issued once that threshold is exceeded.

Options at the bottom of the menu are used to restore *all* STS-1 and VT/Port threshold defaults.

STS-1 Near-End Quarter Hourly Thresholds and Alarms

Select **NEAR END QUARTER HOURLY THRESHOLDS** from the STS-1 Statistics menu screen.

Figure 5-39 shows an example of the Near-End Quarter Hourly Thresholds menu screen.

```
Shelf:  1  Slot:  4A          ADTRAN MX2820 System                  04/16/04 09:05
Unacknowledged Alarms: None                                   TID:      HTVLALEXD16

            STS-1 Statistics - Near End Quarter Hourly Thresholds
                                      Threshold          Alarm
                   1 - CV-L      :         382       Disabled
                   2 - ES-L      :          25       Disabled
                   3 - SES-L     :           4       Disabled
                   4 - UAS-L     :          10       Disabled
                   5 - CV-S      :         382       Disabled
                   6 - ES-S      :          25       Disabled
                   7 - SES-S     :           4       Disabled
                   8 - SEFS-S    :          10       Disabled
                   9 - CV-P      :         382       Disabled
                  10 - ES-P      :          25       Disabled
                  11 - SES-P     :           4       Disabled
                  12 - UAS-P     :          10       Disabled
                  13 - PPJC-P    :           5       Disabled
                  14 - NPJC-P    :           5       Disabled
                  15 - Restore ALL STS-1, VT, and DS1 Threshold Defaults
                  16 - Enable ALL STS-1, VT, and DS1 Threshold Alarms
                  17 - Disable ALL STS-1, VT, and DS1 Threshold Alarms
   Selection:                                          '?' - System Help Screen
```

Figure 5-39. STS-1 Near-End Quarter Hourly Thresholds

Input the number of the desired PM parameter, and press ENTER.

The menu screen for the selected PM parameter appears. The user is then able to set the threshold to the desired level and enable/disable an alarm to be issued once that threshold is exceeded.

NOTE

Options at the bottom of the menu are used to restore *all* STS-1 and VT/Port threshold defaults.

STS-1 Far-End Daily Thresholds and Alarms

Select **FAR END DAILY THRESHOLDS** from the STS-1 Statistics menu screen.

Figure 5-40 shows an example of the Far-End Daily Thresholds menu screen.

```
Shelf:  1  Slot:  4A          ADTRAN MX2820 System                 04/16/04 09:10
Unacknowledged Alarms: None                                  TID:       HTVLALEXD16

                 STS-1 Statistics - Far End Daily Thresholds
                                        Threshold          Alarm
                   1 - CV-L      :          382        Disabled
                   2 - ES-L      :           25        Disabled
                   3 - SES-L     :            4        Disabled
                   4 - UAS-L     :           10        Disabled
                   5 - CV-P      :          382        Disabled
                   6 - ES-P      :           25        Disabled
                   7 - SES-P     :            4        Disabled
                   8 - UAS-P     :           10        Disabled

                   9 - Restore ALL STS-1, VT, and DS1 Threshold Defaults
                  10 - Enable ALL STS-1, VT, and DS1 Threshold Alarms
                  11 - Disable ALL STS-1, VT, and DS1 Threshold Alarms




   Selection:                                          '?' - System Help Screen
```

Figure 5-40. STS-1 Far-End Daily Thresholds

Input the number of the desired PM parameter, and press ENTER.

The menu screen for the selected PM parameter appears. The user is then able to set the threshold to the desired level and enable/disable an alarm to be issued once that threshold is exceeded.

NOTE

Options at the bottom of the menu are used to restore *all* STS-1 and VT/Port threshold defaults.

STS-1 Far-End Quarter Hourly Thresholds and Alarms

Select **FAR END QUARTER HOURLY THRESHOLDS** from the STS-1 Statistics menu screen.

Figure 5-41 shows an example of the Far-End Quarter Hourly Thresholds menu screen.

```
Shelf:  1  Slot:  4A          ADTRAN MX2820 System                  04/16/04 09:12
Unacknowledged Alarms: None                                    TID:      HTVLALEXD16

              STS-1 Statistics - Far End Quarter Hourly Thresholds
                                      Threshold          Alarm
                    1 - CV-L      :         382       Disabled
                    2 - ES-L      :          25       Disabled
                    3 - SES-L     :           4       Disabled
                    4 - UAS-L     :          10       Disabled
                    5 - CV-P      :         382       Disabled
                    6 - ES-P      :          25       Disabled
                    7 - SES-P     :           4       Disabled
                    8 - UAS-P     :          10       Disabled

                    9 - Restore ALL STS-1, VT, and DS1 Threshold Defaults
                   10 - Enable ALL STS-1, VT, and DS1 Threshold Alarms
                   11 - Disable ALL STS-1, VT, and DS1 Threshold Alarms




   Selection:                                          '?' - System Help Screen
```

Figure 5-41. STS-1 Far-End Quarter Hourly Thresholds

Input the number of the desired PM parameter, and press ENTER.

The menu screen for the selected PM parameter appears. The user is then able to set the threshold to the desired level and enable/disable an alarm to be issued once that threshold is exceeded.

NOTE

Options at the bottom of the menu are used to restore *all* STS-1 and VT/Port threshold defaults.

VIEWING VT/PORT STATISTICS

To access the VT/Port Statistics menu, select the options from each screen listed and then press ENTER.

1. Select **ACCESS MODULES** from the MX2820 Main Menu.
2. Select a number from 1 to 7 for a 19-inch shelf, or 1 to 9 for a 23-inch shelf, from the Access Module Menus.
3. Select **PERFORMANCE MONITORING** from the STS-1 Main Menu.
4. Select **VT/PORT** from the Performance Monitoring menu.

Figure 5-42 shows an example of the VT/Port Statistics menu screen.

```
Shelf:  1  Slot:  4A          ADTRAN MX2820 System                  04/16/04 09:18
Unacknowledged Alarms: None                                    TID:       HTVLALEXD16


                              VT/Port Statistics

                        1 - Near End Daily
                        2 - Near End Quarter Hourly

                        3 - Far End Daily
                        4 - Far End Quarter Hourly

                        5 - Near End Daily Thresholds
                        6 - Near End Quarter Hourly Thresholds

                        7 - Far End Daily Thresholds
                        8 - Far End Quarter Hourly Thresholds




   Selection:                                          '?' - System Help Screen
```

Figure 5-42. VT/Port Statistics Menu

From the **VT/PORT STATISTICS** menu screen, options can be selected to view PM data, set threshold levels, and enable or disable alarms. Refer to the applicable subsection for additional information.

VT/Port Near-End Daily Statistics

STS-1 VT/Port near-end daily statistics are maintained for the current 24-hour period and the seven previous days.

Select **NEAR END DAILY** from the VT/Port Statistics menus screen

The menu screen for the VT/Port circuits displays. Figure 5-43 shows an example.

Each VT/Port line displays either **CLEAR** or **PM DATA**. **CLEAR** indicates all PM statistics for that VT/Port line are zero. **PM DATA** indicates PM statistics for that VT/Port line are non-zero.

```
Shelf:  1  Slot:  4A          ADTRAN MX2820 System                 04/16/04 09:23
Unacknowledged Alarms: None                                   TID:      HTVLALEXD16

                     VT/Port Statistics - Near End Daily

    1  - VT #1  (PORT# 1 ) = [PM Data]  15 - VT #15 (PORT# 3 ) = [PM Data]
    2  - VT #2  (PORT# 5 ) = [PM Data]  16 - VT #16 (PORT# 7 ) = [PM Data]
    3  - VT #3  (PORT# 9 ) = [PM Data]  17 - VT #17 (PORT# 11) = [PM Data]
    4  - VT #4  (PORT# 13) = [PM Data]  18 - VT #18 (PORT# 15) = [PM Data]
    5  - VT #5  (PORT# 17) = [PM Data]  19 - VT #19 (PORT# 19) = [PM Data]
    6  - VT #6  (PORT# 21) = [PM Data]  20 - VT #20 (PORT# 23) = [PM Data]
    7  - VT #7  (PORT# 25) = [PM Data]  21 - VT #21 (PORT# 27) = [PM Data]
    8  - VT #8  (PORT# 2 ) = [PM Data]  22 - VT #22 (PORT# 4 ) = [PM Data]
    9  - VT #9  (PORT# 6 ) = [PM Data]  23 - VT #23 (PORT# 8 ) = [PM Data]
    10 - VT #10 (PORT# 10) = [PM Data]  24 - VT #24 (PORT# 12) = [PM Data]
    11 - VT #11 (PORT# 14) = [PM Data]  25 - VT #25 (PORT# 16) = [PM Data]
    12 - VT #12 (PORT# 18) = [PM Data]  26 - VT #26 (PORT# 20) = [PM Data]
    13 - VT #13 (PORT# 22) = [PM Data]  27 - VT #27 (PORT# 24) = [PM Data]
    14 - VT #14 (PORT# 26) = [PM Data]  28 - VT #28 (PORT# 28) = [PM Data]



  Selection:                                        '?' - System Help Screen
```

Figure 5-43. VT/Port Circuits Menu

Select a number for the desired VT/Port circuit, and press ENTER.

Figure 5-44 shows an example of the near-end daily statistics for the VT#1 Port#1 circuit.

```
Shelf:  1  Slot:  4A          ADTRAN MX2820 System                 04/16/04 09:32
Unacknowledged Alarms: None                                  TID:      HTVLALEXD16

                     VT/Port Statistics - Near End Daily



          Current    04/15     04/14     04/13     04/12     04/11     04/10     04/09
VT #1
CV-V            0         0         0         0         0         0         0         0
ES-V            0         0         0        22         0         0         0         0
SES-V           0         0         0        22         0         0         0         0
UAS-V           0         0         0        10         0         0         0         0

PORT# 1
CV-L            0         0         0         0         0         0         0         0
ES-L            0         0         0         0         0         0         0         0
SES-L           0         0         0         0         0         0         0         0
LOSS-L          0         0         0         0         0         0         0         0

AISS-P          0         0         0         0         0         0         0         0

                                                    '?' - System Help Screen
```

Figure 5-44. VT/Port #1 Near-End Daily Statistics (Example)

VT/Port Near-End Quarter Hourly Statistics

VT/Port near-end quarter-hourly statistics are maintained for the current 15-minute interval and the completed 96 previous 15-minute intervals (providing a 24-hour history). A total is also provided that represents the sum of the previous 96 15-minute intervals.

Select **NEAR END QUARTER HOURLY** from the VT/Port Statistics menus.

Select a number for the desired VT/Port circuit.

NOTE

To view an earlier period in the 24-hour history, press B. The previous six 15-minute statistics will display. The screen will update with a new option: **(F) TO GO FORWARD**.

Figure 5-45 shows an example of the near-end quarter-hourly statistics for the VT#1 Port #1 circuit.

```
Shelf:  1  Slot:  4A          ADTRAN MX2820 System                 04/16/04 09:36
Unacknowledged Alarms: None                                  TID:      HTVLALEXD16

                  VT/Port Statistics - Near End Quarter Hourly



          Current     Total     09:15     09:00     08:45     08:30     08:15     08:00
VT #1
CV-V            0         0         0         0         0         0         0         0
ES-V            0         0         0         0         0         0         0         0
SES-V           0         0         0         0         0         0         0         0
UAS-V           0         0         0         0         0         0         0         0

PORT# 1
CV-L            0         0         0         0         0         0         0         0
ES-L            0         0         0         0         0         0         0         0
SES-L           0         0         0         0         0         0         0         0
LOSS-L          0         0         0         0         0         0         0         0

AISS-P          0         0         0         0         0         0         0         0

Select Interval: (B) to go Back.                      '?' - System Help Screen
```

Figure 5-45. T1 #1 Near-End Quarter Hourly Statistics (Example)

VT/Port PM Parameter Descriptions (Near End and Far End)

Table 5-36 provides VT/Port PM Near-End and Far-End parameter descriptions.

Table 5-36. VT/Port PM Near-End/Far-End Parameter Descriptions

VT/Port PM Parameter	Definition	Description
CV-V	Code Violation - VT	This parameter indicates the number of coding violations at the VT Layer.
ES-V	Errored Seconds - VT	This parameter indicates the number of seconds with one or more coding violations or an incoming defect (VAIS, LOP, UNEQ-V) at the VT Layer.
SES-V	Severely Errored Second - VT	This parameter indicates the number of seconds with x or more coding violations at the VT Layer, or a second during which at least one or more incoming defects at the VT Layer has occurred (Values of x vary dependent upon the line rate and the Bit Error Rate).
UAS-V	Unavailable Seconds - VT	This parameter indicates the time in seconds that the VT Layer has been unavailable for data delivery.

SETTING VT/PORT THRESHOLDS AND ENABLING/DISABLING ALARMS

Set the thresholds and enable or disable associated alarms from the VT/Port Statistics screen.

Table 5-37 provides VT/Port Alarm Condition descriptions.

Table 5-37. VT/Port Alarm Condition Descriptions

VT/Port Alarm	Definition	Condition Description
OFF		This condition indicates the VT is equipped but the T1/E1 port is disabled.
OK		This condition indicates the port is in a normal state.
LOS	T1/E1 Loss of Signal	This condition indicates the unit has lost the receive signal.
CAIS	Carrier Side AIS	This condition indicates the T1 is receiving all ones from the STS side of the network.
LAIS	Loop Side AIS	This condition indicates the T1 is receiving all ones from the DSX-1 interface.
XCV	T1/E1 Excessive Code Violations	This condition indicates the MUX module is receiving excessive code violations, exceeding the threshold.
LOP	VP Path Loss of Pointer	This condition indicates a VT LOP defect is declared when either a valid pointer is not detected in eight consecutive VT superframes, or when eight consecutive VT superframes are detected with the NDF set to “1001” without a valid concatenation indicator. A VT LOP is declared when the VT LOP defect persists for 2.5 ±0.5 seconds.
VAIS	VT Path Alarm Indication Signal	This condition indicates the unit is receiving a VT Path alarm indication signal (VT-Path AIS-P is defined as all ones in bytes V1 and V2, as well as all ones in the entire VT synchronous payload envelope). A VAIS failure is declared when the defect persists for 2.5 ±0.5 seconds.
RFI-V	Remote Failure Indication - VT Path	This condition indicates the unit is receiving a VT Path remote failure indication (RFI-V is declared when the incoming VT Path remote defect indication [VTRDI, “1” in bit 4 of the VT-Path overhead byte, V5, in five contiguous frames] lasts for 2.5 ±0.5 seconds.
SLM-V	Signal Level Mismatch - VT Path	This condition indicates a received signal label is mismatched if it does no equal the locally provisioned value or the value “equipped non-specific”.
UEQ-V	Unequipped - VT Path	This condition indicates the received VT path is unequipped if it is not provisioned (Byte V5 of the received VT path overhead is set to zero).
UEQ	Port Unequipped	This condition indicates the VT is not mapped to a T1/E1 port.
TST	Test	This condition indicates the VT/Port is in test mode.

VT/Port Near-End Daily Thresholds and Alarms

Select **NEAR END DAILY THRESHOLDS** from the VT/Port Statistics menu.

Input the number of the desired PM parameter.

The menu for the selected PM parameter displays. The user is then able to set the threshold to the desired level and enable/disable an alarm to be issued once that threshold is exceeded.

Figure 5-46 shows an example of the Near-End Daily Thresholds menu.

```
Shelf:  1  Slot:  4A          ADTRAN MX2820 System                  04/16/04 10:37
Unacknowledged Alarms: None                                  TID:       HTVLALEXD16

                VT/Port Statistics - Near End Daily Thresholds
                                      Threshold          Alarm
                   1 - CV-V      :         387       Disabled
                   2 - ES-V      :          25       Disabled
                   3 - SES-V     :           4       Disabled
                   4 - UAS-V     :           2       Disabled
                   5 - CV-L      :         387       Disabled
                   6 - ES-L      :          25       Disabled
                   7 - SES-L     :           4       Disabled
                   8 - LOSS-L    :           2       Disabled
                   9 - AISS-P    :          10       Disabled

                  10 - Restore ALL STS-1, VT, and DS1 Threshold Defaults
                  11 - Enable ALL STS-1, VT, and DS1 Threshold Alarms
                  12 - Disable ALL STS-1, VT, and DS1 Threshold Alarms




   Selection:                                        '?' - System Help Screen
```

Figure 5-46. VT/Port Near-End Daily Thresholds

NOTE

Options at the bottom of the menu are used to restore *all* VT/Port defaults.

VT/Port Near-End Quarter Hourly Thresholds and Alarms

Select **NEAR END QUARTER HOURLY THRESHOLDS** from the VT/Port Statistics menu screen.

Input the number of the desired PM parameter, and press ENTER.

The menu for the selected PM parameter appears. The user is then able to set the threshold to the desired level and enable/disable an alarm to be issued once that threshold is exceeded.

Figure 5-47 shows an example of the Near-End Quarter Hourly Thresholds menu screen.

```
Shelf:  1  Slot:  4A          ADTRAN MX2820 System                  04/16/04 10:43
Unacknowledged Alarms: None                                  TID:       HTVLALEXD16

           VT/Port Statistics - Near End Quarter Hourly Thresholds
                                    Threshold          Alarm
                   1 - CV-V      :        387       Disabled
                   2 - ES-V      :         25       Disabled
                   3 - SES-V     :          4       Disabled
                   4 - UAS-V     :          2       Disabled
                   5 - CV-L      :        387       Disabled
                   6 - ES-L      :         25       Disabled
                   7 - SES-L     :          4       Disabled
                   8 - LOSS-L    :          2       Disabled
                   9 - AISS-P    :         10       Disabled

                  10 - Restore ALL STS-1, VT, and DS1 Threshold Defaults
                  11 - Enable ALL STS-1, VT, and DS1 Threshold Alarms
                  12 - Disable ALL STS-1, VT, and DS1 Threshold Alarms




   Selection:                                        '?' - System Help Screen
```

Figure 5-47. VT/Port Quarter Hourly Thresholds Screen

NOTE

Options at the bottom of the menu are used to restore *all* VT/Port defaults.

CLEAR ALL STATISTICS

To clear all STS-1 and VT/Port PM statistics, perform the following steps:

1. Select **CLEAR ALL STATISTICS** from the top-level Performance Monitoring menu, and press ENTER.
2. Input a Y to confirm, or input N to leave the menu without clearing the statistics, and press ENTER.

Figure 5-48 illustrates the PM Clear ALL Statistics screen.

```
Shelf:  1  Slot:  4A          ADTRAN MX2820 System                 04/16/04 10:48
Unacknowledged Alarms: None                                  TID:       HTVLALEXD16




                              Performance Monitoring

                               Clear ALL Statistics

            This operation will clear STS-1, VT, and DS1 statistics.

                                  Execute? {Y,N}









   Execute? {Y,N}                                          '?' - System Help Screen
```

Figure 5-48. Clear ALL Statistics Screen

To return to a previous screen, press ESC until the desired screen appears.

UIG-530
M13 Loopbacks

INTRODUCTION

This subsection provides the instructions for accessing the M13 MUX Loopbacks menu screen and performing loopback and Bit Error Rate Tests (BERT).

The M13 MUX Loopback menu allows initiation of loopback tests from the MX2820 system. From the M13 Loopback menu screen, T1/E1, DS3 and DS2 loopback tests can be accessed.

To access this menu, perform the following steps:

1. Select **ACCESS MODULES** from the MX2820 Main Menu, and press ENTER.
2. Input a MUX slot number, 1 to 7 for 19-inch shelf or 1 to 9 for a 23-inch shelf, from the Access Module Menus, and press ENTER.
3. Select the **TEST OPTION** from the M13 MUX Main Menu, and press ENTER.

Figure 5-49 (see Figure 5-50 for P/N 1186002L3) shows the main Loopback menu screen.

```
Shelf:  1  Slot:  1A          ADTRAN MX2820 System                  04/13/04 16:49
Unacknowledged Alarms: None                                   TID:       HTVLALEXD16

                              MX2820 Loopbacks

   T1/E1 Loopbacks       T1/E1 Loopbacks       DS3/DS2 Loopbacks
   1  - Data Mode        15 - Data Mode        29 - DS3    = Data Mode
   2  - Data Mode        16 - Data Mode        30 - DS2 #1 = Data Mode
   3  - Data Mode        17 - Data Mode        31 - DS2 #2 = Data Mode
   4  - Data Mode        18 - Data Mode        32 - DS2 #3 = Data Mode
   5  - Data Mode        19 - Data Mode        33 - DS2 #4 = Data Mode
   6  - Data Mode        20 - Data Mode        34 - DS2 #5 = Data Mode
   7  - Data Mode        21 - Data Mode        35 - DS2 #6 = Data Mode
   8  - Data Mode        22 - Data Mode        36 - DS2 #7 = Data Mode
   9  - Data Mode        23 - Data Mode
   10 - Data Mode        24 - Data Mode        37 - Reset ALL tests
   11 - Data Mode        25 - Data Mode        38 - Pattern = QRSS
   12 - Data Mode        26 - Data Mode
   13 - Data Mode        27 - Data Mode
   14 - Data Mode        28 - Data Mode


   Selection:                                        '?' - System Help Screen
```

Figure 5-49. MX2820 M13 MUX Loopbacks Menu

```
Shelf:  1  Slot:  1A          ADTRAN MX2820 System                  04/13/04 16:49
Unacknowledged Alarms: None                                    TID:      HTVLALEXD16

                              MX2820 Loopbacks

   T1/E1 Loopbacks        T1/E1 Loopbacks        DS3/DS2 Loopbacks
   1  - Data Mode         15 - Data Mode         29 - DS3    = Data Mode
   2  - Data Mode         16 - Data Mode         30 - DS2 #1 = Data Mode
   3  - Data Mode         17 - Data Mode         31 - DS2 #2 = Data Mode
   4  - Data Mode         18 - Data Mode         32 - DS2 #3 = Data Mode
   5  - Data Mode         19 - Data Mode         33 - DS2 #4 = Data Mode
   6  - Data Mode         20 - Data Mode         34 - DS2 #5 = Data Mode
   7  - Data Mode         21 - Data Mode         35 - DS2 #6 = Data Mode
   8  - Data Mode         22 - Data Mode         36 - DS2 #7 = Data Mode
   9  - Data Mode         23 - Data Mode
   10 - Data Mode         24 - Data Mode         37 - Reset ALL tests
   11 - Data Mode         25 - Data Mode         38 - Pattern = QRSS
   12 - Data Mode         26 - Data Mode
   13 - Data Mode         27 - Data Mode         39 - Select Mult T1/E1 Loopbacks
   14 - Data Mode         28 - Data Mode


   Selection:                                          '?' - System Help Screen
```

Figure 5-50. MX2820 M13 MUX Loopbacks Menu - For P/N 1186002L3 Only

T1/E1 LOOPBACKS

Performing a loopback test on a T1 or E1 requires selecting an option from 1 to 28 from the Loopbacks menu screen. Figure 5-51 shows an example for option 1 which selects the T1 #1.

```
Shelf:  1  Slot:  1A          ADTRAN MX2820 System                  04/13/04 17:00
Unacknowledged Alarms: None                                    TID:      HTVLALEXD16



                              T1/E1 Loopbacks

                              T1 #1: Data Mode

                             Low-Speed Loopbacks        High-Speed Loopbacks

   1 - Data Mode              7 - LS CSU Loopback       12 - HS CSU Loopback
   2 - Tributary              8 - LS CSU LB w/BERT      13 - HS CSU LB w/BERT
   3 - Analog Network         9 - LS NIU Loopback       14 - HS NIU Loopback
   4 - Digital Line/Net      10 - LS NIU LB w/BERT      15 - HS NIU LB w/BERT
   5 - CODEC Line/Net        11 - LS Line BERT          16 - HS Line BERT
   6 - Remote Loopback




   Selection:                                          '?' - System Help Screen
```

Figure 5-51. T1/E1 Loopbacks Menu (Slot 1A, T1 #1) Example

Data Mode

Select the Data Mode option to end a test in progress.

Tributary

A Tributary loopback loops the selected T1/E1 back to the DS3 network. The T1/E1 signal is demultiplexed through the M23 and M12/G.747 demultiplexers, looped back, and multiplexed back up through the M12/G.747 and M23 multiplexers. During this loopback, all network receive data is passed to the DSX-1/E1 transmitters, but all data received by the DSX-1/E1 loop side is ignored and substituted with the network data. Figure 5-52 provides an illustration of this test.

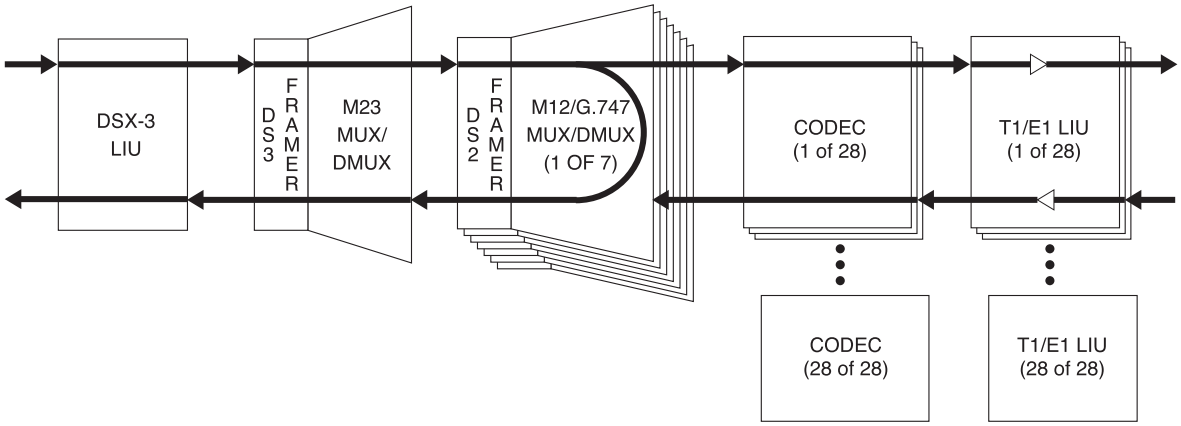


Figure 5-52. Tributary Loopback Test

Analog Network

An Analog Network loopback test loops the selected T1/E1 back to the DS3 network. The T1/E1 signal is completely demultiplexed, looped back at the T1/E1 line interface unit (LIU), through the LIU drivers and receivers, and multiplexed back onto the DS3 network stream. Figure 5-53 provides an illustration of this test.

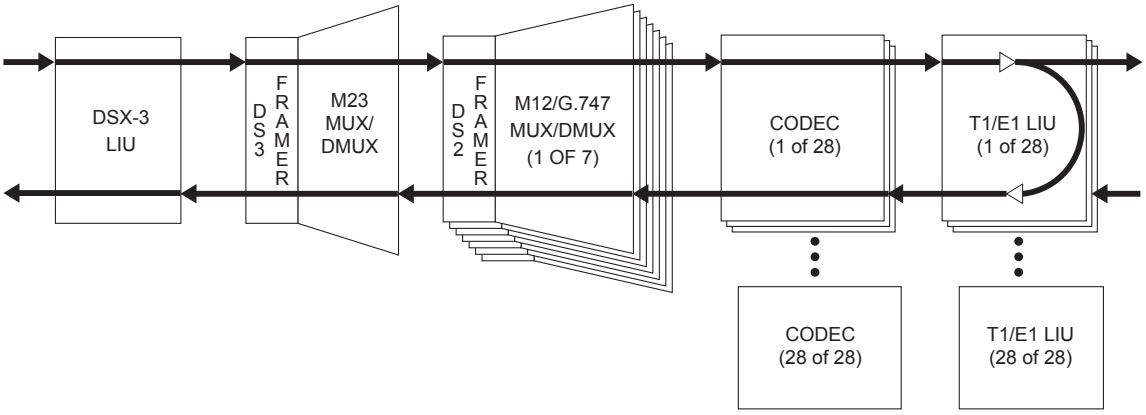


Figure 5-53. Analog Network Loopback Test

Digital Line/Net

A Digital Line/Net loopback performs a loopback of the selected T1/E1 in both the network and local loop directions. Both loopbacks occur at the T1/E1 LIU. The network side loopback occurs at the edge of the LIU, while the T1/E1 loop side loopback occurs within the LIU through the receiver, receive equalizer, transmit jitter attenuator, and through the T1/E1 transmit drivers. Figure 5-54 provides an illustration of this test.

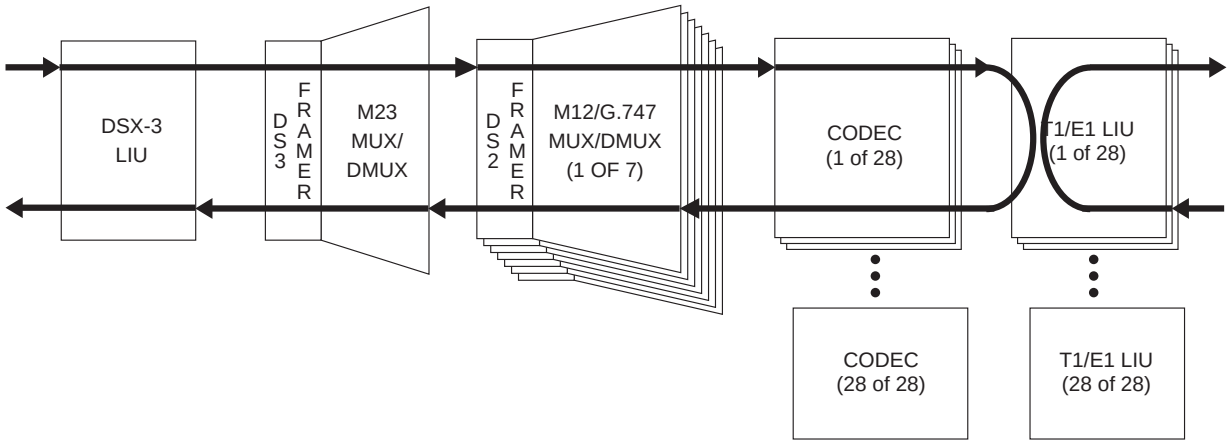


Figure 5-54. Digital Line/Net Loopback Test

CODEC Line/Net

A CODEC Line/Net loopback performs a loopback of the selected T1/E1 line in both the network and local loop directions. Both loopbacks occur at the T1/E1 CODEC. Both the network and the local loop side of the loopback are executed at the edge of the CODEC, which completely tests the M13 MUX and the T1/E1 LIU. Figure 5-55 provides an illustration of this test.

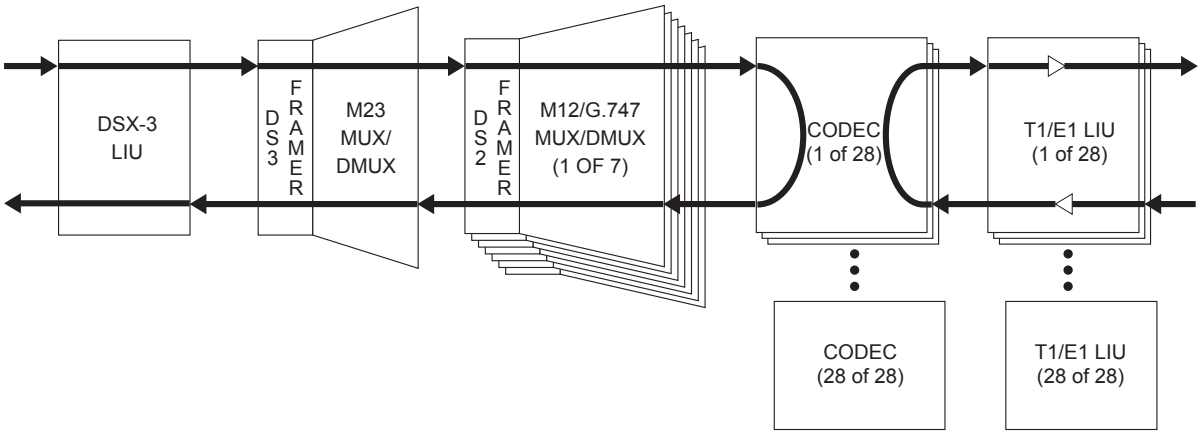


Figure 5-55. CODEC Loopback Test

Remote Loopback

A Remote Loopback performs a loopback of the selected T1/E1 on the far-end M13 multiplexer. If an M13 MUX is located at the far-end, an Analog Network loopback is executed when a Remote Loopback is engaged. This loopback is only available when the DS3 network is configured for C-bit parity framing since it requires the availability of the Far-End Alarm and Control (FEAC) channel. Refer to ANSI T1.107 for additional information.

Low-Speed Loopbacks

Low Speed Loopback commands activate a loopback on the terminating equipment on the near-end T1/E1 circuit (does not traverse the DS3).

High-Speed Loopbacks

High Speed Loopback commands activate a loopback on the terminating equipment on the far-end T1/E1 circuit (traverses the DS3).

The Low and High Speed loopback types include the following selections:

- CSU loopback
- CSU loopback with BERT
- NIU loopback
- NIU loopback with BERT
- Line BERT

These loopbacks are described below.

Bit Error Rate Test (BERT)

The MX2820 M13 MUX has the capability to send, receive, and measure the number of bit errors on a circuit. Six digital patterns are available from the BERT Pattern menu. The BERT pattern is selected by using option 38 on the MX2820 Loopbacks menu (Figure 5-50 on page 84). The resulting pattern selection screen is shown in Figure 5-56 (see Figure 5-57 for P/N 1186002L3).

```
Shelf:  1  Slot:  1A          ADTRAN MX2820 System                 04/14/04 16:58
Unacknowledged Alarms: None                                  TID:      HTVLALEXD16



                                BERT Pattern

                               Pattern: QRSS

                               1 - QRSS
                               2 - ALL ONES
                               3 - ALL ZEROS
                               4 - 2 IN 8 (2:6)
                               5 - 1 IN 8 (1:7)
                               6 - 2^15-1 INV









   Selection:                                          '?' - System Help Screen
```

Figure 5-56. BERT Pattern Selection Screen

```
Shelf:  1  Slot:  1A          ADTRAN MX2820 System                 04/14/04 16:58
Unacknowledged Alarms: None                                  TID:      HTVLALEXD16



                                BERT Pattern

                               Pattern: QRSS

                                1 - ALL ONES
                                2 - ALL ZEROES
                                3 - 2 IN 8 (2:6)
                                4 - 1 IN 8 (1:7)
                                5 - QRSS
                                6 - 63
                                7 - 511
                                8 - 2047
                                9 - 2^15-1 INV
                               10 - 2^20
                               11 - 2^23


   Selection:                                          '?' - System Help Screen
```

Figure 5-57. BERT Pattern Selection Screen - For P/N 1186002L3 Only

Any one of the different unframed BERT patterns can be selected based upon individual need. The BERT test also allows bit error insertion. While the test is running, additional menu items appear to show the state of pattern synchronization, the bit error count, and a clear-error-count option.

CSU Loopback

A Channel Service Unit (CSU) Loopback enables the M13 MUX to generate a CSU loop-up pattern (00001...) for 6 seconds towards the T1 CSU attached to the selected T1 line. After 6 seconds have elapsed, the pattern stops and incoming network traffic passes through to the CSU device. If the CSU device responded to the CSU loop-up pattern, the CSU device returns all data back towards the network. When Data Mode is selected, a loop-down pattern (001001....) is generated towards the CSU for 6 seconds.

CSU Loopback w/BERT

A CSU Loopback w/BERT enables the M13 MUX to test the local T1 loop to the CSU with a user-selected Bit Error Rate (BERT) pattern. When CSU Loopback w/BERT is selected, the M13 MUX initiates a CSU loopback towards the CSU attached to the selected T1 line similar to the CSU Loopback test. After starting the CSU loop-up pattern with the 6-second pattern, the M13 MUX stops sending the CSU loop-up pattern and begins sending the selected BERT pattern towards the CSU. If the CSU device responded to the CSU loop-up pattern, the M13 MUX checks the incoming pattern for errors. Selecting Data Mode stops the transmission of the BERT pattern and starts transmission of a loop-down pattern.

NOTE

When in either CSU Loopback or CSU Loopback w/BERT, only the DATA MODE for the T1 under test can be selected. Selecting any other option results in an error message being displayed.

NIU Loopback

A Network Interface Unit (NIU) Loopback enables the M13 MUX to generate a NIU loop-up pattern (00011...) for 6 seconds towards the NIU attached to the selected T1 line. After 6 seconds have elapsed, the pattern stops and incoming network traffic passes through to the NIU device. If the NIU device responded to the NIU loop-up pattern, the NIU device returns all data back towards the network. When Data Mode is selected, a loop-down pattern (0011100111...) is generated towards the NIU for 6 seconds.

NIU Loopback w/BERT

A NIU Loopback w/BERT enables the M13 MUX to test the local T1 loop to the NIU with a user-selected BERT pattern. The BERT pattern is selected from the MX2820 Loopbacks menu.

When NIU Loopback w/BERT is selected, the M13 MUX initiates a NIU loopback towards the NIU attached to the selected T1 line similar to the NIU Loopback test. Six seconds after starting the NIU loop-up pattern, the M13 MUX stops sending the NIU loop-up pattern and begins sending the selected BERT pattern towards the NIU. If the NIU device responded to the NIU loop-up pattern, the M13 MUX checks the incoming pattern for errors. Additional menu items appear to show: the state of pattern synchronization, the error count, and a clear error count option. Selecting Data Mode stops the transmission of the BERT pattern and starts transmission of a loop-down pattern.

NOTE

When in either NIU Loopback or NIU Loopback w/BERT, only the Data Mode for the T1 under test can be selected. Selecting any other option results in an error message being displayed.

Line BERT

A Line BERT enables the M13 MUX to perform a “head-to-head” BERT test towards the CSU. Selecting Line Bert replaces all incoming network traffic for the selected T1 line with the selected BERT pattern towards the CSU. When Line BERT is selected, additional menu items appear to show: the state of pattern synchronization, the cumulative error count, and a clear error count option. Selecting Data Mode stops the BERT pattern generation and substitution of the incoming data stream.

NOTE

When In Line BERT Mode, Only the Data Mode option for the T1 line under test can be selected. Selecting any other option results in an error message being displayed.

NOTE

Only one T1 port can engage a CSU loopback, CSU Loopback w/ BERT, NIU Loopback, NIU Loopback w/BERT, or a Line BERT. If one of these tests is already active at the time a new test is selected, the former test is terminated and the latter test is engaged.

NOTE

P/N 1186002L3 supports enhanced T1 loopback testing which allows a test to be active on multiple T1 ports at the same time. The options available are CSU Loopback, CSU Loopback w/BERT, NIU Loopback, NIU Loopback w/BERT, or Line BERT.

DS2 LOOPBACKS

Performing a loopback test for the DS2 network requires selecting an option from 30 to 36 from the Loopbacks menu screen. Figure 5-58 shows an example for the DS2 #1 Loopbacks menu. Select option 1, **DATA MODE**, for the appropriate DS2 to end a test in progress.

```
Shelf:  1  Slot:  4A          ADTRAN MX2820 System              04/13/04 16:49
Unacknowledged Alarms: None                                TID:      HTVLALEXD16



                                DS2 Loopbacks

                              DS2 #1: Data Mode

                                1 - Data Mode
                                2 - Network Loopback









  Selection:                                          '?' - System Help Screen
```

Figure 5-58. DS2 Loopbacks Menu (DS2 #1) Example

DS2 Network

A DS2 Network loopback test loops the selected DS2 signal back to the DS3 network prior to being passed through the M12/G.747 demultiplexer. All T1/E1 lines attached to the DS2 network receive data normally, but all data inserted into the T1/E1 lines attached to the selected DS2 signal are ignored and replaced by the incoming DS2 network data. Figure 5-59 provides an illustration for this test.

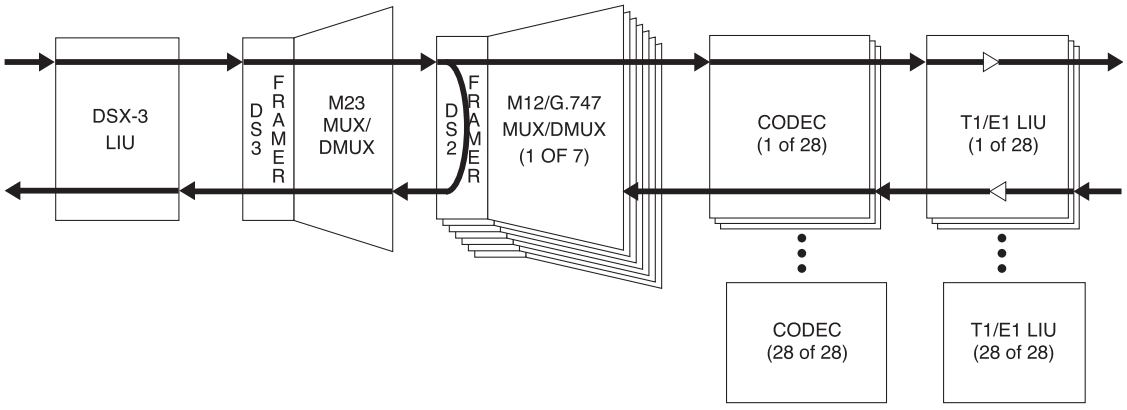


Figure 5-59. DS2 Network Loopback Test

DS3 LOOPBACKS

Performing a loopback test for the DS3 network requires selecting option 29 from the Loopbacks menu screen. Figure 5-60 shows an example for the DS3 Loopbacks menu screen. Selecting option 1, **DATA MODE**, ends a test in progress.

```
Shelf:  1  Slot:  4A          ADTRAN MX2820 System                  04/13/04 16:49
Unacknowledged Alarms: None                                   TID:       HTVLALEXD16


                                DS3 Loopbacks

                                DS3: Data Mode

                                1 - Data Mode
                                2 - Line Loopback
                                3 - Digital Loopback
                                4 - Remote Loopback
                                5 - Remote ALL T1/E1









   Selection:                                          '?' - System Help Screen
```

Figure 5-60. DS3 Loopbacks Menu

Line Loopback

The DS3 Line Loopback test performs a loop of the DS3 signal back to the network. This loopback occurs prior to the DS3 framer and B3ZS decoder, but makes full use of the DS3 LIU in both receive and transmit directions. Therefore, any coding violations received by the DS3 LIU are inserted back into the network without modification. Figure 5-61 provides an illustration of this test.

NOTE

If a DS3 Line Loopback test is active when the M13 MUX is operating in the local timing mode, the timing source for the DS3 equipment is effectively removed from the circuit. Therefore, it is up to the test equipment or network to provide DS3 timing into the circuit for the duration of the test.

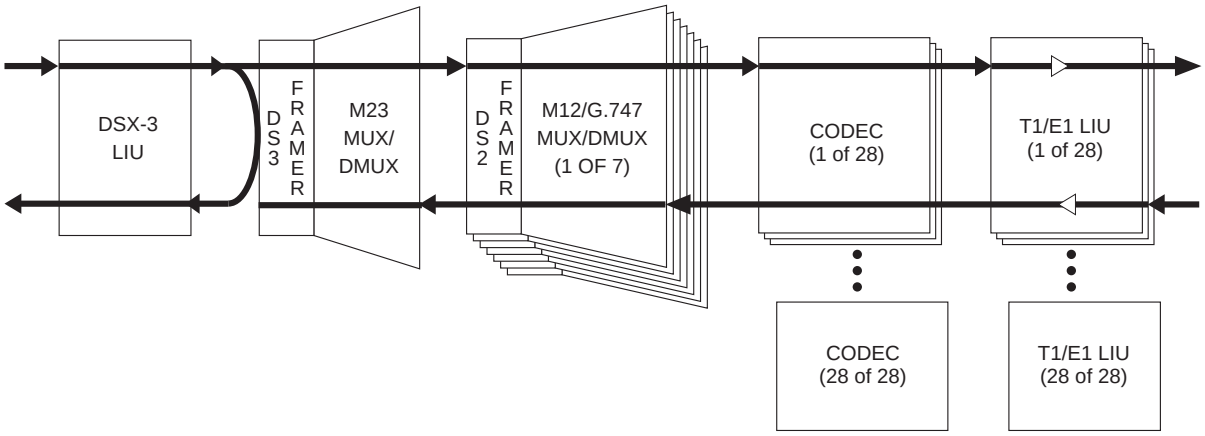


Figure 5-61. DS3 Line Loopback Test

Digital Loopback

A DS3 Digital Loopback test loops the entire DS3 signal back to the local loop side. The end effect of this test is a loopback of all T1/E1 signals after being fully multiplexed and demultiplexed to and from a DS3 signal. The incoming DS3 data is ignored, and the outgoing DS3 stream is substituted in its place prior to exiting the DS3 framer. Figure 5-62 provides an illustration of this test.

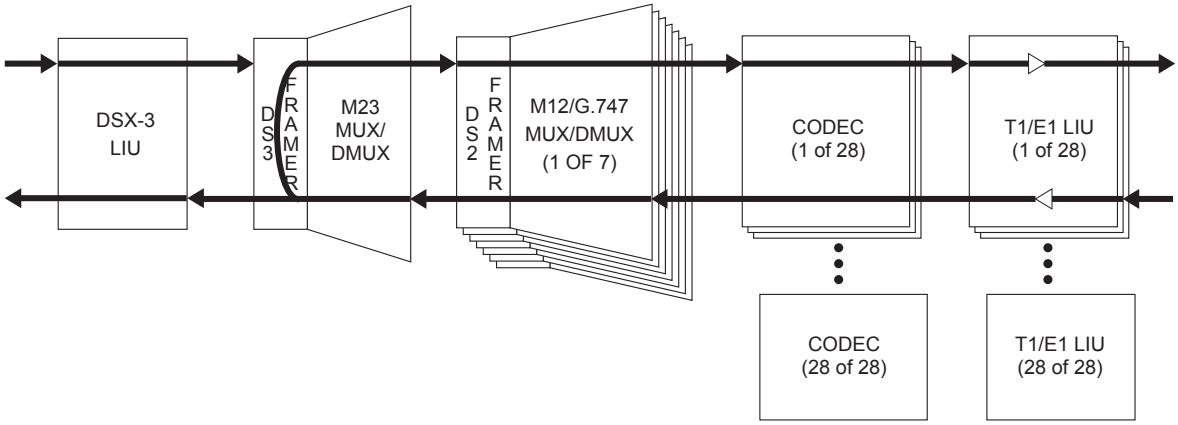


Figure 5-62. DS3 Digital Loopback Test

Remote Loopback

A DS3 Remote Loopback test performs a loopback on the far-end M13 multiplexer. This loopback is only available when the DS3 signal is configured for C-bit parity framing since it requires the availability of the FEAC channel.

NOTE

Local timing must be selected before initiating this loopback. It can be returned, if needed, after the loopback test is cancelled.

Remote All T1/E1

A DS3 Remote All T1/E1 loopback test performs a loopback of all T1/E1 channels on the far-end M13 multiplexer. If an M13 MUX is located at the far end, an Analog Loopback is executed on all active channels simultaneously. The form of the loopback code sent to the far-end depends on the framing mode being used. When in C-bit parity mode, the M13 MUX sends loopback commands over the FEAC channel. When operating in M13 framing mode, the M13 MUX sends C-bit loopbacks at the DS2 level.

RESET ALL TESTS

To reset all M13 MUX loopback tests, select option 37, **RESET ALL TESTS**, from the MX2820 Loopbacks Menu screen, and press ENTER.

UIG-535
STS-1 Loopbacks

INTRODUCTION

This subsection provides the instructions for accessing the MX2820 STS-1 MUX Loopbacks menu screen and performing loopback tests and Bit Error Rate Tests (BERT).

The STS-1 MUX Loopback menu allows initiation of loopback tests from the MX2820 system. From the STS-1 Loopback Menu screen, STS-1 and VT/Port loopback tests can be accessed. Figure 5-63 shows the main Loopback Menu screen.

```
Shelf:  1  Slot:  4A          ADTRAN MX2820 System                 04/15/04 12:55
Unacknowledged Alarms: NONE                                 TID:          HTVLALEXD16

                                MX2820 Loopbacks

 VT / Port Loopbacks          VT / Port Loopbacks          STS-1 Loopbacks
 1  - (1 ) Data Mode          15 - (3 ) Data Mode          29 - STS-1  = Data Mode
 2  - (5 ) Data Mode          16 - (7 ) Data Mode
 3  - (9 ) Data Mode          17 - (11) Data Mode
 4  - (13) Data Mode          18 - (15) Data Mode
 5  - (17) Data Mode          19 - (19) Data Mode
 6  - (21) Data Mode          20 - (23) Data Mode
 7  - (25) Data Mode          21 - (27) Data Mode
 8  - (2 ) Data Mode          22 - (4 ) Data Mode
 9  - (6 ) Data Mode          23 - (8 ) Data Mode          30 - Reset ALL tests
 10 - (10) Data Mode          24 - (12) Data Mode
 11 - (14) Data Mode          25 - (16) Data Mode
 12 - (18) Data Mode          26 - (20) Data Mode
 13 - (22) Data Mode          27 - (24) Data Mode
 14 - (26) Data Mode          28 - (28) Data Mode


   Selection:                                        '?' - System Help Screen
```

Figure 5-63. MX2820 STS-1 MUX Loopbacks Menu

From this menu, press the number for the desired VT/Port, or press 29 to test at the STS-1 level. When ENTER is pressed, a second menu displays the types of tests available.

Descriptions and testing diagrams of the loopback tests are provided in the following portions of this section:

- "VT/Port Loopbacks" on page 96
- "STS-1 Loopbacks" on page 101

VT/PORT LOOPBACKS

After selecting the number that corresponds with the desired line to test, the menu illustrated in Figure 5-64 appears. The number selected, from 1 to 28, refers to the VT number. The Port (T1/E1) that will be tested is the port mapped to the selected VT number. The following subsections provide descriptions and illustrations of the testing options.

Selecting option 1, **DATA MODE**, will terminate a test that is in progress.

```
Shelf:  1  Slot:  4A          ADTRAN MX2820 System                 04/15/04 13:26
Unacknowledged Alarms: NONE                                TID:          HTVLALEXD16



                              VT / Port Loopbacks

                             VT #1 (#1 ): Data Mode

                                 1 - Data Mode
                                 2 - Tributary
                                 3 - Analog Network
                                 4 - Digital Line/Net
                                 5 - CODEC Line/Net
                                 6 - CSU Loopback
                                 7 - CSU LB w/BERT
                                 8 - Line BERT
                                 9 - VT BERT




   Selection:                                          '?' - System Help Screen
```

Figure 5-64. VT/Port Loopback Menu

Tributary

A Tributary loopback loops the selected VT/Port back to the network (STS-1). The T1/E1 is looped back through the STS-1 mapper. During this loopback, the corresponding DSX-1/E1 input is overwritten by the outgoing DSX-1/E1 signal. See Figure 5-65 for an illustration of this test.

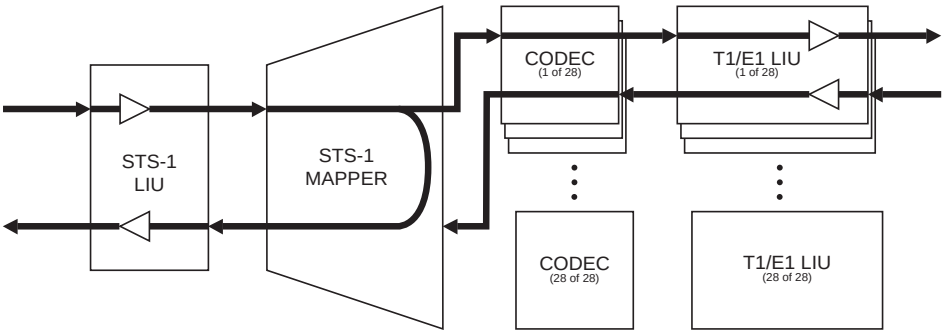


Figure 5-65. Tributary Loopback Test

Analog Network

An Analog Network loopback test loops the selected T1/E1 back to the network (STS-1). The T1/E1 is completely demultiplexed, looped back at the T1/E1 line interface unit (LIU) through the LIU drivers and receivers, and multiplexed back onto the STS-1 network stream. See Figure 5-66 for an illustration of this test.

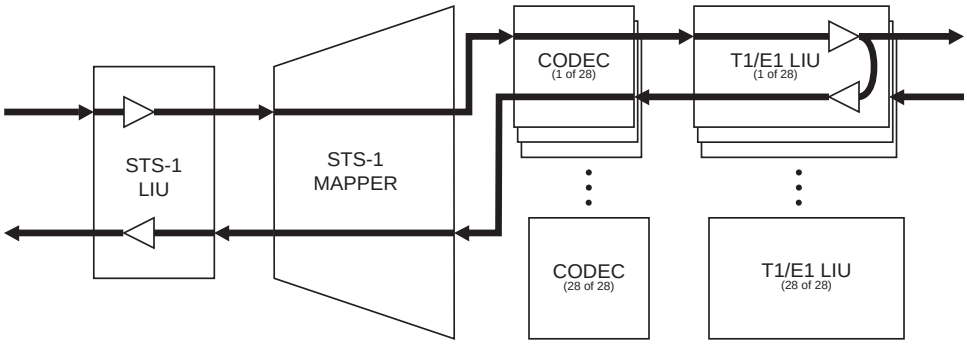


Figure 5-66. Analog Network Loopback

Digital Line/Net

A Digital Line/Net loopback performs a loopback of the selected T1/E1 in both the network and local loop directions. Both loopbacks occur at the T1/E1 LIU. The network side loopback occurs deep into the LIU through the receiver, receive equalizer, transmit jitter attenuator, and finally, through the T1/E1 transmit drivers. See Figure 5-67 for an illustration of this test.

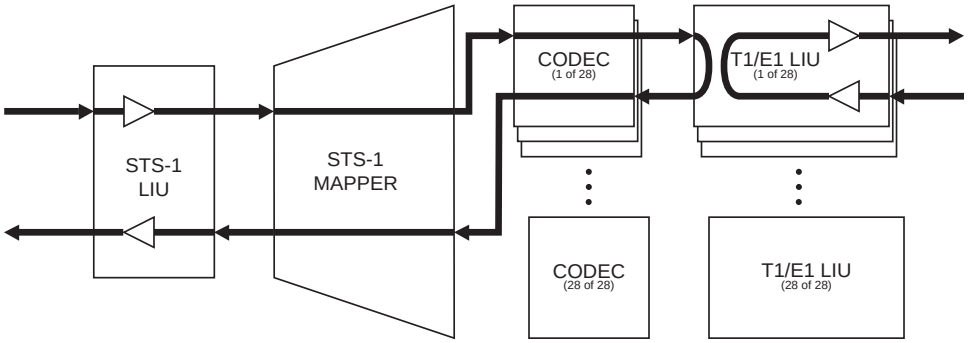


Figure 5-67. Digital Line/Network Loopback

CODEC Line/Net

A CODEC Line/Net loopback performs a loopback of the selected T1/E1 in both the network and local loop directions. Both loopbacks occur at the T1/E1 codec. Both the network and the local loop side of the loopback are executed at the edge of the codec, completely testing the STS-1 mapper and the T1/E1 LIU. See Figure 5-68 for an illustration of this test.

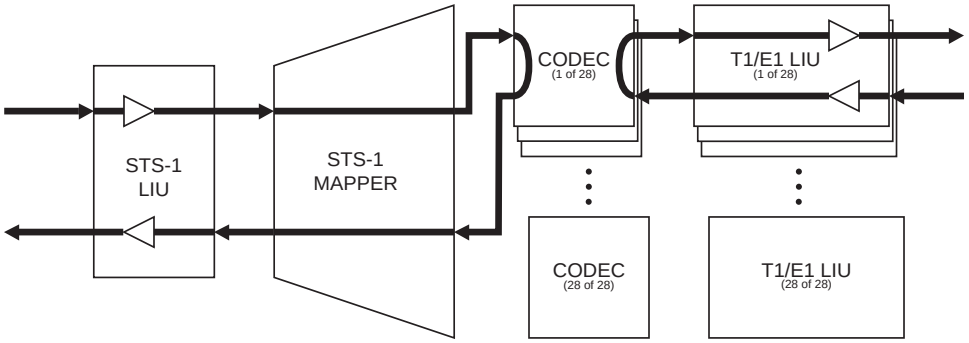


Figure 5-68. Codec Loopback

CSU Loopback

A CSU Loopback enables the MX2820 STS-1 to generate a CSU loop-up pattern (00001…) towards the T1 CSU attached to the selected T1 line for 6 seconds. After 6 seconds have elapsed, the pattern will cease and incoming network traffic will be passed through to the CSU device. If the CSU device responded to the CSU loop-up pattern, it will return all data back towards the network. A loop-down pattern (001001….) will be generated towards the CSU for 6 seconds when Data Mode is selected.

NOTE

When in CSU Loopback, only the Data Mode for the T1 under test can be selected. Selecting any other option will result in an error message being displayed.

CSU Loopback w/BERT

A CSU Loopback w/BERT enables the MX2820 STS-1 to test the local T1 loop to the CSU using the standard QRSS pseudo-random bit sequence. When CSU Loopback w/BERT is selected, the MX2820 STS-1 will initiate a CSU loopback towards the CSU attached to the selected T1 line similar to the CSU Loopback test above. Six seconds after starting the CSU loop-up pattern, the MX2820 STS-1 will cease sending the CSU loop-up pattern and begin sending an unframed 511 pattern towards the CSU. If the CSU device responded to the CSU loop-up pattern, the MX2820 STS-1 will check the incoming pattern for errors. Additional menu items will appear to show the state of pattern synchronization, error count, and a clear error count option (see Figure 5-69).

Selecting Data Mode will cease the transmission of the QRSS pattern and start transmission of a loop-down pattern as previously described.

NOTE

Only one T1 port can engage a CSU Loopback, CSU Loopback w/ Bert, or a Line Bert. If a test of this type is already active at the time a new test is selected, the former test will be terminated and the latter test will be engaged.

```
Shelf:  1  Slot:  4A          ADTRAN MX2820 System                 04/15/04 14:52
Unacknowledged Alarms: NONE                                 TID:          HTVLALEXD16

                                MX2820 Loopbacks

 VT / Port Loopbacks        VT / Port Loopbacks         STS-1 Loopbacks
 1  - (1 ) VT BERT          15 - (3 ) Data Mode        29 - STS-1  = Data Mode
 2  - (5 ) Data Mode        16 - (7 ) Data Mode
 3  - (9 ) Data Mode        17 - (11) Data Mode
 4  - (13) Data Mode        18 - (15) Data Mode
 5  - (17) Data Mode        19 - (19) Data Mode
 6  - (21) Data Mode        20 - (23) Data Mode
 7  - (25) Data Mode        21 - (27) Data Mode
 8  - (2 ) Data Mode        22 - (4 ) Data Mode
 9  - (6 ) Data Mode        23 - (8 ) Data Mode        30 - Reset ALL tests
 10 - (10) Data Mode        24 - (12) Data Mode        31 - Insert One Bit Error
 11 - (14) Data Mode        25 - (16) Data Mode        32 - Clear Error Count
 12 - (18) Data Mode        26 - (20) Data Mode        PATT = NO SYNC
 13 - (22) Data Mode        27 - (24) Data Mode        BERR = 0
 14 - (26) Data Mode        28 - (28) Data Mode


   Selection:                                          '?' - System Help Screen
```

Figure 5-69. Loopback Menu with BERT Selected

VT BERT

A VT BERT enables the MX2820 STS-1 to perform a “head-to-head” BERT test towards the STS-1 network. Selecting VT BERT will replace all incoming T1/E1 traffic for the T1/E1 mapped to the selected VT with an *unframed* QRSS pattern towards the network. When VT

BERT is selected, additional menu items will appear to show the state of pattern synchronization, cumulative error count, and a clear error count option. Selecting Data Mode will cease QRSS pattern generation and substitution of the incoming data stream. See Figure 5-70 for an illustration of this test.

NOTE

When in VT BERT mode, only the Data Mode option for the VT/Port under test can be selected. Selecting any other option will cause an error message to be displayed.

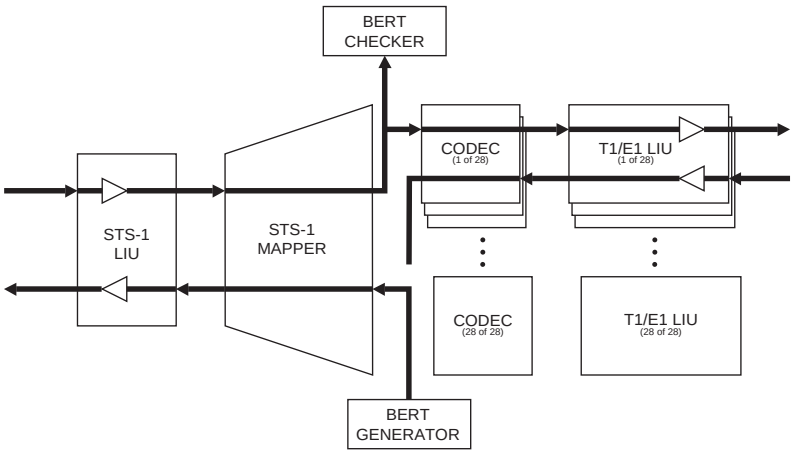


Figure 5-70. VT Bert Test

Line BERT

A Line BERT enables the MX2820 STS-1 to perform a “head-to-head” BERT test towards the T1/E1 line mapped to the VT selected. Selecting Line BERT will replace all outgoing T1/E1 traffic for the T1/E1 mapped to the selected VT with an *unframed* QRSS pattern. When Line BERT is selected, additional menu items will appear to show the state of pattern synchronization, cumulative error count, and a clear error count option. Selecting Data Mode will cease QRSS pattern generation and substitution of the incoming data stream. See Figure 5-71 for an illustration of this test.

NOTE

When in Line BERT mode, only the Data Mode option for the VT/Port under test can be selected. Selecting any other option will result in an error message being displayed.

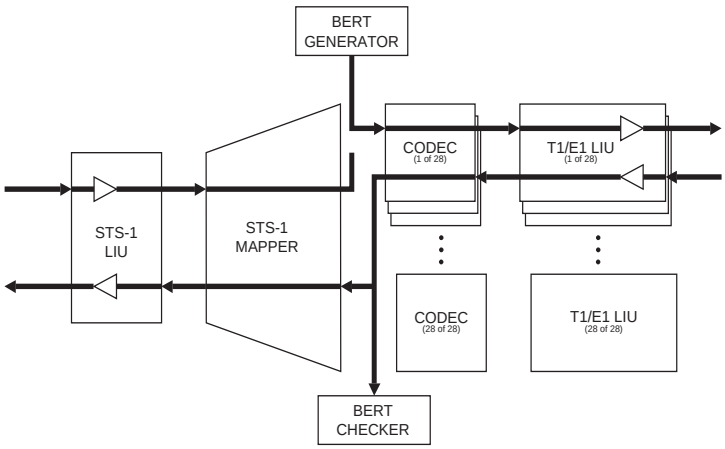


Figure 5-71. Line Bert Test

STS-1 LOOPBACKS

After selecting **STS-1 LOOPBACKS** from the MX2820 Loopbacks Menu, the menu in Figure 5-72 appears. The sections following the figure provide descriptions and illustrations of the testing options.

Select the **DATA MODE** option to terminate a test in progress.

```
Shelf:  1  Slot:  4A          ADTRAN MX2820 System                 04/15/04 15:44
Unacknowledged Alarms: NONE                                 TID:          HTVLALEXD16


                                STS-1 Loopbacks

                                STS-1: Data Mode

                                 1 - Data Mode
                                 2 - Line
                                 3 - Digital









   Selection:                                              '?' - System Help Screen
```

Figure 5-72. STS-1 Loopback Menu

Line Loopback

Line loopback performs a loop of the STS-1 back to the network. This loopback occurs just prior to the HDB3/B8ZS decoder of the LIU; therefore, any coding violations received by the STS-1 will be inserted back into the network without modification. See Figure 5-73 for an illustration of this text.

NOTE

If a Line Loopback is active when the MX2820 STS-1 is operating in the Free-Run timing mode, the timing source for the STS-1 is effectively removed from the circuit. Therefore, it is up to the test equipment or network to provide STS-1 timing into the circuit for the duration of the test.

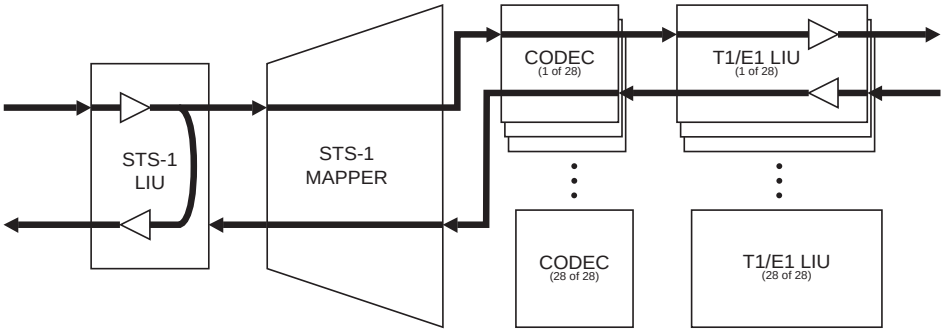


Figure 5-73. Line Loopback Test

Digital Loopback

A Digital Loopback loops the entire STS-1 back to the local loop side. The end effect of this test is a loopback of all VT/Ports after passing through the STS-1 mapper and partially through the LIU. The incoming STS-1 data is ignored and the outgoing STS-1 stream is substituted in its place just prior to entering the STS-1 encoder block of the LIU. This data will be processed through the “Transmit Clock Duty Cycle Adjust” PLL and the “HDB3/B3ZS Encoder” block. At this point, the data will be looped back to the “HDB3/B3ZS Encoder” block. This test is illustrated in Figure 5-74.

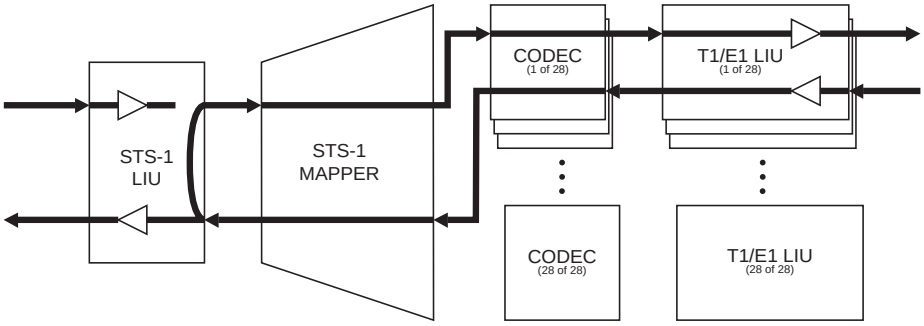


Figure 5-74. Digital Loopback

This page is intentionally blank.

UIG-540
SCU Utilities

INTRODUCTION

This subsection provides the instructions for performing utility tasks for the MX2820 System Controller Unit (SCU). SCU utility tasks include the following:

- Restoring of default provisioning options
- Rebooting of the SCU
- Performing tests on SCU relays
- Provisioning Smart Start
- Copying Module Provisioning
- Provisioning IP Forwarding
- Provisioning Telnet Client
- Provisioning System Configuration Archive (SCA)
- General Network Management Provisioning (IP, GW, Subnet, Port #s, etc.)
- Provisioning SNMP

RESTORE DEFAULT PROVISIONING

To restore default provisioning options for the MX2820 SCU, perform the following steps:

1. Select **SYSTEM CONTROLLER** from the MX2820 Main Menu.
2. Select **PROVISIONING** from the System Controller Menu.
3. Select **GENERAL** from the Provisioning menu.
4. Select **RESTORE DEFAULT PROVISIONING** from the General menu.

Figure 5-75 provides an illustration of the Restore Default Provisioning screen.

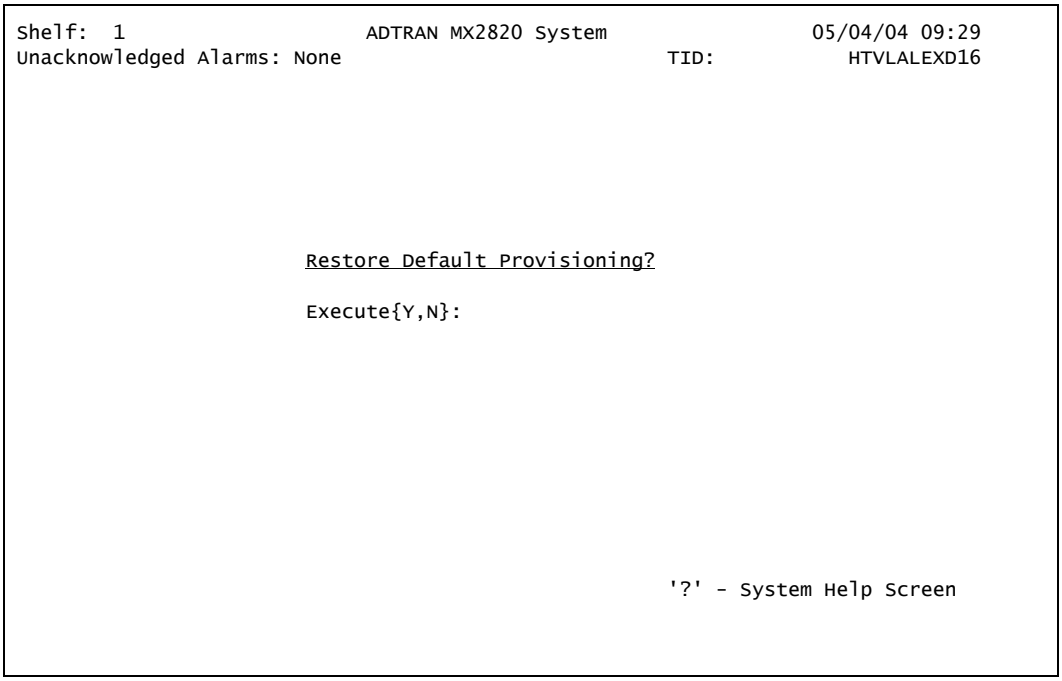


Figure 5-75. Restore Default Provisioning Screen

5. Input a Y, and press ENTER to restore default provisioning, or input an N, and press ENTER to exit the screen without restoring default provisioning.
6. Return to the MX2820 Main Menu by pressing ESC until the screen appears.

REBOOT SCU

To reboot the MX2820 SCU, perform the following steps:

1. Select **SYSTEM CONTROLLER** from the MX2820 Main Menu.
2. Select **PROVISIONING** from the System Controller Menu.
3. Select **REBOOT SCU** from the Provisioning menu.

Figure 5-76 provides an illustration of the MX2820 Reboot SCU screen.

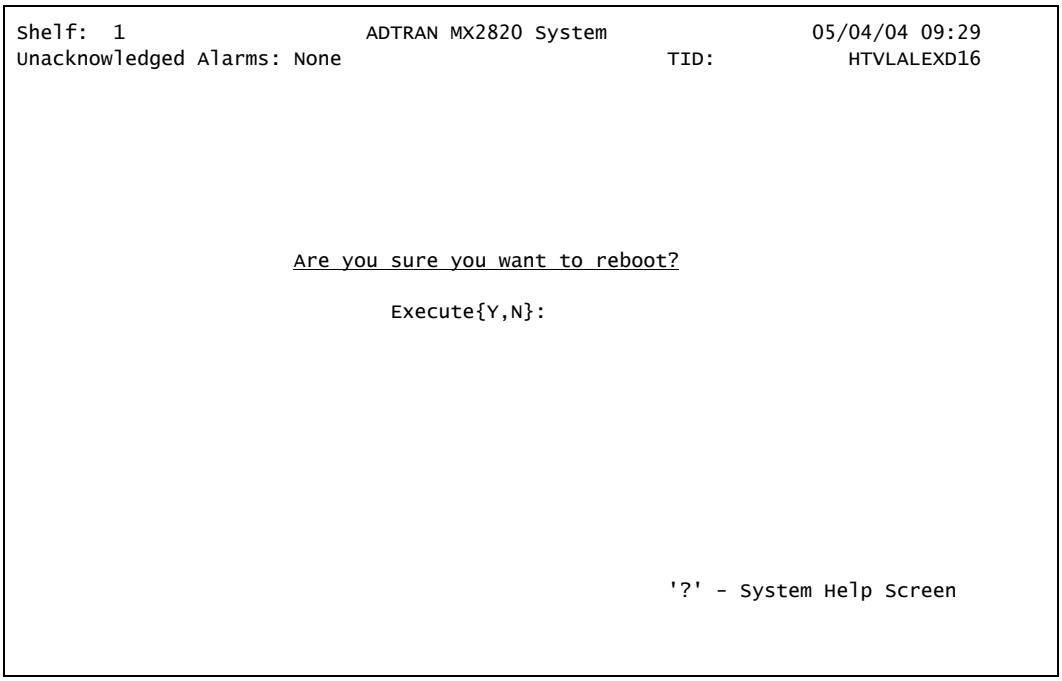


Figure 5-76. MX2820 Reboot SCU Screen

4. Input a Y, and press ENTER to reboot the SCU; or input an N, and press ENTER to exit the screen without rebooting the SCU.
5. Return to the MX2820 Main Menu screen by pressing ESC until the screen appears.

PERFORM TESTS ON SCU RELAYS

These tests check the critical, major, and minor alarm relay contacts for the MX2820 system.

To access the alarm relay screen for testing, perform the following steps:

1. Select **SYSTEM CONTROLLER** from the MX2820 Main Menu.
2. Select **TEST** from the System Controller menu.

Figure 5-77 provides an illustration of the Test Menu.

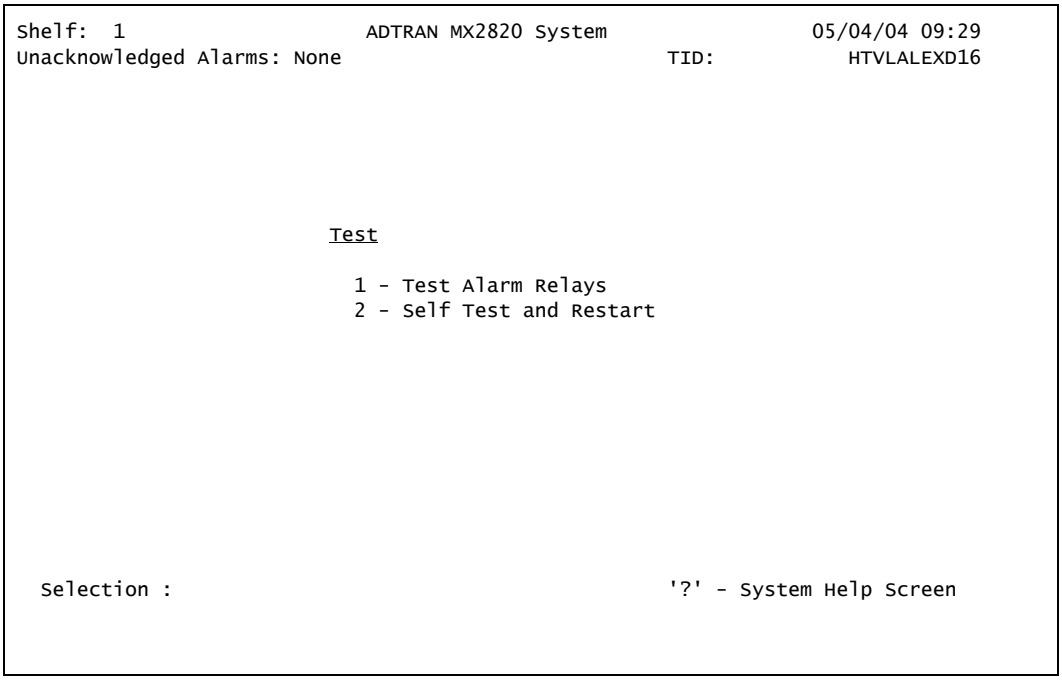


Figure 5-77. Test Menu

3. Select **TEST ALARM RELAYS** from the Test screen.

Figure 5-78 provides an illustration of the Alarm Relay Tests Screen.

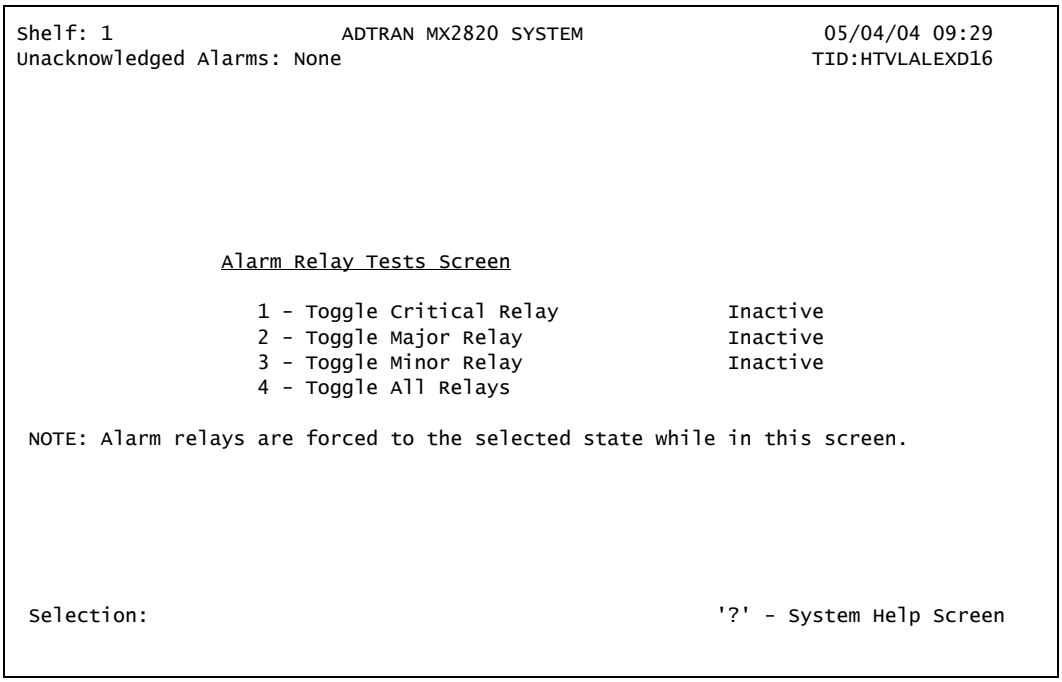


Figure 5-78. Alarm Relay Tests Screen

4. Input the desired test number and press ENTER.
5. Verify the relay(s) is functioning.

Self Test and Restart

This test checks the operation of the SCU, and reboots the SCU. To access the Test screen, perform the following steps:

1. Select **SYSTEM CONTROLLER** from the MX2820 Main Menu.
2. Select **TEST** from the System Controller menu.

   Refer to Figure 5-77 on page 5-108 for an illustration of the Test menu screen.
3. Select **SELF TEST AND RESTART** from the Test menu screen.

Figure 5-79 provides an illustration of the SCU Self Test and Restart screen.

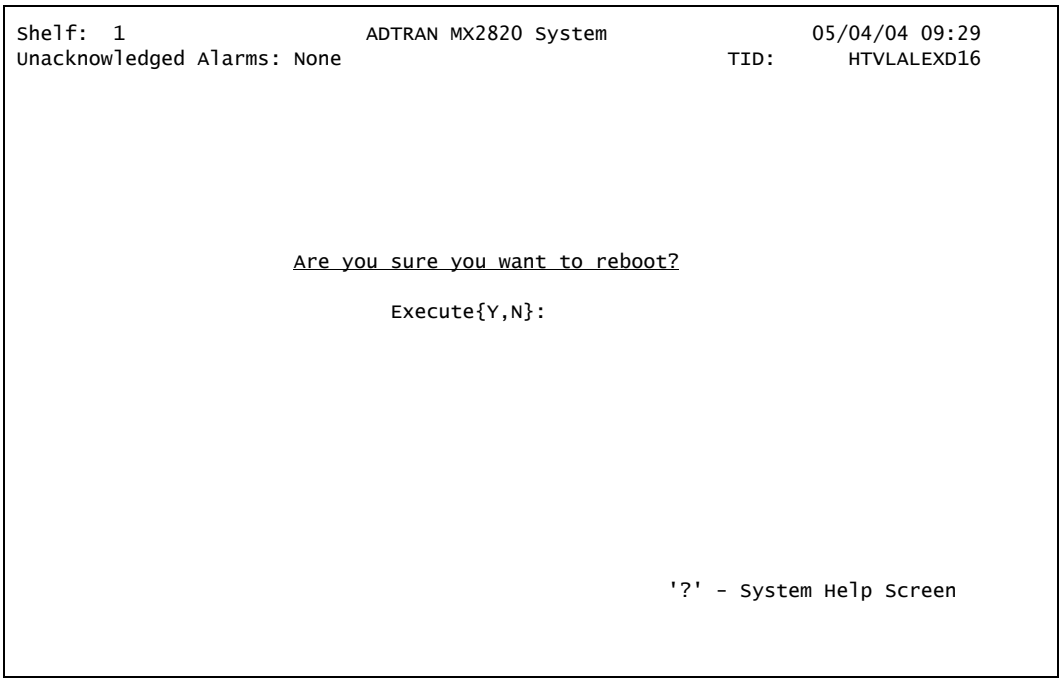


Figure 5-79. SCU Self Test and Restart Screen

PROVISIONING SMART START

Smart Start is a feature of the MX2820 system that allows a module to be replaced and have the new module assume the provisioning settings of the old unit.

When a new SCU is inserted into the shelf, the SCU will request the provisioning information from the module. This ensures that the SCU has a copy of the latest module provisioning information. This information is updated once per minute.

The SCU in the MX2820 System has the ability to save its provisioning to modules that support Smart Start. When a module of the same type that was previously in the slot is placed in that slot, The SCU will transmit the provisioning image of the previous module to the replacement module. Upon validation of the provisioning image, the module writes the provisioning to flash and begins running with the new configuration. If the transfer fails or the SCU does not have a valid provisioning image, the module operates using the settings saved in non-volatile memory.

Provisioning Steps

To enable Smart Start options for the MX2820 SCU, select the option and press ENTER:

1. Select **SYSTEM CONTROLLER** from the MX2820 Main Menu.
2. Select **PROVISIONING** from the System Controller menu.
3. Select **SMART START** from the Provisioning menu.

Figure 5-80 provides an illustration of the Smart Start screen.

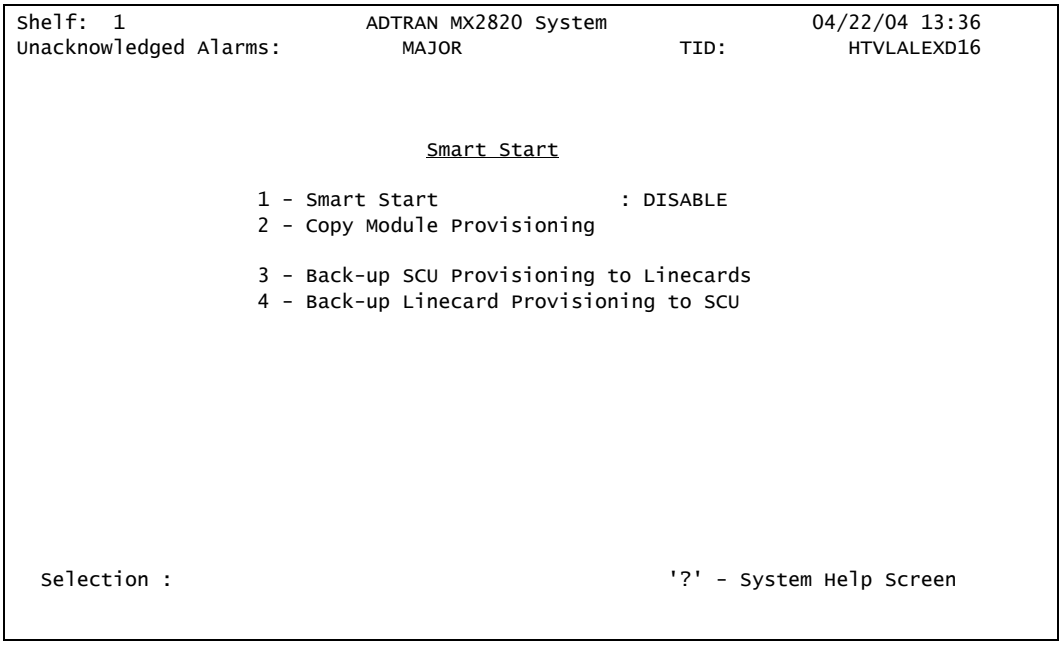


Figure 5-80. Smart Start Provisioning Screen

4. Select **DISABLE** or **ENABLE** from the Provisioning Screen and press ENTER.
5. Return to the MX2820 Main Menu by pressing ESC until the screen appears.

NOTE

The default setting for Smart Start is *Enabled*. The default must be set this way, or a new module from the factory will not know to retrieve the data from the access modules. In the case that the user has disabled Smart Start on the prior SCU, no data will be saved for Smart Start and the new SCU will initialize utilizing factory default provisioning.

COPYING OF ACCESS MODULE PROVISIONING

This feature allows provisioning information to be copied from one module to another.

Table 5-38. Cloning the Provisioning Data

Entity	Response
User Interaction	The user selects a source module. The SCU compares the module type to that in the rest of the system and displays a list of all eligible candidates to receive a copy of the provisioning. The user selects one or more modules, and the SCU will mediate the exchange.
Source	The source module, upon request from the SCU, packages its provisioning information and sends it to the SCU. The SCU retains this provisioning information until another source is selected, or the SCU is reset. This allows the re-provisioning of a replacement module if only a single module is being used in the system.
Receiver	The receiving module accepts the packet and reconfigures itself accordingly.

To perform the cloning function, perform the following steps:

1. Select **COPY MODULE PROVISIONING** from the Smart Start screen.

Figure 5-81 provides an illustration of the SCU Copy Module Provisioning screen.

```
Shelf:  1                    ADTRAN MX2820 System                 04/22/04 14:25
Unacknowledged Alarms:                                    TID:          HTVLALEXD16

                              Copy Module Provisioning

        1      A - MX2820 M13.. [None]          B - ............ [None]
        2      A - MX2820 M13.. [None]          B - ............ [None]
        3      A - ............ [None]          B - ............ [None]
        4      A - MX2820 STS1. [None]          B - ............ [None]
        5      A - ............ [None]          B - ............ [None]
        6      A - ............ [None]          B - ............ [None]
        7      A - ............ [None]          B - ............ [None]









  Select Source Mux (1..7): _1_
```

Figure 5-81. Copy Module Provisioning Screen

2. Select the desired source for provisioning data and press ENTER. Figure 5-81 on page 5-113 indicates that the M13 MUX in slot 1 is the source.

Figure 5-82 provides an illustration of the Copy Module Provisioning screen.

```
Shelf:  1                    ADTRAN MX2820 System                 04/22/04 14:30
Unacknowledged Alarms:                                    TID:          HTVLALEXD16

                              Copy Module Provisioning

        1      A - MX2820 M13.. [Source]       B - ............ [None]
        2      A - MX2820 M13.. [Candidate]    B - ............ [None]
        3      A - ............ [None]         B - ............ [None]
        4      A - MX2820 STS1. [None]         B - ............ [None]
        5      A - ............ [None]         B - ............ [None]
        6      A - ............ [None]         B - ............ [None]
        7      A - ............ [None]         B - ............ [None]









  Select Source Mux (1..7):   1A
  Select Destination Mux(1..7, A = All):
```

Figure 5-82. Copy Module Provisioning, Source Selected

3. Choose a module, marked as “Candidate,” to receive the data from the source and press ENTER. Press
   A, then ENTER to select *all* modules that have been marked as candidates.

Figure 5-83 provides an illustration of the Copy Module Provisioning screen with source and candidate identified.

```
Shelf:  1                    ADTRAN MX2820 System                 04/22/04 14:30
Unacknowledged Alarms:                                    TID:          HTVLALEXD16

                              Copy Module Provisioning

        1      A - MX2820 M13.. [Source]       B - ............ [None]
        2      A - MX2820 M13.. [Candidate]    B - ............ [None]
        3      A - ............ [None]         B - ............ [None]
        4      A - MX2820 STS1. [None]         B - ............ [None]
        5      A - ............ [None]         B - ............ [None]
        6      A - ............ [None]         B - ............ [None]
        7      A - ............ [None]         B - ............ [None]









  Copy Source: MX2820 M13 in slot 1A to Destination: MX2820 M13 in slot 2A.
  Execute (Y/N = Yes/No): ___
```

Figure 5-83. Copy Module Provisioning, Confirmation

4. Input a Y, and press ENTER to copy from the Source to the Candidate, or input an N, and press ENTER to cancel the copy.
5. If Y is selected to continue, the provisioning data is copied and the Candidate identifier changes to Complete.
6. If N is selected, then a blank Copy Module Provisioning screen will display again asking for source selection.

BACK-UP LINECARD PROVISIONING

The **BACK-UP SCU PROVISIONING TO LINECARDS** and **BACK-UP LINECARD PROVISIONING TO SCU** options in the Smart Start menu are in place to expedite the Smart Start process. The module provisioning and SCU provisioning are transferred only once per minute. If a module is removed prior to that one minute save, the Smart Start provisioning image will not match the latest configuration.

When the task is complete, return to the desired screen by pressing ESC until that screen appears.

PROVISIONING IP FORWARDING

IP Forwarding provides the ability to extend a local area network (LAN) to encompass remote devices by conducting IP traffic over an out-of-band maintenance channel of one or more DS3 channels. Only DS3 channels configured for C-bit framing can be used to conduct IP traffic. The IP Forwarding features of the MX2820 are compatible with those of the MX2800. From the perspective of an MX2820 system in an IP Forwarding application, the LAN is considered to have a Local side and a Remote side that are bridged together with one or more IP Forwarding channels.

Figure 5-84 illustrates an example of an application in which IP Forwarding can be implemented with MX2820 systems and an MX2800.

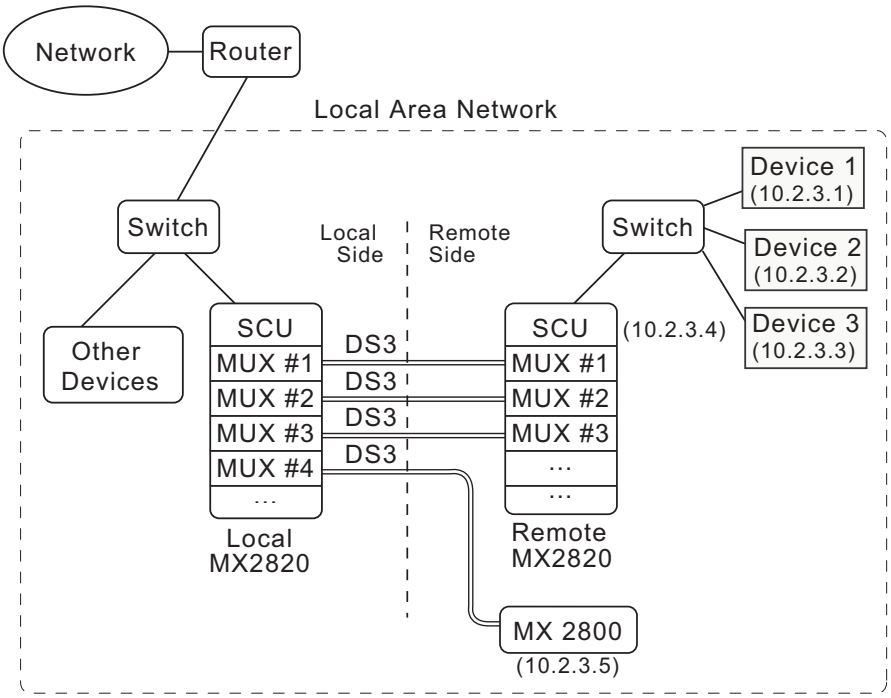


Figure 5-84. IP Forwarding Application Example

Provisioning Steps

Some provisioning of the MX2820 is necessary for IP forwarding to operate properly. Such provisioning includes the following items:

- The Mode of the MX2820 system (Local vs. Remote)
- The IP address assigned to the SCU
- One or more IP addresses assigned to each DS3 channel that is designated to conduct IP traffic (herein called an IP forwarding channel).
- Other options specific to the MUX module being used to transport the IP forwarding channel (refer to "DLP-730, Provision DS3/DS2 Network")

The SCU provisioning options are described in the following sections.

IP Forwarding Mode

The IP Forwarding Mode setting applies to the MX2820 system as a whole, and indicates the side of the LAN where the MX2820 system resides. Generally, the LAN grows outward from the Local side toward the Remote side. The Remote side of the LAN is considered to contain devices that are not accessible from the Local side without the use of IP Forwarding. For example, the Local side is typically where a gateway device would reside that provides access outside of the LAN.

IP traffic will not be conducted across the IP Forwarding channels unless the Mode setting is provisioned properly for the MX2820 systems at both the Local and Remote sides of the LAN.

CAUTION

Network **problems can result** if an MX2820 that resides on the **Local** side is provisioned such that its Mode setting is **Remote**.

The available options for the Mode setting are described below:

Disabled

The IP Forwarding functionality of the MX2820 system is disabled. The SCU will not forward any IP traffic received from its Ethernet port to any IP forwarding channels. Also, IP traffic received from any IP forwarding channel will not be forwarded to the SCU Ethernet port.

Local

The SCU Ethernet port is connected directly to the Local side of the LAN.

Remote

The SCU Ethernet port is connected directly to the Remote side of the LAN.

IP Addresses for Forwarding Channels

Each IP forwarding channel can be assigned one or more unique IP addresses. Each IP address that is assigned to an IP forwarding channel must be identical to an IP address of a device that resides on the Remote side of the LAN (including the SCU of the Remote MX2820 system). Each IP forwarding interface must be assigned the same set of IP addresses at both the Local and Remote sides of a given channel.

Provisioning Menu

Provisioning necessary for IP forwarding is set via a menu for the SCU and for the MUX. All address-mux associations (herein called address routes) are sorted in the menu by mux pair and then by IP address. Options are available for setting the Mode, adding and deleting address routes, and designating the address route for the SCU. Refer to “DLP-730, Provision DS3/DS2 Network” for settings in the MUX.

To enable IP Forwarding options for the MX2820 SCU, perform the following steps:

1. Select the **SYSTEM CONTROLLER** option from the MX2820 Main Menu and press ENTER.
2. Select **PROVISIONING** from the System Controller menu.
3. Select **NETWORK MANAGEMENT** from the Provisioning menu.
4. Select **IP FORWARDING** from the Network Management menu.

Figure 5-85 provides an illustration of the IP Forwarding screen.

```
Shelf:  1                    ADTRAN MX2820 System                  05/04/04 09:29
Unacknowledged Alarms:  None                                TID:        REMOTE_SYSTEM

          IP Address      Mux                 IP Address      Mux
      1  - 10.2.3.1       1+            15  - 10.2.3.15      5+
      2  - 10.2.3.2       1+            16  - 10.2.3.16      5+
      3  - 10.2.3.3       1+            17  - 10.2.3.17      6+
      4  - 10.2.3.4       1+            18  - 10.2.3.18      6+
      5  - 10.2.3.5       2+            19  - 10.2.3.19      6+
      6  - 10.2.3.6       2+            20  - 10.2.3.20      7+
      7  - 10.2.3.7       2+            21  - 10.2.3.21      7+
      8  - 10.2.3.8       3+            22  - 10.2.3.22      7+
      9  - 10.2.3.9       3+            23  - 10.2.3.23      8+
      10 - 10.2.3.10      3+            24  - 10.2.3.24      8+
      11 - 10.2.3.11      3+            25  - 10.2.3.25     *8+
      12 - 10.2.3.12      4+            26  - 10.2.3.26      9+
      13 - 10.2.3.13      4+            27  - 10.2.3.27      9+
      14 - 10.2.3.14      4+            28  - 10.2.3.28      9+

  A - Add Address                      D - Delete Address(es)
  M - IP Forwarding Mode : Remote      S - Set SCU Address (indicated by '*')
                          +/- Indicates Link Status
 Selection :                                        '?' - System Help Screen
```

Figure 5-85. Provisioning Menu for IP Forwarding

Menu Options for IP Forwarding

A - Add Address

Follow these steps to add a new address route:

1. At the prompt, enter the IP address for the new route.
2. Enter the MUX pair number (1-7 for 19-inch shelf or 1-9 for 23-inch shelf).

When the new IP address and MUX pair are accepted, the new address route will be created and displayed in the menu. A link status indication appears next to the MUX value of each entry to indicate whether the present conditions allow (+) or prevent (-) conduction of IP traffic over the DS3.

D - Delete Address(es)

To delete a block of one or more contiguous address routes, follow these steps:

1. Enter the beginning route number and an ending route number.
2. Respond to the confirmation prompt if the specified routes are to be deleted.

Set SCU Address

This option (applicable only on a system whose Mode is Remote) designates the address route for the IP address of the SCU. Options are as follows:

- Create a new route by pressing “0”.
- Select from the existing routes by entering the route number.

The entry corresponding to the SCU is denoted with an asterisk (*) as shown in Figure 5-85.

Example Application

Refer to the example application illustrated in Figure 5-84 on page 5-116.

The devices on the Remote side of the LAN consist of Device 1, Device 2, Device 3, an MX2800, and the SCU of the Remote MX2820 system.

For each of these devices to be visible from both sides of the network, one of the provisioning schemes that are possible is as follows:

- The Mode options of the MX2820 systems on the local and remote sides of the LAN must be provisioned for Local and Remote, respectively.
- The IP forwarding addresses assigned for Mux #1 (for both MX2820 systems) consist of the IP address of Device #1 (10.2.3.1).
- The IP forwarding addresses assigned for Mux #2 (for both MX2820 systems) consist of the IP addresses of Device #2 (10.2.3.2) and Device #3 (10.2.3.3).
- The IP forwarding addresses assigned for Mux #3 (for both MX2820 systems) consist of the IP address of the SCU of the Remote MX2820 system (10.2.3.4).
- The IP forwarding addresses assigned for Mux #4 (for the Local MX2820 system) consist of the “Local IP address” of the MX2800 (10.2.3.5).

The provisioning menus utilized to establish IP Forwarding for the Local and Remote systems in the example application are illustrated in Figure 5-86 and Figure 5-87.

```
Shelf:  1                    ADTRAN MX2820 System                 05/04/04 09:29
Unacknowledged Alarms:  None                              TID:          LOCAL_SYSTEM

           IP Address       Mux                 IP Address       Mux
       1  - 10.2.3.1        1+
       2  - 10.2.3.2        2+
       3  - 10.2.3.3        2+
       4  - 10.2.3.4        3+
       5  - 10.2.3.5        4+









   A - Add Address                      D - Delete Address(es)
   M - IP Forwarding Mode : Remote      S - Set SCU Address (indicated by '*')
                          +/- Indicates Link Status
  Selection :                                          '?' - System Help Screen
```

Figure 5-86. Provisioning Menu, IP Forwarding, Local System

```
Shelf:  1                    ADTRAN MX2820 System                 05/04/04 09:29
Unacknowledged Alarms:  None                              TID:         REMOTE_SYSTEM

           IP Address       Mux                 IP Address       Mux
       1  - 10.2.3.1        1+
       2  - 10.2.3.2        2+
       3  - 10.2.3.3        2+
       4  - 10.2.3.4       *3+









   A - Add Address                      D - Delete Address(es)
   M - IP Forwarding Mode : Remote      S - Set SCU Address (indicated by '*')
                          +/- Indicates Link Status
  Selection :                                          '?' - System Help Screen
```

Figure 5-87. Provisioning Menu, IP Forwarding, Remote System

PROVISIONING TELNET CLIENT

A telnet session can be established from an MX2820 SCU with any device in the network that is visible from the MX2820 system. From the Telnet Client menu, the user enters the destination IP address and the desired telnet port number, and then initiates the session. Once initiated, the new session will become visible in the menu. When the session is terminated, the menu will return to the Telnet Client menu.

To access the Telnet Client options for the MX2820 system, select Telnet **CLIENT** from the MX2820 Main Menu and press ENTER.

Figure 5-88 provides an illustration of the Telnet Client screen.

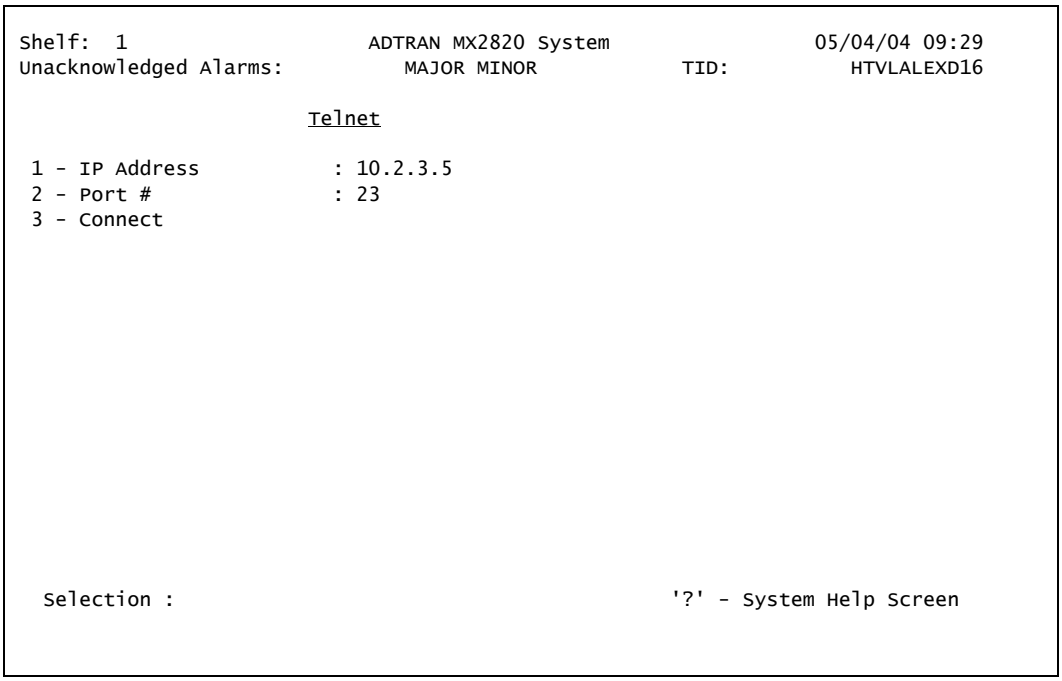


Figure 5-88. Telnet Client Menu

NOTE

While the MX2820 continues to generally support YModem over telnet, the product does NOT support YModem over the built-in Telnet Client. This is due to compatibility issues with the handling of certain control characters by some terminal applications and the YModem protocol.

PROVISIONING SYSTEM CONFIGURATION ARCHIVE (SCA)

The System Configuration Archive (SCA) system allows the shelf administrator to manually or automatically save provisioning information for all installed cards to a remote TFTP server for possible restoration at a later time. In addition to its obvious use for fast recovery of shelf provisions in the case a failure, the SCA system can be used to “clone” baseline shelf configurations to new installations so that only a few shelf-specific provisions need to be altered, significantly reducing initial setup time.

The menus and SNMP system allows the administrator to perform automatic or manual save and restores of SCA information to a TFTP server. Automatic save operations can be scheduled to occur after a specific time of day so that installations with large numbers of MX2820 shelves can reduce simultaneous SCA network traffic.

While SCA save operations back up information from all cards present in the shelf, the restore operation allows the administrator to control the type of provisions to be restored to the SCU, and whether or not to restore provisions to specific modules.

SCA menus and operations are available only to privileged administrator-level accounts.

The SCA menu consists of three sub-menus:

- SCA Autosave Provisioning
- SCA Restore Provisioning Options
- SCA Operations

SCA AutoSave Provisioning Screen

The SCA AutoSave Provisioning screen is used to display and configure provisions related to SCA AutoSave operations. See Figure 5-89 for the SCA Autosave Provisioning screen.

```
Shelf:  1                    ADTRAN MX2820 System                10/10/00 00:07
Unacknowledged Alarms: CRITICAL                          TID:




              SCA Autosave Provisioning

       1 - Autosave System               : DISABLE
       2 - Autosave Only If Prov Changes : ENABLE
       3 - Autosave Filename Prefix      :
       4 - Autosave Filename Suffix      : .sca
       5 - Max Autosave File Instances   : 1
       6 - Autosave Time                 : 00:00
       7 - Autosave Retries              : 5









  Selection :                                        '?' - System Help Screen
```

Figure 5-89. SCA AutoSave Provisioning Screen

AutoSave System

This field enables or disables the AutoSave system. Please note that there will be a 5 minute delay after initial power-up of the SCU before an AutoSave operation will be performed. This is to allow sufficient time for the shelf and provision settings on the SCU and Modules to stabilize.

AutoSave Only If Prov Changes

This field allows the administrator to reduce the number of redundant AutoSave operations and SCA files on the TFTP server by instructing the SCU to perform Autosave operations only if provisions have been changed on the SCU or an installed module.

AutoSave Filename Prefix, AutoSave Filename Suffix, and Max AutoSave File Instances

These three fields are collectively used to construct the name of the AutoSave SCA file on the TFTP server.

The AutoSave filename prefix is a 0 to 30 character string that will be used to construct the first part of the SCA filename.

The AutoSave filename suffix is a 0 to 8 character string that will be used to construct the trailing type, or extent portion of the SCA filename. If a period between the first and second part of the SCA filename is desired, it should be placed within this suffix field.

The max AutoSave file instances field determines the maximum number of SCA filenames to save to the TFTP server. This is often called a backup file rotation scheme, where the last “n” files are always maintained on the backup medium (the TFTP server in this case). For example, if this field is set to a value of seven (7), seven uniquely named SCA files will be written to the TFTP server**.** After the seventh file has been written, the count will recycle to one (1), and the first file will be overwritten**.** The sequence 1 to 7, 1 to 7, 1 to 7 will be continually cycled through until the value of this field is changed, at which time it will be reset to one (1).

The generated SCA filename will be of the form **(prefix)_(instance)(suffix)**, excluding parentheses, where:

- “prefix” is the value of filename prefix field;
- “instance” is decimal number between 1 and the max AutoSave instances field; and
- “suffix” is the value of the filename suffix field.

For example, if the prefix is “Flintville,” the next AutoSave file instance is 2, and the suffix is “.sca”, the name of the next SCA AutoSave filename will be “Flintville_2.sca”.

AutoSave Time

This field represents the time of day after which the AutoSave SCA file can be written to the remote TFTP server. These fields allow the administrator to configure the MX2820 shelves on the customer network to write their AutoSave SCA files at different times so as to prevent network congestion that might occur if all the shelves attempted to save their SCA files at the same time.

If, for example, the AutoSave Time was set to “03:15”, the SCU would attempt an SCA AutoSave operation shortly after 03:15 in the morning.

AutoSave Retries

This field specifies how many times the AutoSave system should attempt to re-send the SCA file to the TFTP server in the event of TFTP errors before giving up.

SCA Restore Provisioning Screen

This screen is used to display and configure provisions related to SCA restore of access and MUX module provisions. See Figure 5-90 for the SCA Module Restore Provisioning Screen.

```
Shelf:  1                    ADTRAN MX2820 System                  10/10/00 00:15
Unacknowledged Alarms: CRITICAL                          TID:

                  SCA Restore Provisioning Options

                      Pair  CardType    Restore

                       C.  ............
                       1.  ............
                       2.  MX2820 M13.. Yes
                       3.  ............
                       4.  ............
                       5.  MX2820 STS1. Yes
                       6.  ............
                       7.  ............


                                                              - = No Prov-Info
   8 - Restore Provisions To SCU      : ENABLE                 x = Unsupported
   9 - Restore Provisions To Modules  : ENABLE      ............ = Empty Slot
  Selection :

Normal  = Restorable,          = NOT restorable        '?' - System Help Screen
(E)nable ALL, (D)isable ALL, (T)oggle ALL
```

Figure 5-90. SCA Restore Provisioning Options Screen

Pair

This column represents each of the MX2820 module slots 1 through 9 (23-inch chassis) or 1 through 7 (19-inch chassis) and Clock Module C. Provisioning will be restored to the active module, which will then restore the standby module (if equipped).

CardType

These columns represent the card type identification of the module currently installed in the corresponding slot of the MX2820.

Restore

These columns represent whether or not SCA restore to the corresponding slot has been enabled by the administrator. If the field is displayed in inverse video, some condition (such as an empty slot, user disable, or exclusion due to the card being In-Service) exists that prevents SCA restore to this slot.

1 to 9 (1 to 7)

Entering one of these slot identifiers followed by the ENTER key will toggle the SCA restore ENABLE/DISABLE state for this slot.

Restore Provisions to SCU

This field acts as a global override to disable the restore of all access and MUX module provisions, and is useful in protecting the current SCU settings during SCA restore operations to the SCU.

Restore Provisions to Modules

This field acts as a global override to disable the restore of all access and MUX module provisions, and is useful in protecting the current access and MUX module settings during SCA restore operations to the SCU.

If this field disabled, no access or MUX module provisions will be altered during an SCA restore regardless of the other settings on this screen.

Hot Keys

Pressing the E key will force the restore state of all slots to Enable. Pressing the D key will force the restore state of all slots to Disable. Pressing the T key will toggle the restore state of all slots.

SCA Operations Screen

This screen is used to display and configure provisions related to manual SCA save and restore operations. This screen also allows the user to initiate manual SCA save and restore operations or to monitor the status of the SCA AutoSave system. See Figure 5-91 for the SCA Operations Screen.

```
Shelf:  1                    ADTRAN MX2820 System                 07/15/04 10:20
Unacknowledged Alarms:          MAJOR                    TID:          HTVLALEXD16




                         SCA Operations

                  1 - SCA TFTP server        : 0.0.0.0
                  2 - SCA Remote Filename    :

                  3 - SCA Autosave status
                  4 - Perform TFTP SCA Save
                  5 - Perform TFTP SCA Restore
                  6 - TFTP SCA Save Status
                  7 - TFTP SCA Restore Status




  Selection :                                        '?' - System Help Screen
```

Figure 5-91. SCA Operations Screen

SCA TFTP Server

This 40-character field contains the Host name or IP address of the customer SCA TFTP server.

SCA Remote Filename

This 40-character field contains the TFTP filename to be written or read by manual SCA save and restore operations.

SCA AutoSave Status

This menu choice will bring up the SCA AutoSave status screen.

Perform TFTP SCA Save

This menu choice will bring up the SCA Save screen and attempt to initiate a manual SCA save operation.

Perform TFTP SCA Restore

This menu choice will bring up the SCA Restore screen and attempt to initiate a manual SCA restore operation.

TFTP SCA Save Status

This menu choice will bring up the SCA TFTP Save Status screen allowing the monitor of the status of the TFTP Save system without invoking a SCA Save operation.

TFTP SCA Restore Status

This menu choice will bring up the SCA TFTP Restore Status screen allowing the monitor of the status of the TFTP Restore system without invoking an SCA Restore operation.

SCA Autosave Status Screen

The SCA Autosave Status Screen, from the SCA Operations menu (Figure 5-92), displays the status of the SCA Autosave system. There are no user-editable fields on this status-information screen. These fields are informational displays of the settings present on the SCA Autosave Provisioning screen.

```
Shelf:  1                    ADTRAN MX2820 System                10/10/00 00:49
Unacknowledged Alarms: CRITICAL                          TID:

SCA Autosave Status

     Autosave Filename Prefix       :
     Autosave Filename Suffix       : .sca
     Current/Next Autosave Instance : 1
     Autosave Only If Prov Changes  : ENABLE

     Cards in Shelf                 :  3 (SCU,MUX2,MUX5)
     Cards With Prov Data           :  3 (SCU,MUX2,MUX5)
     Cards With Changes             :  1 (SCU)
     Date/Time of last SCA Autosave : N/A
     Date/Time of next SCA Autosave : 10/11/00 00:00:00

     Autosave Status                : Idle




(S)ave                                              '?' - System Help Screen
```

Figure 5-92. SCA AutoSave Status Screen

AutoSave Filename Prefix and Suffix

These fields are collectively used to construct the name of the AutoSave SCA file on the TFTP server.

The AutoSave filename prefix is a 0 to 30 character string that will be used to construct the first part of the SCA filename.

The AutoSave filename suffix is a 0 to 8 character string that will be used to construct the trailing type, or extent portion of the SCA filename. If a period between the first and second part of the SCA filename is desired, it should be placed within this suffix field.

Current/Next AutoSave Instance

The Current/Next AutoSave Instance field determines the maximum number of SCA filenames to save to the TFTP server. This is often called a backup file rotation scheme, where the last *n* files are always maintained on the backup medium (the TFTP server in this case).

For example, if this field is set to a value of seven (7), seven uniquely named SCA files will be written to the TFTP server. After the seventh file has been written, the count will recycle to one (1), and the first file will be overwritten. The sequence will be continually cycled through until the value of this field is changed, at which time it will be reset to one (1).

The generated SCA filename will be of the form **PREFIX_INSTANCE.SUFFIX** where:

- **PREFIX** is the value of filename prefix field
- **INSTANCE** is decimal number between 1 and the maximum allowed
- **SUFFIX** is the value of the filename suffix field

For example, if the prefix is **FLINTVILLE**, the next AutoSave file instance is **3**, and the suffix is **SCA**, the name of the next SCA AutoSave filename will be **FLINTVILLE_3.SCA**.

AutoSave Only If Prov Changes

This field is used by the administrator to reduce the number of redundant AutoSave operations and SCA files on the TFTP server by instructing the SCU to perform AutoSave operations only if provisions have been changed on the SCU or an installed MUX or access module.

Cards in Shelf

This field displays the number of cards present in the shelf as well as a summary of the slot numbers where the cards are installed.

Cards With Prov Data

This field displays the number of cards with provision information as well as a summary of the slot numbers with such provisioning information.

Cards With Changes

This field displays the number and summary of cards whose provisions have been changed since SCU power-up or since the last SCA manual or Autosave operation.

Date/Time of last SCA Autosave

This field displays the date/time of the last SCA Autosave operation or “N/A” if none have been performed.

Date/Time of next SCA Autosave

This field displays the date/time of the next scheduled SCA Autosave operation.

AutoSave Status

This field displays the completion status of the last SCA Autosave operation or “Idle” if none have been performed.

SCA TFTP Save Status Screen

This screen (Figure 5-93) initiates and displays the status of a TFTP SCA save operation. There are no user-editable fields on this status-information screen. The SCA TFTP server and SCA Remote Filename fields are informational displays of the settings present on the SCA Operations screen.

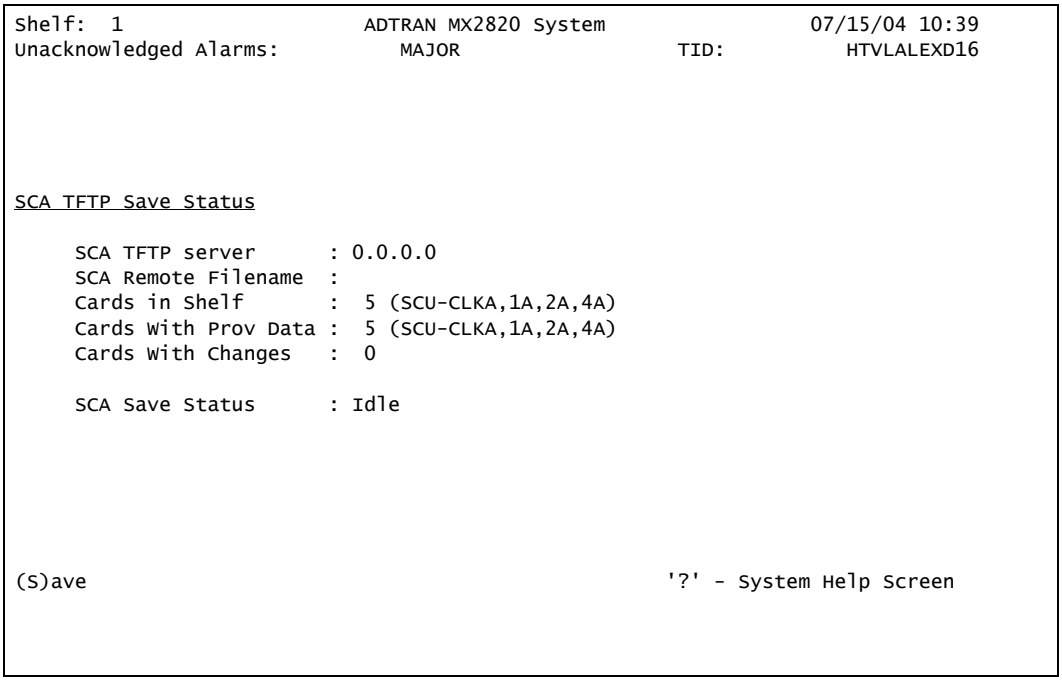


Figure 5-93. SCA TFTP Save Screen

SCA TFTP server

This 40-character field contains the hostname or IP address of the customer SCA TFTP server.

SCA Remote Filename

This 40-character field contains the TFTP filename to be written or read by manual SCA save and restore operations.

Cards in Shelf

This field displays the number of cards present in the shelf as well as a summary of the slot numbers where the cards are installed.

Cards With Prov Data

This field displays the number of cards with provision information as well as a summary of the slot numbers with such provisioning information.

Cards With Changes

This field displays the number and summary of card slots whose provisions have been changed since the last SCA AutoSave or manual save operation.

SCA Save Status

This field displays a status summary of the current SCA save operation.

SCA TFTP Restore Screen

This screen (**Figure 5-94**) initiates and displays the status of a TFTP SCA restore operation. There are no user-editable fields on this status-information screen.

```
Shelf:  1                    ADTRAN MX2820 System                  07/15/04 10:43
Unacknowledged Alarms:          MAJOR                   TID:          HTVLALEXD16
SCA TFTP Restore Status
     SCA TFTP server      : 0.0.0.0
     SCA Remote Filename  :
     Cards in Shelf       :  5 (SCU-CLKA,1A,2A,4A)
     Cards With Prov Data :  5 (SCU-CLKA,1A,2A,4A)
     Cards In SCA         :  0
     Cards w/ Prov In SCA :  5 (SCU-CLKA,1A,2A,4A)
     Cards Restored       :  0
     Cards Excluded       :  1 (SCU)
     Cards NOT Restored   :  1 (SCU)
     Cards w/ Exceptions  :  0
     SCA Restore Status   : Idle

Slot   0: Idle
Slot   1: Idle
Slot   3: Idle
Slot   5: Idle
Slot   9: Idle


                                                    '?' - System Help Screen
(R)estore, (F)irst, (P)revious, (N)ext, (L)ast
```

Figure 5-94. SCA TFTP Restore Screen

SCA TFTP server

This 40-character field contains the hostname or IP address of the customer SCA TFTP server.

SCA Remote Filename

This 40-character field contains the TFTP filename to be written or read by manual SCA save and restore operations.

Cards in Shelf

This field displays the number of cards present in the shelf as well as a summary of the slot numbers where the cards are installed.

Cards With Prov Data

This field displays the number of cards with provision information as well as a summary of the slot numbers with such provisioning information.

Cards In SCA

This field displays the number and summary of card slots represented in the SCA file retrieved from the TFTP server.

Cards w/Prov In SCA

This field displays the number and sum of card slots with provision information represented in the SCA file retrieved from the TFTP server.

Cards Restored

This field displays the number and summary of card slots whose provision settings were successfully restored.

Cards Excluded

This field displays the number and summary of cards that were not restored due to user or other exclusions. Refer to the "SCA Restore Provisioning Screen" on page 5-124 section for a description of user configurable exclusion conditions.

Cards NOT Restored

This field displays the number and summary of card slots that were not restored for any reason, including user exclusions or errors.

Cards w/ Exceptions

This field displays the number and summary of card slots that experienced exception or error conditions during the restore operation.

SCA Restore Status

This field displays a status summary of the current SCA restore operation.

Hot Keys

Pressing the "P" key will display the completion status for the previous group of Module slots. Pressing the N key will display the completion status for the next group of Module slots. Pressing the F key will display the completion status for the first group of Module slots. Pressing the L key will display the completion status for the last group of Module slots.

PROVISIONING SIMPLE NETWORK MANAGEMENT PROTOCOL

The embedded SNMP feature of the MX2820 allows the unit to be accessed and controlled by a network manager through the 10/100Base-T local area network (LAN) port.

To provision SNMP options for the MX2820 SCU, perform the following steps:

1. Select **SYSTEM CONTROLLER** from the MX2820 Main Menu.
2. Select **PROVISIONING** from the System Controller Menu.
3. Select **SNMP** from the Provisioning menu.

Figure 5-75 provides an illustration of the Restore Default Provisioning screen.

```
Shelf:  1                    ADTRAN MX2820 System                07/15/04 10:43
Unacknowledged Alarms: CRITICAL                          TID:




                                      SNMP

 1 - Trap Host 1 IP  : 0.0.0.0
 2 - Trap Host 2 IP  : 0.0.0.0
 3 - Trap Host 3 IP  : 0.0.0.0
 4 - Trap Host 4 IP  : 0.0.0.0
 5 - ifIndex  Method : Fixed (slot-based)
 6 - SCU Traps       : ENABLE
 7 - System Name     :
 8 - System Location : SysLocation not set
 9 - System Contact  : www.adtran.com
10 - Read Community  : public
11 - Write Community : private



  Selection :                                          '?' - System Help Screen
```

Figure 5-95. SNMP Provisioning Screen

The options include configuring up to four SNMP Trap Hosts, selecting the ifIndex method, enabling/disabling SCU traps, and setting the System Name, System Location, System Contact, Read Community, and Write Community.

Trap IP Addresses

Enter up to four IP addresses of SNMP managers to which the MX2820 sends traps.

Read Community Name

This field is used to enter the authentication strings used for SNMP management. Match the MX2820 to the SNMP manager for read privileges.

Write Community Name

This field is used to enter the authentication strings used for SNMP management. Match the MX2820 to the SNMP manager for write privileges.

System Name

This value is equivalent to the sysName item defined in RFC1213. The value is an administratively assigned name for the managed node. By convention, this is the node's fully-qualified domain name.

The term SNMP broadly refers to the message protocols used to exchange information between the network management system (NMS) and the managed devices, as well as to the structure of device management databases. SNMP has three basic components:

- the network manager
- the agent
- the MIB

Network Manager

The network manager is a set of control programs that collect, control, and present data pertinent to the operation of the network devices. These programs reside on a network management station.

Agent

The agent is a control program that resides in every network device. This program responds to queries and commands from the network manager, returns requested information or invokes configuration changes initiated by the manager, and sends unsolicited traps to the manager.

MIB

An MIB is an industry standard presentation of all status and configuration parameters supported by a network device.

NOTE

MIB files are available from ADTRAN. Refer to “Appendix B, Warranty” for the Tech. Support contact.

All facilities are associated with an interface index (“ifIndex”) that identifies the entity. This ifIndex is the SNMP standard way of referring to interfaces, but the mapping method back to slot and port can be confusing. Fortunately, this ifIndex can be translated back into a slot and port number using two objects in the MIB designed for just that purpose. These are in the ADTRAN generic port MIB (genport.mib), as follows:

- adGenSlotAddress
- adGenPortAddress

Each of these objects is indexed by the ifIndex. One of them defines the slot number associated with that ifIndex. The other defines which port number on that slot is associated with that ifIndex.

If set to sequential ifIndex method, these MIB objects *must* be used each time there is a need to map an ifIndex value to a slot/port pair (because the ifIndex values can re-number if cards are added/removed). “Fixed” mode allows the use of some math on the ifIndex value to determine with which slot and port it is associated (for example, an ifIndex of 500017 means mux pair 5, port 17; an ifIndex of 3 means the SCU, port 3). The MIB objects mentioned above will also still work with these fixed ifIndex values.

adGenSlotAddress and adGenPortAddress mapping

Slot numbers are mapped in the following manner:

- Clock slot A is slot number 1, clock slot B is slot number 2
- MUX 1A is slot number 3, MUX 1B is slot number 4, MUX 2A is slot number 5, etc.
- The SCU's slot number is one greater than that of the highest MUX slot in the shelf. That is, in a 19" shelf the last mux is 7B, which is slot number 16. Therefore, the SCU in a 19" shelf is slot number 17. In a 23" shelf, there are 4 more mux slots, so the SCU is slot number 21.

Port numbers are mapped as follows (Each module type has its own port number mapping). The DS3 mux is as follows:

- port numbers 1 through 28 = T1 interfaces 1 through 28
- port number 29 = the DS3 interface
- port numbers 30 through 36 = the seven DS2 “virtual” interfaces (These virtual ports receive ifIndex values starting at the base (500000 for mux pair 5) plus 1000. So the first DS2 would be 501001.)

Note that each MUX module has its own slot number. When running redundant MUX modules, and adGenSlotAddress is utilized to look up the slot number associated with an ifIndex, the value returned is the active module in the pair. For example, for a T1 in MUX pair 2, adGenSlotAddress will give display a slot number of 5 if card A is active, or 6 if card B is active. Both refer to the same physical port (the one connected to MUX pair 2 in the example).

If the slot and port number are known and the ifIndex is needed, use the item “adGenIfIfIndex” in the same MIB. It provides the ifIndex.

UIG-550
Access Module Utilities

INTRODUCTION

This subsection provides the instructions for performing utility tasks for the MX2820 M13, STS-1 Multiplexer (MUX) modules, and the Clock Module. Utility tasks include the following:

- Saving provisioning options
- Restoring factory defaults
- Resetting modules
- Enabling or disabling Auto Save

SAVE PROVISIONING

This feature saves the provisioning data for the access module installed in the selected slot of the MX2820 shelf.

To save provisioning for an MX2820 access module, perform the following steps:

1. Select **ACCESS MODULES** from the MX2820 Main Menu.
2. Input a number from 1 to 7 (19-inch shelf), 1 to 9 (23-inch shelf), or letter C for the Clock Module and press ENTER.
3. Select **PROVISIONING** from the Main Menu screen.
4. Select **SAVE PROVISIONING** from the Provisioning menu.

   The words `PROVISIONING SAVED` will display in reverse video at the bottom of the screen.
5. Return to the MX2820 Main Menu by pressing ESC until the screen appears.

RESTORE FACTORY DEFAULTS

This utility restores factory default settings for the access module installed in the selected slot location of the MX2820 shelf.

To restore factory defaults for an MX2820 access module, perform the following steps:

1. Select **ACCESS MODULES** from the MX2820 Main Menu.
2. Input a number from 1 to 7 (19-inch shelf), or 1 to 9 (23-inch shelf), or letter C for the Clock Module and press ENTER.
3. Select **PROVISIONING** from the Main Menu.
4. Select **RESTORE FACTORY DEFAULTS** from the Provisioning menu.

Figure 5-96 provides an illustration for the Restore Factory Defaults menu.

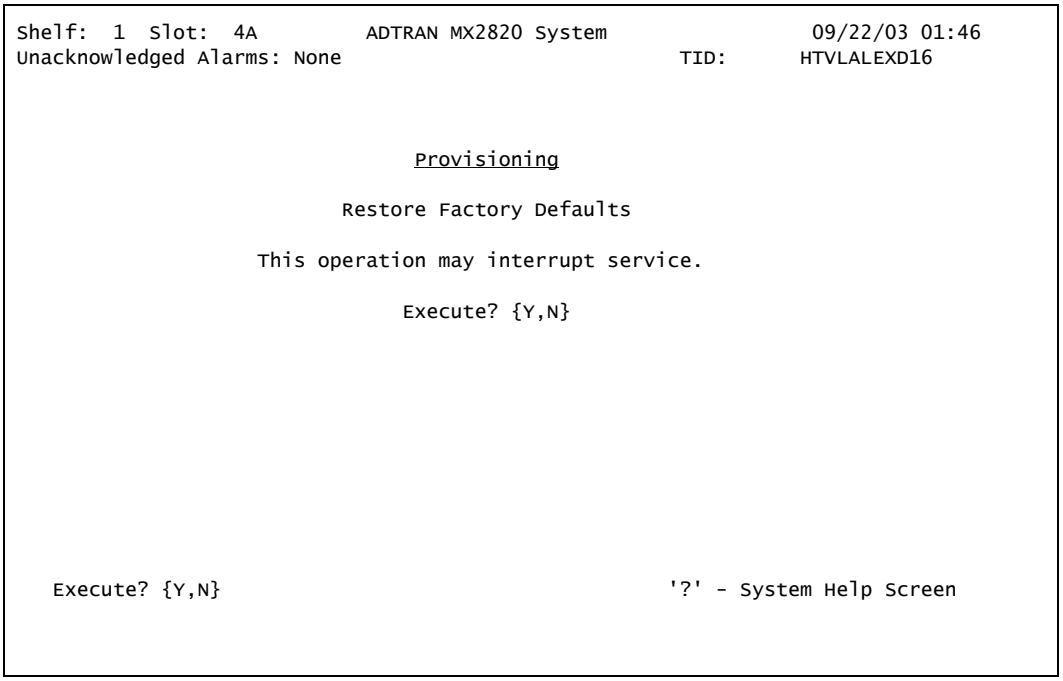


Figure 5-96. Restore Factory Defaults Screen

5. Input a Y and press ENTER to restore factory default settings, or input an N and press ENTER to exit the Restore Factory Defaults menu without restoring the settings.

CAUTION

Restoring factory defaults for a MX2820 access module can interrupt service.

6. Return to the MX2820 Main Menu by pressing ESC until the screen appears.

CARD RESET

This utility resets a access module in the MX2820 shelf.

To reset an access module, perform the following steps:

1. Select **ACCESS MODULES** from the MX2820 Main Menu.
2. Input a number from 1 to 7 (19-inch shelf), 1 to 9 (23-inch shelf), or letter C for Clock Module and press ENTER.
3. Select **PROVISIONING** from the Main Menu.
4. Select **CARD RESET** from the Provisioning menu.

Figure 5-97 provides an illustration for the Card Reset menu.

```
Shelf:  1  Slot:  4A          ADTRAN MX2820 System                09/22/03 01:49
Unacknowledged Alarms: None                                 TID:      HTVLALEXD16


                                  Provisioning

                                   Card Reset

                        This operation may interrupt service.

                                  Execute? {Y,N}









   Execute? {Y,N}                                          '?' - System Help Screen
```

Figure 5-97. M13/STS-1 Card Reset Screen

5. Input a Y and press ENTER to reset the module, or input an N and press ENTER to exit the Reset Card menu without resetting the card.

CAUTION

Resetting an access module can interrupt service.

6. Return to the MX2820 Main Menu screen by pressing Esc until the screen appears.

AUTO SAVE

The Auto Save feature allows automatic saving of the access module provisioning data.

To enable or disable the Auto Save feature, perform the following steps:

1. Select **ACCESS MODULES** from the MX2820 Main Menu.
2. Input a number from 1 to 7 (19-inch shelf), 1 to 9 (23-inch shelf), or letter C for Clock Module and press ENTER.
3. Select **PROVISIONING** from the Main Menu.
4. Select **AUTO SAVE** from the Provisioning menu.

Figure 5-98 provides an illustration for the Auto Save menu.

```
Shelf:  1  Slot:  4A          ADTRAN MX2820 System                09/22/03 01:44
Unacknowledged Alarms: None                                TID:      HTVLALEXD16


                                   Provisioning

                                Auto Save: Enabled

                                  1 - Disabled
                                  2 - Enabled









   Selection:                                          '?' - System Help Screen
```

Figure 5-98. Auto Save Menu

5. Input a 2 and press ENTER to enable the feature, or input a 1 and press ENTER to disable the Auto Save feature.
6. Return to the MX2820 Main Menu screen by pressing ESC until the screen appears.

UIG-560
RADIUS

INTRODUCTION

This subsection provides the information regarding the Remote Authentication Dial-In User Service (RADIUS) client. The MX2820 communicates with a RADIUS server for authentication and authorization for both menu and TL1 access. The RADIUS server is provisioned by company network administrators.

ACCESSING THE RADIUS PROVISIONING MENU

To access the RADIUS Provisioning Menu, select the options from each screen listed and then press ENTER:

1. Select **SYSTEM CONTROLLER** from the MX2820 Main Menu.
2. Select **PROVISIONING** from the System Controller menu.
3. Select **GENERAL** from the Provisioning menu.
4. Select **SECURITY ADMINISTRATION** from the General menu.
5. Select **RADIUS** from the Security Administration menu.

Figure 5-99 provides an illustration for the RADIUS provisioning menu.

```
Shelf:  1                    ADTRAN MX2820 System                 03/22/05 09:12
Unacknowledged Alarms: CRITICAL                          TID:          HTVLAL28201




        RADIUS

          1 - Server #1 Settings
          2 - Server #2 Settings
          3 - Server #3 Settings
          4 - Server #4 Settings
          5 - Validate Server Connection          : Run RADIUS Test
          6 - RADIUS Authentication (Menus)       : DISABLE
          7 - RADIUS Authentication (TL1)         : DISABLE
          8 - RADIUS SNMP Access                  : DISABLE
          9 - Default Authorization Level         : READ

        Selection :

                                                    '?' - System Help Screen
```

Figure 5-99. RADUIS Provisioning Menu

The first four options, Server #n Settings, permits the provisioning of up to four RADIUS servers. The Server #1 menu is illustrated in **Figure 5-100**.

```
Shelf:  1                    ADTRAN MX2820 System                 03/22/05 09:20
Unacknowledged Alarms: CRITICAL                          TID:          HTVLAL28201




              RADIUS Server #1 Settings

           1 - Server Address : 200.4.52.1
           2 - Port Number    : 1812
           3 - Shared Secret  :
           4 - Retries        : 4
           5 - Time Out       : 1000(ms)









  Selection :                                       '?' - System Help Screen
```

Figure 5-100. RADIUS Server Provisioning Menu

Table 5-39 provides a description of the RADIUS provisioning menu options.

Table 5-39. RADIUS Provisioning Descriptions

Menu Option	Description	Default
Server #n Settings (n=1,2,3,4)	This option selects the server number to provision. The following set of five provisioning options is used to configure up to four RADIUS servers. Server #1 has the highest priority. Each server is attempted until either an answer is received or the provisioned number of retries has elapsed.	
Server Address	This is the IP Address for the RADIUS server. If this value is 0.0.0.0 the SCU will *not* attempt to contact the server.	0.0.0.0
Port Number	This is the UDP port number used when contacting the RADIUS server.	1812
Shared Secret	This string, up to forty characters long, is used as part of the RADIUS encryption scheme. This string must be set both on the server and client for RADIUS messages to be properly decrypted.	" "
Retries	If the RADIUS server does not respond, the SCU makes additional attempts to connect. This value indicates the number of times it will retry. This value can range from 0 to 10.	4
Time Out	If the RADIUS server does not respond, the SCU makes additional attempts to connect. The SCU will wait the specified number of milliseconds before retransmitting. This value can range from 1,000 to 30,000 milliseconds.	1000
Validate Server Connection	This option displays a screen that requests a username and password. This information is used to simulate a RADIUS login. If the login is accepted immediately, the SCU returns to the previous screen and indicates that the login was accepted. If a challenge is issued, the SCU prompts for a challenge response. If the request fails, the SCU reverts to the previous screen and indicates that the authentication failed or that no server could be contacted.	
RADIUS Authentication (Menus)	This option enables the RADIUS client for the menu system. With this enabled, menu logins require authentication by a RADIUS server. If disabled, or if no servers can be contacted, the local SCU database is utilized during the login process.	Disable

Table 5-39. RADIUS Provisioning Descriptions (Continued)

Menu Option	Description	Default
RADIUS Authentication (TL1)	This option enables the RADIUS client for the TL1 system. With this enabled, TL1 logins require authentication by a RADIUS server. If disabled, or if no servers can be contacted, the local SCU database is utilized during the login process.	Disable
RADIUS SNMP Access	This option determines if the RADIUS provisioning options are visible through SNMP. This option can be disabled through the menus or through SNMP, but can only be enabled through a menu session. See Table 5-40 for SNMP OID command structure.	Disable
Default Authorization Level	Servers can be configured to specify the level of authorization for each account. If this level is returned, the SCU sets access accordingly. If the RADIUS server does not specify an authorization level, the security level specified by this option is used. The “None” option allows the SCU to deny access if the RADIUS server does not provide an authorization level.	Read

Table 5-40 provides the SNMP command structure for the provisioning options.

To provision SNMP options for the MX2820 SCU, refer to “UIG-540, SCU Utilities”, and “DLP-732, Provision SNMP Management Options”.

Table 5-40. OID SNMP Command Structure

Menu Option	OID SNMP Command	Default
Server #n Settings	adMX2820SCURADIUSServerTable	
Server Address	adMX2820SCURADIUSIPAddress	0.0.0.0
Port Number	adMX2820SCURADIUSPortNumber	1812
Shared Secret	adMX2820SCURADIUSSharedSecret	“ ”
Retries	adMX2820SCURADIUSRetries	4
Time Out	adMX2820SCURADIUSTimeOut	1000
RADIUS Authentication (Menus)	adMX2820SCURADIUSMenusAuth	Disable
RADIUS Authentication (TL1)	adMX2820SCURADIUSTL1Auth	Disable
RADIUS SNMP Access	adMX2820SCURADIUSSNMPAccess	Disable
Default Authorization Level	adMX2820SCURADIUSDefaultAuth	Read

Menu Login Procedure with RADIUS

When connecting to a system, the SCU presents a login prompt. Refer to "DLP-716, Logging on to the System" for detailed procedures.

If RADIUS authentication is enabled, the SCU contacts the provisioned RADIUS server(s) and validates the login/password combination. It is possible that the server will respond with a challenge request (as established by network administration). If so, a challenge message is displayed on the screen and a challenge prompt is made available. A correct response to the challenge will result in a completed login to the MX2820 system.

If a RADIUS challenge is not issued, immediate access is provided to the MX2820 Main Menu.

In the event that the RADIUS server can not be contacted, the local list of users stored in the SCU is accessed for authentication.

NOTE

If RADIUS is the preferred method of authentication, the list of users in the SCU can be disabled or deleted.

Login Problems

Should an authentication attempt with RADIUS fail, or an administrative password be forgotten, ADTRAN provides a failsafe method to gain access. Refer to "DLP-716, Logging on to the System" for detailed procedures.

TL1 Login Procedure

RADIUS authentication is available through TL1 commands. Refer to the *MX2820 TL1 Reference Guide*, Document Number 61186003L1-35C for information.

This page is intentionally blank.

UIG-565
SSH Configuration

INTRODUCTION

This subsection provides the information regarding the SSH configuration options. The SSH Configuration menu provides options to specify the TL1 and secondary secure shell port numbers and the size (in multiples of eight bits) of newly generated keys. An option is also provided to generate new SSH keys.

ACCESSING THE SSH CONFIGURATION MENU

To access the SSH Configuration Menu, select the options from each screen listed and then press ENTER:

1. Select **SYSTEM CONTROLLER** from the MX2820 Main Menu.
2. Select **PROVISIONING** from the System Controller menu.
3. Select **GENERAL** from the Provisioning menu.
4. Select **SECURITY ADMINISTRATION** from the General menu.
5. Select **SSH CONFIGURATION** from the Security Administration menu.

Figure 5-101 provides an illustration for the SSH Configuration menu.

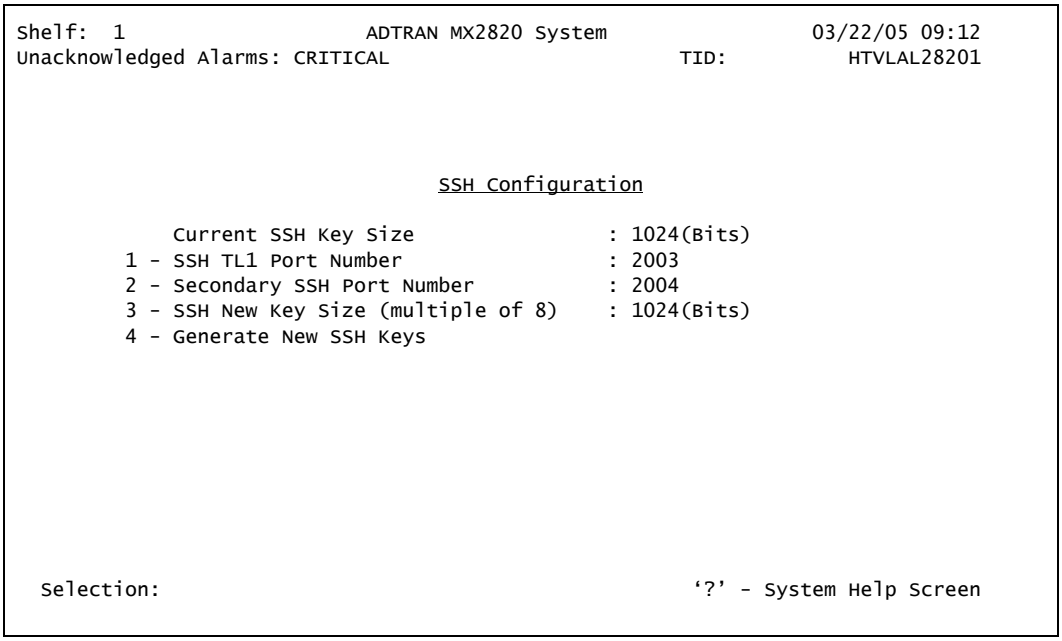


Figure 5-101. SSH Configuration Menu

Table 5-41. SSH Configuration Descriptions

Menu Option	Description	Default
Current SSH Key Size	This field displays the current SSH Key size in bits.	1024
SSH TL1 Port Number	This option provides a text entry field to designate the SSH TL1 port number. Valid values are 1024 to 65535.	2006
Secondary SSH Port Number	This option provides a text entry field to designate the Secondary SSH port number. The valid values are 1024 to 65535.	2007
SSH New Key Size (multiple of 8)	This option provides a text entry field to designate the SSH Key size when new keys are generated. Valid values are 512 to 2048 bits (in multiples of 8).	1024
Generate New SSH Keys	This option is used to generate new SSH keys.	N/A

UIG-567
IP Port Access

INTRODUCTION

This subsection provides the information regarding the IP port access options.

ACCESSING THE IP SERVICE PORTS ACCESS CONTROL MENU

To access the IP Service Ports Access Control Menu, select the options from each screen listed and then press ENTER:

1. Select **SYSTEM CONTROLLER** from the MX2820 Main Menu.
2. Select **PROVISIONING** from the System Controller menu.
3. Select **NETWORK MANAGEMENT** from the Provisioning menu.
4. Select **IP SERVICES PORT ACCESS CONTROL** from the Network Management menu.

Figure 5-102 provides an illustration for the IP Service Ports Access Control menu.

```
Shelf:  1                    ADTRAN MX2820 System                 03/22/05 09:12
Unacknowledged Alarms: CRITICAL                          TID:          HTVLAL28201




    IP Service Ports Access Control

      1 - SNMP IP Access Ports(UDP port 161)              : ENABLE
      2 - TL1 IP Access Ports (2000,2001)                 : ENABLE
      3 - Menu IP Access Ports (23 and 2002)              : ENABLE
      4 - SSH IP Access Ports (22, 2004, and 2003)        : ENABLE
      5 - SSH Tunnels                                     : ENABLE

    Selection :









                                                  '?' - System Help Screen
```

Figure 5-102. IP Service Ports Access Control Menu

Table 5-42. IP Service Ports Access Control Menu Descriptions

Menu Option	Description	Default
SNMP IP Access Ports	This option displays the SNMP IP Access Ports (UDP port 161) menu, which provides the following options: • ENABLE • DISABLE • SSH Tunnel Only	Enable
TL1 IP Access Ports	This option displays the TL1 IP Access Ports menu, which provides the following options: • ENABLE • DISABLE • SSH Tunnel Only	Enable
Menu IP Access Ports	This option displays the Menu IP Access Ports menu, which provides the following options: • ENABLE • DISABLE • SSH Tunnel Only	Enable
SSH IP Access Ports	This option displays the SSH IP Access Ports (TCP port 22) menu, which provides the following options: • ENABLE • DISABLE	Enable
SSH Tunnels	This option displays the SSH Tunnels menu, which provides the following options: • ENABLE • DISABLE	Enable

UIG-570
User-Definable Alarms

INTRODUCTION

This subsection provides the instructions to assist the user in defining alarm parameters for environmental alarms managed by the MX2820 System Controller Unit (SCU).

The user-definable environmental alarms include the following:

- AUX #1 Input
- AUX #2 Input
- AUX #3A Input
- AUX #3B Input
- PWR Bus A Input
- PWR Bus B Input

The auxiliary alarm parameters include the following:

- Alarm description (Defaults are Aux #1 Input, Aux #2 Input, Aux #3A Input, and Aux#3B Input)
- Alarm severity level (Default is MAJOR)
- Access Identifier (AID) index (Defaults are 1=Aux1; 2=Aux2; 3=Aux3A or 3B)
- Alarm condition code (Defaults are AUX1, AUX2, AUX3A, AUX3B)

The alarm parameters for the power supplies include:

- Alarm severity level for power supply failure (Default is MAJOR)
- AID index (Defaults are 4=PWRA; 5=PWRB)
- Alarm condition code (Default is PWRA and PWRB)

This document also provides the instructions that allow the user to set the alarm severity level for a module that is removed from the MX2820 shelf.

The alarm severity levels include the following:

- INFO
- ALERT
- MINOR: Non Service Affecting (NSA) Module Removed Level
- MAJOR: Service Affecting (SA) Module Removed Level (default)
- CRITICAL

ENVIRONMENTAL ALARMS

Defining the parameters for the environmental alarms requires accessing the user-definable menu screen for the alarms.

To access the menu for user-definable environmental alarms, perform the following steps:

1. Select **SYSTEM ALARMS** from the MX2820 Main Menu and press ENTER.

Figure 5-103 provides an illustration of the System Alarms menu.

```
Shelf:  1                    ADTRAN MX2820 System                  05/04/04 12:52
Unacknowledged Alarms: None                                  TID:      HTVLALEXD16




                    System Alarms

                      1 - Shelf Alarm Status
                      2 - Alarm Logs
                      3 - User-Definable Alarms
                      4 - Alarm Chronology : Ascending









  Selection :                                          '?' - System Help Screen
```

Figure 5-103. System Alarms Menu

2. Select **USER-DEFINABLE ALARMS** from the System Alarms menu and press ENTER.

Figure 5-104 provides an illustration of the User-Definable Alarms menu.

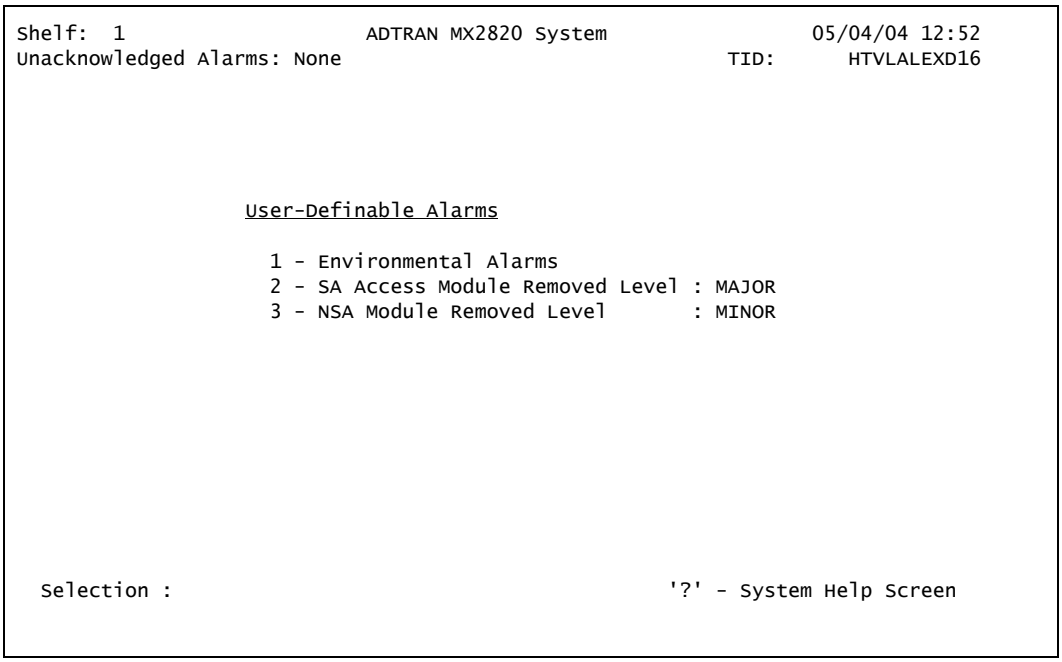


Figure 5-104. User-Definable Alarms Menu

3. Select **ENVIRONMENTAL ALARMS** from the User-Definable Alarms menu and press ENTER.

Figure 5-105 provides an illustration for the Environmental Alarms menu.

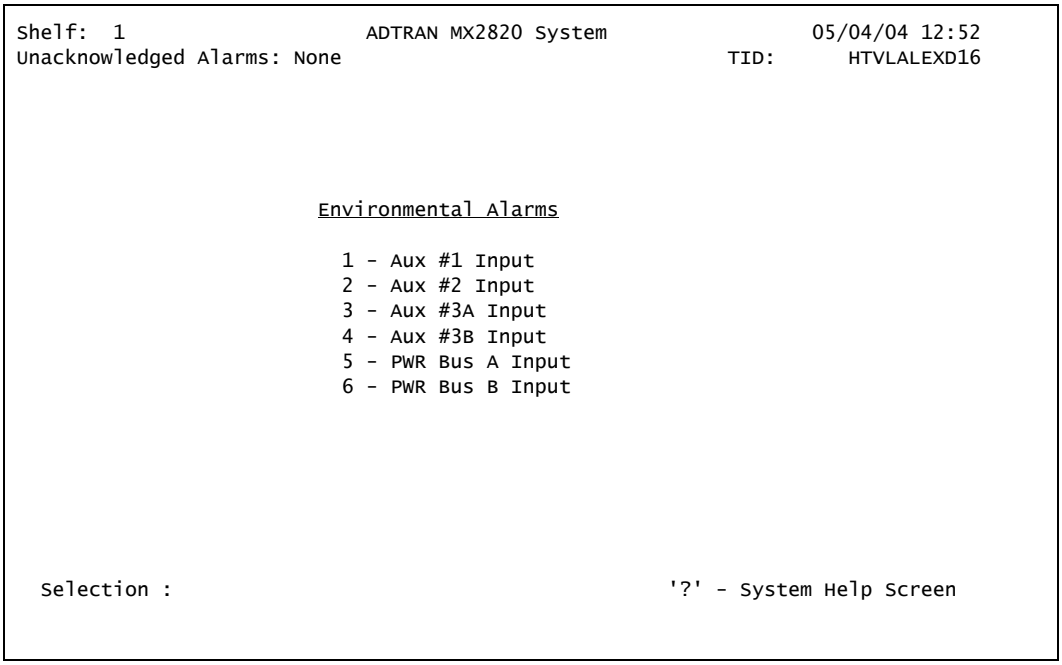


Figure 5-105. Environmental Alarms Menu

4. Input the number for the desired environmental alarm and press ENTER.

Figure 5-106 provides an example for the Aux #1 Input menu.

```
Shelf:  1                    ADTRAN MX2820 System                 05/04/04 12:52
Unacknowledged Alarms: None                                  TID:      HTVLALEXD16




        Aux #1 Input

          1 - Aux #1 Input Description          : Aux #1 Input
          2 - Aux #1 Input Level                : MAJOR
          3 - Aux #1 Input AID Index            : 1
          4 - Aux #1 Input Condition Code       : Aux1









  Selection :                                          '?' - System Help Screen
```

Figure 5-106. Aux #1 Input Menu

Figure 5-107 provides an example for the PWR Bus A Input menu.

```
Shelf:  1                    ADTRAN MX2820 System                 05/04/04 12:52
Unacknowledged Alarms: None                                  TID:      HTVLALEXD16




        PWR Bus A Input

          1 - PWR Bus A Level                 : MAJOR
          2 - PWR Bus A AID Index             : 4
          3 - PWR Bus A Condition Code        : PWRA









  Selection :                                          '?' - System Help Screen
```

Figure 5-107. PWR Bus A Input Menu

NOTE

At this point, the parameters for the auxiliary alarms and the power supply alarms can be defined by selecting the appropriate option from the menu screen. If these parameters have not been changed since the initial shelf installation, the menu screen should display the default settings for each of these parameters.

5. Return to the MX2820 Main Menu screen by pressing Esc until the screen appears.

ACCESS MODULE REMOVED ALARM LEVEL

The Access Module Removed Alarm Level option allows the alarm severity level to be set to indicate that a module is removed from the MX2820 shelf.

- For Service Affecting (SA) the default alarm severity level is MAJOR.
- For Non-Service Affecting (NSA) the default alarm severity level is MINOR.

To access this option, perform the following steps:

1. Select **SYSTEM ALARMS**, from the MX2820 Main Menu, and press ENTER.
2. Select **USER-DEFINABLE ALARMS**, from the System Alarms menu, and press ENTER.
3. Select either **SA** or **NSA MODULE REMOVED LEVEL**, from the User-Definable Alarms menu, and press ENTER.

Figure 5-108 provides an illustration of the SA Module Removed Level menu (NSA menu has identical options).

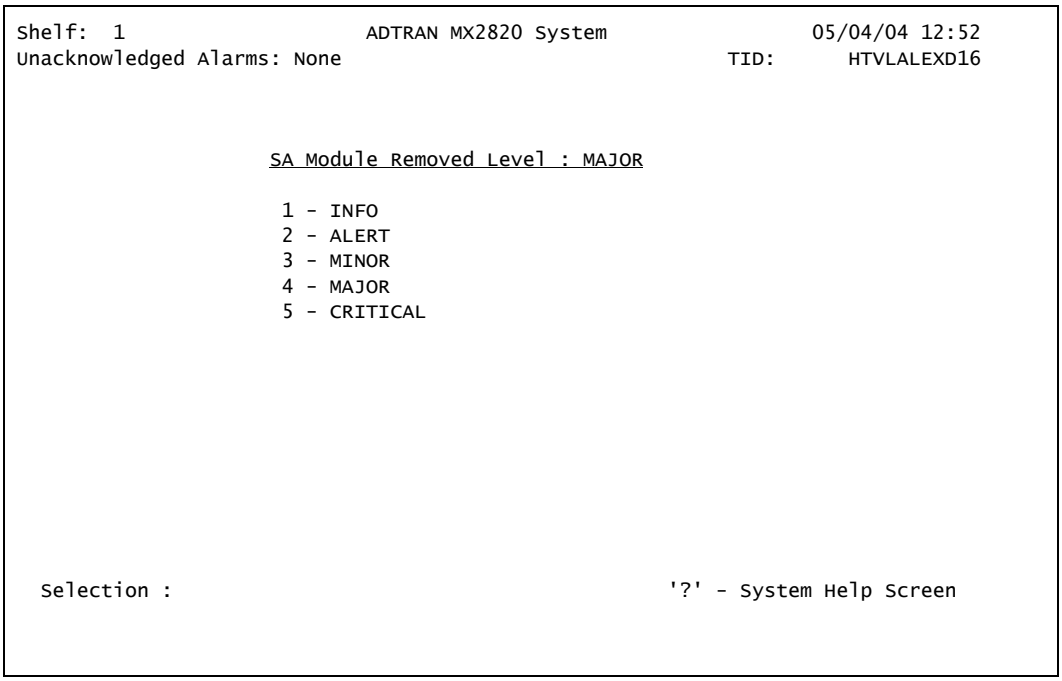


Figure 5-108. Access Module Removed Level Menu

4. Input a number from 1 to 5, and press ENTER to set the desired alarm severity level.
5. Return to the MX2820 Main Menu screen by pressing ESC until the screen appears.

Section 6
Non-Trouble Clearing Procedures

This section provides Non-Trouble clearing Procedures (NTPs) for network designers who are incorporating a system into their networks.

Contents

NTP-001
Shelf and SCU Installation

INTRODUCTION

This NTP provides the tasks for installing one or more MX2820 shelves in a Central Office (CO), Multi-Tenant Unit (MTU), or Remote Terminal (RT). Installation procedures include the removal of the MX2820 shelves from shipping containers, mounting shelves in a CO rack, power up, all necessary data and administrative connections, and turn-up. This NTP also provides the tasks for installing a System Controller Unit (SCU).61186003L1-1D

This NTP applies to 19-inch and 23-inch shelves.

PREREQUISITE PROCEDURES

Before beginning the installation described in this NTP, the installer should thoroughly review "Section 4, Site Preparation". Based on the information in "Section 4", the installer should know which steps of this NTP are required for the intended use of the MX2820 shelf.

To comply with UL60950 requirements, the following items must be adhered to:

- Connection must be made to a reliably grounded power source (–48 VDC or ±24 VDC dependent upon application) which is electrically isolated from the AC source.
- A readily accessible disconnect device, that is suitably approved and rated, shall be incorporated in the fixed wiring.
- The branch circuit overcurrent protection shall be a fuse or circuit breaker rated –48 VDC minimum, 30 amps maximum.
- The installation of this product is in a Restricted Access Location only.
- The installation of this product is in accordance with the requirements of NEC NFPA 70.
- Instructions stating the proper methods for grounding shall be included within the guidelines of the detailed level procedure.

TOOLS REQUIRED

Installation of the MX2820 shelf requires the following tools:

- Wire-wrap tool
- #2 phillips-head screwdriver
- #1 phillips-head screwdriver

- Straight-slot screwdriver
- Multimeter
- Crimping tool for power lugs
- Wire strippers
- 3/16-inch wrench

MATERIALS REQUIRED

Installation of the MX2820 shelf requires the following materials:

- Insulated wire and ring lugs for the –48/±24 VDC power source and frame ground on the barrier strip connector. For more information, refer to "Wire Gauge and Fuse Size" in Section 2, Engineering Guidelines.
- Insulated wire for the wire-wrap posts that connect the environmental alarms to the SCU.
- Insulated wire for the wire-wrap posts that connect AUX 1, AUX 2, and AUX 3.
- Insulated wire for the wire-wrap posts that connect the critical, major, and minor alarm relay contacts.
- Insulated wire for the wire-wrap posts for connecting the shelves in a RS-485 configuration. This wiring only applies for a multi-shelf configuration.
- Insulated wire for connecting CLK A and CLK B.
- Data cables for the BNC coax female connectors on the backplane of the MX2820 chassis (DS3/STS-1 interface).
- Data cables for FutureBus connectors on the backplane of the MX2820 chassis (DSX-1 T1/E1 interface).
- Screws for mounting each MX2820 shelf to the CO or MTU rack or RT cabinet.
- Screws for mounting each MX2820 Heat Baffle to the CO or MTU rack or RT cabinet.
- RJ-45 data cable for the 10/100Base-T Ethernet interface.
- DB-25 data cable or modem cable for the RS-232 synchronous X.25 interface (NTWK MGMT).
- DB-9 data cable for the RS-232, serial VT100 interface (Craft interface).

WARNING

To comply with NEBS fire test requirements for CO, hut, and vault installations, vacant slots in the MX2820 shelf need to have blank front panels installed.

PROCEDURE

Perform the Steps Below in the Order Listed:	For details, refer to:
1. Unpack and inspect the shelf.	DLP-500
2. Mount Shelf, Heat Baffle, and Fan: • Mount the brackets for the shelf and the heat baffle. • Install the shelf, heat baffle, and fan.	DLP-501
3. Remove the metal cover.	DLP-502
4. Connect MX2820 Wire-Wrap Posts: • Wire wrap the Chain posts, if applicable, for RS-485 bus. • Wire wrap the MIN alarm relay posts. • Wire wrap the CLKB and CLKA posts, for STS-1 applications. • Wire the ACO posts. • Wire wrap the AUX3, AUX2, and AUX1 alarm input posts. • Wire wrap the MAJ and CRIT alarm relay posts.	DLP-506
5. Connect Power and Ground: • Connect the Fan Module to frame ground. • Test the frame ground connection. • Connect the power and return to the shelf. • Connect the power to Fan Modules. • Apply power and check the voltage, and then remove the power.	DLP-503
6. Connect the fan alarm input, if applicable.	DLP-711
7. Connect the RS-485 Bus between shelves, if applicable.	DLP-712
8. Connect the RJ-45 cable for Ethernet 10/100Base-T interface.	DLP-708
9. Connect the DB-25 cable for X.25 network interface (NTWK MGMT).	DLP-714
10.Re-install the metal cover.	DLP-502
11.Connect the DS3 cable.	DLP-709
12.Connect the DSX-1 cable.	DLP-706
13.Install SCU in MX2820 Shelf • Apply power to MX2820 shelf for SCU self-test verification. • Install the SCU in MX2820 shelf. • Verify the SCU self-test passes. • Insert any required front panel blanks.	DLP-504
14.Perform the acceptance test for MX2820 shelf.	DLP-601

FOLLOW-UP PROCEDURES

If this is an initial installation, the SCU can be provisioned at this time or the M13 MUX modules can be installed.

If installing Modules, refer to the following NTP:

- For M13 MUX installation, "NTP-002, M13 MUX Installation"
- For STS-1 MUX installation, "NTP-003, Clock Module Installation"

NTP-002
M13 MUX Installation

INTRODUCTION

This NTP provides the tasks for installing the MX2820 M13 MUX module into a Central Office (CO) shelf. Installation procedures include removal of the product from its packaging, inspecting for damage, seating the unit in the shelf, provisioning the module, and acceptance testing.

PREREQUISITE PROCEDURES

Before starting this procedure, determine if a 1:1 redundant configuration is being deployed. Whether a redundant configuration is being deployed affects when the provisioning procedures for the M13 MUX modules can take place.

The following procedures must be completed before installing the M13 MUX module. If necessary, refer to the appropriate documentation before proceeding.

- "NTP-001, Shelf and SCU Installation"
- "DLP-709, Connect High-Speed Cabling"
- "DLP-706, Connect Low-Speed Cabling"

MATERIALS REQUIRED

- MX2820 M13 MUX module (two modules for 1:1 redundant system)

WARNING

To comply with NEBS fire test requirements for CO, hut, and vault installations, vacant slots in the MX2820 shelf need to have blank front panels installed.

NOTE

At this point in the initial NTP for the MX2820 system, power should be applied to the shelf.

PROCEDURE

Perform the Steps Below in the Order Listed:	For details, refer to:
1. Install Modules in MX2820 Shelf: • Unpack, inspect, and install the primary M13 MUX Module. • Unpack, inspect, and install the protect M13 MUX Module, if required. • Install front panel blanks in vacant slots.	DLP-505
2. Provision the DS3/DS2 network.	DLP-730
3. Provision the DSX-1 (T1/E1) interface.	DLP-737
4. Provision M13 MUX protection.	DLP-738
5. Provision M13 MUX loopback timeout.	DLP-739
6. Perform acceptance testing for M13 MUX Modules.	DLP-602

FOLLOW-UP PROCEDURES

All applicable modules, including SCU and the required M13 MUX modules, have been installed. Follow-up procedures should be observed in accordance with CO SOP.

If STS-1 MUX modules are to be deployed, refer to "NTP-003, Clock Module Installation".

NTP-003
Clock Module Installation

INTRODUCTION

This NTP provides the tasks for installing the MX2820 Clock Module into a Central Office (CO) shelf. Installation procedures include removal of the product from its packaging, inspecting for damage, seating the unit in the shelf, provisioning the module, and acceptance testing.

NOTE

The Clock Module is only needed if the STS-1 application that requires external timing is being deployed.

PREREQUISITE PROCEDURES

Before starting this procedure, determine if a 1:1 redundant configuration is being deployed. Whether a redundant configuration is being deployed affects when the provisioning procedures for the Clock Modules can take place.

The following procedures must be completed before installing the STS-1 MUX module. If necessary, refer to the appropriate documentation before proceeding.

- "NTP-001, Shelf and SCU Installation"
- "DLP-506, Connect MX2820 Wire-Wrap Posts"

MATERIALS REQUIRED

- MX2820 Clock Module (two modules for 1:1 redundant system)

WARNING

To comply with NEBS fire test requirements for CO, hut, and vault installations, vacant slots in the MX2820 shelf need to have blank front panels installed.

NOTE

At this point in the initial NTP for the MX2820 system, power should be applied to the shelf.

PROCEDURE

Perform the Steps Below in the Order Listed:	For details, refer to:
1. Install Modules in MX2820 Shelf: • Unpack, inspect, and install the primary Clock Module. • Unpack, inspect, and install the protect Clock Module, if required. • Install front panel blanks in vacant slots.	DLP-505
2. Connect the primary and secondary clock source to the shelf (if not completed as part of NTP-001).	DLP-506
3. Provision the Clock interface	DLP-743
4. Provision Clock Module Protection	DLP-744

FOLLOW-UP PROCEDURES

SCU and Clock Card are now installed for the STS-1 application. Proceed with "NTP-004, STS-1 MUX Installation". Follow-up procedures should be observed in accordance with CO SOP.

NTP-004
STS-1 MUX Installation

INTRODUCTION

This NTP provides the tasks for installing the MX2820 STS-1 MUX module into a Central Office (CO) shelf. Installation procedures include removal of the product from its packaging, inspecting for damage, seating the unit in the shelf, provisioning the module, and acceptance testing.

PREREQUISITE PROCEDURES

Before starting this procedure, determine if a 1:1 redundant configuration is being deployed. Whether a redundant configuration is being deployed affects when the provisioning procedures for the STS-1 MUX modules can take place.

The following procedures must be completed before installing the STS-1 MUX module. If necessary, refer to the appropriate documentation before proceeding.

- "NTP-001, Shelf and SCU Installation"
- "NTP-003, Clock Module Installation"
- "DLP-706, Connect Low-Speed Cabling"
- "DLP-709, Connect High-Speed Cabling"

MATERIALS REQUIRED

- MX2820 STS-1 MUX module (two modules for 1:1 redundant system)

WARNING

To comply with NEBS fire test requirements for CO, hut, and vault installations, vacant slots in the MX2820 shelf need to have blank front panels installed.

NOTE

At this point in the initial NTP for the MX2820 system, power should be applied to the shelf.

PROCEDURE

Perform the Steps Below in the Order Listed:	For details, refer to:
1. Install Modules in MX2820 Shelf: • Unpack, inspect, and install the primary MUX Module. • Unpack, inspect, and install the protect MUX Module, if required. • Install front panel blanks in vacant slots.	DLP-505
2. Provision the STS-1 network.	DLP-741
3. Provision the VT/Port (T1/E1) interface.	DLP-742
4. Provision STS-1 MUX protection.	DLP-738
5. Provision STS-1 MUX loopback timeout.	DLP-739
6. Perform acceptance testing for STS-1 MUX Modules.	DLP-602

FOLLOW-UP PROCEDURES

All applicable modules, SCU and the required STS-1 MUX modules, have been installed. Follow-up procedures should be observed in accordance with CO SOP.

NTP-005
SCU Provisioning (System Management)

INTRODUCTION

This NTP provides the tasks for provisioning the System Management parameters for the MX2820 System Controller Unit (SCU). System management tasks include:

- Date and Time
- Network Management
  - Internet Protocol (IP) network settings (Ethernet Interface)
  - Network Service Ports
  - Trivial File Transfer Protocol (TFTP) Server
- Simple Network Management Protocol (SNMP) management options

PREREQUISITE PROCEDURES

Before beginning the tasks listed in this NTP, the user should determine if the MX2820 system requires connecting to a Network Management (NTWK MGMT) interface. Based on this information, the user should know which steps of this NTP are required for the intended use of the MX2820 shelf.

The following procedure must be completed before provisioning the SCU. If necessary, refer to the appropriate documentation before proceeding.

- "NTP-001, Shelf and SCU Installation"

TOOLS REQUIRED

- VT100 terminal or PC with VT100 Terminal Emulation software

MATERIALS REQUIRED

- DB-9 data cable for the RS-232, serial VT100 interface (Craft interface)

PROCEDURE

Perform the Steps Below in the Order Listed:	For details, refer to:
1. Connect VT100 terminal or PC to craft port.	DLP-715
2. Logon to system.	DLP-716
3. Set the date and time.	DLP-731
4. Provision the network management settings.	DLP-732
5. Provision the SNMP management options.	DLP-718

FOLLOW-UP PROCEDURES

This completes the SCU System Management provisioning procedure.

NTP-006
SCU Provisioning (System Security)

INTRODUCTION

This NTP provides the tasks for provisioning the System Security parameters for the MX2820 System Controller Unit (SCU). System security tasks include the following:

- User account management
- Security options, including RADIUS configuration
- Terminal timeout/Auto Logoff
- Network administrator password change

NOTE

It is recommended that the system or network administrator for the MX2820 system perform the tasks in this NTP.

PREREQUISITE PROCEDURES

Before beginning the tasks listed in this NTP, the system or network administrator should obtain the user name, password, and access privilege data for all personnel that require a user account. All other pertinent security should also be obtained before performing these procedures.

The following procedure must be completed before provisioning the SCU. If necessary, refer to the appropriate documentation before proceeding.

- "NTP-001, Shelf and SCU Installation"

TOOLS REQUIRED

- VT100 terminal or PC with VT100 Terminal Emulation software

MATERIALS REQUIRED

- DB-9 data cable for the RS-232, serial VT100 interface (Craft interface)

PROCEDURE

Perform the Steps Below in the Order Listed:	For details, refer to:
1. Connect VT100 terminal or PC to craft port.	DLP-715
2. Logon to system.	DLP-716
3. Set security options.	DLP-734
4. Create user account.	DLP-733
5. Set terminal timeout/Auto Logoff.	DLP-735
6. Change network administrator password.	DLP-736
7. Provision RADIUS	DLP-745

FOLLOW-UP PROCEDURES

This completes the SCU System Security provisioning procedure.

NTP-007
Software Upgrades

INTRODUCTION

This NTP provides the tasks for performing software upgrades to the System Controller Unit (SCU) and the Multiplexer (MUX) modules for the MX2820 system. Software upgrade procedures include:

- Code upgrade via TFTP
- Code upgrade via YModem

PREREQUISITE PROCEDURES

This NTP provides Flash upgrade procedures for the SCU, M13, and STS-1 modules. The SCU upgrade should be performed prior to any MUX upgrade.

TOOLS REQUIRED

- VT100 terminal or PC with VT100 Terminal Emulation software
- YModem for software upgrades performed via YModem

MATERIALS REQUIRED

- Storage Medium, such as the CD-ROM, tape, or diskette, that contains the updated software.

PROCEDURE

Perform the Steps Below in the Order Listed:	For details, refer to:
1. Connect VT100 terminal or PC to craft port.	DLP-715
2. Logon to system.	DLP-716
3. Determine preferred firmware upgrade mode: • Code Upgrade via TFTP. • Code Upgrade via YModem.	either/or: DLP-700 DLP-701

FOLLOW-UP PROCEDURES

This completes the module upgrade procedure.

Section 7
Detailed Level Procedures

This section provides detailed level procedures for network designers who are incorporating an system into their networks.

Contents

Figures

Tables

This page is intentionally blank.

DLP-500
Unpack and Inspect Shelf

INTRODUCTION

This procedure provides step-by-step instructions to unpack and inspect the MX2820 shelf. Each shelf is shipped in its own cardboard shipping carton. Do not allow any sharp objects to puncture the carton.

PREREQUISITE PROCEDURES

Obtain all necessary local instructions before proceeding with the MX2820 shelf installation.

TOOLS REQUIRED

A box cutter or other appropriate tool is required to open the carton.

WARNING

To prevent electrical shock, do not install equipment in a wet location or during a lightning storm.

CAUTION

Electronic modules can be damaged by static electrical discharge. Before handling modules, wear an antistatic discharge wrist strap to prevent damage to electronic components. Place modules in antistatic packing material when transporting or storing. When working on modules, always place them on an approved antistatic mat that is electrically grounded.

PROCEDURE

1. Open the carton carefully, and remove the shelf from the carton.
2. Remove the foam endcaps, and slip the shelf out of the cardboard shipping sleeve and protective plastic bag.
3. Immediately inspect the shelf for damage.
4. If the shipment has been damaged, file a claim immediately with the carrier, and then contact ADTRAN Customer Service. For further information, refer to “Appendix B, Warranty”.

FOLLOW-UP PROCEDURES

Once this procedure is complete, return to the procedure which called out this DLP and continue with the tasks indicated.

DLP-501
Mount Shelf, Heat Baffle, and Fan

INTRODUCTION

This procedure provides step-by-step instructions for mounting shelves, heat baffles, and fans for the MX2820 system. This procedure provides step-by-step instructions for the following installations:

- Shelf with passive heat baffle
- Shelf with heat baffle and fan assembly
- Shelf with pusher fan assembly

NOTE

Refer to "Configuration Guidelines for the MX2820 System" in "Section 2" of this manual for ADTRAN Part Numbers, illustrations, and engineering specifications.

Shelf

The shelf comes with mounting brackets that allow it to be flush-mounted or mid-mounted in the rack.

Passive Heat Baffle (Passively Cooled)

A Passively cooled system does not include fans. Heat baffles are installed to divert rising heat away from shelves.

Heat Baffle with Fan Assembly (Actively Cooled, Multiple Shelf)

A combination heat baffle and fan assembly provide forced-air ventilation for the MX2820 shelf. The fan assembly is designed to mount on the rear of the heat baffle.

The fan assembly accommodates two power inputs, each input consisting of a –48 VDC feed and a battery return feed. The power inputs are on 0.375 inch centers. A frame ground terminal is also provided on the rear of the assembly. The unit operates with either one or both inputs active. In the event of a fan failure, the unit provides for an alarm indication. The AUX3 environmental alarm input on the System Controller Unit (SCU) must be set to act as a fan alarm to indicate a fan failure.

NOTE

This assembly operates at –48 VDC *only*.

Fan Assembly (One-to-One Cooling, Pusher Fan)

When the MX2820 shelf is installed in an existing rack having limited space, a pusher fan can be installed. The MX2820 Fan Module is a single 1U housing that incorporates a filter, circuit boards, and fans to provide forced air ventilation for the MX2820 Chassis and all of its associated modules. It is installed immediately below the MX2820 Shelf and is designed to cool a single chassis. The MX2820 and pusher fan assembly occupy 3U of space in the rack.

NOTE

This assembly operates at either –48 VDC or ±24 VDC.

PREREQUISITE PROCEDURES

Obtain all necessary local instructions before proceeding with the MX2820 shelf installation. Refer to "Section 2, Engineering Guidelines", and "Section 4, Site Preparation". Based on the information in "Section 2" and "Section 4", the installer should know which steps of this procedure are required for the intended use of the MX2820 shelf.

TOOLS REQUIRED

Mounting the shelves, heat baffles, and fans requires the following tools:

- #2 phillips-head screwdriver
- #1 phillips-head screwdriver
- Straight-slot screwdriver

MATERIALS REQUIRED

Mounting the shelves, heat baffles, and fans requires the following materials:

- Screws for mounting brackets
- Screws for mounting shelf to mounting brackets
- Screws for heat baffle
- Screws for mounting fan assembly to heat baffle

WARNING

To prevent electrical shock, do not install equipment in a wet location or during a lightning storm.

PROCEDURE

CAUTION

Electronic modules can be damaged by static electrical discharge. Before handling modules, wear an antistatic discharge wrist strap to prevent damage to electronic components. Place modules in antistatic packing material when transporting or storing. When working on modules, always place them on an approved antistatic mat that is electrically grounded.

Shelf with Passive Heat Baffle

1. Mid-mount the shelf when it is being installed with a passive heat baffle.

   Use a #2 phillips-head screwdriver and attach the mounting brackets with flanges facing rearward on the rear mounting holes of the shelf.

2. Install the shelf.

   The shelf must be mounted from the front of the rack, with mounting bracket flanges facing rearward. Use the appropriate screwdriver and screws for the CO rack type to mount and secure the shelf in the rack.

3. Install heat baffle.

   The heat baffle mounts directly to the rack with spacing as defined in “Section 2, Engineering Guidelines”. The passive heat baffle allows the warm air to flow to the rear of the rack.

Shelf with Heat Baffle and Fan Assembly

4. Determine whether the shelf is to be flush-mounted or mid-mounted.

   a. Flush-mount: For flush-mounting on the rack, use a #2 phillips-head screwdriver and attach the mounting brackets with flanges facing rearward on the front mounting holes.

   b. Mid-mount: For mid-mounting, use a #2 phillips-head screwdriver and attach the mounting brackets with flanges facing rearward on the rear mounting holes.

5. Install the shelf.

   The shelf must be mounted from the front of the rack, with mounting bracket flanges facing rearward. Use the appropriate screwdriver and screws for the CO rack type to mount and secure the shelf in the rack.

6. Install heat baffle.

   The heat baffle has mounting brackets similar to those on the shelf but are mounted in different orientations.

   a. Flush-mount: For flush-mounting on the rack, use a #2 phillips-head screwdriver and attach the mounting brackets with flanges facing rearward on the rear mounting holes.

   b. Mid-mount: For mid-mounting, use a #2 phillips-head screwdriver and attach the mounting brackets with flanges facing forward on the front mounting holes.

7. Install fan.

   The fan assembly is designed to mount on the rear of the heat baffle. Together they provide forced-air ventilation for the shelf. The heat-baffled fan assembly is designed to cool up to three chassis at a time.

   a. Use the screws provided and a screwdriver to attach the fan assembly to the back of the heat baffle. Cable ties are provided for strain relief and wiring management of incoming power, return, frame ground, and alarming to the System Controller Unit (SCU). Cable tie holders are built into the fan assembly to accept the cable ties provided.

   b. Remove the protective cover from the terminal block by squeezing the black plastic clips on each end of the terminal block and pull the cover off.

   c. Route the wire using the wire ties provided ensuring that the wires do not interfere with the operation of the fan.

Shelf with Pusher Fan Assembly

Install the Pusher Fan Assembly:

1. Mount the MX2820 Fan Module in the rack immediately below the MX2820 Chassis with the screws provided.
2. Disconnect the power source and run power connections to the MX2820 Fan Module for both A and B power feeds, and terminate them on the power lugs located on the terminal block on the rear of the chassis. Refer to individual Job Aids or Installation and Maintenance Practices for the Fan Assemblies.
3. Run connecting wires from the FAN1 and FAN2 wire-wrap pins located near the power connectors on the MX2820 Fan Module to the Aux3 wire-wrap pins on the right rear of the MX2820 chassis to connect the fan alarms to the MX2820 SCM Module.
4. Restore power to the MX2820 Fan Module.

FOLLOW-UP PROCEDURES

Once this procedure is complete, return to the procedure which called out this DLP and continue with the tasks indicated.

DLP-502
Remove and Re-install Metal Cover

INTRODUCTION

This procedure provides step-by-step instructions to remove the metal cover that protects the power terminals on the MX2820 backplane. Following the sequence of steps outlined in "NTP-001, Shelf and SCU Installation" allows removing the metal cover once, making all the necessary backplane connections, and then re-installing the metal cover.

The metal cover provides a wiring diagram which can be helpful in wiring the MX2820 backplane.

PREREQUISITE PROCEDURES

Obtain all necessary local instructions before proceeding with the MX2820 shelf installation.

TOOLS REQUIRED

A #1 phillips-head screwdriver is required to remove the metal cover.

MATERIALS REQUIRED

None

WARNING

To prevent electrical shock, do not install equipment in a wet location or during a lightning storm.

CAUTION

Electronic modules can be damaged by static electrical discharge. Before handling modules, wear an antistatic discharge wrist strap to prevent damage to electronic components. Place modules in antistatic packing material when transporting or storing. When working on modules, always place them on an approved antistatic mat that is electrically grounded.

PROCEDURE

1. Use a #1 phillips-head screwdriver to remove the screw that secures the metal cover over the power terminals.

   The metal cover provides an electrical diagram for the wire-wrap posts and power terminals that can be used to assist in wiring the MX2820 shelf. Figure 7-1 provides an example of the diagram.

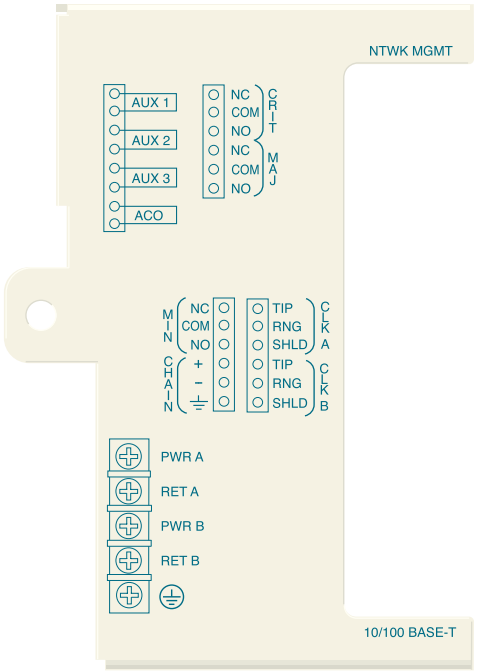


Figure 7-1. MX2820 Metal Cover Electrical Diagram

2. Make all required MX2820 backplane connections.
3. Re-install the metal cover.

FOLLOW-UP PROCEDURES

Once this procedure is complete, return to the procedure which called out this DLP and continue with the tasks indicated.

DLP-503
Connect Power and Ground

INTRODUCTION

This procedure provides step-by-step instructions to connect the power and ground wires for the MX2820 shelf. The barrier strip connector, located on the rear of the MX2820 chassis, provides the frame ground and redundant power connections with separate battery returns. The barrier strip connector can accommodate up to 14 AWG wire.

NOTE

The MX2820 has two power options: –48VDC or ±24 VDC. The STS-1 MUX operates at –48VDC *only*. Do not deploy a ±24 VDC system if STS-1 MUXes are to be deployed.

PREREQUISITE PROCEDURES

Obtain all necessary local instructions before proceeding with the MX2820 shelf installation.

TOOLS REQUIRED

To connect power and ground to the MX2820 system, the following tools are required:

- Wire strippers
- Crimping tool
- #1 phillips-head screwdriver
- Straight-slot screwdriver

MATERIALS REQUIRED

To connect power and ground to the MX2820 system, the following materials are required:

- Insulated wire and ring lugs (#6) for the DC power source and frame ground on the barrier strip connector

WARNING

To prevent electrical shock, do not install equipment in a wet location or during a lightning storm.

CAUTION

Electronic modules can be damaged by static electrical discharge. Before handling modules, wear an antistatic discharge wrist strap to prevent damage to electronic components. Place modules in antistatic packing material when transporting or storing. When working on modules, always place them on an approved antistatic mat that is electrically grounded.

PROCEDURE

1. Connect shelf to frame ground.
   a. Remove the metal cover over the power terminals if it has not already been removed.
   b. Use an appropriate crimping tool and lug to fasten the lug to the ground wire.
   c. Locate a nearby grounding screw on the equipment rack.
   d. Secure the ground wire to frame ground with the lugged end of the ground wire.
   e. Cut the ground wire length to reach from the grounding lug on the rack to the MX2820 ground terminal, located on the barrier strip connector of the backplane. Leave enough slack to allow for tying to the rack, if required.
   f. Use wire strippers to strip 5/8 inches of insulation from the ground wire. Apply an approved antioxidant compound to the exposed wire.
   g. Connect the stripped end of the ground wire into the MX2820 ground terminal (see Figure 7-2).

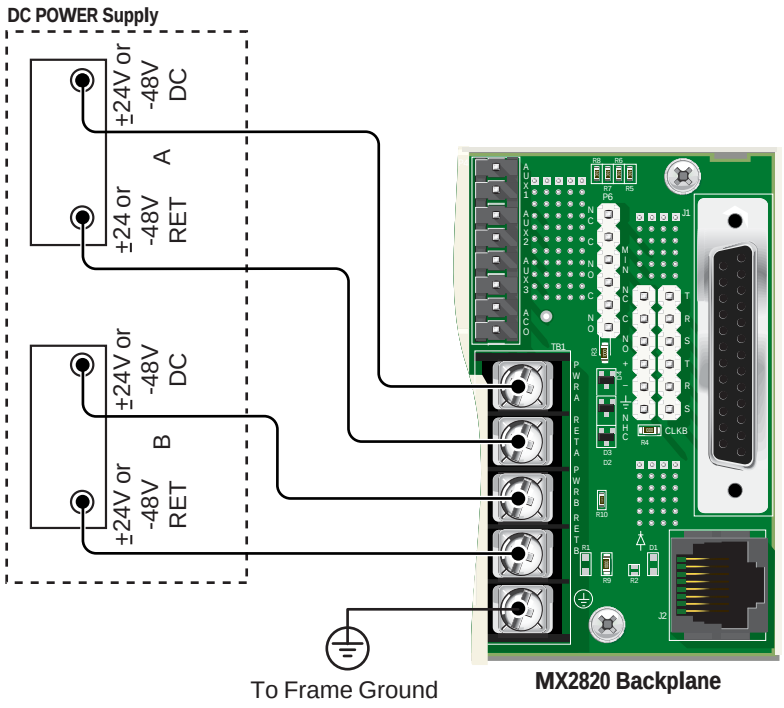


Figure 7-2. MX2820 Power and Frame Ground Connections

h. Tighten the ground connection securely with a straight-slot screwdriver.

NOTE

The MX2820 Fan Module has a frame ground wire internal to the Fan Module. When the Fan Module is included in the installation and properly mounted to a correctly installed heat baffle, the Fan Module is automatically connected to the frame ground.

2. Test frame ground connection.

   To ensure a good ground, use a multimeter to check continuity between the frame ground lug and the rack grounding strap at the top of the rack.

   a. Use a voltmeter set to its lowest resistance range. Place one lead on the ground strap of the rack and the other lead on the MX2820 frame ground terminal. The reading should be 1 or 2 ohms. Greater readings should be investigated.

   b. Repeat the process for the Fan Module, if applicable. Use the grounding strap of the rack and bare metal on the Fan Modules chassis, such as the mounting screws. Readings should be in the 1 to 2 ohms range. Greater readings should be investigated.

3. Connect power and return to shelf.

   After connecting and checking the ground to the MX2820 shelf, connect power to the shelf. Check to make sure the power source is providing the correct power and polarity to the shelf.

a. Determine which fuse or circuit breaker pairs are to supply power and return to the shelf.

b. Remove the fuses or turn off circuit breakers for the pair determined in the preceding step.

c. Cut four lengths of wire to reach from the terminals on the fuse or circuit breaker pairs to the power terminals on the shelf. Be sure to include enough length to allow for tying the wire neatly to the frame as specified by CO Standard Operating Procedures (SOP). Wire color should differentiate between –48/±24 VDC supply and the return, according to CO SOP.

d. Use the crimping tool to connect an appropriate ring lug to each end of the wires.

e. Use a screwdriver appropriate for the fuse panel or circuit breakers, and a straight-slot screwdriver for the MX2820 power terminals to connect the ends of one wire between the "A" CO ±24/–48 VDC supply and the PWR A terminal on the Barrier Strip connector. see Figure 7-2.

f. Use the other three wires to connect:

- "A" CO ±24/–48 VDC return to RET A
- "B" CO ±24/–48 VDC supply to PWR B
- "B" CO ±24/–48 VDC return to RET B

See Figure 7-2.

4. Fan Module power connection.

- This subsection applies to the MX2820 Fan Module.
- If utilizing a Pusher Fan, go to step 5.
- If not incorporating active cooling, go to step 6.

The Fan Module is powered by dual independent power supplies from the CO. The MX2820 Fan Module comes with a one amp fuse mounted on the fan frame and draws less than 200 milli-amps.

a. Determine which pair of fuses or circuit breakers are to supply power to the Fan Module.

b. Remove the fuses or turn off circuit breakers from the A and B slots in the fuse panel or circuit breaker panel determined in the preceding step.

c. Cut four lengths of appropriately-sized wire to reach from the terminals on the fuse panel or circuit breaker panel to the power terminal strip on the Fan Module. Be sure to include enough length to allow for tying the wire neatly to the frame as specified by CO SOP. Wire color should differentiate between VDC supply and return according to CO SOP.

d. Use a crimping tool to connect an appropriate ring lug to each end of the four wires.

e. For the MX2820 Fan Assembly, connect the power. Use a screwdriver appropriate for the fuse panel or circuit breaker panel and a #1 phillips-head screwdriver for the Fan Module terminals. Connect the Fan Module as follows:

- –48 VDC A CO supply to the –48 VDC A Fan Module terminal
- –48 VDC A CO return to the –48 VDC RET A Fan Module terminal

- –48 VDC B CO supply to the –48 VDC B Fan Module terminal
- –48 VDC B CO return to the –48 VDC RET B Fan Module terminal

See Figure 7-3.

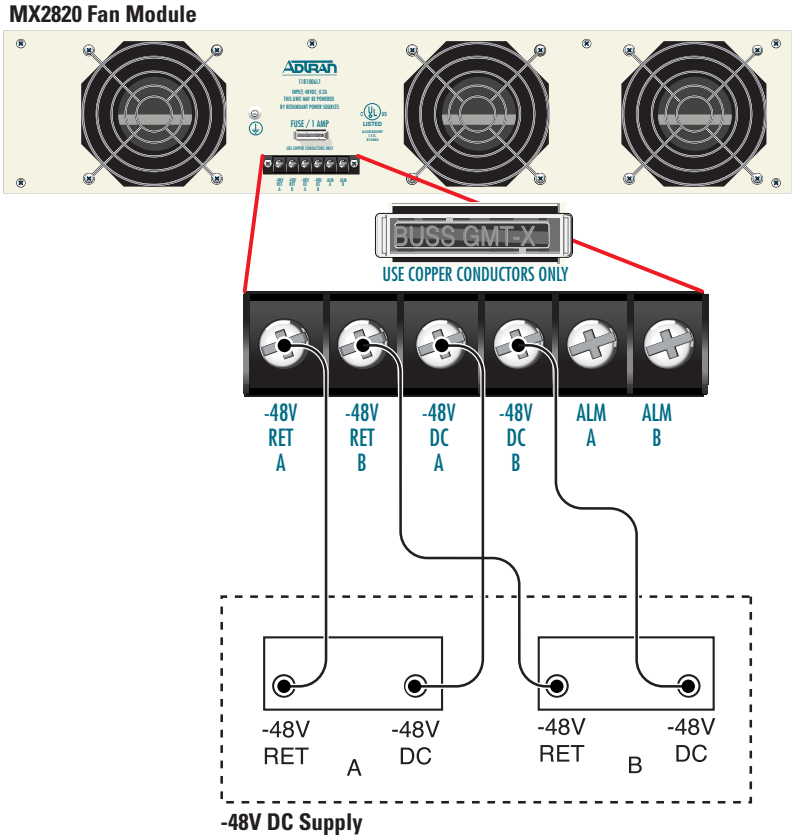


Figure 7-3. MX2820 Fan Module Power Connections

f. Install the fan filter.

5. For the Pusher Fan Assembly, determine the voltage requirements per system and CO requirements, then connect the power. Use a screwdriver appropriate for the fuse panel or circuit breaker panel and a #1 phillips-head screwdriver for the Fan Module terminals. Connect the Pusher Fan Assembly as follows:

   - ±24/–48 VDC A CO supply to the ±24/–48 VDC A IN fan terminal
   - ±24/–48 VDC A CO return to the ±24/–48 VDC A RET fan terminal
   - ±24/–48 VDC B CO supply to the ±24/–48 VDC B IN fan terminal
   - ±24/–48 VDC B CO return to the ±24/–48 VDC B RET fan terminal

   See Figure 7-4.

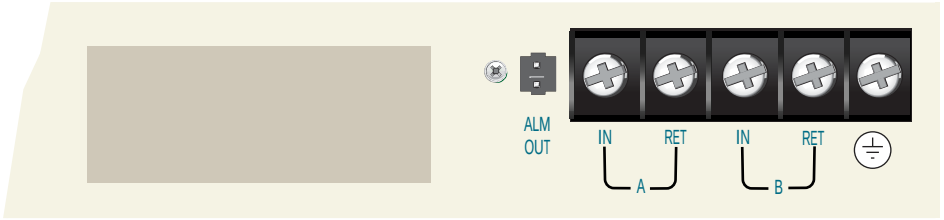


Figure 7-4. Pusher Fan Assembly Power Connections

6. Apply power and check voltage, and then remove power.

CAUTION

Installing fuses in the fuse panel or turning the circuit breaker switches to the ON position at this stage provides power to the shelf and fans. The fans in the Fan Module will begin to rotate, and there will be power to pins on the backplane and inside the shelf. Use caution to avoid electric shock.

NOTE

Before proceeding further, ensure that power has been correctly applied to the shelf.

There are two power supply voltages available to the MX2820, based upon application requirements:

- For a –48 VDC system, the proper voltage to the shelf is –48 VDC with an operating range of –42 VDC to –56 VDC.
- For a ±24 VDC system, the proper voltage is + or – 24 VDC with an operating range of –22 to –27 VDC or +22 to +27 VDC.

a. Install fuses in the slots of the fuse panel that services the shelf.

b. Use a voltmeter and place the common lead (normally black) on the RET A terminal and the DC volts lead (normally red) on the PWR A terminal. The reading should be in the operating range shown above. Repeat this step for the RET B terminal and the PWR B terminal.

c. Remove the fuses from the fuse panel or turn off the circuit breakers from the circuit breaker panel powering the shelf.

d. Install the proper-sized fuses in the slots of the fuse panel that power the Fan Module.

e. Use a voltmeter and place the common lead (normally black) on the Fan Module RET A terminal and the DC volts lead (normally red) on the DC (IN) A terminal. The reading

should be in the operating range specified above for the selected fan assembly. Use a voltmeter and repeat this step for the RET B and DC (IN) B terminals.

f. Remove the fuses from the fuse panel or turn off circuit breakers from the circuit breaker panel powering the Fan Module.

FOLLOW-UP PROCEDURES

Once this procedure is complete, return to the procedure which called out this DLP and continue with the tasks indicated.

This page is intentionally blank.

DLP-504
Install SCU in MX2820 Shelf

INTRODUCTION

This procedure provides step-by-step instructions to unpack, inspect, and install the System Controller Unit (SCU) in the MX2820 shelf. This procedure also includes steps to power up and self-test the SCU.

The MX2820 SCU provides the focal point for all management functions carried out by the MX2820 system, and the SCU has the greatest number of considerations when installing.

The Ethernet interface for the SCU allows Transaction Language 1 (TL1), Telnet, SSH, or Simple Network Management Protocol (SNMP) management. The SCU can also be accessed locally or remotely through the DB-25 connector (X.25 connection, RS-232 interface) located on the MX2820 backplane.

Communication sessions

There is one session reserved for each of the following communication methods:

- Craft
- Telnet
- X.25
- RS-485
- SSH

Additionally, there are ten pool sessions that can connect to any of these entities.

PREREQUISITE PROCEDURES

Obtain all necessary local instructions before proceeding with the MX2820 shelf installation. All backplane wiring to the MX2820 shelf should be completed before installing the SCU.

TOOLS REQUIRED

- Voltmeter

MATERIALS REQUIRED

- SCU, P/N 1186003L1, –48 VDC only OR

- SCU, P/N 1186003L2, –48 or ±24 VDC

WARNING

To prevent electrical shock, do not install equipment in a wet location or during a lightning storm.

WARNING

To comply with NEBS fire test requirements for CO, hut, and vault installations, vacant slots in the MX2820 shelf need to have a blank
front panel installed.

CAUTION

Electronic modules can be damaged by static electrical discharge. Before handling modules, wear an antistatic discharge wrist strap to prevent damage to electronic components. Place modules in antistatic packing material when transporting or storing. When working on modules, always place them on an approved antistatic mat that is electrically grounded.

PROCEDURE

1. Open the container, and remove the SCU from its protective plastic bag.

   Each SCU is shipped in its own cardboard shipping carton. Open the carton carefully, and avoid puncturing the carton with sharp objects. After removing the unit from the carton, unwrap the bubble-wrap and pull the unit from the antistatic plastic bag.

2. Immediately inspect the SCU for damage.

3. If the shipment has been damaged, file a claim immediately with the carrier, and then contact ADTRAN Customer Service. For more information, refer to “Appendix B, Warranty”.

4. Apply power to the MX2820 shelf.

   Install the fuse into the appropriate slot of the fuse panel or turn on the circuit breaker to either feed of the MX2820 shelf.

5. Pull the ejector on the bottom of the SCU front panel from its stowed or closed position. The MX2820 SCU can be inserted into only the slot adjacent to the Clock Module slots (labeled **SCU**.)

CAUTION

Attempting to insert the SCU in any other slot can damage the SCU and the backplane pin connectors.

NOTE

The SCU can have a “key” screwed into the top of the module to prevent inadvertent installation in the wrong slot. It works with an MX2820 chassis which has an extra slot to accommodate the key. *If an SCU is to be inserted into a chassis that does not accommodate the key, it will be necessary to remove the key by first removing its screw*. See **Figure 7-5**.
If removed, use precaution to prevent SCU insertion into a MUX slot; this will result in bent backplane pins and possible equipment replacement.

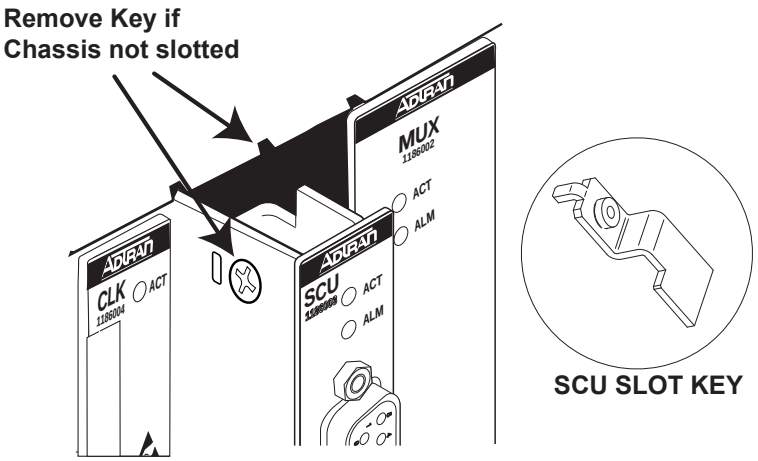


Figure 7-5. SCU Slot Key

6. Gently but firmly push the SCU into the second slot on the front-left of the shelf. This slot is labelled for the SCU. Simultaneous thumb pressure at the top and bottom of the SCU ensures a good seat of the SCU pins into the backplane connector. Be sure the latch engages securely. The latch must be pressed firmly to snap it into place.
7. Push the ejector up and closed against the SCU front panel.
8. Verify SCU self-test passes. The sequence on the SCU front panel is as follows:
   - **ACT** and **ALM** LEDs sequence from green to red to amber for approximately 15 seconds.
   - Both LEDs extinguish, then **ACT** LED changes to green.
9. Insert blank front panels for vacant slots.

   Insert the Clock Module blank front panel(s), P/N 1186011L1, into the first slot on the front-left of the shelf if the Clock Module will not be used. Insert the MX2820 MUX blank front panel(s), P/N 1186010L1, into the MUX slots that will not be used.

10. If provisioning tasks for the SCU are to be performed at this time, refer to "Section 6, Non-Trouble Clearing Procedures", to determine which SCU provisioning tasks are required.
11. If the M13 MUX modules are to be installed into the shelf at this time, go to "NTP-002".
12. If the STS-1 MUX modules are to be installed into the shelf at this time, go to "NTP-003".
13. If no MUXes are to be installed at this time, this procedure is complete.

FOLLOW-UP PROCEDURES

Once this procedure is complete, return to the procedure which called out this DLP and continue with the tasks indicated.

DLP-505
Install Modules in MX2820 Shelf

INTRODUCTION

This procedure provides step-by-step instructions to unpack, inspect, and install the modules into the MX2820 shelf. Each module is shipped in its own cardboard shipping carton. Do not allow any sharp objects to puncture the carton.

PREREQUISITE PROCEDURES

Obtain all necessary local instructions before proceeding with the module installation.

TOOLS REQUIRED

A box cutter or other appropriate tool is required to open the carton.

WARNING

To prevent electrical shock, do not install equipment in a wet location or during a lightning storm.

WARNING

To comply with NEBS fire test requirements for CO, hut, and vault installations, vacant slots in the MX2820 shelf need to have blank front panels installed.

CAUTION

Electronic modules can be damaged by static electrical discharge. Before handling modules, wear an antistatic discharge wrist strap to prevent damage to electronic components. Place modules in antistatic packing material when transporting or storing. When working on modules, always place them on an approved antistatic mat that is electrically grounded.

MATERIALS REQUIRED

Install the modules required per local application. These can include one or more of the following:

- ADTRAN M13 MUX Module (P/N 1186002Lx)
- ADTRAN STS-1 MUX Module (P/N 1186005L1)
- ADTRAN Clock Module (P/N 1186004L1) if the STS-1 MUX Module is installed

NOTE

Other ADTRAN MX2820 modules are available. Refer to the Job Aid for those modules for specific requirements.

PROCEDURE

1. Open the carton carefully, and remove the module from the carton.
2. After removing the module from the carton, unwrap the bubble-wrap and pull the module from the antistatic plastic bag.
3. Immediately inspect the module for damage.
4. If the shipment has been damaged, file a claim immediately with the carrier, and then contact ADTRAN Customer Service. For more information, refer to "Appendix B, Warranty".
5. Repeat steps 1 - 4 for each module.
6. Install the primary module.
   a. Gently but firmly push the module into the appropriate slot.

      MUX: Slots are labeled **1A** through **7A** on the front of the 19-inch shelf and labeled **1A** through **9A** on the 23-inch shelf. The primary module should be installed in the "A" slot.

      Clock: Slots are labeled **CLKA** and **CLKB**. Insert the primary clock module in **CLKA**.

      Simultaneous thumb pressure at the top and bottom of the module ensures a good seat of the pins into the backplane connector.

   b. Push the ejector tab up and closed against the front panel.

   c. Allow the self-test LED sequence to complete. The self-test should take about 10 to 15 seconds.

   d. Repeat steps a - c if additional primary modules are to be installed.
7. Provision the primary module. For details, refer to DLP-730 and DLP-741.

   Return to this procedure and continue at step 11. If a protection configuration is being deployed, proceed to step 8.

8. Install the Protect module.
   a. Gently but firmly push the module into the appropriate slot

      MUX: Slots are labeled **1B** through **7B** on the front of the 19-inch shelf and labeled **1B** through **9B** on the 23-inch shelf. The protect module should be installed in the "B" slot.

      Clock: Insert the protect clock module in **CLKB**.

   b. Simultaneous thumb pressure at the top and bottom of the module ensures a good seat of the pins into the backplane connector.

      Push the ejector tab up and closed against the front panel.

   c. Allow the self-test LED sequence to complete. The self-test should take about 10 to 15 seconds.

   d. Repeat substeps steps a - c if additional protect modules are to be installed.

9. Insert blank front panels for vacant slots.

   Insert the Clock Module blank front panel(s), P/N 1186011L1, into the first slot on the front-left of the shelf if the Clock Module will not be used.

   Insert the MX2820 MUX blank front panel(s), P/N 1186010L1, into the MUX slots that will not be used.

10. Provision the module.

    Provisioning a module in the "A" slot automatically provisions the module in the "B" slot. For details, refer to DLP-730 - Provision DS3/DS2 Network, DLP-741 - Provision STS-1 Network, and DLP-743 - Provision Clock Module.

11. Perform Acceptance Testing for the modules after all modules are installed and provisioned. For details, refer to DLP-602.

FOLLOW-UP PROCEDURES

Once this procedure is complete, return to the procedure which called out this DLP and continue with the tasks indicated.

This page is intentionally blank.

DLP-506
Connect MX2820 Wire-Wrap Posts

INTRODUCTION

This procedure provides step-by-step instructions to connect the wire-wrap posts on the MX2820 backplane.

The wire-wrap posts for the MX2820 system include the following:

- AUX1, AUX2, AUX3 for external (environmental) alarms

  The AUX3 wire-wrap posts can be used as a fan alarm also.
- ACO for an alarm acknowledgment and audible alarm cutoff switch
- Critical (CRIT), Major (MAJ), and Minor (MIN) alarm relays
- CHAIN
- CLKA and CLKB

Figure 7-6 shows the wire-wrap posts locations on the MX2820 backplane.

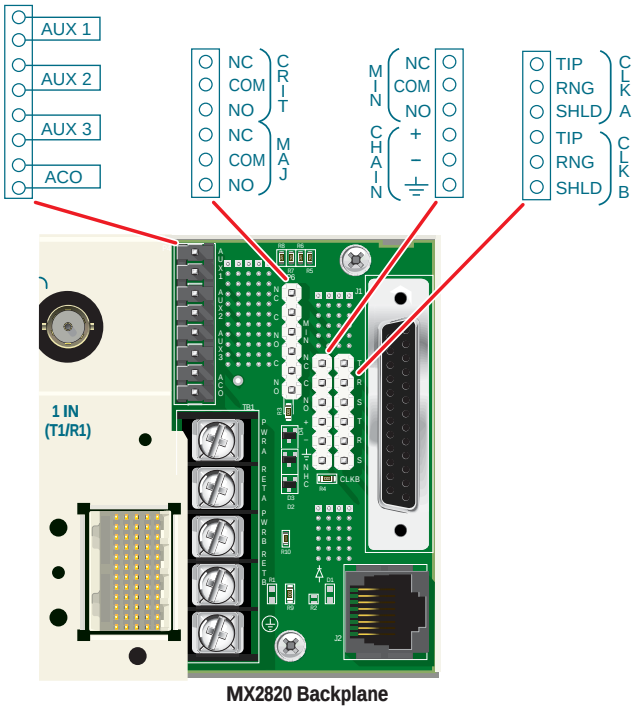


Figure 7-6. MX2820 Backplane Wire-Wrap Posts

PREREQUISITE PROCEDURES

Obtain all necessary local instructions before connecting the wire-wrap posts. This procedure should be performed before installing the DS3/STS-1 network and DSX-1 (T1/E1) network cabling. Before making external alarm connections, the MX2820 shelf should be mounted in its permanent location.

The CHAIN wire-wrap posts are intended for use in an RS-485 bus configuration. For details on interconnecting the shelves in an RS-485 bus configuration, refer to "DLP-712, Make RS-485 Bus Connections Between Shelves".

TOOLS REQUIRED

- wire cutters
- wire strippers
- wire-wrap tool

MATERIALS REQUIRED

- 22 or 24 two-conductor twisted pair cross-connect wire

WARNING

To prevent electrical shock, do not install equipment in a wet location or during a lightning storm.

CAUTION

Electronic modules can be damaged by static electrical discharge. Before handling modules, wear an antistatic discharge wrist strap to prevent damage to electronic components. Place modules in antistatic packing material when transporting or storing. When working on modules, always place them on an approved antistatic mat that is electrically grounded.

PROCEDURE

Wire Wrap CHAIN Posts

1. Measure and cut three pieces of wire long enough to reach from the **CHAIN** wire-wrap posts to **CHAIN** wire-wrap posts of the next shelf.
2. Use the wire strippers to strip 1 inch to 2 inches from both ends of each wire.
3. Use the wire-wrap tool to wrap the strands on the MX2820 backplane (see Figure 7-6) as follows:
   a. Wire wrap one strand to the CHAIN ground wire-wrap post, and route wire downward.
   b. Wire wrap one strand to the CHAIN negative (-) wire-wrap post, and route wire downward.
   c. Wire wrap one strand to the CHAIN positive (+) wire-wrap post, and route wire downward.

   If additional shelves are to be wired at this time for an RS-485 configuration, make the RS-485 Bus connection between the shelves. For details, refer to DLP-712.

Wire Wrap MIN Alarm Relay Posts

1. Determine whether the external alarm reporting device uses a normally open or normally closed circuit for the alarm relay.
2. Measure and cut three pieces of wire long enough to reach from the **MIN** wire-wrap posts to an Alarm Relay concentrator or to the external office alarm equipment that is to be connected to the MX2820 shelf.
3. Use the wire strippers to strip 1 inch to 2 inches from both ends of each wire.
4. Use the wire-wrap tool to wrap the strands on the MX2820 backplane (see Figure 7-6) as follows:
   a. Wire wrap one strand to the MIN center post (**COM**), and route wire downward.

b. Wire wrap one strand to the MIN Normally Closed (**NC**) post, and route wire downward.

c. Wire wrap one strand to the MIN Normally Open (**NO**) post, and route wire downward.

5. Route the wires to the Alarm Relay concentrator or to the external office alarm equipment, and connect the wires according to local instructions.

Wire Wrap CLKB and CLKA Posts

1. If the STS-1 application is being deployed that requires external timing, measure and cut six pieces of wire long enough to reach from the **CLKB** and **CLKA** wire wrap posts to the external clock source.

NOTE

Only CLKA should be wired if only one external clock source is utilized.

2. Use the wire strippers to strip 1 inch to 2 inches from both ends of each wire.
3. Use the wire-wrap tool to wrap the strands on the MX2820 backplane (see Figure 7-6) as follows:

a. Wire wrap one strand to the post labeled **S** for the CLKB terminal, and route wire downward.

b. Wire wrap one strand to the post labeled **R** for the CLKB terminal, and route wire downward.

c. Wire wrap one strand to the post labeled **T** for the CLKB terminal, and route wire downward.

d. Wire wrap one strand to the post labeled **S** for the CLKA terminal, and route wire downward.

e. Wire wrap one strand to the post labeled **R** for the CLKA terminal, and route wire downward.

f. Wire wrap one strand to the post labeled **T** for the CLKA terminal, and route wire downward.

4. Route the wires to the external clock source, and connect the wires according to local instructions. Figure 7-7 provides an example for wiring the clock terminals on the MX2820 backplane to an external clock source.

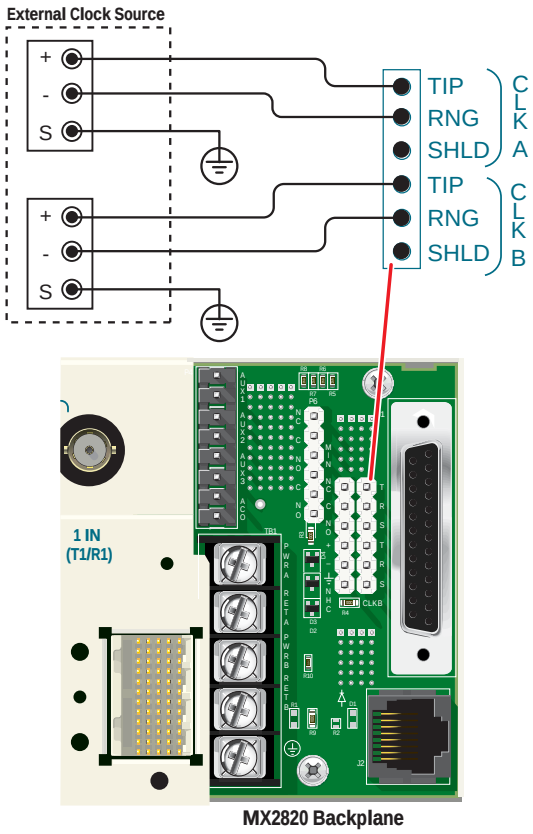


Figure 7-7. MX2820 CLKA and CLKB Terminal Connections to External Clock Source

Wire Wrap ACO Posts

1. Measure and cut three pieces of wire long enough to reach from the **ACO** wire-wrap posts on the MX2820 backplane to the external office alarm equipment.
2. Use the wire strippers to strip 1 inch to 2 inches from both ends of each wire.
3. Use the wire-wrap tool to wrap the strands on the ACO input posts (see Figure 7-6) as follows:
   a. Wire wrap one strand to the lowest ACO post, and route wire downward.
   b. Wire wrap one strand to the highest ACO post, and route wire downward.
4. Route the wires to the external office alarm equipment, and connect the wires according to local instructions.

Wire Wrap AUX3, AUX2, and AUX1 Alarm Input Posts

1. Measure and cut six pieces of wire long enough to reach from the **AUX3**, **AUX2** and **AUX1** alarm input posts on the MX2820 backplane to the external office alarm equipment.
2. Use the wire strippers to strip 1 inch to 2 inches from both ends of each wire.
3. Use the wire-wrap tool to wrap the strands on the AUX3, AUX2, and AUX1 alarm input posts (see Figure 7-6) as follows:

a. Wire wrap one strand to the lowest AUX3 post, and route wire downward.
b. Wire wrap one strand to the highest AUX3 post, and route wire downward.
c. Wire wrap one strand to the lowest AUX2 post, and route wire downward.
d. Wire wrap one strand to the highest AUX2 post, and route wire downward.
e. Wire wrap one strand to the lowest AUX1 post, and route wire downward.
f. Wire wrap one strand to the highest AUX1 post, and route wire downward.

4. Route the wires to the external office alarm equipment, and connect the wires according to local instructions.
5. Connect AUX3 as a Fan Module alarm. For details, refer to DLP-711.

Wire Wrap MAJ and CRIT Alarm Relay Posts

1. Measure and cut six pieces of wire long enough to reach from the **MAJ** and **CRIT** wire-wrap posts on the MX2820 backplane to the external office alarm equipment.
2. Use the wire strippers to strip 1 inch to 2 inches from both ends of each wire.
3. Use the wire-wrap tool to wrap the strands on the MX2820 backplane (see Figure 7-6) as follows:
   a. Wire wrap one strand to the MAJ center post (**COM**), and route wire downward.
   b. Wire wrap one strand to the MAJ Normally Closed (**NC**) post, and route wire downward.
   c. Wire wrap one strand to the MAJ Normally Open (**NO**) post, and route wire downward.
   d. Wire wrap one strand to the CRIT center post (**COM**), and route wire downward.
   e. Wire wrap one strand to the CRIT Normally Closed (**NC**) post, and route wire downward.
   f. Wire wrap one strand to the CRIT Normally Open (**NO**) post, and route wire downward.
4. Route the wires to the Alarm Relay concentrator or to the external office alarm equipment, and connect the wire according to local instructions.

FOLLOW-UP PROCEDURES

Once this procedure is complete, return to the procedure which called out this DLP and continue with the tasks indicated.

DLP-601
MX2820 Acceptance Test Procedure

INTRODUCTION

This procedure provides step-by-step instructions to verify that one or more MX2820 shelves are properly installed in a Central Office (CO). An Acceptance Test Checklist is provided at the end of this procedure for sign-off after completing this phase of the installation.

PREREQUISITE PROCEDURES

The following procedure must be completed before provisioning the SCU. If necessary, refer to the appropriate documentation before proceeding.

- "NTP-002, M13 MUX Installation"
- "NTP-004, STS-1 MUX Installation"

TOOLS REQUIRED

- A computer with Local Area Network (LAN) access if the MX2820 system is connected to a LAN

WARNING

To prevent electrical shock, do not install equipment in a wet location or during a lightning storm.

CAUTION

Electronic modules can be damaged by static electrical discharge. Before handling modules, wear an antistatic discharge wrist strap to prevent damage to electronic components. Place modules in antistatic packing material when transporting or storing. When working on modules, always place them on an approved antistatic mat that is electrically grounded.

PROCEDURE

1. Verify fan operation. If Fan Modules have been installed with the MX2820 system Menu

   a. Verify fan operation with a visual check.

      Verify that all fans are operating, and that no obstructions are present to impede the free air flow through the shelves.

   b. Verify that the Fan Module alarm input to the System Controller Unit (SCU) generates the proper alarm when the Fan Module fails. For details, refer to DLP-723.

2. Verify Alarm Relay output connections.

   If a shelf's alarm relays are wired to external alarming equipment, verify that the alarm relay outputs are properly wired and functioning. For details, refer to DLP-724.

3. Verify inter-shelf communications.

   If the installation consists of multiple shelves which are wired together via the RS-485 interface management bus, verify that the shelves are properly connected and communicating. Otherwise, omit this step. For details, refer to DLP-725.

4. Verify Internet Protocol (IP) LAN connection.

   If the MX2820 shelf connects via the 10/100Base-T Ethernet port to a network, verify that the network connection is properly configured and functioning. For details, refer to DLP-727.

FOLLOW-UP PROCEDURES

Once this procedure is complete, return to the procedure which called out this DLP and continue with the tasks indicated.

ACCEPTANCE TEST CHECKLIST

MX2820 Shelf Installation in a Central Office Checklist

Table 7-1 provides the checklist. Write N/A by any step which does not apply to the installed configuration.

Table 7-1. MX2820 Shelf Installation Checklist

Test Step	Completed (Initial)
1. Verify fan operation.	
2. Verify Alarm Relay output connection.	
3. Verify inter-shelf communication.	
4. Verify IP LAN connection.	

Comments

_____

_____

_____

_____

_____

_____

Installation Engineer Sign-off

Name (print): _____ Date Completed: _____

Signature: _____

Customer Sign-off

Name (print): _____ Date Completed: _____

Signature: _____

This page is intentionally blank.

DLP-602
MUX Module Acceptance Test Procedure

INTRODUCTION

This procedure provides step-by-step instructions to verify that one or more M13 MUX or STS-1 MUX modules are properly installed in an MX2820 shelf. An Acceptance Test Checklist is provided at the end of this procedure for sign-off after completing this phase of the installation.

NOTE

Reference to DS3 in this procedure applies also to STS-1.

Verification of Data Throughput

Three acceptance testing procedures are provided which include:

- DS1 daisy-chain to DS3 (hard) Loopback
- DS1 to DS3 “Head-to-Head” Test
- DS1 to DS3 (hard) Loopback
- MUX Module Redundancy

The test equipment available determines which method is selected for the acceptance testing procedure. These tests are to be performed at the DSX-1 and DSX-3 cross-connect bays to check the MX2820 circuitry and the CO cabling.

PREREQUISITE PROCEDURES

The applicable procedure must be completed prior to performing the MUX Module Acceptance Test Procedure. If necessary, refer to the appropriate documentation before proceeding. The applicable prerequisite procedure is one of the following:

- “NTP-004, STS-1 MUX Installation”
- “NTP-002, M13 MUX Installation”

TOOLS REQUIRED

Depending on the method being used, the following tools are required:

DS1 Daisy-chain to DS3 (Hard) Loopback

- DS1 test set capable of running a Bit Error Rate Test (BERT)
- 28 mini Bantam test cords
- DS3 test cord

DS1 to DS3 “Head-to-Head” Test

- DS1 test set capable of running a BERT test
- DS3 test set capable of accessing and running a BERT on a single DS1

DS1 to DS3 (Hard) Loopback

- DS1 test set capable of running a BERT test
- DS3 test cord

WARNING

To prevent electrical shock, do not install equipment in a wet location or during a lightning storm.

CAUTION

Electronic modules can be damaged by static electrical discharge. Before handling modules, wear an antistatic discharge wrist strap to prevent damage to electronic components. Place modules in antistatic packing material when transporting or storing. When working on modules, always place them on an approved antistatic mat that is electrically grounded.

PROCEDURE

NOTE

Ensure that the DS3 timing is configured to LOCAL during these tests.
Ensure that the STS-1 timing is configured to FREE-RUN or EXTERNAL during these tests.

DS1 Daisy-chain to DS3 (Hard) Loopback

This test loads up all 28 ports of the MX2820 system with traffic at the same time.

1. At the DSX-3 cross connect, use a test cord to loop the DS3 from the MX2820 back to itself.
2. At the DSX-1 cross connect, insert the TX OUTPUT of the DS1 test set into the INPUT of the first DS1 channel on the MX2820 system.
3. At the DSX-1 cross connect, install a Bantam test cord from the OUTPUT of the first DS1 channel to the INPUT of the second DS1 channel. Then connect a second Bantam test cord from the OUTPUT of the second DS1 channel to the INPUT of the third DS1 channel. Repeat this procedure for all 28 DS1 channels.
4. Connect the OUTPUT of the 28th DS1 channel to the RX INPUT of the DS1 test set.
5. Set the test set options for ESF/B8ZS and run a standard BERT test per operating company practices.
6. All alarms should clear, and the BERT test should run error free.
7. If problems are encountered, refer to the appropriate subsections in “Section 5, User Interface Guide” to help in troubleshooting and isolating the problem.
8. This step completes the DS1 Daisy-chain to DS3 (hard) Loopback test. If other acceptance tests are to be performed at this time, proceed to those tests within this procedure. Otherwise this procedure is complete.

DS1 to DS3 “Head-to-Head” Test

This test tests one DS1 channel at a time by using a DS1 test set at the DSX-1 cross connect and a DS3 test set at the DSX-3 cross connect.

1. At the DSX-3 cross connect bay, connect the DS3 test set to the DS3 coming from the MX2820 system. Configure the test set to drop out DS1 #1 and to run a BERT on it in ESF/B8ZS mode.
2. At the DSX-1 cross connect bay, connect the DS1 test set to the first DS1 channel of the MX2820 system. Configure the test set for the same BERT pattern as the DS3 test set is sending.
3. Verify data passes error free between the DS3 test set and the DS1 test set.

4. Repeat for DS1 channel 2 through 28 by moving the DSX-1 test cables, and reconfigure the
   DS3 test set to drop out the appropriate DS1 channel under test.
5. If problems are encountered, refer to the appropriate subsections in "Section 5, User Interface Guide" to help in troubleshooting and isolating the problem.
6. This step completes the DS1 to DS3 "Head-to-Head" test.

DS1 to DS3 (Hard) Loopback

This test tests one DS1 at a time.

1. At the DSX-3 cross connect bay, use a test cord to loop the DS3 from the MX2820 system back on itself.
2. At The DSX-1 Cross Connect Bay, insert the TX OUTPUT of the DS1 test set to the DS1 INPUT of the first channel of the MX2820 system. Connect the RX INPUT of the test set to the output of the first DS1 channel of the MX2820 system.
3. Set the DS1 test set for ESF/B8ZS and the desired BERT pattern. Verify data passes error free.
4. Repeat for the DS1 channels 2 through 28 (steps 2 - 3).
5. If problems are encountered, refer to the appropriate subsections in "Section 5, User Interface Guide" to help in troubleshooting and isolating the problem.
6. This step completes the DS1 to DS3 (hard) Loopback test.

MUX Module Redundancy

The MX2820 can be equipped with either one or two MUX Modules per slot. The MUX contains all of the critical circuitry, including the DS3 interface, DS1 interfaces, management and communications hardware/firmware, etc. If the slot is equipped with only one MUX, there is no protection against failure. If a failure does occur to the MUX, an alarm is initiated, and the front panel LEDs reflect the condition. The **ACT** LED is either solid or flashing red.

If the MX2820 is equipped with redundant modules, all traffic is protected and can be switched over to the Standby MUX in the event of a card failure. The following procedures demonstrate the functionality of a MUX switchover:

1. Using the BERT setup that should still be in place from previous testing, ensure that the system is still passing traffic error free.
2. Log into the MX2820 (if necessary) via the craft port to get to the Main Menu screen for the active MUX (green **ACT** LED). From there, select **PROVISIONING**, followed by **PROTECTION**.
3. **SELECT** the **PERFORM MANUAL SWITCH** option. This procedure forces a switch to the standby MUX. The screen display returns to the MX2820 Main Menu.
4. Verify that data is error free following the switch. (Data traffic will be interrupted momentarily during the switch but will become error free on the new module.)
5. Repeat steps 2 and 3 to make MUX A active (preferred arrangement for normal operation).

FOLLOW-UP PROCEDURES

Once this procedure is complete, return to the procedure which called out this DLP and continue with the tasks indicated.

ACCEPTANCE TEST CHECKLIST

MX2820 Shelf Installation in a Central Office Checklist

Table 7-2 provides the checklist. Write N/A by any step which does not apply to the installed configuration.

Table 7-2. MX2820 M13 MUX Installation Checklist

Test Step	Completed (Initial)
1. DS1 Daisy-chain to DS3/STS-1 (hard) Loopback.	
2. DS1 to DS3/STS-1 “Head-to-Head” Test.	
3. DS1 to DS3/STS-1 (hard) Loop-back.	
4. MUX Module Redundancy	

Comments

_____

_____

_____

_____

_____

_____

Installation Engineer Sign-off

Name (print): _____ Date Completed: _____

Signature: _____

Customer Sign-off

Name (print): _____ Date Completed: _____

Signature: _____

DLP-700
Code Upgrade Using TFTP

INTRODUCTION

This procedure provides step-by-step instructions to upgrade the software of selected MX2820 modules via the Trivial File Transfer Protocol (TFTP) mechanism.

Downloading new software consists of two procedures:

- "Pre-C01 Software upgrade Procedure"
- "C01, or Later, Software Upgrade Procedure"

Both procedures are provided in this section.

PREREQUISITE PROCEDURES

Obtain all necessary local instructions before performing the upgrade procedure.

PRE-C01 SOFTWARE UPGRADE PROCEDURE

1. If not already connected, connect VT100 terminal or PC to craft port. For details, refer to DLP-715.
2. Logon to the MX2820 system. For details, refer to DLP-716.
3. From the MX2820 Main Menu, select the **MODULE CODE DOWNLOAD** and press ENTER.
4. Select the module to upgrade:
   - SCU, select S - SCU

   NOTE

   A software upgrade to the SCU must be completed separately from other modules. It is recommended to complete the SCU first to take advantage of the new software in the upgrade process for other modules.

   - Other module, select the slot and position (for example, 4B)
5. From the Software Upload Method screen, select **TFTP** and press ENTER.
6. Provide the required information on the TFTP Update screen, as illustrated in Figure 7-8.

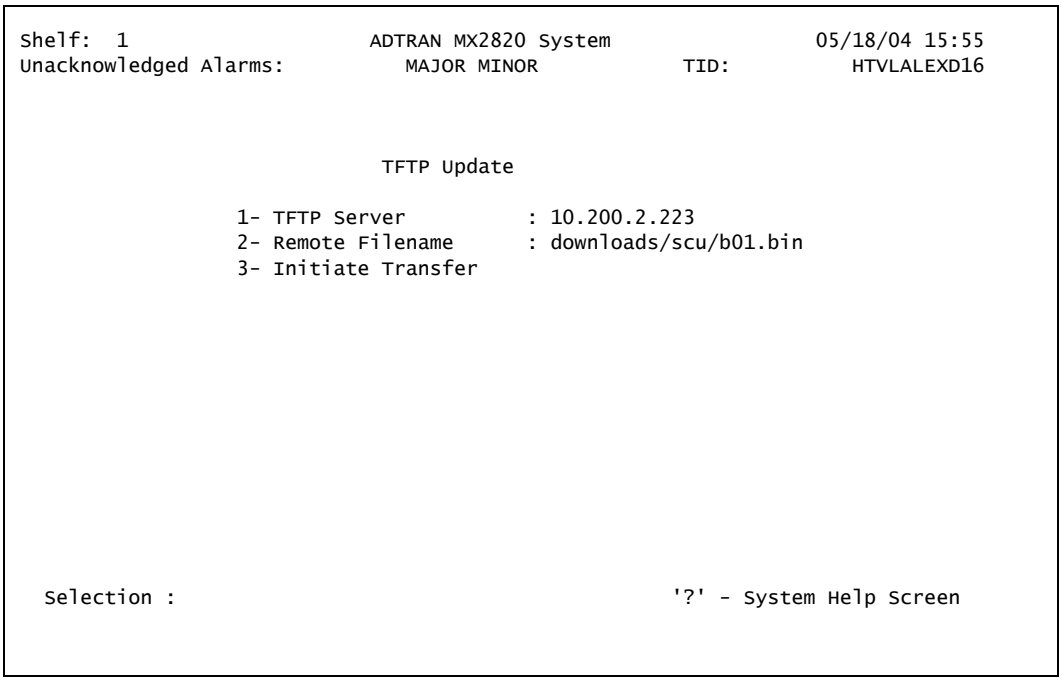


Figure 7-8. TFTP Update Screen

7. Make sure the Firmware TFTP server IP address is set. Consult the network administrator for this information.
8. Input the Remote Filename where the firmware image is located. This can include a path and filename to the code image file.
9. Select **INITIATE TRANSFER**.

   The upload routine begins and provides a status as follows:

   a. Downloading the Image

   b. Erase the Flash

   c. Reprogramming the Flash

   When the status indicates "Complete", the firmware is successfully upgraded.
10. Press ESC to return to the Module Download Screen.
11. Reset the module.

    The SCU *requires* resetting before the new code revision takes effect.

    a. From the MX2820 Main Menu screen, select **SYSTEM CONTROLLER** and press ENTER.

    b. From the System Controller menu, select **PROVISIONING** and press ENTER.

    c. From the Provisioning menu, select **REBOOT SCU** and press ENTER.

    d. Input a Y to confirm the reboot, and press ENTER.

    The active MUX must be manually reset following download of new software to that module. Select Card Reset from the MUX Provisioning menu. (The standby MUX, if equipped, will perform a reset automatically.

C01, OR LATER, SOFTWARE UPGRADE PROCEDURE

1. If not already connected, connect VT100 terminal or PC to craft port. For details, refer to DLP-715.
2. Logon to the MX2820 system. For details, refer to DLP-716.
3. From the MX2820 Main Menu, select **MODULE CODE DOWNLOAD** and press ENTER.

   Figure 7-9 illustrates the Module Download Screen.

```
Shelf:  1                    ADTRAN MX2820 System                 05/18/04 15:49
Unacknowledged Alarms:          MAJOR MINOR             TID:          HTVLALEXD16

                              Module Download Screen

                S - SCU......... [    D02]

               CA - MX2820 SMC.. [ A01.09]     CB - ............ [       ]
               1A - MX2820 M13.. [    D01]     1B - ............ [       ]
               2A - MX2820 M13.. [    D01]     2B - ............ [       ]
               3A - ............ [       ]     3B - ............ [       ]
               4A - MX2820 STS1. [ A00.39]     4B - ............ [       ]
               5A - ............ [       ]     5B - ............ [       ]
               6A - ............ [       ]     6B - ............ [       ]
               7A - ............ [       ]     7B - ............ [       ]

                G - Get Code Image             Code Image:
                U - Upload Selected Modules
                D - Deselect All               Please Get Code Image
                A - Select All


  Selection :              Inverse = Selected Cards  '?' - System Help Screen
```

Figure 7-9. Module Download Screen

4. Download the new image. Press G to obtain the image.
5. From the Software Upload Method screen, select **TFTP** and press ENTER.
6. Provide the required information on the TFTP Update screen, illustrated in Figure 7-10.

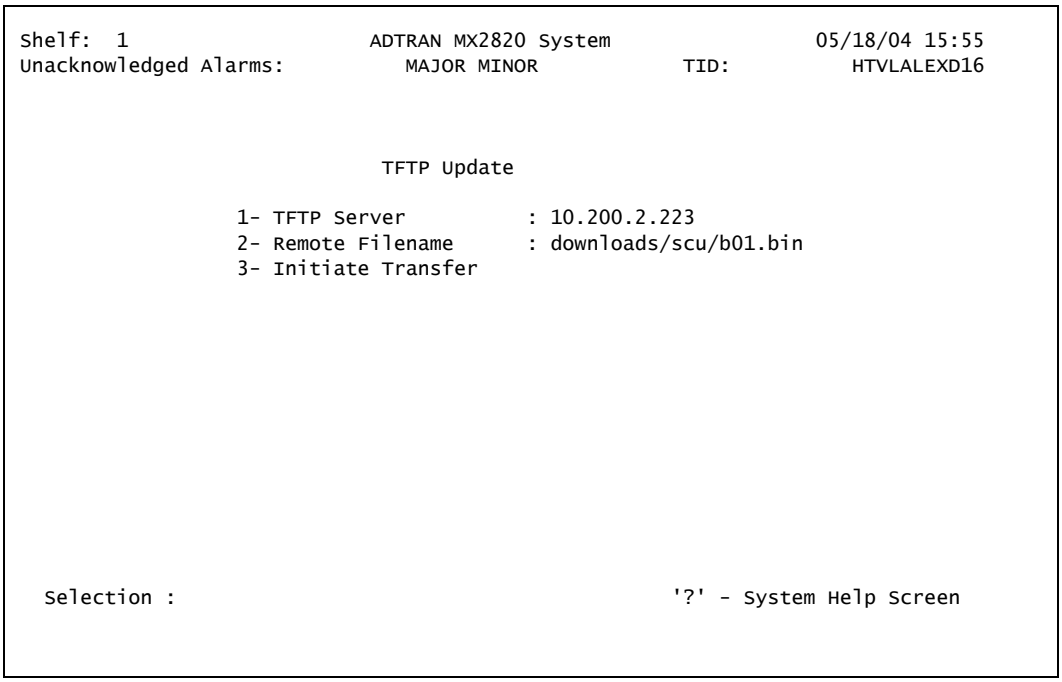


Figure 7-10. TFTP Update Screen

7. Make sure the Firmware TFTP server IP address is set. Consult the network administrator for this information.
8. Input the Remote Filename where the firmware image is located. This can include a path and filename to the code image file.
9. Select **INITIATE TRANSFER**.

   The upload routine begins and provides a status, “Downloading the Image”. When the status indicates complete, the firmware is successfully uploaded.
10. Press Esc to return to the Module Download Screen.
11. Select the module to upgrade:
    - SCU, select S - SCU
    - Clock Module, select CA or CB

NOTE

A software upgrade to the SCU must be completed separately from other modules. It is recommended to complete the SCU first to take advantage of the new software in the upgrade process for other modules.

- Other module, select the slot and position (for example, 4B)

NOTE

To select *all* of a particular module type, after entering the slot/position of the first, press A (all) then press ENTER.

Modules selected for upgrade will be highlighted in reverse video.

12. Press U then ENTER to initiate the transfer of the code image to each of the selected modules. The screen will indicate the percentage transferred, followed by a verifying step, and finally a writing step. When complete, the screen will indicate Done.
13. Reset the module, if necessary.

    Many modules will automatically restart their code without taking down the data interface. In this case, the module display will disappear momentarily and then restore, indicating the new code revision.

    In other cases, the Done indication will remain and a reset of the module is necessary from that modules Provisioning menu to initialize the new code.

FOLLOW-UP PROCEDURES

Once this procedure is complete, return to the procedure which called out this DLP and continue with the tasks indicated.

This page is intentionally blank.

DLP-701
Code Upgrade Using YModem

INTRODUCTION

This procedure provides step-by-step instructions to upgrade MX2820 module software using YModem.

Downloading new software consists of two procedures:

- Pre-C01 software
- C or newer release

Both procedures are provided in this section.

PREREQUISITE PROCEDURES

Obtain all necessary local instructions before performing the upgrade procedure.

NOTE

If the YModem is being used from the craft port interface, the download process can be expedited by setting the craft port baud rate to 115.2 kpbs.

PRE-C01 UPGRADE PROCEDURE

1. If not already connected, connect VT100 terminal or PC to the craft port. For details, refer to DLP-715.
2. Logon to the MX2820 system. For details, refer to DLP-716.
3. From the MX2820 Main Menu, select **MODULE CODE DOWNLOAD** and press ENTER.
4. Select the module to upgrade:
   - SCU, select S - SCU

NOTE

A software upgrade to the SCU must be completed separately from other modules. It is recommended to complete the SCU first to take advantage of the new software in the upgrade process for other modules.

- Other module, select the slot and position (for example, 4B)

5. From the Software Upload Method screen, select **YMODEM** and press ENTER.
6. Confirm the YModem transfer by pressing Y.

   The screen indicates Expecting YModem transfer, and the cursor displays C repeatedly.
7. Begin the YModem transfer within the terminal application. Refer to the application's user guide for help with this procedure.

   The menu indicates the percentage of flash erased, and then the percentage of flash written. When the status indicates `Flash Written`, the upload is complete.
8. Reset the module.

   The SCU requires resetting before the new code revision takes effect.

   a. From the MX2820 Main Menu, select **SYSTEM CONTROLLER** and press ENTER.

   b. From the System Controller menu, select **PROVISIONING** and press ENTER.

   c. From the Provisioning menu, select **REBOOT SCU** and press ENTER.

   d. Input a Y to confirm the reboot, and press ENTER.

   The active MUX must be manually reset following download of new software to that module. Select Card Reset from the MUX Provisioning menu. (The standby MUX, if equipped, will perform a reset automatically.

C01, OR LATER, SOFTWARE UPGRADE PROCEDURE

1. If not already connected, connect VT100 terminal or PC to craft port. For details, refer to DLP-715.
2. Logon to the MX2820 system. For details, refer to DLP-716.
3. From the MX2820 Main Menu, select **MODULE CODE DOWNLOAD** and press ENTER.

   Figure 7-11 illustrates the Module Download Screen.

```
Shelf:  1                    ADTRAN MX2820 System                 05/18/04 15:49
Unacknowledged Alarms:          MAJOR MINOR            TID:          HTVLALEXD16

                              Module Download Screen

                 S - SCU......... [    D02]

                CA - MX2820 SMC.. [ A01.09]     CB - ............ [       ]
                1A - MX2820 M13.. [    D01]     1B - ............ [       ]
                2A - MX2820 M13.. [    D01]     2B - ............ [       ]
                3A - ............ [       ]     3B - ............ [       ]
                4A - MX2820 STS1. [ A00.39]     4B - ............ [       ]
                5A - ............ [       ]     5B - ............ [       ]
                6A - ............ [       ]     6B - ............ [       ]
                7A - ............ [       ]     7B - ............ [       ]

                 G - Get Code Image             Code Image:
                 U - Upload Selected Modules
                 D - Deselect All               Please Get Code Image
                 A - Select All


  Selection :              Inverse = Selected Cards  '?' - System Help Screen
```

Figure 7-11. Module Download Screen

4. Download the new image. Press G to obtain the image.
5. From the Software Upload Method screen, select **Y-MODEM** and press ENTER.
6. Confirm the YModem transfer by pressing Y.

   The screen indicates Expecting YModem transfer, and the cursor displays C repeatedly.
7. Begin the YModem transfer within the terminal application. Refer to the application's user guide for help with this procedure.

   The menu indicates the percentage of flash erased, and then the percentage of flash written. When the status indicates `Flash Written`, the upload is complete.
8. Press ESC to return to the Module Download Screen.
9. Select the module to upgrade:
   - SCU, select S - SCU

NOTE

A software upgrade to the SCU must be completed separately from other modules. It is recommended to complete the SCU first to take advantage of the new software in the upgrade process for other modules.

   - Other module, select the slot and position (for example, 4B)

NOTE

To select ALL of a particular module type, after entering the slot/position of the first, press A (all) then press ENTER.

Modules selected for upgrade will be highlighted in reverse video.

10. Press U then ENTER to initiate the transfer of the code image to each of the selected modules. The screen will indicate that the software is "`writing`." When complete, the screen will indicate Done.
11. Reset the module, if necessary.

    Many modules will automatically restart their code without taking down the data interface. In this case, the module display will disappear momentarily and then restore, indicating the new code revision.

    In other cases, the Done indication will remain and a reset of the module is necessary from that modules Provisioning menu to initialize the new code.

FOLLOW-UP PROCEDURES

Once this procedure is complete, return to the procedure which called out this DLP and continue with the tasks indicated.

DLP-706
Connect Low-Speed Cabling

INTRODUCTION

This procedure provides step-by-step instructions to connect the low-speed (T1/E1 or VT/Port) cabling to the MX2820 shelf. The FutureBus connectors on the backplane of the MX2820 shelf provide the physical interface to the network. These connectors provide the Transmit pairs and Receive pairs for the circuits.

PREREQUISITE PROCEDURES

Obtain all necessary local instructions before proceeding with the MX2820 shelf installation.The instructions for routing and connecting the low-speed cabling from the MX2820 backplane to the network should be performed according to Central Office (CO) Standard Operating Procedures (SOP).

The MX2820 shelf should be mounted in its permanent location in the CO before connecting the cabling.

CAUTION

DSX-1, DS3, STS-1, and 10/Base-T Ethernet circuits from the MX2820 are not to be connected directly to outside plant facilities.

TOOLS REQUIRED

- Straight-slot screwdriver
- Wire strippers
- Wire-wrap tool

WARNING

To prevent electrical shock, do not install equipment in a wet location or during a lightning storm.

CAUTION

Electronic modules can be damaged by static electrical discharge. Before handling modules, wear an antistatic discharge wrist strap to prevent damage to electronic components. Place modules in antistatic packing material when transporting or storing. When working on modules, always place them on an approved antistatic mat that is electrically grounded.

PROCEDURE

1. Connect the FutureBus cables to the MX2820 shelf.

   The first row of connectors is for the Transmit side. The second row of connectors is for the Receive side. The 19-inch shelf has seven redundant pairs of connectors for the cable interface. The 23-inch shelf has nine redundant pairs of connectors for the cable interface. Figure 7-12 shows the insertion orientation for the MX2820 cable assembly.

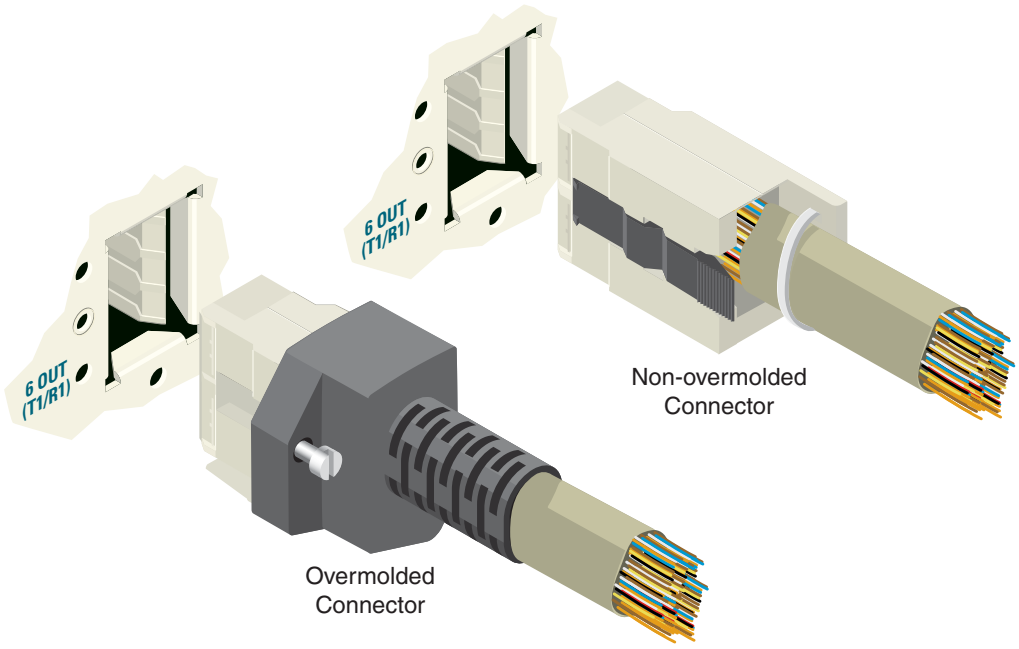


Figure 7-12. MX2820 Cable Assembly Insertion Orientation

2. Route the cables from the MX2820 shelf to the low-speed cross connect or to the appropriate connection.
3. If necessary, trim the cable to length and crimp on the appropriate connector for the connection point.
4. Neatly tie down the cable according to company guidelines.

FOLLOW-UP PROCEDURES

Once this procedure is complete, return to the procedure which called out this DLP and continue with the tasks indicated.

This page is intentionally blank.

DLP-708
Connect RJ-45 Cable

INTRODUCTION

This procedure provides step-by-step instructions to install the data cable to the RJ-45 port on the MX2820 backplane for a 10/100Base-T Ethernet connection.

The MX2820 system can provide Simple Network Management Protocol (SNMP) management capability, Telnet, and SSH access over an Ethernet connection. The System Controller Unit (SCU) has a built-in Ethernet interface. The MX2820 shelf connects to the Ethernet ring via the RJ-45 10/100Base-T port.

CAUTION

DSX-1, DS3, STS-1, and 10/Base-T Ethernet circuits from the MX2820 are not to be connected directly to outside plant facilities.

PREREQUISITE PROCEDURES

Obtain all necessary local instructions before proceeding with the MX2820 shelf installation.

TOOLS REQUIRED

MATERIALS REQUIRED

- Data cable
- Cable ties

WARNING

To prevent electrical shock, do not install equipment in a wet location or during a lightning storm.

CAUTION

Electronic modules can be damaged by static electrical discharge. Before handling modules, wear an antistatic discharge wrist strap to prevent damage to electronic components. Place modules in antistatic packing material when transporting or storing. When working on modules, always place them on an approved antistatic mat that is electrically grounded.

PROCEDURE

1. Plug the male RJ-45 modular connector into the female RJ-45 port on the MX2820 backplane.
2. Route the cable to the Ethernet Local Area Network (LAN) connector. Allow enough cable for routing the cable to the right from the backplane connector to the frame, and for neat tie-off appearance in accordance with Central Office (CO) Standard Operating Procedures (SOP).

FOLLOW-UP PROCEDURES

Once this procedure is complete, return to the procedure which called out this DLP and continue with the tasks indicated.

DLP-709
Connect High-Speed Cabling

INTRODUCTION

This procedure provides step-by-step instructions to install the DS3 or STS-1 network cabling to the backplane of the MX2820 shelf. Two standard BNC connectors provide the physical interface to the network for each Multiplexer (MUX) module or each pair for 1:1 redundant configuration. These BNC connectors provide the transmit and receive paths for the MX2820 system.

PREREQUISITE PROCEDURES

Obtain all necessary local instructions before proceeding with the MX2820 shelf installation. The instructions for routing and connecting the high-speed cabling from the MX2820 backplane to the DS3/STS-1 network should be performed according to Central Office (CO) Standing Operating Procedures (SOP).

The MX2820 shelf should be mounted in its permanent location in the CO before connecting the cabling.

CAUTION

DSX-1, DS3, STS-1, and 10/Base-T Ethernet circuits from the MX2820 are not to be connected directly to outside plant facilities.

TOOLS REQUIRED

- BNC connector
- BNC crimping tool
- Wire cutter

MATERIALS REQUIRED

- coaxial cable

WARNING

To prevent electrical shock, do not install equipment in a wet location or during a lightning storm.

CAUTION

Electronic modules can be damaged by static electrical discharge. Before handling modules, wear an antistatic discharge wrist strap to prevent damage to electronic components. Place modules in antistatic packing material when transporting or storing. When working on modules, always place them on an approved antistatic mat that is electrically grounded.

PROCEDURE

1. Determine which cable from the network is for transmitting and which is for receiving.
2. Attach the network transmit cable to the MX2820 BNC connector labeled **OUT**.

   The fitting is a standard BNC connector. Align the outer ring of the cable connector with the keys on the shelf connector barrel; press the cable in, and turn approximately one half turn clockwise to the locking position.
3. Attach the network receive cable to the MX2820 BNC connector labeled **IN**.

   The fitting is a standard BNC connector. Align the outer ring of the cable connector with the keys on the shelf connector barrel; press the cable in, and turn approximately one half turn clockwise to the locking position.
4. Route the coaxial cable to the high-speed cross connect or to the appropriate connection point.
5. If necessary, trim the cable to length and crimp on the appropriate connector for connecting to the cross connect or other connection point.
6. Repeat steps 2 - 5 for each MUX module or MUX pair for 1:1 redundant configuration.

FOLLOW-UP PROCEDURES

Once this procedure is complete, return to the procedure which called out this DLP and continue with the tasks indicated.

DLP-711
Connect Fan Module Alarm

INTRODUCTION

This procedure provides step-by-step instructions to connect the fan alarms.

- MX2820 Fan Module (P/N 1181006L1)
- Pusher Fan Module (P/N 1186006L1)

PREREQUISITE PROCEDURES

Obtain all necessary local instructions before proceeding with the MX2820 shelf installation. Since this procedure is used specifically for a Fan Module alarm, the Fan Module must be mounted to an installed heat baffle.

The MX2820 shelf should be mounted in its permanent location in the CO before connecting the external alarm outputs.

TOOLS REQUIRED

- Wire strippers
- Wire-wrap tool
- Phillips-head screwdriver

MATERIALS REQUIRED

- 22 or 24 AWG two-conductor twisted pair cross-connect wire

WARNING

To prevent electrical shock, do not install equipment in a wet location or during a lightning storm.

CAUTION

Electronic modules can be damaged by static electrical discharge. Before handling modules, wear an antistatic discharge wrist strap to prevent damage to electronic components. Place modules in antistatic packing material when transporting or storing. When working on modules, always place them on an approved antistatic mat that is electrically grounded.

PROCEDURE

MX2820 Fan Module, P/N 1181006L1

1. Locate the AUX3 wire-wrap post on the MX2820 backplane (see Figure 7-13).

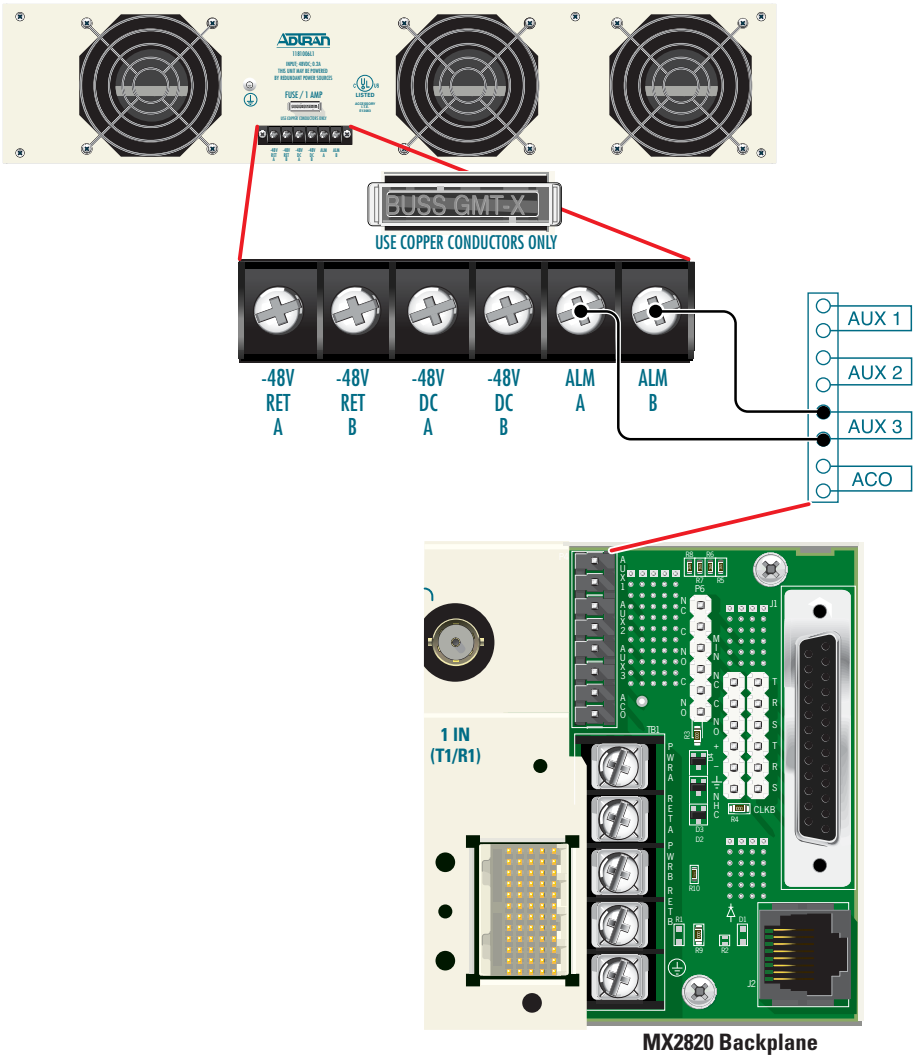


Figure 7-13. MX2820 Fan Connections and AUX3 Alarm Contacts

2. Measure and cut two strands of wire long enough to reach from the MX2820 Fan Module to the AUX3 wire-wrap post. Allow at least 1 to 2 inches of wire wrap for neat routing from the Fan Module to the AUX3 wire-wrap post.
3. Use the wire strippers to strip 1 inch to 2 inches from one end of each wire.
4. Remove the guard over the Fan Module terminal block.
5. Use the wire-wrap tool to wire-wrap one strand to the top input of the AUX3 wire-wrap post. Connect the other end to the Fan Module unit **ALM B** terminal.
6. Use the wire-wrap tool to wire wrap one end of the other strand of wire to the bottom input of the AUX3 wire wrap post. Connect the other end to the Fan Module unit **ALM A** terminal.
7. Re-install the guard over the Fan Module terminal block.

Pusher Fan Module, P/N 1186006L1

1. Locate the **ALM OUT** wire-wrap pins located behind a metal protective guard to the left of the power connectors on the rear of the Pusher Fan Module. See Figure 7-14.

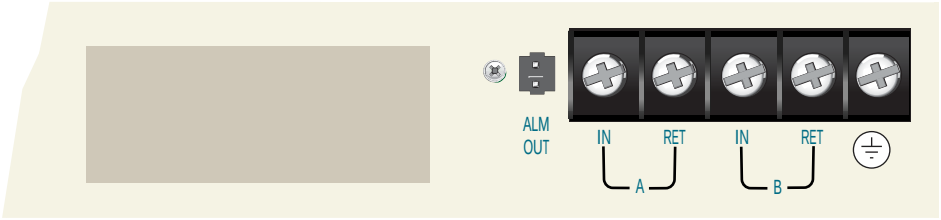


Figure 7-14. Pusher Fan Alarm and Power Connections

2. Measure and cut two strands of wire long enough to reach from the Pusher Fan Module to the AUX3 wire-wrap post. Allow at least 1 to 2 inches of wire wrap for neat routing from the Fan Module to the AUX3 wire-wrap post.
3. Use the wire strippers to strip 1 inch to 2 inches from one end of each wire.
4. Remove the guard over the Fan Module **ALM OUT** terminal.
5. Use the wire-wrap tool to wire-wrap one strand to the top input of the AUX3 wire-wrap post. Connect the other end to one input of the **ALM OUT** terminal.
6. Use the wire-wrap tool to wire wrap one end of the other strand of wire to the bottom input of the AUX3 wire wrap post. Connect the other end to the bottom input of the **ALM OUT** terminal.
7. Re-install the guard over the **ALM OUT** terminal block.

FOLLOW-UP PROCEDURES

Once this procedure is complete, return to the procedure which called out this DLP and continue with the tasks indicated.

This page is intentionally blank.

DLP-712
Make RS-485 Bus Connections Between Shelves

INTRODUCTION

This procedure provides step-by-step instructions to make RS-485 bus connections between MX2820 shelves.

Multiple shelves can be linked together for management from a single shelf that is designated as the host shelf. The maximum number of shelves depends on the configuration. This feature provides local or remote management for the shelves from the craft interface on the front panel of the host System Controller Unit (SCU) or external management ports.

The daisy chain of shelves linked together via the RS-485 bus can be up to 4000 feet long. Only one SCU, located at either end of the chain, is designated as the host SCU. The SCU that is to function as the host must be provisioned as the host. The SCUs that are to function as clients must be provisioned as clients. Procedures for designating the SCUs as host or clients are provided in NTP-004.

PREREQUISITE PROCEDURES

Obtain all necessary local instructions before proceeding with the MX2820 shelf installation. The MX2820 shelves should be mounted in their permanent location before making RS-485 bus connections.

TOOLS REQUIRED

- Wire strippers
- Wire-wrap tool
- Wire cutters

MATERIALS REQUIRED

- Shielded, twisted pair interconnect wire, with drain wire

WARNING

To prevent electrical shock, do not install equipment in a wet location or during a lightning storm.

CAUTION

Electronic modules can be damaged by static electrical discharge. Before handling modules, wear an antistatic discharge wrist strap to prevent damage to electronic components. Place modules in antistatic packing material when transporting or storing. When working on modules, always place them on an approved antistatic mat that is electrically grounded.

PROCEDURE

1. Measure and pre-cut wire.

   Determine and cut the length of wire necessary to reach from the RS-485 wire-wrap post in the first shelf in the chain to the RS-485 wire-wrap post in the second shelf. Allow for stripping the ends of the wire, routing the wires out of the shelf, and tying down in accordance with CO Standard Operating Procedures (SOP).

2. Make wire-wrap connections to the host shelf.

   Use the wire-wrap tool to connect the shielded, twisted-pair interconnect wire to the RS-485 wire-wrap post on the MX2820 backplane. Connect the two conductors to the positive and negative terminals, and connect the shield wire or drain wire to the ground post.

3. Make wire-wrap connections to the next shelf.

   Run the interconnect wire to the backplane of the next shelf in the chain. Use the wire-wrap tool to connect the two conductors of the interconnect wire to the RS-485 wire-wrap post on the backplane of the client shelf. Wire the two conductors to the positive and negative terminals, and wire the ground or shielded wire to the ground post. Be sure to connect the positive terminals of each shelf together and the negative terminals of each shelf together. Do not cross the polarities. The drain wire should be connected at only one end of the ground post, but not both.

4. Connect any additional shelves.

   If there are more shelves to be connected, repeat steps 1 - 3 for each shelf to be added to the chain. Disregard the designation of host and client for the additional shelves. Each shelf after the first one is a client shelf on the daisy chain.

FOLLOW-UP PROCEDURES

Once this procedure is complete, return to the procedure which called out this DLP and continue with the tasks indicated.

DLP-714
Connect Shelf to the X.25 Network

INTRODUCTION

This procedure provides step-by-step instructions to connect a MX2820 shelf to the X.25 network. The MX2820 system can send and receive Transaction Language 1 (TL1) commands over an X.25 network. The System Controller Unit (SCU) has a built-in X.25 PAD, and the shelf is ready to connect to the X.25 network via a DB-25 connector. Access to the network is via an RS-232 port labeled, NTWK MGMT.

PREREQUISITE PROCEDURES

Obtain all necessary local instructions before proceeding with the MX2820 shelf installation.

The MX2820 shelf should be mounted in its permanent location in the Central Office (CO) before connecting the shelf to the X.25 network.

MATERIALS REQUIRED

- DB-25 data cable with male connector on one end of the MX2820 shelf
- An appropriate connector to connect the X.25 switch or other X.25 equipment on the opposite end. The connector needs to be of sufficient length to reach from the MX2820 backplane to the X.25 equipment and tied down in accordance with Central Office (CO) Standard Operating Procedures (SOP).

WARNING

To prevent electrical shock, do not install equipment in a wet location or during a lightning storm.

CAUTION

Electronic modules can be damaged by static electrical discharge. Before handling modules, wear an antistatic discharge wrist strap to prevent damage to electronic components. Place modules in antistatic packing material when transporting or storing. When working on modules, always place them on an approved antistatic mat that is electrically grounded.

PROCEDURE

1. Connect the DB-25 data cable male connector to the female connector labeled **NTWK MGMT** on the MX2820 backplane. **Table 7-3** provides the pin assignments for the Network Management port.

Table 7-3. NTWK MGMT (X.25) Connector Pin Assignments

Pin Number	Function
1	Frame Ground (FG)
2	Transmit Data (TD) from DTE
3	Received Data (RD) into DTE
4	Request To Send (RTS)
5	Clear To Send (CTS)
6	Data Set Ready (DSR)
7	Signal Ground (SG)
8	Data Carrier Detect (DCD)
15	Transmit Clock (TC)
17	Receive Clock (RC)
20	Data Terminal Ready (DTR)
22	Ring Indicator (RI)
24	External Clock (EXC)

The MX2820 supports an RS-232 compatible serial interface to be used in conjunction with the X.25 network. The unit includes PAD functions onboard, so an external PAD is not required for operation with the X.25 network. Physical access uses a 25-pin female DB-25 connector. This port operates as a DTE and is configured for the following settings:

- 1-way in or 2-way operation
- Up to four SVCs
- Up to 64 kbps (synchronous)
- Packet size: 128 bytes
- Packet window: 2
- n2 retry limit: 3
- T1 ACK timer: 20 seconds
- T3 time out: 3 seconds
- k window size: 2

2. Connect the other end of the DB-25 data cable to the designated port of the X.25 equipment.

FOLLOW-UP PROCEDURES

Once this procedure is complete, return to the procedure which called out this DLP and continue with the tasks indicated.

This page is intentionally blank.

DLP-715
Connect Terminal or PC to Craft Port

INTRODUCTION

This procedure provides step-by-step instructions to connect a VT100 terminal or PC to the craft port. The MX2820 shelf management and provisioning is accomplished by a series of menus that are accessible on a computer screen. Connecting either a VT100 terminal or a PC emulating a VT100 terminal to the craft interface on the System Controller Unit (SCU) front panel allows access to the menus and management features of the MX2820 system.

PREREQUISITE PROCEDURES

An MX2820 SCU must be installed in the MX2820 shelf, and the shelf must be powered for terminal communication.

MATERIALS REQUIRED

- VT100 compatible terminal or computer with terminal emulation software
- Serial data cable to connect the terminal to the MX2820 shelf

WARNING

To prevent electrical shock, do not install equipment in a wet location or during a lightning storm.

CAUTION

Electronic modules can be damaged by static electrical discharge. Before handling modules, wear an antistatic discharge wrist strap to prevent damage to electronic components. Place modules in antistatic packing material when transporting or storing. When working on modules, always place them on an approved antistatic mat that is electrically grounded.

PROCEDURE

Connecting a VT100 Terminal to the MX2820 Shelf

1. Set the parameters for the VT100 terminal as follows:
   - 9600 baud rate
   - 8 data bits
   - No parity
   - 1 stop bit
   - No flow control
2. If the terminal has a parallel setting, disable it, and use the serial setting.
3. Plug the male end of the serial data cable into the craft port (DB-9 connector) on the SCU front panel.
4. Make the data cable connection to the VT100 terminal as appropriate for the equipment.

Connecting a PC emulating a VT100 Terminal to the MX2820 Shelf

Most Personal Computers (PC) or laptops can run communications software that emulates a VT100 terminal. Windows programs such as Terminal or Hyperterminal, are two examples, but there are other commercially available software packages which allows a PC or laptop to emulate a VT100 terminal. There are configuration items that must be set on a PC or laptop before they can emulate a VT100 terminal for the MX2820 system.

1. Set the parameters of the communications software as follows:
   - 9600 baud rate
   - 8 data bits
   - No parity
   - 1 stop bit
   - No flow control
2. Set the PC for direct connect on the appropriate com port.
3. Plug the male end of the serial data cable into the craft port (DB-9 connector) on the SCU front panel.
4. Make the data cable connection to the PC or laptop as appropriate for the equipment.

FOLLOW-UP PROCEDURES

Once this procedure is complete, return to the procedure which called out this DLP and continue with the tasks indicated.

Access to the MX2820 system is now available. “DLP-716, Logging on to the System” provides details for logging on to the MX2820 system.

DLP-716
Logging on to the System

INTRODUCTION

This procedure provides step-by-step instructions to logon to the MX2820 system. Once connected to the MX2820 System Controller Unit (SCU) via either a VT100 terminal or PC configured as a VT100 terminal, it is necessary to logon to the system to gain access to the management and provisioning functions.

A logon can be performed through the security of the MX2820 SCU or can require further authentication by a RADIUS server (Remote Authentication Dial In User Service) in accordance with procedures provided in IETF standard RFC2865.

Refer to "UIG-560, RADIUS" for additional information.

PREREQUISITE PROCEDURES

The following procedures must be completed before logging onto the system. If necessary, refer to the appropriate documentation before proceeding.

- "NTP-006, SCU Provisioning (System Security)"
- "DLP-715, Connect Terminal or PC to Craft Port"

ACCOUNT NAME AND PASSWORD

The *default* account name and password are to be entered in all capital letters. The MX2820 system has four levels of access granted to a user. The lowest level of access is READONLY, and allows the user to see, but not change the current system configuration. The next level, READWRITE, allows the user to both see and change system configuration parameters. The third level of access is the TEST level. This access level allows system testing. The fourth, ADMIN, is reserved for system or network administrators. **Table 7-4** provides the account names and passwords for the MX2820 system

Table 7-4. Default MX2820 Account Names and Passwords

Account Level	Account Name	Default Password
READ ONLY	READONLY	PASSWORD
READ/WRITE	READWRITE	PASSWORD
TEST	TEST	PASSWORD
ADMIN	ADMIN ADTRAN	PASSWORD
TECH SUPPORT *	Challenge Key	Response Key

* The Tech Support Account Level is established and accessed as directed by ADTRAN Technical Support during troubleshooting and analysis. See “Appendix B, Warranty”.

PROCEDURE

1. After connecting to the system, if a blank screen appears press any key to bring up the logon screen. After the logon screen appears, the cursor blinks at the Account Name field. For details, refer to DLP-715.
2. At the Account Name field, input the Account Name, and press ENTER. The cursor blinks at the Password field.
3. At the Password field, input the Password, and press ENTER.

NOTE

The Account Name and Password are case sensitive by default.

4. After inputting the correct password, one of the following responses will occur:
   - The MX2820 Main Menu displays, and the cursor flashes at the Selection field indicating successful logon to the MX2820 system.
   - The logon attempt can return an error message indicating an error in the Account Name or Password fields.
   - An additional security check can be required. If RADIUS is enabled, it is possible that the server will respond with a challenge request, in the form of a question on the screen requiring a response at the screen prompt. This response is transmitted to the RADIUS server, and if accepted, the logon will be successful and the MX2820 Main Menu will display.
5. To access a menu option, input the number of the desired menu option, and press ENTER.

NOTE

A navigation aid with keyboard shortcuts is available from any screen when the ? prompt is displayed at the lower right. Press the ? to display the navigation aid. Press Esc to return to the previous menu.

Help With Password

If there is a failure in the SCU or RADIUS authentication and a logon is not permitted, or if an administrator has forgotten their password, a failsafe password “adtranpleasehelp” is provided.

To utilize this password, follow these steps:

1. Call Tech Support. (800-726-8663)
2. As directed by Tech Support, enter the “adtranpleasehelp” password. A challenge screen will be displayed.
3. Enter the response to the challenge as provided by Tech Support.
4. This will set the account name “ADTRAN” to the default password “PASSWORD”. The RADIUS Authentication feature will be disabled.

NOTE

Notify the local network administrator if RADIUS has been disabled.

FOLLOW-UP PROCEDURES

Once this procedure is complete, return to the procedure which called out this DLP and continue with the tasks indicated.

This page is intentionally blank.

DLP-717
Set TIRKS Parameters for the SCU

INTRODUCTION

This procedure provides step-by-step instructions to set TIRKS parameters for the System Controller Unit (SCU). Remote management systems require a specific address and description for every system they manage. The Target ID (TID) and shelf number must be registered with the management system before it can find and manage the MX2820 system. This procedure assigns the codes to the MX2820 shelf for use with the management system.

NOTE

For multiple MX2820 shelves to operate on a daisy chain connected by the RS-485 bus, all shelves on the daisy chain must have a unique shelf number to identify the specific shelf. "DLP-712, Make RS-485 Bus Connections Between Shelves" and "NTP-004, STS-1 MUX Installation" provide information about the RS-485 configuration.

NOTE

The TIRKS system issues the TID and shelf number and should be provided to the installer as part of the MX2820 installation package. If not, contact the Central Office (CO) system administrator for the TID and shelf number assignment. For a CO that does not use the TIRKS system, values must still be put into the TID and shelf number locations if the shelf is to be used as a host or client on the RS-485 bus.

PREREQUISITE PROCEDURES

Obtain all necessary local instructions before proceeding with the MX2820 shelf installation.

The installer or system administrator must be connected and logged on to the MX2820 system to set the TIRKS parameters for the SCU.

MATERIALS REQUIRED

- Data cable to connect to the VT100 terminal or PC configured as a VT100 terminal
- VT100 terminal or PC configured as a VT100 terminal

WARNING

To prevent electrical shock, do not install equipment in a wet location or during a lightning storm.

CAUTION

Electronic modules can be damaged by static electrical discharge. Before handling modules, wear an antistatic discharge wrist strap to prevent damage to electronic components. Place modules in antistatic packing material when transporting or storing. When working on modules, always place them on an approved antistatic mat that is electrically grounded.

PROCEDURE

1. Connect the VT100 terminal or PC to the craft port on the front panel of the SCU. For details, refer to DLP-715.
2. Logon to the system. For details, refer to DLP-716.
3. From the MX2820 Main Menu, select **SYSTEM CONTROLLER** and press ENTER.
4. From the System Controller menu, select **PROVISIONING** and press ENTER.
5. From the Provisioning menu, select **TL1** and press ENTER.
6. From the TL1 menu, select **SYSTEM NAME** and press ENTER.
7. Input the TIRKS ID (TID), following the rules listed below, and press ENTER.

   The rules for TID usage are as follows:

   - TID characters must be upper case only
   - The first entry must be a letter
   - The final entry must be a letter or number (no symbols)
   - The only symbol allowed in the TID is the dash (–)
   - The TID length is limited to 20 characters

   Example: The TID that the TIRKS group issues consists of an 11 digit code similar to the format HTALEXD16.

   This TID is decoded as follows:

   - HTVL designates the city
   - AL designates the state

- EX identifies the CO or remote terminal location
- D identifies the equipment type (D is administrative equipment)
- 16 identifies the specific equipment for equipment type

8. Press ESC to return to the TL1 menu for the SCU.
9. From the TL1 menu, select Client **SHELF MANAGEMENT** and press ENTER.
10. Input the shelf type and number and press ENTER.
11. Press ESC until the MX2820 system Main Menu appears.
12. Return to the document that referenced this procedure and continue. Otherwise, this procedure is complete.

This page is intentionally blank.

DLP-718
Provision Network Management Settings

INTRODUCTION

This procedure provides step-by-step instructions to provision the Network Management settings for the MX2820 System Controller Unit (SCU). The Network Management settings include:

- Internet Protocol (IP) network settings (Ethernet Interface)
- Network Service ports
- Trivial File Transfer Protocol (TFTP) server

PREREQUISITE PROCEDURES

Obtain all necessary local instructions before provisioning the Network Management settings.

PROCEDURE

1. If not already connected, connect VT100 terminal or PC to the craft port. For details, refer to DLP-715.
2. Logon to the MX2820 system. For details, refer to DLP-716.
3. Provision IP network settings.

a. From the MX2820 Main Menu, select **SYSTEM CONTROLLER** and press ENTER.

Figure 7-15 shows the System Controller menu.

```
Shelf:  1                    ADTRAN MX2820 System                 04/26/04 10:53
Unacknowledged Alarms: None                                TID:          HTVLALEXD16



                                 System Controller

                               1 - Configuration
                               2 - Provisioning
                               3 - Status
                               4 - Test









  Selection :                                          '?' - System Help Screen
```

Figure 7-15. System Controller Menu

b. From the System Controller menu, select **PROVISIONING** and press ENTER.

Figure 7-16 shows Provisioning menu.

```
Shelf:  1                    ADTRAN MX2820 System                 04/26/04 12:26
Unacknowledged Alarms:                                     TID:          HTVLALEXD16



                                 Provisioning

                               1 - General
                               2 - Network Management
                               3 - SNMP
                               4 - TL1
                               5 - Smart Start
                               6 - Service States
                               7 - Reboot SCU









  Selection :                                          '?' - System Help Screen
```

Figure 7-16. Provisioning Menu

c. From the Provisioning menu, select **NETWORK MANAGEMENT** and press ENTER.

Figure 7-17 shows the Network Management menu.

```
Shelf:  1                    ADTRAN MX2820 System                 04/26/04 13:43
Unacknowledged Alarms:                                    TID:          HTVLALEXD16



                              Network Management

                  1 - Ethernet Interface
                  2 - Network Service Ports
                  3 - IP Forwarding
                  4 - TFTP Server             : 10.200.2.223









  Selection :                                          '?' - System Help Screen
```

Figure 7-17. Network Management Menu

d. From the Network Management menu, select **ETHERNET INTERFACE** and press ENTER.

Figure 7-18 shows the Ethernet Interface menu.

```
Shelf:  1                   ADTRAN MX2820 System                 04/26/04 13:44
Unacknowledged Alarms:                                  TID:          HTVLALEXD16



                              Ethernet Interface

                  1 - IP Address          : 10.200.3.32
                  2 - Subnet Mask         : 255.255.0.0
                  3 - Gateway             : 10.200.254.254
                      Ethernet Data Rate  : 10 Mbps
                  4 - Interface           : ENABLE
                      Ethernet Link       : Up
                      MAC Address         : 00:a0:c8:05:03:0a









  Selection :                                          '?' - System Help Screen
```

Figure 7-18. Ethernet Interface Menu

e. From the Ethernet Interface menu, select *IP Address*, and press ENTER.

f. Input the IP address, and press ENTER.

g. From the Ethernet Interface menu, select *Subnet Mask*, and press ENTER.

h. Input the Subnet Mask, and press ENTER.

i. From the Ethernet Interface menu, select *Gateway*, and press ENTER.

j. Input the Gateway address, and press ENTER.

k. From the Ethernet Interface menu, select *Ethernet Data Rate*, and press ENTER.

l. From the Ethernet Data Rate menu, select one of the following data rates then press ENTER:

- 1 for AUTO
- 2 for 10 Mbps
- 3 for 100 Mbps

m. From the Ethernet Interface menu, select **INTERFACE ETHERNET LINK MAC ADDRESS**, and press ENTER.

n. From the Interface Ethernet Link MAC Address menu, select one of the following options, and press ENTER:

- 1 to Enable

- 2 to Disable

o. Press ESC until the Network Management menu appears, then go to step 4.

4. Provision the Network Service ports.

a. From the Network Management menu, select **NETWORK SERVICE PORTS**, and press ENTER. Figure 7-19 shows the Network Service Ports menu.

```
Shelf:  1                    ADTRAN MX2820 System                 04/26/04 13:53
Unacknowledged Alarms:                                    TID:          HTVLALEXD16


                          Network Service Ports Screen

                    1 - TL1 Telnet Port             : 2000
                    2 - TL1 Raw-TCP Port            : 2001
                    3 - Secondary Telnet Port       : 2002









  Selection :                                        '?' - System Help Screen
```

Figure 7-19. Network Service Ports Menu

b. From the Network Service Ports Screen menu, select **TL1 TELNET PORT**, and press ENTER.

c. Input a value from 1024 to 65535 to set a Secondary Telnet port, and press ENTER.

d. Press ESC until the Network Management menu appears, then go to step 5.

5. Provision the TFTP server.
   a. From the Network Management menu, select **TFTP SERVER** and press ENTER.

      Figure 7-20 shows the TFTP Server menu screen

```
Shelf:  1                    ADTRAN MX2820 System                 04/26/04 13:53
Unacknowledged Alarms:                                    TID:          HTVLALEXD16




    Current TFTP Server : 10.200.2.223

    Enter hostname:

                                                                '?' - System Help Screen
```

Figure 7-20. TFTP Server Menu

   b. Input the hostname or IP address for the server, and press ENTER.
   c. Press ESC until the MX2820 Main Menu appears.

FOLLOW-UP PROCEDURES

Once this procedure is complete, return to the procedure which called out this DLP and continue with the tasks indicated.

DLP-723
Verifying Fan Module Alarm Connection to the SCU

INTRODUCTION

This procedure provides step-by-step instructions to verify the Fan Module's alarm relay contacts are properly wired to the System Controller Unit (SCU) external alarm inputs. This procedure also verifies that the SCU is properly provisioned to indicate a Fan Module failure when a failure condition is indicated by the Fan Module.

This procedure should be performed after the installation for each MX2820 shelf that has a Fan Module installed in the shelf's heat baffle.

PREREQUISITE PROCEDURES

The following procedures must be completed before verifying fan unit alarm connection to the SCU. If necessary, refer to the appropriate documentation before proceeding.

- "NTP-005, SCU Provisioning (System Management)"
- "NTP-006, SCU Provisioning (System Security)"

TOOLS REQUIRED

- Fuse Extractor (if required by model of fan fuse in use)

WARNING

To prevent electrical shock, do not install equipment in a wet location or during a lightning storm.

CAUTION

Electronic modules can be damaged by static electrical discharge. Before handling modules, wear an antistatic discharge wrist strap to prevent damage to electronic components. Place modules in antistatic packing material when transporting or storing. When working on modules, always place them on an approved antistatic mat that is electrically grounded.

PROCEDURE

1. Connect to the craft port for the shelf being tested. For details, refer to DLP-715.
2. Logon to the system. For details, refer to DLP-716.
3. Go to the shelf's Master Alarm log.
   a. From the MX2820 system Main Menu, select **SYSTEM ALARMS** and press ENTER.
   b. From the System Alarms menu, select **ALARM LOGS**.
   c. Check the Master Alarms log to verify that no active alarm is indicated for the Fan Module. The Fan Module failure alarm is generated when the AUX3 input is set to act as a fan alarm, and the AUX3 input receives an alarm signal. The name of the fan alarm is user definable with the User Definable menu.
   d. If an alarm is indicated, check to make sure the Fan Module is powered and working. If the Fan Module is operating, but an alarm is still present, check the wiring between the Fan Module and the MX2820 shelf to verify the wiring is correct. For details, refer to DLP-711.

   Take corrective action to clear the alarm before proceeding.
4. Locate the fuse in the fuse panel that feeds the Fan Module being tested.

CAUTION

Verify the fuse is the correct fuse. Pulling the wrong fuse can remove power from an active transmission system and result in service-affecting problems.

5. Use the fuse extractor, if necessary to remove the Fan Module fuse from the fuse panel. If no fuse panel fuse exists for the Fan Module, remove the fuse from the rear of the Fan Module instead.
6. Check the System Alarm log to verify that an active alarm appears which has the description associated with the AUX3 fan failure. Verify that the alarm level matches the user-definable level assigned during the installation procedure. Minor is the default level for this alarm. If an alarm does not appear, check the alarm wiring between the Fan Module and the MX2820 shelf. For details, refer to DLP-711.
7. Re-install the Fan Module fuse.

8. Check the System Alarm log to verify the AUX3 fan failure alarm clears. The original AUX3 fan failure active alarm remains in the System Alarm log, but should no longer be reversed video. A new line should appear in the System Alarm log and indicate that the fan failure alarm has cleared.
9. At the Master Alarm screen, select (C)lear to clear inactive alarms.
10. Repeat this test for each shelf with a Fan Module.

FOLLOW-UP PROCEDURES

Once this procedure is complete, return to the procedure which called out this DLP and continue with the tasks indicated.

This page is intentionally blank.

DLP-724
Verifying Alarm Relay Output Connections

INTRODUCTION

This procedure provides step-by-step instructions to verify the MX2820 shelf's external alarm relay outputs are properly connected to any office alarm equipment.

This procedure should be performed after the installation for each MX2820 shelf that is wired to external office alarm equipment.

PREREQUISITE PROCEDURES

The following procedure must be completed before verifying alarm relay output connections. If necessary, refer to the appropriate documentation before proceeding.

- "DLP-506, Connect MX2820 Wire-Wrap Posts"

MATERIALS REQUIRED

- VT100 terminal or PC with VT100 terminal emulation software

WARNING

To prevent electrical shock, do not install equipment in a wet location or during a lightning storm.

CAUTION

Electronic modules can be damaged by static electrical discharge. Before handling modules, wear an antistatic discharge wrist strap to prevent damage to electronic components. Place modules in antistatic packing material when transporting or storing. When working on modules, always place them on an approved antistatic mat that is electrically grounded.

PROCEDURE

1. Connect to the craft port for the shelf being tested. For details, refer to DLP-715.
2. Logon to the MX2820 system. For details, refer to DLP-716.
3. From the MX2820 system Main Menu, select **SYSTEM CONTROLLER** and press ENTER.
4. From the System Controller menu, select **TEST**.
5. From the Test menu, select **TEST ALARM RELAYS**.
6. Configure the Alarm Relay Concentrator for Out-of-Service or Test.

   If the MX2820 shelf connects to an Alarm Relay Concentrator which connects to an upstream alarm system, configure the Concentrator in Out-of-Service or Test mode for the MX2820 shelf's input positions so that no alarms are forwarded. Refer to the appropriate Alarm Relay Concentrator documentation.
7. Check the Critical relay.
   a. From the Alarm Relay Tests Screen menu, select option 1, and press ENTER to toggle the Critical relay on.
   b. Verify that the Alarm Relay Concentrator indicates a critical alarm for the shelf location.
   c. Select menu option 1, and press ENTER to toggle the Critical relay off.
   d. Verify that the alarm indication clears on the Concentrator.
8. Check the Major relay.
   a. From the Alarm Relay Tests Screen menu, select option 2, and press ENTER to toggle the Major relay on.
   b. Verify that the Alarm Relay Concentrator indicates a major alarm for the shelf location.
   c. Select menu option 2, and press ENTER to toggle the Major relay off.
   d. Verify that the alarm indication clears on the Concentrator.
9. Check the Minor relay.
   a. From the Alarm Relay Tests Screen menu, select option 3, and press ENTER to toggle the Minor relay on.
   b. Verify that the Alarm Relay Concentrator indicates a minor alarm for the shelf location.
   c. Select menu option 3, and press ENTER to toggle the Minor relay off.
   d. Verify that the alarm indication clears on the Concentrator.
10. Repeat steps 7 - 10 for each MX2820 shelf connected to external alarm equipment.
11. Restore the Alarm Relay Concentrator.

    If the Alarm Relay Concentrator was re-provisioned, restore the provisioning. Verify that the Concentrator does not show any alarm states for the MX2820 shelf.

FOLLOW-UP PROCEDURES

Once this procedure is complete, return to the procedure which called out this DLP and continue with the tasks indicated.

DLP-725
Verifying Intershelf Communication

INTRODUCTION

This procedure provides step-by-step instructions to verify the host System Controller Unit (SCU) can properly communicate with all client SCUs connected on the RS-485 bus. This procedure must be performed if two or more MX2820 shelves are connected together via the RS-485 bus.

PREREQUISITE PROCEDURES

Before starting this procedure, all installation tasks in DLP-712 should be completed. For intershelf communication, the Target ID (TID) and shelf number for each SCU must be properly configured and, the RS-485 interface must be enabled for each SCU (shelf). One SCU must be configured for Host mode while all other SCUs must be configured in Client mode.

MATERIALS REQUIRED

- VT100 terminal or PC with VT100 terminal emulation software

WARNING

To prevent electrical shock, do not install equipment in a wet location or during a lightning storm.

CAUTION

Electronic modules can be damaged by static electrical discharge. Before handling modules, wear an antistatic discharge wrist strap to prevent damage to electronic components. Place modules in antistatic packing material when transporting or storing. When working on modules, always place them on an approved antistatic mat that is electrically grounded.

PROCEDURE

1. Connect to the Host SCU craft interface port. For details, refer to DLP-715.
2. Log on to the system. For details, refer to DLP-716.
3. Establish a Host system, if not previously done.
   a. Access the MX2820 Main Menu of the system desired as the Host.
   b. From the Main Menu, select **PROVISIONING**, and press ENTER.
   c. From the Provisioning menu, select **GENERAL**, and press ENTER.
   d. From the General menu, select **MANAGEMENT PORTS**, and press ENTER.
   e. From the Management Ports menu, select **INTERBANK COMM. MODE**.
   f. Select **HOST**, and press ENTER.
4. From the MX2820 Main Menu, select **AUXILIARY SHELF ACCESS**, and press ENTER.
   a. Check the list of shelves presented by the SCU to ensure that all shelves connected on the RS-485 bus appear. Each shelf should appear listed by CLLI code and TIRKS ID number. An asterisk (*) should distinguish the shelf containing the Host SCU.
   b. If a shelf does not appear on the list, check the following items in the order listed until the problem is corrected:
      - Verify the RS-485 bus wiring between shelves. Refer to "DLP-712, Make RS-485 Bus Connections Between Shelves" for additional information.
      - Verify that the shelf is powered and that the SCU is active.
      - Verify that the shelf is properly provisioned with a CLLI code and TIRKS ID number.
      - Verify that each shelf in the chain has a unique Target ID number.
      - Verify that each shelf has the RS-485 bus enabled.
      - Verify that only one SCU in the chain is configured for Host mode.
5. Perform a Bank Connect to the Client shelf.

   Pick the first Client shelf from the list. Do not attempt to select the Host shelf from the list since this connection is not allowed. Type the number next to the Client shelf, and press ENTER to perform a bank connect. The Main Menu for the Client shelf should appear. If the Main Menu appears, then communication between the Host SCU and Client SCU works properly. If communication fails, check the items listed in step 4.
6. Disconnect from the Client shelf.

   Press ESC to return to the Client shelf's Main Menu, select the **LOGOFF** option, and press ENTER. The bank selection menu of the Host SCU should appear.
7. Repeat the Bank Connect for each Client shelf.

   Repeat step 5 and step 6 for each Client shelf in the chain.
8. Return to the document that referenced this procedure and continue. Otherwise, this procedure is complete.

FOLLOW-UP PROCEDURES

Once this procedure is complete, return to the procedure which called out this DLP and continue with the tasks indicated.

DLP-727
Verifying SCU Communication over an IP LAN

INTRODUCTION

This procedure provides step-by-step instructions to verify the System Controller Unit (SCU) can properly communicate over an Internet Protocol (IP) Local Area Network (LAN).

PREREQUISITE PROCEDURES

The following procedure must be completed before verifying SCU communication over an IP LAN. If necessary, refer to the appropriate documentation before proceeding.

- "DLP-718, Provision Network Management Settings"

MATERIALS REQUIRED

PC or other computer which has access to the LAN

PROCEDURE

1. Logon to the system. This procedure requires logging on the system as the system or network administrator. For details, refer to DLP-716.
2. Check the SCU IP address. Manually check for the address in the Provisioning menu for the SCU. For details, refer to DLP-718.
3. Ping the SCU from a remote computer on the network.

NOTE

Refer to the documentation for the computer system, if necessary, for assistance on how to perform a Ping command. Most computers running a network version of Microsoft Windows or UNIX allow a Ping to be performed by typing “ping<IP address>” at the command line prompt. The Ping program responds by indicating that the remote IP address has either responded in a certain amount of time or that no response was received. Some versions of Ping continue running until told to stop. If the program does not terminate on its own, try typing CTRL+C to get the program to stop.

a. Use a remote computer connected to the LAN to perform an ICMP Ping on the IP address of the SCU. Verify that the SCU responds.

b. If the SCU fails to respond, perform the following steps:

- Verify the proper IP address, Subnet Mask, and Default Gateway are provisioned in the SCU. For details, refer to DLP-718.
- Verify the shelf containing the SCU is properly cabled into the LAN and that the 10/100Base-T cable is properly seated in the RJ-45 jack on the rear of the shelf. If multiple shelves are present, make sure the network cable is plugged into the proper shelf.
- If the MX2820 shelf is connected to a hub or other network device that provides a carrier sense light for each port, verify that the carrier sense light for the port to which the shelf is connected is lighted. If not, check the cabling between the hub and the shelf.

c. If the substeps in step b are not successful, contact the LAN administrator for assistance.

4. From the computer used in step 3, Telnet to the SCU. Verify that the Telnet session opens properly and a list of shelves are present.

NOTE

Refer to the documentation for the computer system, if necessary, for assistance on how to perform a Telnet. Most computer systems running a network version of Microsoft Windows or UNIX allow a Telnet to be performed by typing “Telnet<IP address>” at a command line prompt. Telnet is a utility common on many LANs that allows remote access to another computer or equipment. Performing a Telnet to an SCU results in the user being presented with a list of shelves available for connection. Selecting one of the shelves from the list provides access to the same menu interface that is available through the craft interface port on the front panel of the SCU. Some versions of Telnet displays these menus in the same window from which the Telnet command is issued while others open a separate window to display the Telnet session.

5. Perform a Simple Network Management Protocol (SNMP) query on the SCU.

   If the SCU is to be managed remotely using an SNMP management station, then the network connection between the SCU and the management station should be tested.

   Contact the administrator of the SNMP management system, and provide the administrator with the IP address and the SNMP community name strings for the SCU. Ask the administrator to perform an SNMP query on the MIB II System Group to ensure the management system can access the SCU.

   If the SNMP management system cannot query the SCU, contact the local SNMP network administrator for assistance.

NOTE

The SNMP community name strings are set on the SNMP Provisioning menu for the SCU. The default value for the Read Community Name is public. The default Write Community Name is private.

FOLLOW-UP PROCEDURES

Once this procedure is complete, return to the procedure which called out this DLP and continue with the tasks indicated.

This page is intentionally blank.

DLP-729
Enable or Disable Smart Start

INTRODUCTION

This procedure provides step-by-step instructions to enable or disable the Smart Start feature for the MX2820 System Controller Unit (SCU). The Smart Start feature allows an SCU to be replaced and have the new SCU operate with the same settings as the SCU being replaced.

PREREQUISITE PROCEDURES

Obtain all necessary local instructions before enabling or disabling the Smart Start feature.

PROCEDURE

1. If not already connected, connect VT100 terminal or PC to craft port. For details, refer to DLP-715
2. Logon to the MX2820 system. For details, refer to DLP-716

3. From the MX2820 Main Menu, select **SYSTEM CONTROLLER,** and press ENTER.

   Figure 7-21 shows the Main Menu screen.

```
Shelf:  1                    ADTRAN MX2820 System                 04/26/04 10:53
Unacknowledged Alarms: None                                TID:         HTVLALEXD16



                                 System Controller

                               1 - Configuration
                               2 - Provisioning
                               3 - Status
                               4 - Test









  Selection :                                          '?' - System Help Screen
```

Figure 7-21. System Controller Main Menu

4. From the System Controller menu, select option **PROVISIONING,** and press ENTER.

   Figure 7-22 shows the Provisioning screen.

```
Shelf:  1                    ADTRAN MX2820 System                 04/26/04 12:26
Unacknowledged Alarms: None                                TID:         HTVLALEXD16



                                 Provisioning

                               1 - General
                               2 - Network Management
                               3 - SNMP
                               4 - TL1
                               5 - Smart Start
                               6 - Service States
                               7 - Reboot SCU









  Selection :                                          '?' - System Help Screen
```

Figure 7-22. SCU Provisioning Menu

5. From the Provisioning menu, select **SMART START,** and press ENTER.

   Figure 7-23 shows the Smart Start screen.

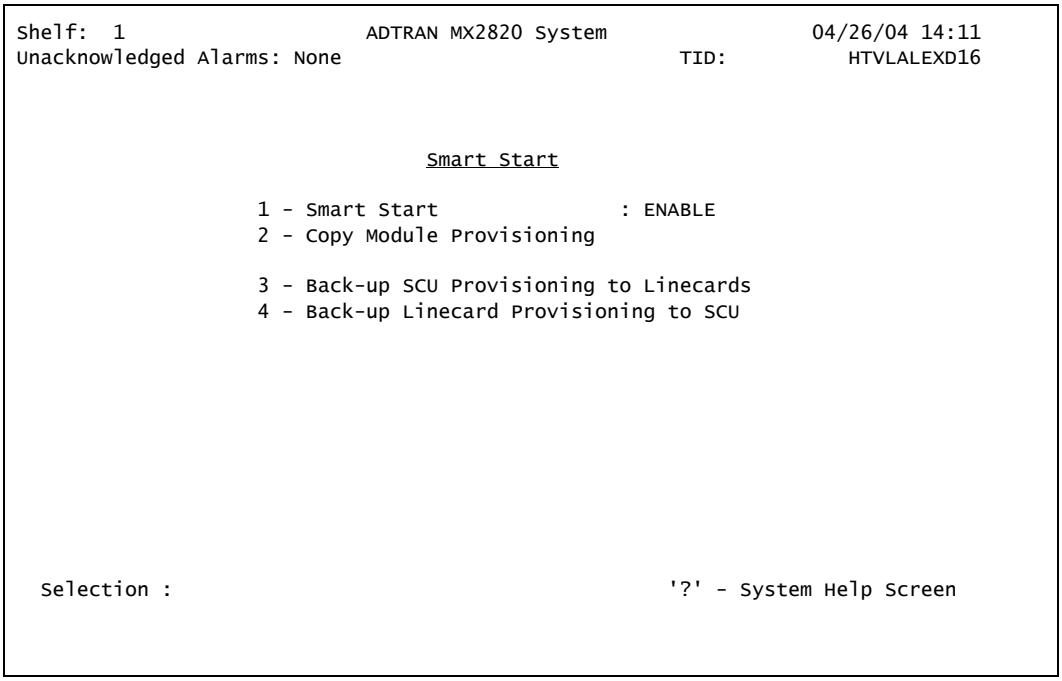


Figure 7-23. Smart Start Screen

6. From the Smart Start menu, input a 1 for the Smart Start provisioning screen - to Disable or Enable the Smart Start feature, and press ENTER.

   Figure 7-24 shows the Smart Start provisioning screen.

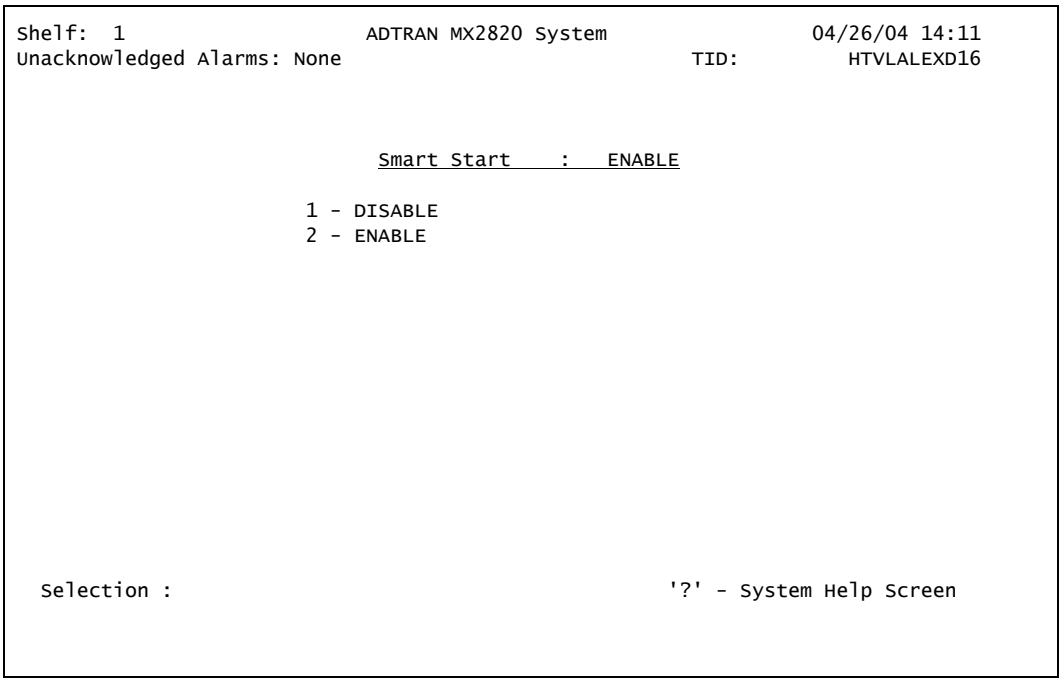


Figure 7-24. Provisioning Smart Start

7. From the Smart Start provisioning screen, input a 2 to enable, or input a 1 to disable the Smart Start feature, and press ENTER.

> **NOTE**
>
> The default option for Smart Start is **ENABLED**. If set to **DISABLED**, a new module from the factory will not know to retrieve the data from the access modules. Factory default provisioning will be utilized by the new module.

8. Press ESC as required to return to the MX2820 Main Menu.
9. Return to the document that referenced this procedure and continue. Otherwise, this procedure is complete.

FOLLOW-UP PROCEDURES

Once this procedure is complete, return to the procedure which called out this DLP and continue with the tasks indicated.

DLP-730
Provision DS3/DS2 Network

INTRODUCTION

This procedure provides step-by-step instructions to provision the DS3/DS2 Network for the MX2820 system.

PREREQUISITE PROCEDURES

Obtain all necessary local instructions before provisioning the DS3/DS2 network. The parameters need to be set to match the desired application.

DS3/DS2 PROVISIONING DATA

Provisioning data includes the following:

- DS3 framing
- DS3 timing
- DS3 remote loopbacks
- DS3 XCV threshold
- IP Forwarding Protocol
- IP Forwarding MTU
- DS2 mode (1-7)
- DS3 Equipment Identification

NOTE

In the case of 1:1 protection, provisioning the Active M13 MUX module automatically provisions the Standby M13 MUX module.

PROCEDURE

1. If not already connected, connect the VT100 terminal or PC to the craft port. For details, refer to DLP-715.
2. Logon to the MX2820 system. For details, refer to DLP-716.
3. From the MX2820 Main Menu, select **ACCESS MODULES** and press ENTER.

   Figure 7-25 shows the Access Module Menus for a 19-inch shelf.

```
Shelf:  1                    ADTRAN MX2820 System                  05/04/04 09:29
Unacknowledged Alarms: None                                   TID:      HTVLALEXD16

                              Access Module Menus

          1      A - ............ [None]          B - ............ [None]
          2      A - ............ [None]          B - ............ [None]
          3      A - ............ [None]          B - ............ [None]
          4      A - MX2820 M13.. [Critical]      B - MX2820 M13.. [None]
          5      A - ............ [None]          B - ............ [None]
          6      A - ............ [None]          B - ............ [None]
          7      A - ............ [None]          B - ............ [None]









  Select Mux:               Inverse = Busy Modules    '?' - System Help Screen
```

Figure 7-25. Access Module Menus

4. From the Access Module Menus, select the slot number for the M13 MUX module that is to be provisioned, and press ENTER.

   Figure 7-26 shows the Access Modules Main Menu screen.

```
Shelf:  1                    ADTRAN MX2820 System                  05/04/04 09:29
Unacknowledged Alarms: None                                  TID:       HTVLALEXD16




                                   Main Menu

                              1 - Configuration
                              2 - Provisioning
                              3 - Status
                              4 - Test
                              5 - Performance Monitoring









   Selection:                                          '?' - System Help Screen
```

Figure 7-26. Access Modules Main Menu

5. From the Access Module Main Menu, select **PROVISIONING** and press ENTER.

   Figure 7-27 shows the Access Modules Provisioning menu.

```
Shelf:  1  Slot:  1A         ADTRAN MX2820 System                  04/26/04 16:26
Unacknowledged Alarms: None                                  TID:          HTVLALEXD16




                                  Provisioning

                             1 - Network Interface
                             2 - T1/E1 Interfaces
                             3 - Service States
                             4 - Protection
                             5 - Save Provisioning
                             6 - Restore Factory Defaults
                             7 - Card Reset
                             8 - Auto Save        :  Enabled
                             9 - Loopback Timeout :  60 minutes
                            10 - Card Pair ID     :  MX2820 M13









   Selection:                                          '?' - System Help Screen
```

Figure 7-27. Access Module Provisioning Menu

6. From the Access Modules Provisioning menu, select **NETWORK INTERFACE** and press ENTER.

   Figure 7-28 shows the DS3/DS2 Network Provisioning Menu.

```
Shelf:  1  Slot:  1A          ADTRAN MX2820 System                 07/26/04 16:57
Unacknowledged Alarms:           MAJOR                    TID:          HTVLALEXD16

                              Network Provisioning

                        1 - DS3 Framing           : C-BIT
                        2 - DS3 Timing            : Local
                        3 - DS3 Remote Loopbacks  : FEAC/C-BIT
                        4 - DS3 XCV Threshold     : Disabled
                        5 - IP Forwarding Protocol: ADTRAN
                        6 - IP Forwarding MTU      : 260 (PREFERRED)

                        7 - DS2 #1 Mode           : M12   <4xT1>
                        8 - DS2 #2 Mode           : M12   <4xT1>
                        9 - DS2 #3 Mode           : M12   <4xT1>
                       10 - DS2 #4 Mode           : M12   <4xT1>
                       11 - DS2 #5 Mode           : M12   <4xT1>
                       12 - DS2 #6 Mode           : M12   <4xT1>
                       13 - DS2 #7 Mode           : M12   <4xT1>

                       14 - DS3 Equipment Identification

   Selection:                                          '?' - System Help Screen
```

Figure 7-28. DS3/DS2 Network Provisioning Menu

7. From the Network Provisioning menu, select **DS3 FRAMING** and press ENTER.
8. Input a value to set the DS3 framing format to match the format of the receive signal at the network interface, and press ENTER.
   - Select 1 for C-BIT framing.
   - Select 2 for M13 framing.
9. From the Network Provisioning menu, select **DS3 TIMING** and press ENTER.
10. Input a value to set the desired DS3 timing and press ENTER.
    - Select 1 for Loop timing if the M13 MUX connects to a network that provides timing.
    - Select 2 for Local timing if the M13 MUX provides the master timing source for the circuit.
11. From the Network Provisioning menu, select option 3, **DS3 REMOTE LOOPBACKS**, and press ENTER.
12. Input a value from 1 to 4, and press ENTER.
    - Select 1, **DISABLE**, to ignore all out-of-band requests (FEAC and DS2 C-BIT). The M13 MUX still responds to individual T1 in-band CSU/NIU loopbacks if configured with the T1/E1 Loopback Detection menu.
    - Select 2, **FEAC/C-BIT**, to allow the M13 MUX to respond to remote loopback requests received over either the DS3 Far End Alarm and Control (FEAC) channel and/or DS2-level C-bits. This mode is valid for both C-BIT and M13 framing formats.

- Select 3, **FEAC**, to allow the M13 MUX to respond only to remote loopback requests received over the DS3 FEAC channel. This mode is only valid when using C-BIT framing. In this mode, DS2 C-Bit loopbacks are ignored.
- Select 4, **C-BIT**, to allow the M13 MUX to respond only to remote loopback requests received over DS2 C bits. This mode is available when operating in either C-BIT or M13 framing. In this mode, FEAC loopbacks received when operating in C-BIT framing are ignored.

13. From the Networking Provisioning menu, select **DS3 XCV THRESHOLD**.
14. Enter a value from 1 to 5 to set the desired Excessive Code Violations (XCV) threshold, and press ENTER.
    - Select 1 to Disable. Code violations do not cause the MUX modules to switch.
    - Select 2 for 1E-3. The MUX modules switch if more than one out of every 1,000 bits received on the DS3 signal contains a code violation.
    - Select 3 for 1E-4. The MUX modules switch if more than one out of every 10,000 bits received on the DS3 signal contains a code violation.
    - Select 4 for 1E-5. The MUX modules switch if more than one out of every 100,000 bits received on the DS3 signal contains a code violation.
    - Select 5 for 1E-6. The MUX modules switch if more than one out of every 1,000,000 bits received on the DS3 signal contains a code violation.
15. From the Networking Provisioning menu, select **IP FORWARDING PROTOCOL**.

    This setting controls the protocol used to carry the IP data over the DS3 overhead. Refer to "UIG-540, SCU Utilities" for additional IP Forwarding information.

    The available options for the Protocol setting are described in Table 7-5. Maximum Transmission Unit size (MTU) is described in Table 7-6.

Table 7-5. IP Forwarding Protocol Mode Settings

Mode	Description
ADTRAN	With this setting, an ADTRAN proprietary protocol is utilized to carry the IP data. This protocol is compatible with all ADTRAN MX2820 and MX2800 systems that support IP forwarding. This is the preferred setting when an ADTRAN product is connected to each end of the DS3 facility.
PPP	The PPP protocol is included to provide compatibility with certain non-ADTRAN multiplexer products which use the PPP protocol to carry IP data across the DS3 overhead. This option should not be selected unless the device connected at the far end of the DS3 facility supports this protocol.

Table 7-6. MTU Datagram Size

MTU Size	Description
260	This value sets the maximum IP datagram size to 260 bytes. All ADTRAN MX2820 and MX2800 systems that support IP forwarding are compatible with this MTU value. Therefore, this is the preferred setting when the IP Forwarding Protocol mode is set for ADTRAN.
1500	This value sets the maximum IP datagram size to 1500 bytes. This is the preferred value when the IP Forwarding Protocol mode is set to PPP. If the IP Forwarding Protocol is set for ADTRAN, then the IP Forwarding MTU should *only* be set to 1500 when that same value can be set on both ends of the DS3 facility. **NOTE** If one of the ADTRAN devices does not have an IP Forwarding MTU setting (as in an older module) then the other end should be set for 260 in order to avoid lost packets.

16. From the Network Provisioning menu, select **DS2 #1 MODE**.

    Input a value of 1 or 2 to select the desired setting, and press ENTER.

    1 - M12 <4xT1>

    2 - G.747 <3xE1>

NOTE

The MX2820 system can individually frame each of the seven DS2 streams in M12 (four T1s) format or G.747 (three E1s) format. When set to M12 (4xT1) format, the four T1s for the selected group are framed per ANSI T1.107. When set to G.747 (3xE1) format, the first three T1/E1 ports of the selected group are framed per CCITT G.747 into the DS3 stream. The fourth T1/E1 port of the selected group is not available in this mode. Any combination of M12 and G.747 is allowed. This note applies to Step 15.

17. Repeat step 16 for the remaining DS2 #n Modes, pressing Enter after each option setting.

18. From the Network Provisioning menu, select **DS3 EQUIPMENT IDENTIFICATION**.

    Figure 7-29 shows the DS3 Equipment Identification menu screen. These fields provide user-configurable text strings to identify the MX2820 system over the network. The Near End Location ID Code, Near End Frame ID Code, and Near End Equipment Code fields support up to ten alphanumeric characters. The Near End Facility ID Code supports up to 38 characters. The Near End Unit Code supports up to six characters. The Far-End fields are read-only.

```
Shelf:  1  Slot:  1A          ADTRAN MX2820 System                 04/26/04 16:31
Unacknowledged Alarms:                                    TID:          HTVLALEXD16

                              Network Provisioning

                         DS3 Equipment Identification

   1 - Near End Facility ID Code      : N/A
   2 - Near End Location ID Code      : N/A
   3 - Near End Frame ID Code         : N/A
   4 - Near End Unit Code             : N/A
   5 - Near End Equipment Code        : N/A

       Far End Facility ID Code       : N/A
       Far End Location ID Code       : N/A
       Far End Frame ID Code          : N/A
       Far End Unit Code              : N/A
       Far End Equipment Code         : N/A




   Selection:                                          '?' - System Help Screen
```

Figure 7-29. DS3 Equipment Identification Menu

19. Input a value from 1 to 5 to select and input data for the desired field, and press ENTER.
    1 - Near End Facility ID Code
    2 - Near End Location ID Code
    3 - Near End Frame ID Code
    4 - Near End Unit code
    5 - Near End Equipment Code
20. Press ESC as required to return to the MX2820 Main Menu.

FOLLOW-UP PROCEDURES

Once this procedure is complete, return to the procedure which called out this DLP and continue with the tasks indicated.

This page is intentionally blank.

DLP-731
Set Date and Time

INTRODUCTION

This procedure provides step-by-step instructions to set the date and time for the MX2820 System Controller Unit (SCU).

PREREQUISITE PROCEDURES

Obtain all necessary local instructions before setting date and time for the MX2820 SCU.

PROCEDURE

1. If not already connected, connect VT100 terminal or PC to craft port. For details, refer to DLP-715.
2. Logon to the MX2820 system. For details, refer to DLP-716.

3. From the MX2820 Main Menu, select **SYSTEM CONTROLLER** and press ENTER.

   Figure 7-30 shows the System Controller menu.

```
Shelf:  1                ADTRAN MX2820 System                   04/26/04 10:53
Unacknowledged Alarms:                               TID:          HTVLALEXD16


                                 System Controller

                             1 - Configuration
                             2 - Provisioning
                             3 - Status
                             4 - Test









  Selection :                                       '?' - System Help Screen
```

Figure 7-30. System Controller Menu

4. From the System Controller menu, select **PROVISIONING**.

   Figure 7-31 shows the Provisioning menu.

```
Shelf:  1                ADTRAN MX2820 System                   04/26/04 12:26
Unacknowledged Alarms:                               TID:          HTVLALEXD16


                                 Provisioning

                             1 - General
                             2 - Network Management
                             3 - SNMP
                             4 - TL1
                             5 - Smart Start
                             6 - Service States
                             7 - Reboot SCU






  Selection :                                       '?' - System Help Screen
```

Figure 7-31. System Controller Provisioning Menu

5. From the Provisioning menu, select **GENERAL**.

   Figure 7-32 shows the General menu.

```
Shelf:  1                    ADTRAN MX2820 System                 04/26/04 12:30
Unacknowledged Alarms:                                  TID:          HTVLALEXD16



                                  General

              1 - Management Ports
              2 - Date                                  : 04/26/04
              3 - Time                                  : 12:30:18
              4 - Auto-Logoff                           : DISABLE
              5 - Restore Default Provisioning
              6 - Security Administration
              7 - Change ADMIN Password









  Selection :                                           '?' - System Help Screen
```

Figure 7-32. System Controller General Menu

6. From the General menu, select **DATE**.

   Figure 7-33 shows the System Controller Date screen.

```
Shelf:  1                    ADTRAN MX2820 System                 04/26/04 12:34
Unacknowledged Alarms:                                  TID:          HTVLALEXD16









                    Current Date : 04/26/04

                    Enter date (MM/DD/YY):









                                                        '?' - System Help Screen
```

Figure 7-33. System Controller Date Screen

7. Set the date in the following format MM/DD/YY, and press ENTER.

   MM is month of the year (00-12); DD is day of the month (01-31); YY is the year (00-99).

8. Press ESC to return to the General menu.
9. From the General menu, select **TIME**.

   Figure 7-34 shows the System Controller Time screen.

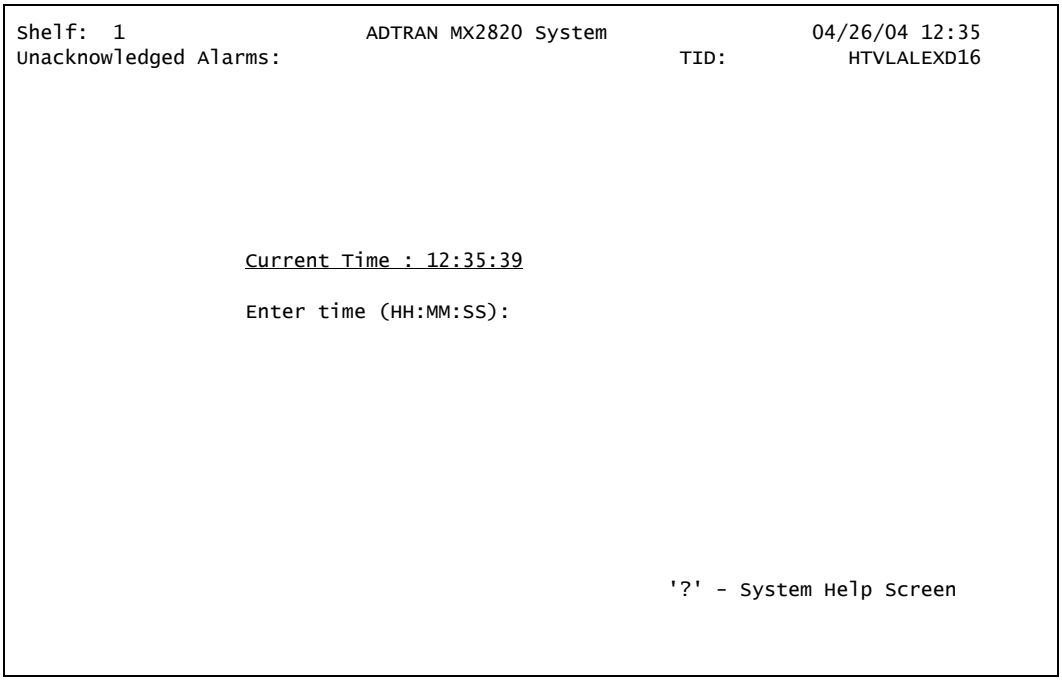


Figure 7-34. System Controller Time Screen

10. Set the time in the following 24-hour format HH:MM:SS, and press ENTER.

    HH is the hour (00-23); MM is the minutes (00-59); SS is the seconds (00-59).

11. Press ESC as required to return to the MX2820 Main Menu.

FOLLOW-UP PROCEDURES

Once this procedure is complete, return to the procedure which called out this DLP and continue with the tasks indicated.

DLP-732
Provision SNMP Management Options

INTRODUCTION

This procedure provides step-by-step instructions to set the Simple Network Management Protocol (SNMP) management options for the MX2820 System Controller Unit (SCU).

PREREQUISITE PROCEDURES

Obtain all necessary local instructions before setting the SNMP management options.

PROCEDURE

1. If not already connected, connect VT100 terminal or PC to craft port. For details, refer to DLP-715.
2. Logon to the MX2820 system. For details, refer to DLP-716.

3. From the MX2820 Main Menu, select **SYSTEM CONTROLLER** and press ENTER.

   Figure 7-35 shows the System Controller menu.

```
Shelf:  1                    ADTRAN MX2820 System                 04/26/04 10:53
Unacknowledged Alarms: None                                TID:          HTVLALEXD16



                                 System Controller

                               1 - Configuration
                               2 - Provisioning
                               3 - Status
                               4 - Test









  Selection :                                          '?' - System Help Screen
```

Figure 7-35. System Controller Menu

4. From the System Controller menu, select **PROVISIONING**.

   Figure 7-36 shows the System Controller Provisioning menu screen.

```
Shelf:  1                    ADTRAN MX2820 System                 04/26/04 12:26
Unacknowledged Alarms: None                                TID:          HTVLALEXD16



                                 Provisioning

                               1 - General
                               2 - Network Management
                               3 - SNMP
                               4 - TL1
                               5 - Smart Start
                               6 - Service States
                               7 - Reboot SCU









  Selection :                                          '?' - System Help Screen
```

Figure 7-36. System Controller Provisioning Menu

5. From the Provisioning menu, select **SNMP**.

   Figure 7-37 shows the SNMP menu.

```
Shelf:  1                    ADTRAN MX2820 System                 04/26/04 14:04
Unacknowledged Alarms: None                                TID:          HTVLALEXD16



                                      SNMP

 1 - Trap Host 1 IP  : 0.0.0.0
 2 - Trap Host 2 IP  : 0.0.0.0
 3 - Trap Host 3 IP  : 0.0.0.0
 4 - Trap Host 4 IP  : 0.0.0.0
 5 - ifIndex  Method : Sequential (RFC2863)
 6 - SCU Traps       : ENABLE
 7 - System Name     : HTVLALEXD16
 8 - System Location : SysLocation not set
 9 - System Contact  : www.adtran.com
10 - Read Community  : public
11 - Write Community : private



  Selection :                                          '?' - System Help Screen
```

Figure 7-37. SNMP Menu

NOTE

For step 6, the MX2820 system sends traps to these SNMP manager IP addresses.

6. From the SNMP menu, select **TRAP HOST 1 IP**.
7. From the Trap Host 1 IP menu, select 1, and press ENTER.
8. Input Trap Host 1 IP address, and press ENTER.
9. From the Trap Host 1 IP menu, select 2, and press ENTER.
10. Input one of the following values, and press ENTER to set the Trap Host 1 Status:
    - 1 - Valid
    - 2 - Create Request
    - 3 - Under Creation
    - 4 - Invalid
11. Repeat steps 6 - 10 for Trap Host 2, 3, and 4, by selecting options 2, 3, and 4 respectively in step 6. After inputting this information, proceed to step 12.
12. From the SNMP menu, select **IFINDEX METHOD**.

13. From the ifIndex Method menu, input one of the following values, and press ENTER:
    - 1 - Sequential (RFC2863)
    - 2 - Fixed (Slot-based)
14. From the SNMP menu, select **SCU TRAPS**.
15. From the SCU Traps menu, input one of the following values, and press ENTER:
    - 1 - Enable SCU Traps
    - 2 - Disable SCU Traps

    When disabled, the MX2820 system ignores all incoming SNMP packets, and does not transmit SNMP packets.
16. From the SNMP menu, select **SYSTEM NAME**.
17. Input alphanumeric characters that identify the name of the MX2820 system, and press ENTER.
18. From the SNMP menu, select **SYSTEM LOCATION**.
19. Input alphanumeric characters that identify the physical location of the MX2820 system, and press ENTER.
20. From the SNMP menu, select **SYSTEM CONTACT**.
21. Input the name of personnel to contact about the MX2820 system, and press ENTER.
22. From the SNMP menu, select **READ COMMUNITY**.
23. Input a value for the Read Community, and press ENTER.

    Enter the authentication string used for SNMP management. Match the MX2820 system to the SNMP manager for read privileges. Examples include public and private.
24. From the SNMP menu, select **WRITE COMMUNITY**.
25. Input a value for the Write Community, and press ENTER.

    Enter the authentication string used for SNMP management. Match the MX2820 system to the SNMP manager for write privileges. Examples include public and private.
26. Press ESC as required to return to the MX2820 Main Menu.

FOLLOW-UP PROCEDURES

Once this procedure is complete, return to the procedure which called out this DLP and continue with the tasks indicated.

DLP-733
Create User Account

INTRODUCTION

This procedure provides step-by-step instructions to create and manage user accounts for all users that have access to the MX2820 system.

NOTE

It is recommended that the system or network administrator perform the steps in this procedure. The personnel using this procedure must logon to the MX2820 system with the ADMIN account.

PREREQUISITE PROCEDURES

Obtain all necessary local instructions before creating user accounts. Prerequisite information includes the following:

- Set Account Name and Password security items in "NTP-006, SCU Provisioning (System Security)"
- All user names (UID)
- All user passwords (PID)
- Access privilege data for each user

PROCEDURE

1. If not already connected, connect VT100 terminal or PC to the craft port. For details, refer to DLP-715.
2. Logon to the MX2820 system. For details, refer to DLP-716.

3. From the MX2820 Main Menu, select **SYSTEM CONTROLLER**, and press ENTER.

   Figure 7-38 shows the System Controller menu.

```
Shelf:  1                    ADTRAN MX2820 System                 04/26/04 10:53
Unacknowledged Alarms: None                                TID:          HTVLALEXD16



                                 System Controller

                             1 - Configuration
                             2 - Provisioning
                             3 - Status
                             4 - Test









  Selection :                                          '?' - System Help Screen
```

Figure 7-38. System Controller Menu

4. From the System Controller menu, select **PROVISIONING**.

   Figure 7-39 shows the Provisioning menu.

```
Shelf:  1                    ADTRAN MX2820 System                 04/26/04 12:26
Unacknowledged Alarms: None                                TID:          HTVLALEXD16



                                 Provisioning

                             1 - General
                             2 - Network Management
                             3 - SNMP
                             4 - TL1
                             5 - Smart Start
                             6 - Service States
                             7 - Reboot SCU









  Selection :                                          '?' - System Help Screen
```

Figure 7-39. System Controller Provisioning Menu

5. From the Provisioning menu, select **GENERAL**.

   Figure 7-40 shows the General menu.

```
Shelf:  1                    ADTRAN MX2820 System                 04/26/04 12:30
Unacknowledged Alarms: None                                TID:          HTVLALEXD16



                                   General

              1 - Management Ports
              2 - Date                                     : 04/26/04
              3 - Time                                     : 12:30:18
              4 - Auto-Logoff                              : DISABLE
              5 - Restore Default Provisioning
              6 - Security Administration
              7 - Change ADMIN Password









  Selection :                                              '?' - System Help Screen
```

Figure 7-40. System Controller General Menu

6. From the General menu, select **SECURITY ADMINISTRATION**.

   Figure 7-41 shows the Security Administration menu.

```
Shelf:  1                    ADTRAN MX2820 System                 04/26/04 12:41
Unacknowledged Alarms: None                                TID:          HTVLALEXD16



                             Security Administration

                        1 - Users Currently Logged On
                        2 - Edit User Accounts
                        3 - Create New User Account
                        4 - Security Options
                        5 - Restore Back to Default Accounts
                        6 - Access Tech Support Account
                        7 - RADIUS
                        8 - SSH Configuration









  Selection :                                              '?' - System Help Screen
```

Figure 7-41. Security Administration Menu

7. From the Security Administration menu, select **CREATE NEW USER ACCOUNT**.

   Figure 7-42 shows the Create New User Account menu.

```
Shelf:  1                    ADTRAN MX2820 System                 04/26/04 13:28
Unacknowledged Alarms: None                                TID:          HTVLALEXD16



                              Create User Account

          1 - User-ID                                :
              Password                               :
              Account Properties/Access Privilege    :









  Selection :                                          '?' - System Help Screen
```

Figure 7-42. Create User Account Menu

8. From the Create User Account menu, input a 1 and press ENTER.
9. Input the desired account name for the user, and press ENTER.

   The screen illustrated in Figure 7-43 appears.

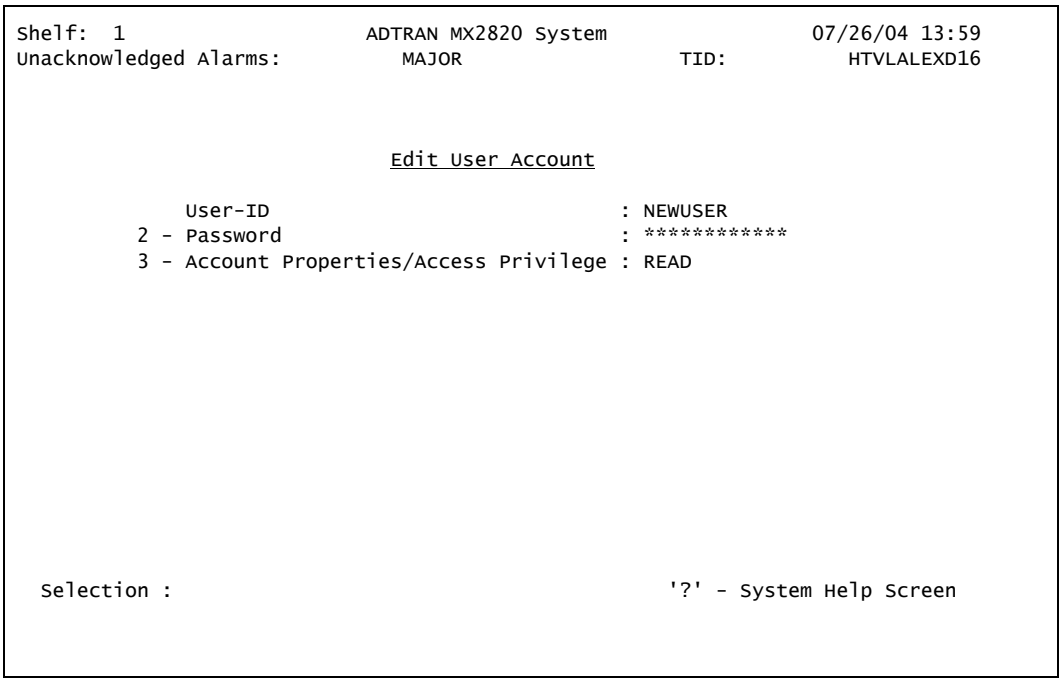


Figure 7-43. Edit User Account Options

10. Select the **PASSWORD** option from this screen, and enter the password for the new user, and press ENTER.

    The Edit User Account screen appears, as shown in Figure 7-43.

NOTE

The account name and password are case sensitive.

11. Select the **ACCOUNT PROPERTIES** option from this screen, and press ENTER.

    The screen shown in Figure 7-44 is displayed.

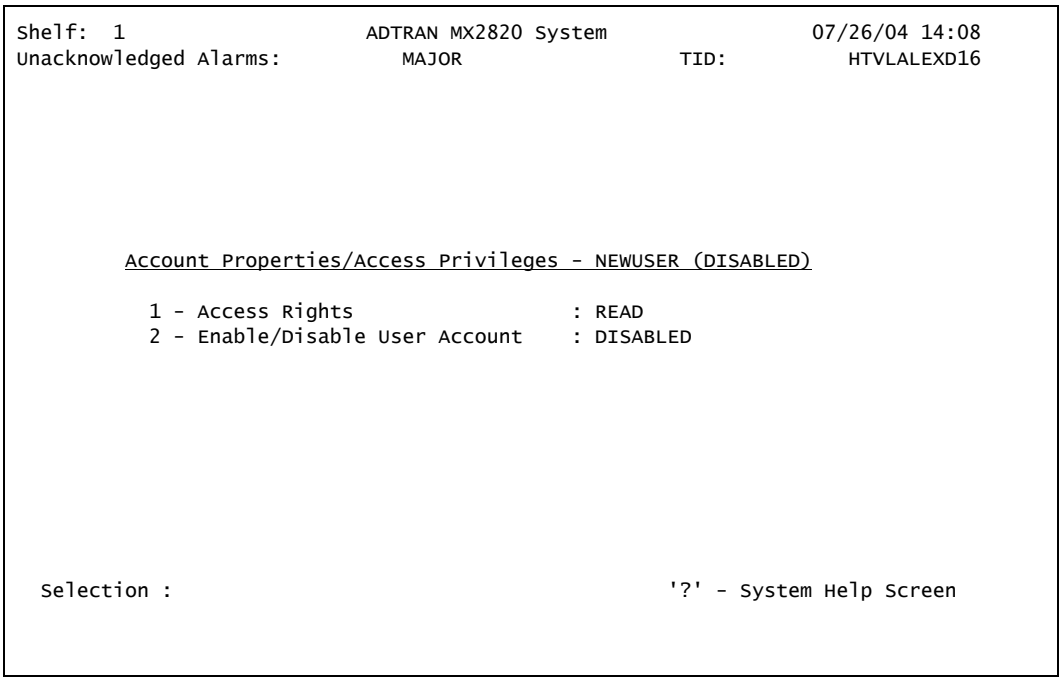


Figure 7-44. Account Properties/Access Privileges Screen

    a. Select the **ACCESS RIGHTS** option.

    b. Set the Access Rights by selecting the desired level.

12. Select **ENABLE/DISABLE USER ACCOUNT**, then select the **ENABLE** option. Otherwise, this user is not activated in the system.

13. Repeat step 8 and step 12 for each user that requires access to the MX2820 system.

14. Press ESC as required to return to the desired menu.

FOLLOW-UP PROCEDURES

Once this procedure is complete, return to the procedure which called out this DLP and continue with the tasks indicated.

DLP-734
Set Security Options

INTRODUCTION

This procedure provides step-by-step instructions to set security options for the MX2820 system.

NOTE

It is recommended that the system or network administrator perform the steps in this procedure. The personnel using this procedure must logon to the MX2820 system with the ADMIN account.

PREREQUISITE PROCEDURES

Obtain all necessary local instructions before setting security options. Prerequisite information includes the following:

- Simple Network Management Protocol (SNMP) access
- User lockout on login failure
- Case sensitive password or user ID
- Null password accepted
- Number of login failures before lockout
- Lockout duration
- RADIUS server address (if equipped)

PROCEDURE

1. From the MX2820 Main Menu, select **SYSTEM CONTROLLER** and press ENTER.
2. From the System Controller menu, select **PROVISIONING**.
3. From the Provisioning menu, select **GENERAL**.

4. From the General menu, select **SECURITY ADMINISTRATION**.

   Figure 7-45 shows the Security Administration menu.

```
Shelf:  1                    ADTRAN MX2820 System                 04/26/04 12:41
Unacknowledged Alarms: None                                TID:          HTVLALEXD16


                              Security Administration

                         1 - Users Currently Logged On
                         2 - Edit User Accounts
                         3 - Create New User Account
                         4 - Security Options
                         5 - Restore Back to Default Accounts
                         6 - Access Tech Support Account
                         7 - RADIUS
                         8 - SSH Configuration




  Selection :                                          '?' - System Help Screen
```

Figure 7-45. Security Administration Menu

5. From the Security Administration menu, select **SECURITY OPTIONS**.

   Figure 7-46 shows the Security Options menu.

```
Shelf:  1                    ADTRAN MX2820 System                 04/26/04 13:28
Unacknowledged Alarms: None                                TID:          HTVLALEXD16


                                 Security Options

              1 - Enable SNMP Security Account Access          : YES
              2 - Lock-Out User on Login Failure               : NO
              3 - Case Sensitive Password/User-ID              : YES
              4 - Null Password Accepted                       : NO
              5 - Number of Login Failure Before Lock-Out      : 5
              6 - Lock-Out Duration in Seconds                 : 60









  Selection :                                          '?' - System Help Screen
```

Figure 7-46. Security Options Menu

6. Make the following changes, as required locally, from the Security Options menu

   a. To allow SNMP access, select the **ENABLE SNMP SECURITY ACCOUNT ACCESS** option, and press ENTER.

      This option toggles between Yes and No. If set to No, inputting the option number changes the value to Yes. If set to Yes, inputting the option number changes the value to No.

   b. To lock out a user on failed login attempt, select the **LOCK-OUT USER ON LOGIN FAILURE** option, and press ENTER.

      This option toggles between Yes and No. If set to No, the value changes to Yes. If set to Yes, the value changes to No.

   c. **TO HAVE A CASE-SENSITIVE ACCOUNT NAME OR PASSWORD, SELECT THE CASE** *Sensitive Password/ User-ID* option, and press ENTER.

      This option toggles between Yes and No. If set to No, changing the value to No will allow any character case. If set to Yes, The exact character, including case (capital or lower case) is required.

   d. To allow a password to be bypassed by simply hitting the ENTER key, select the **NULL PASSWORD ACCEPTED** option, and press ENTER.

      This option toggles between Yes and No. If set to No, a password is required for access to the system. If set to Yes, a password is not required.

   e. If the **LOCK-OUT USER ON LOGIN FAILURE** option (step b) is set to Yes, then the **NUMBER OF LOGIN FAILURE BEFORE LOCKOUT** can be set. Select this option, and press ENTER.

      Input a value from 2 to 5 to set the maximum number of login failures before a user is prohibited from logging into system, and press ENTER.

   f. If the **LOCK-OUT USER ON LOGIN FAILURE** option (step b) is set to Yes, then the **LOCK-OUT DURATION IN SECONDS** can be modified. Select this option, and press ENTER.

   g. Input a value from 3 to 60 to set the lock-out duration in seconds, and press ENTER.

7. Press ESC as required to return to the MX2820 Main Menu.

FOLLOW-UP PROCEDURES

Once this procedure is complete, return to the procedure which called out this DLP and continue with the tasks indicated.

This page is intentionally blank.

DLP-735
Set Terminal Automatic Logoff

INTRODUCTION

This procedure provides step-by-step instructions to set the time that a terminal connected to the MX2820 system is automatically logged off the system if the terminal is not being used.

NOTE

It is recommended that the system or network administrator perform the steps in this procedure. The personnel using this procedure must logon to the MX2820 system with the ADMIN account.

PREREQUISITE PROCEDURES

Obtain all necessary local instructions before setting the terminal/Auto Logoff feature.

PROCEDURE

1. If not already connected, connect VT100 terminal or PC to the craft port. For details, refer to DLP-715.
2. Logon to the MX2820 system with an ADMIN account. For details, refer to DLP-716.
3. From the MX2820 Main Menu, select **SYSTEM CONTROLLER**.
4. From the System Controller menu, select **PROVISIONING**.

5. From the Provisioning menu, select **GENERAL**.

   Figure 7-47 shows the General menu.

```
Shelf:  1                    ADTRAN MX2820 System                 04/26/04 12:30
Unacknowledged Alarms: None                                TID:          HTVLALEXD16



                                  General

            1 - Management Ports
            2 - Date                                      : 04/26/04
            3 - Time                                      : 12:30:18
            4 - Auto-Logoff                               : DISABLE
            5 - Restore Default Provisioning
            6 - Security Administration
            7 - Change ADMIN Password









  Selection :                                             '?' - System Help Screen
```

Figure 7-47. System Controller General Menu

6. From the General menu, select **AUTO-LOGOFF**.

   Figure 7-48 shows the Terminal Auto-Logoff menu.

```
Shelf:  1                    ADTRAN MX2820 System                 04/26/04 12:36
Unacknowledged Alarms: None                                TID:          HTVLALEXD16



                             Terminal Auto-Logoff

                         1 - Auto-Logoff      : DISABLE
                         2 - Auto-Logoff Time : 30 min.

















  Selection :                                             '?' - System Help Screen
```

Figure 7-48. Terminal Auto-Logoff Menu

7. From the Terminal Auto-Logoff menu, select **AUTO-LOGOFF**.
8. From the Terminal Auto-Logoff menu, input a 2 to enable the Auto-Logoff feature, and press ENTER.

NOTE

Input a 1 to disable the Auto-Logoff feature.

9. From the Terminal Auto-Logoff menu, select **AUTO-LOGOFF TIME**.
10. Input a value from 1 to 60, and press ENTER.

    This value sets the terminal automatic log-off time in minutes for any terminal connected to the MX2820 system that is not being used within the time set.
11. Press ESC as required to return to the MX2820 Main Menu.

FOLLOW-UP PROCEDURES

Once this procedure is complete, return to the procedure which called out this DLP and continue with the tasks indicated.

This page is intentionally blank.

DLP-736
Change Password

INTRODUCTION

This procedure provides step-by-step instructions to change the password for the logged-in user.

NOTE

It is recommended that the system or network administrator perform the steps in this procedure. The personnel using this procedure must logon to the MX2820 system with the ADMIN account.

PREREQUISITE PROCEDURES

Obtain all necessary local instructions before changing the password.

PROCEDURE

1. If not already connected, connect VT100 terminal or PC to the craft port. For details, refer to DLP-715.
2. Logon to the MX2820 system. For details, refer to DLP-716.
3. From the MX2820 Main Menu, select **SYSTEM CONTROLLER**, and press ENTER.
4. From the System Controller menu, select **PROVISIONING**.

5. From the Provisioning menu, select **GENERAL**.

   Figure 7-49 shows the General menu.

```
Shelf:  1                ADTRAN MX2820 System                04/26/04 12:30
Unacknowledged Alarms: None                         TID:         HTVLALEXD16



                                General

             1 - Management Ports
             2 - Date                              : 04/26/04
             3 - Time                              : 12:30:18
             4 - Auto-Logoff                       : DISABLE
             5 - Restore Default Provisioning
             6 - Security Administration
             7 - Change ADMIN Password









  Selection :                                      '?' - System Help Screen
```

Figure 7-49. System Controller General Menu

6. From the General menu, select **CHANGE [USER ACCOUNT] PASSWORD**.

   Figure 7-50 shows the Change ADMIN Password screen.

```
Shelf:  1                ADTRAN MX2820 System                04/26/04 13:41
Unacknowledged Alarms: None                         TID:         HTVLALEXD16







                            Account Name : ADMIN

                            Password     :









                                                   '?' - System Help Screen
```

Figure 7-50. Change ADMIN Password Screen

7. Input the new password desired for that account name, and press ENTER.
8. Press ESC as required to return to the MX2820 Main Menu.

FOLLOW-UP PROCEDURES

Once this procedure is complete, return to the procedure which called out this DLP and continue with the tasks indicated.

This page is intentionally blank.

DLP-737
Provision DSX-1 (T1/E1) Interface

INTRODUCTION

This procedure provides step-by-step instructions to provision the DSX-1 (T1/E1) interface for the M13 MUX in the MX2820 system.

PREREQUISITE PROCEDURES

Obtain all necessary local instructions before provisioning the DSX-1 (T1/E1) interface. The parameters need to be set to match the desired application.

DSX-1 (T1/E1) PROVISIONING DATA

Provisioning data includes the following:

- Line State
- Line coding
- Line length
- Loopback detection
- Circuit protection
- Line identification
- Excessive Code Violation (XCV) threshold

T1/E1 Set Multiple

The Set Multiple parameter (value 29) allows setting the same values for a contiguous group of T1/E1 circuits or setting the same values for all T1/E1 circuits at the same time. To set a value for all T1/E1 circuits, set First to 1 and Last to 28. Select Apply Settings before leaving the menu.

To set a value for only some of the T1/E1 circuits, set First and Last to correspond to the lines desired. Select Apply Settings before leaving the menu.

NOTE

In the case of 1:1 protection, provisioning the Active MUX module automatically provisions the Standby MUX module.

PROCEDURE

1. If not already connected, connect the VT100 terminal or PC to the craft port. For details, refer to DLP-715.
2. Logon to the MX2820 system. For details, refer to DLP-716.
3. From the MX2820 Main Menu, select **ACCESS MODULE**, and press ENTER.

   Figure 7-51 shows the Access Module Menus screen for a 19-inch shelf.

```
Shelf:  1                    ADTRAN MX2820 System                 05/04/04 09:29
Unacknowledged Alarms: None                                  TID:      HTVLALEXD16

                              Access Module Menus

          1      A - ............ [None]          B - ............ [None]
          2      A - ............ [None]          B - ............ [None]
          3      A - ............ [None]          B - ............ [None]
          4      A - MX2820 M13.. [Critical]      B - MX2820 M13.. [None]
          5      A - ............ [None]          B - ............ [None]
          6      A - ............ [None]          B - ............ [None]
          7      A - ............ [None]          B - ............ [None]









  Select Mux:               Inverse = Busy Modules     '?' - System Help Screen
```

Figure 7-51. Access Module Menus Screen

4. From the Access Module Menus screen, select the slot number for the M13 MUX module that is to be provisioned, and press ENTER.

   Figure 7-52 shows the Main Menu screen for the access module.

```
Shelf:  1  Slot:  1A          ADTRAN MX2820 System                 04/26/04 16:25
Unacknowledged Alarms: None                                TID:          HTVLALEXD16




                                    Main Menu

                                1 - Configuration
                                2 - Provisioning
                                3 - Status
                                4 - Test
                                5 - Performance Monitoring









   Selection:                                          '?' - System Help Screen
```

Figure 7-52. Access Module Main Menu

5. From the Main Menu screen, select **PROVISIONING**.

   Figure 7-53 shows the Provisioning menu.

```
Shelf:  1  Slot:  1A          ADTRAN MX2820 System                 04/26/04 16:26
Unacknowledged Alarms: None                                TID:          HTVLALEXD16




                                  Provisioning

                              1 - Network Interface
                              2 - T1/E1 Interfaces
                              3 - Service States
                              4 - Protection
                              5 - Save Provisioning
                              6 - Restore Factory Defaults
                              7 - Card Reset
                              8 - Auto Save         :  Enabled
                              9 - Loopback Timeout  :  60 minutes
                             10 - Card Pair ID      :  MX2820 M13









   Selection:                                          '?' - System Help Screen
```

Figure 7-53. Access Module Provisioning Menu

6. From the Provisioning menu, select **T1/E1 INTERFACE**.

   Figure 7-54 shows the T1/E1 Provisioning menu.

```
Shelf:  1  Slot:  1A          ADTRAN MX2820 System                 04/26/04 16:32
Unacknowledged Alarms: None                                TID:          HTVLALEXD16




                              T1/E1 Provisioning

                        1 - T1/E1 State
                        2 - T1/E1 Line Coding
                        3 - T1/E1 Line Length
                        4 - T1/E1 Loopback Detection
                        5 - T1/E1 Circuit Protection
                        6 - T1/E1 Line Identification
                        7 - T1/E1 XCV Threshold       : Disabled









   Selection:                                          '?' - System Help Screen
```

Figure 7-54. T1/E1 Provisioning Menu

7. From the T1/E1 Provisioning menu, select **T1/E1 STATE**.

   Options for a T1/E1 line are as follows:

   - 1 - Disables T1/E1 lines
   - 2 - Enables T1/E1 lines
   - 3 - Auto Enables T1/E1 lines. The M13 MUX unit automatically detects when a T1/E1 is connected and enables the T1/E1 line.

8. From the T1/E1 Provisioning menu, select **T1/E1 LINE CODING**.

   This parameter sets the line code for each individual T1/E1 interface to match the connected device. Options for a T1/E1 line are as follows:

   - 1 - AMI
   - 2 - B8ZS
   - 2 - HDB3 (for an E1 line)

9. From the T1/E1 Provisioning menu, select **T1/E1 LINE LENGTH**.

This parameter sets the line length for each T1 interface according to the distance from the MX2820 system to the DTE device. The E1 line length is not selectable and remains at 0-6 dB loss. Options for a T1 line length are as follows:

- 1 - sets line length from 0 to 133 feet
- 2 - sets line length from 133 to 266 feet
- 3 - sets line length from 226 to 399 feet
- 4 - sets line length from 399 to 533 feet
- 5 - sets line length from 533 to 655 feet

10. From the T1/E1 Provisioning menu, select **T1/E1 LOOPBACK DETECTION**.

    This parameter determines which T1 line responds to CSU or NIU loopback requests coming from the network. Set to CSU or NIU to allow the T1 line to respond to either a CSU or NIU request. Set to Disable to permit the T1 line to ignore the loopback request. This option is not available in E1 mode. Values for the T1 line are as follows:

    - 1 - Disabled, T1 line ignores loopback requests
    - 2 - CSU, T1 responds to CSU loopback requests
    - 3 - NIU, T1 line responds to NIU loopback requests

11. From the T1/E1 Provisioning menu, select **T1/E1 CIRCUIT PROTECTION**.

    This parameter determines which circuit is allowed to initiate a protection switch if a failure in the circuitry for a channel is detected. If a T1/E1 line is set to Disabled, then the failure of the circuitry for that one channel does not cause a protection switch. If a T1/E1 line is set to Enabled, then the failure of a channel could cause a protection switch to occur. This depends on the Protection Threshold setting in this menu.

    The Protection Threshold setting determines how many of the Enabled lines must fail before a module switch occurs. For example, to allow the failure of a single protected (enabled) line to cause a module switch, set the Protection Threshold to 1.

    Options for a T1/E1 line are as follows:

    - 1 - Disabled
    - 2 - Enabled

12. From the T1/E1 Provisioning menu, select **T1/E1 LINE IDENTIFICATION**.

    This parameter allows a user-configurable text string to name the individual T1/E1 lines. This field accepts up to 32 alphanumeric characters, including spaces and special characters.

13. From the T1/E1 Line Identification menu, input a value from 1 to 28 to select the T1/E1 line that requires changing the line identification, and press ENTER.

14. Input the new alphanumeric line identification data, and press ENTER. This step can be repeated for all T1/E1 lines.

15. From the T1/E1 Provisioning menu, select **T1/E1 XCV THRESHOLD**.

    This parameter sets the limit on Code Violations (CV) accepted by the unit over an individual T1/E1 line before it switches MUX modules. If set to Disabled, code violations do not cause the unit to switch MUX modules.

Options for the T1/E1 XCV Threshold are as follows:

- 1 - Disable. Code violations do not cause the unit to switch.
- 2 - 1E-3. The unit switches if more than one out of every 1,000 bits received on a T1/E1 line contains a code violation.
- 3 - 1E-4. The unit switches if more than one out of every 10,000 bits received on a T1/E1 line contains a code violation.
- 4 - 1E-5. The unit switches if more than one out of every 100,000 bits received on a T1/E1 line contains a code violation.
- 5 - 1E-6. The unit switches if more than one out of every 1,000,000 bits received on a T1/E1 line contains a code violation.

16. Press Esc as required to return to the MX2820 Main Menu.

FOLLOW-UP PROCEDURES

Once this procedure is complete, return to the procedure which called out this DLP and continue with the tasks indicated.

DLP-738
Provision MUX Module Protection

INTRODUCTION

This procedure provides step-by-step instructions to provision the M13 or STS-1 Multiplexer (MUX) protection for the MX2820 system.

PREREQUISITE PROCEDURES

Obtain all necessary local instructions before provisioning the protection for the MUX module. This procedure is required only for a 1:1 configuration and only if a manual switch of protection is required. This procedure can also be performed to prohibit a manual switch of protection.

CIRCUIT PROTECTION

The MX2820 system provides protection for circuit failures. The two modes of operation include:

- Non-redundant mode, which offers no backup protection.
- Circuit failure recovery mode, which offers backup protection for a 1:1 redundant configuration in the event one of the MUX modules fails.

Non-Redundant Mode

In non-redundant mode, the MX2820 system houses only one MUX module, installed in slot A. In the event of a failure, an alarm is generated and the front panel LEDs reflect the condition.

Circuit Failure Recovery Mode

In circuit failure recovery mode, the MX2820 system houses two MUX modules installed in slots A and B. The MX2820 system provides circuit protection with redundant equipment provisioning. The Active and Standby MUX modules share the same network and terminal connections and both monitor all received network signals. The Standby MUX module takes over if the Active MUX module fails.

Table 7-7 provides the configuration recommendations for circuit recovery.

NOTE

During a module switch, service interruption is experienced on both the DS3/STS-1 and T1/E1 connections. However, since the standby module remains framed to the incoming signal at all times, it is a minimal interruption.

Table 7-7. Configuration Recommendations for Circuit Recovery

Parameter	Recommended Setting
Network XCV Threshold	1E-3 (The XCV Threshold settings are based on the error rates considered acceptable on the DS3 or DS1 before switching.)
Maximum Switch Threshold	3
Minimum Switch Period	10 seconds
T1/E1 Circuit Protection	Enable all or select the T1/E1s where redundant switching should occur
T1/E1 XCV Threshold	1E-3 (The XCV Threshold settings are based on the error rates considered acceptable on the DS3 or DS1 before switching.)

MUX MODULE PROTECTION DATA

Provisioning data includes the following:

- Manual switch of protection
- Minimum switching period
- Maximum switch threshold

NOTE

In the case of 1:1 protection, provisioning the Active MUX module automatically provisions the Standby MUX module.

PROCEDURE

1. If not already connected, connect the VT100 terminal or PC to the craft port. For details, refer to DLP-715.
2. Logon to the MX2820 system. For details, refer to DLP-716.
3. From the MX2820 Main Menu, select **ACCESS MODULE** and press ENTER. The Access Modules menu screen displays.

4. From the Access Module Menus screen, select the slot number for the MUX module that is to be provisioned, and press ENTER. The Access Module Main Menu displays.
5. From the Main Menu, select **PROVISIONING** and press ENTER.
6. From the Provisioning menu, select **PROTECTION**.

   Figure 7-55 shows the Protection Provisioning Menu screen.

```
Shelf:  1  Slot:  1A          ADTRAN MX2820 System                 04/26/04 16:54
Unacknowledged Alarms: None                                TID:          HTVLALEXD16


                            Protection Provisioning


                        1 - Perform Manual Switch
                        2 - Minimum Switching Period (sec.) : 10
                        3 - Maximum Switch Threshold : 3
                        4 - Clear Number of Switches = 0









   Selection:                                          '?' - System Help Screen
```

Figure 7-55. Protection Provisioning Menu

7. From the Protection Provisioning menu, select **PERFORM MANUAL SWITCH**.

   Input the letter Y to perform manual protection switch, or input the letter N to escape without performing a manual protection switch, and press ENTER.
8. From the Protection Provisioning menu, select **MINIMUM SWITCHING PERIOD**.

   This parameter determines the number of seconds that must pass before another module switch is allowed. The default is 10 seconds.

   Input a value from 0 to 3600 to set the Minimum Switch Period (in seconds), and press ENTER.
9. From the Protection Provisioning menu, select **MAXIMUM SWITCH THRESHOLD**.

   This parameter determines the number of times per hour the module is allowed to switch between MUX modules. If in an hour, the modules switch more than the Maximum Switch Threshold allows, the module issues a trap and stops switching modules for the next 24 hours. The default setting is three times per hour.

   Input a value from 1 to 24 to set the Maximum Switch Threshold (in hours), and press ENTER.
10. From the Protection Provisioning menu, select **CLEAR NUMBER OF SWITCHES**.

This parameter displays (and provides the ability to reset) the running count of protection switches utilized as the basis for activating the “Excessive Switches” alarm.

11. Press Esc as required to return to the MX2820 Main Menu.

FOLLOW-UP PROCEDURES

Once this procedure is complete, return to the procedure which called out this DLP and continue with the tasks indicated.

DLP-739
Provision MUX Module Loopback Timeout

INTRODUCTION

This procedure provides step-by-step instructions to provision the loopback timeout for the Multiplexer (MUX) modules.

PREREQUISITE PROCEDURES

Obtain all necessary local instructions before provisioning the loopback timeout.

NOTE

In the case of 1:1 protection, provisioning the Active MUX module automatically provisions the Standby MUX module.

PROCEDURE

1. If not already connected, connect the VT100 terminal or PC to the craft port. For details, refer to DLP-715.
2. Logon to the MX2820 system. For details, refer to DLP-716.
3. From the MX2820 Main Menu, select **ACCESS MODULES**, and press ENTER. The MX2820 Access Module menu screen displays.
4. From the Access Module Menus screen, select the slot number for the MUX module that is to be provisioned, and press ENTER.

   The Access Module Main Menu displays.

5. From the Access Modules Main Menu screen, select **PROVISIONING,** and press ENTER.
   Figure 7-56 shows the Access Module Provisioning Menu.

```
Shelf:  1  Slot:  1A        ADTRAN MX2820 System                04/26/04 16:26
Unacknowledged Alarms: None                          TID:          HTVLALEXD16


                                 Provisioning

                         1 - Network Interface
                         2 - T1/E1 Interfaces
                         3 - Service States
                         4 - Protection
                         5 - Save Provisioning
                         6 - Restore Factory Defaults
                         7 - Card Reset
                         8 - Auto Save        :  Enabled
                         9 - Loopback Timeout :  60 minutes
                        10 - Card Pair ID     :  MX2820 M13



   Selection:                                       '?' - System Help Screen
```

Figure 7-56. Access Module Provisioning Menu

6. From the Provisioning menu, select **LOOPBACK TIMEOUT**, and press ENTER.

   Figure 7-57 shows the Loopback Timeout Provisioning Menu.

```
Shelf:  1  Slot:  1A          ADTRAN MX2820 System                 04/26/04 16:57
Unacknowledged Alarms: None                                TID:          HTVLALEXD16


                                   Provisioning

                             Loopback Timeout: 60 minutes

                                    1 - Disabled
                                    2 - 1 minute
                                    3 - 5 minutes
                                    4 - 10 minutes
                                    5 - 15 minutes
                                    6 - 30 minutes
                                    7 - 45 minutes
                                    8 - 60 minutes




   Selection:                                          '?' - System Help Screen
```

Figure 7-57. Loopback Timeout Provisioning Menu

7. Input the value for the preferred loopback timeout, and press ENTER.
8. Press ESC as required to return to the MX2820 Main Menu.

FOLLOW-UP PROCEDURES

Once this procedure is complete, return to the procedure which called out this DLP and continue with the tasks indicated.

This page is intentionally blank.

DLP-741
Provision STS-1 Network

INTRODUCTION

This procedure provides step-by-step instructions to provision the STS-1 MUX for the MX2820 system.

PREREQUISITE PROCEDURES

Obtain all necessary local instructions before provisioning the STS-1 MUX. The parameters need to be set to match the desired application.

STS-1 PROVISIONING DATA

Provisioning data includes the following:

- STS-1 timing
- STS-1 VT Mode
- STS-1 J1 Path Trace

NOTE

In the case of 1:1 protection, provisioning the Active STS-1 MUX module automatically provisions the Standby STS-1 MUX module.

PROCEDURE

1. If not already connected, connect the VT100 terminal or PC to the craft port. For details, refer to DLP-715.
2. Logon to the MX2820 system. For details, refer to DLP-716.
3. From the MX2820 Main Menu, select **ACCESS MODULES** and press ENTER.
4. From the Access Module Menus, select the slot number for the STS-1 MUX module that is to be provisioned, and press ENTER.

5. From the STS-1 Main Menu, select **PROVISIONING**.

   Figure 7-58 shows the STS-1 Provisioning menu.

```
Shelf:  1  Slot:  4A        ADTRAN MX2820 System                04/26/04 17:18
Unacknowledged Alarms: None                            TID:         HTVLALEXD16


                                 Provisioning

                         1 - Network Interface
                         2 - VT/Port Interfaces
                             Service States
                         4 - Protection
                         5 - Save Provisioning
                         6 - Restore Factory Defaults
                         7 - Card Reset
                         8 - Auto Save         :  Enabled
                         9 - Loopback Timeout :  5 minutes
                        10 - Card Pair ID      :  MX2820 STS1




   Selection:                                         '?' - System Help Screen
```

Figure 7-58. STS-1 Provisioning Menu

6. From the STS-1 Provisioning menu, select **NETWORK INTERFACE**.

   Figure 7-59 shows the STS-1 Network Provisioning Menu.

```
Shelf:  1  Slot:  4A        ADTRAN MX2820 System                04/26/04 17:22
Unacknowledged Alarms: None                            TID:         HTVLALEXD16


                             Network Provisioning

                      1 - Network Timing         : Free-Run
                      2 - VT Mode                : VT1.5 (T1)

                      3 - STS-1 J1 Path Trace









   Selection:                                         '?' - System Help Screen
```

Figure 7-59. STS-1 Network Provisioning Menu

- From the Network Provisioning menu, select **NETWORK TIMING**.
- Input a value to set the desired STS-1 timing, and press ENTER. The choices are Loop, Free-Run, and External.
  - Loop timing configures the unit to recover clocking from the STS-1 receive signal.
  - Free-Run timing mode is derived from a ±20 ppm internal reference.
  - External timing mode configures the unit to derive clocking from the clock module.

7. From the Network Provisioning menu, select **VT MODE** and press ENTER.

   The STS-1 can frame the 7 VT groups as either VT1.5 or VT2. The settings are as follows:

   - When set for VT1.5 (T1), all VT groups are set for VT1.5[TU=11] at 1.728 Mbps and the ports are set for T1 at 1.544 Mbps.
   - When set for VT2 (E1), all the VT groups are set for VT2[TU=12] at 2.304 Mbps and the ports are set for E1 at 2.048 Mbps.
   - When set for VT2, the last 7 VTs (VT 22-28) and the last 7 DSX ports (DSX 22-28) become unavailable.

8. From the Network Provisioning menu, select the **J1 PATH TRACE OPTION**, and press ENTER.

   This trace message is transmitted/received in the J1 path overhead byte. This byte is used to repetitively transmit a 64 byte (last two bytes are a fixed CR/LF) string so the receiving terminal in a path can verify its continued connection to the intended transmitter.

9. Press Esc as required to return to the MX2820 Main Menu.

FOLLOW-UP PROCEDURES

Once this procedure is complete, return to the procedure which called out this DLP and continue with the tasks indicated.

This page is intentionally blank.

DLP-742
Provision VT/Port (T1/E1) Interface

INTRODUCTION

This procedure provides step-by-step instructions to provision the VT/Port (T1/E1) interface for the STS-1 MUX in the MX2820 system.

PREREQUISITE PROCEDURES

Obtain all necessary local instructions before provisioning the VT/Port (T1/E1) interface. The parameters need to be set to match the desired application.

VT/PORT (T1/E1) PROVISIONING DATA

Provisioning data includes the following:

- Line State
- Line coding
- Line length
- Loopback detection
- Circuit protection
- T1/E1 Line identification
- Excessive Code Violation (XCV) threshold
- VT Hairpin Loopback
- Cross-Connect Mapping
- VT AIS Transmission

T1/E1 Set Multiple

The Set Multiple parameter (value 29) allows setting the same values for a contiguous group (or all) of the T1/E1 circuits. To set a value for all T1/E1 circuits, set First to 1 and LAST to 28. Select Apply Settings before leaving the menu. To set a value for only some of the T1/E1 circuits, set First and Last to correspond to the lines desired. Select Apply Settings before leaving the menu.

NOTE

In the case of 1:1 protection, provisioning the Active STS-1 MUX module automatically provisions the Standby STS-1 MUX module.

PROCEDURE

1. If not already connected, connect the VT100 terminal or PC to the craft port. For details, refer to DLP-715.
2. Logon to the MX2820 system. For details, refer to DLP-716.
3. From the MX2820 Main Menu, select **ACCESS MODULE** and press ENTER.
4. From the Access Module Menus screen, select the slot number for the STS-1 MUX module that is to be provisioned, and press ENTER.

   Figure 7-60 shows the STS-1 Main Menu screen.

```
Shelf:  1                    ADTRAN MX2820 System                  05/04/04 09:29
Unacknowledged Alarms: None                                  TID:      HTVLALEXD16




                                   Main Menu

                              1 - Configuration
                              2 - Provisioning
                              3 - Status
                              4 - Test
                              5 - Performance Monitoring









  Selection:                                          '?' - System Help Screen
```

Figure 7-60. STS-1 Main Menu

5. From the Main Menu screen, select **PROVISIONING** and press ENTER.

   Figure 7-61 shows the Provisioning menu.

```
Shelf:  1  Slot:  4A          ADTRAN MX2820 System                 04/26/04 17:18
Unacknowledged Alarms: None                                TID:          HTVLALEXD16



                                  Provisioning

                            1 - Network Interface
                            2 - VT/Port Interfaces
                                Service States
                            4 - Protection
                            5 - Save Provisioning
                            6 - Restore Factory Defaults
                            7 - Card Reset
                            8 - Auto Save         :  Enabled
                            9 - Loopback Timeout  :  5 minutes
                           10 - Card Pair ID      :  MX2820 STS1




   Selection:                                          '?' - System Help Screen
```

Figure 7-61. STS-1 Provisioning Menu

6. From the Provisioning menu, select **VT/PORT INTERFACES**.

   Figure 7-62 shows the resulting VT/Port Provisioning menu.

```
Shelf:  1  Slot:  5A          ADTRAN MX2820 System                  10/10/00 00:05
Unacknowledged Alarms:           MAJOR                    TID:      SysName not set




                               VT/Port Provisioning

                         1 - T1/E1 State
                         2 - T1/E1 Line Coding
                         3 - T1/E1 Line Length
                         4 - T1/E1 Loopback Detection
                         5 - T1/E1 Circuit Protection
                         6 - T1/E1 Line Identification
                         7 - VT Identification
                         8 - T1/E1 XCV Threshold       : Disabled

                         9 - VT Hairpin Loopback
                        10 - VT Cross-Connect Mapping
                        11 - VT AIS Transmission       : Enabled (GR-253)


   Selection:                                            '?' - System Help Screen
```

Figure 7-62. VT/Port Provisioning Menu

7. From the VT/Port Provisioning menu, select **T1/E1 STATE**.

   From this screen, select the desired Port and press ENTER.

   Options for a T1/E1 line are as follows:

   - 1 - Disables T1/E1 lines
   - 2 - Enables T1/E1 lines
   - 3 - Auto Enables T1/E1 lines

   When the Auto Enables T1/E1 lines option is selected, the STS-1 MUX unit automatically detects when a T1/E1 is connected and enables the T1/E1 line.

   Multiple ports can also be provisioned using the menu item at the bottom of the screen.

8. From the T1/E1 Provisioning menu, select **T1/E1 LINE CODING**.

   This parameter sets the line code for each individual T1/E1 interface to match the connected device. Options for a T1/E1 line are as follows:

   - 1 - AMI
   - 2 - B8ZS
   - 2 - HDB3 (for an E1 line)

9. From the T1/E1 Provisioning menu, select **T1/E1 LINE LENGTH**.

   This parameter sets the line length (line build out) for each T1 interface according to the distance from the MX2820 system to the DTE device. The E1 line length is not selectable and remains at 0-6 dB loss. Options for a T1 line length are as follows:

   - 1 - Sets line length from 0 to 133 feet
   - 2 - Sets line length from 133 to 266 feet
   - 3 - Sets line length from 226 to 399 feet
   - 4 - Sets line length from 399 to 533 feet
   - 5 - Sets line length from 533 to 655 feet

10. From the T1/E1 Provisioning menu, select **T1/E1 LOOPBACK DETECTION**.

    From this screen, select the desired Port and press ENTER.

    This parameter determines which T1 line responds to CSU or NIU loopback requests coming from the network. Set to CSU or NIU to allow the T1 line to respond to either a CSU or NIU request. Set to Disable to permit the T1 line to ignore the loopback request. This option is not available in E1 mode. Values for the T1 line are as follows:

    - 1 - Disabled. T1 line ignores loopback requests
    - 2 - CSU. T1 responds to CSU loopback requests
    - 3 - NIU. T1 line responds to NIU loopback requests

11. From the T1/E1 Provisioning menu, select **T1/E1 CIRCUIT PROTECTION**.

    This parameter determines which circuit is allowed to initiate a protection switch if a failure in the circuitry for a channel is detected. If a T1/E1 line is set to Disabled, then the failure of the circuitry for that one channel does not cause a protection switch. If a T1/E1

line is set to Enabled, then the failure of a channel could cause a protection switch to occur. This depends on the Protection Threshold setting in this menu.

The Protection Threshold setting determines how many of the Enabled lines must fail before a module switch occurs. For example, to allow the failure of a single protected (enabled) line to cause a module switch, set the Protection Threshold to 1.

Options for a T1/E1 line are as follows:

- 1 - Disabled
- 2 - Enabled

12. From the T1/E1 Provisioning menu, select **T1/E1 LINE IDENTIFICATION**.

    This parameter allows a user-configurable text string to name the individual T1/E1 lines. This field accepts up to 32 alphanumeric characters, including spaces and special characters.

    •From the T1/E1 Line Identification menu, input a value from 1 to 28 to select the T1/E1 line that requires changing the line identification, and press ENTER.

    •Input the new alphanumeric line identification data, and press ENTER. This step can be repeated for all T1/E1 lines.

13. From the T1/E1 Provisioning menu, select **VT IDENTIFICATION**.

    This parameter allows a user-configurable text string to name the individual VT Ports. This field accepts up to 32 alphanumeric characters, including spaces and special characters.

    - From the VT Identification menu, input a value from 1 to 14 to select the VT port that requires a change to its identification, and press ENTER. Input 15 to advance to the next page to select ports 15 through 18.
    - Input the new alphanumeric line identification data, and press ENTER. This step can be repeated for all VT ports.

14. From the T1/E1 Provisioning menu, select **T1/E1 XCV THRESHOLD**.

    This parameter sets the limit on Code Violations (CV) accepted by the unit over an individual T1/E1 line before it switches MUX modules. If set to Disabled, code violations do not cause the unit to switch MUX modules.

    Options for the T1/E1 XCV Threshold are as follows:

    - 1 - Disable. Code violations do not cause the unit to switch.
    - 2 - 1E-3. The unit switches if more than one out of every 1,000 bits received on a T1/E1 line contains a code violation.
    - 3 - 1E-4. The unit switches if more than one out of every 10,000 bits received on a T1/E1 line contains a code violation.
    - 4 - 1E-5. The unit switches if more than one out of every 100,000 bits received on a T1/E1 line contains a code violation.
    - 5 - 1E-6. The unit switches if more than one out of every 1,000,000 bits received on a T1/E1 line contains a code violation.

15. From the T1/E1 Provisioning menu, select **VT HAIRPIN LOOPBACK**.

    Hairpin back the VT to the STS-1 signal for dropping farther down the SONET ring. The VT Hairpin Loopback options are as follows:

    - 1 - Disabled
    - 2 - Enabled

16. From the T1/E1 Provisioning menu, select **CROSS-CONNECT MAPPING**.

    Any VT can be cross-connect mapped to any available T1/E1 port. Selecting **UNEQUIPPED** (option 29) will free the port and disable the VT. The default mapping is VT Group Mapping.

    The last option on this menu allows the setting of multiple VT cross connects. The default mapping is GV Group Mapping. Sequential (1-to-1) mapping can be selected from this screen.

17. From the T1/E1 Provisioning menu, select **VT AIS TRANSMISSION**.

    When enabled, the VT AIS is transmitted toward the STS-1 during DS1/E1 LOS and LAIS conditions (per GR-253). The default is **ENABLED**.

    When disabled, VT AIS is never transmitted.

18. Press Esc as required to return to the MX2820 Main Menu.

FOLLOW-UP PROCEDURES

Once this procedure is complete, return to the procedure which called out this DLP and continue with the tasks indicated.

DLP-743
Provision Clock Module

INTRODUCTION

This procedure provides step-by-step instructions to provision the Clock Module for the STS-1 MUX in the MX2820 system.

PREREQUISITE PROCEDURES

Obtain all necessary local instructions before provisioning the Clock Module. The parameters need to be set to match the desired application.

The applicable prerequisite procedures can be found in "NTP-003, Clock Module Installation".

CLOCK CARD PROVISIONING DATA

Provisioning data includes the following:

- Timing Mode
- Timing Type
- Termination

PROCEDURE

1. If not already connected, connect the VT100 terminal or PC to the craft port. For details, refer to DLP-715.
2. Logon to the MX2820 system. For details, refer to DLP-716.
3. From the MX2820 Main Menu, select **ACCESS MODULES** and press ENTER.

4. From the Access Module Menus screen, select C for the SMC Clock module, and press ENTER.

   Figure 7-63 shows the Clock module Main Menu.

```
Shelf:  1  Slot:  CLK A     ADTRAN MX2820 System                   03/22/05 11:29
Unacknowledged Alarms: NONE                            TID:           HTVLALEXD16



                                  Main Menu

                           1 - Configuration
                           2 - Provisioning
                           3 - Status










   Selection:                                         '?' - System Help Screen
```

Figure 7-63. Clock Module Main Menu

5. From the Main Menu screen, select **PROVISIONING** and press ENTER.

   Figure 7-64 shows the Provisioning menu.

```
Shelf:  1  Slot:  CLK A     ADTRAN MX2820 System                   03/22/05 11:31
Unacknowledged Alarms: NONE                            TID:           HTVLALEXD16



                                 Provisioning

                         1 - Clock Interface
                         2 - Service States
                         3 - Protection
                         4 - Save Provisioning
                         5 - Restore Factory Defaults
                         6 - Card Reset
                         7 - Auto Save        :  Enable
                         8 - Card Pair ID     :  MX2820 SMC







   Selection:                                         '?' - System Help Screen
```

Figure 7-64. Clock Module Provisioning Menu

6. From the Main Menu screen, select **CLOCK INTERFACE** and press ENTER.

   Figure 7-65 shows the Clock Interface menu.

```
Shelf:  1  Slot:  CLK A      ADTRAN MX2820 System                 03/22/05 11:33
Unacknowledged Alarms: NONE                              TID:          HTVLALEXD16



                        Clock Interface Provisioning

                    1 - Timing Mode  : External Timing
                    2 - Timing Type  : All Ones
                    3 - Termination  : Enable









  Selection:                                          '?' - System Help Screen
```

Figure 7-65. Clock Interface Menu

Table 7-8 describes the clock interface options.

Table 7-8. Clock Interface Timing Descriptions

Setting	Options *	Description
TIMING MODE	**External Timing** Force Hold-over	This variable sets the clock card to synchronize to either of the external clock references or operate in hold over.
TIMING TYPE	**SF/ESF** All Ones	This variable enables and disabled AIS detection on the incoming clock references. It can be used for debugging purposes.
TERMINATION MODE	Disable **Enable**	This variable specifies if the clock card pair will provide line termination for the incoming bits clock inputs or if another timing destination will be responsible for termination

* Bold type indicates default setting

7. Press ESC as required to return to the Clock Provisioning menu.

8. From the Clock Provisioning Menu screen, select **SERVICE STATES** and press ENTER.

   Figure 7-66 shows the Service States menu.

```
Shelf:  1  Slot:  CLK A      ADTRAN MX2820 System                 03/22/05 11:40
Unacknowledged Alarms: NONE                              TID:          HTVLALEXD16



                                Service States

   1 - Card CLK A Equipment Provisioned State  :  IS
       Card CLK A Equipment Functional State   :  IS-ANR

   2 - Card CLK B Equipment Provisioned State  :  IS (Card not installed)
       Card CLK B Equipment Functional State   :  (Card not installed)

   3 - Primary Clock Failure Alarm             :  Enable
   4 - Secondary Clock Failure Alarm           :  Disable









   Selection:                                          '?' - System Help Screen
```

Figure 7-66. Service States Menu

9. Provision the Primary and Secondary Failure Alarms as **DISABLED** for unused clock input(s).
10. Press ESC as required to return to the MX2820 Main Menu.

NOTE

A complete description of Service States is available in the *MX2820 TL1 Reference Guide*, Manual Number 61186003L1-35.

FOLLOW-UP PROCEDURES

Once this procedure is complete, return to the procedure which called out this DLP and continue with the tasks indicated.

DLP-744
Provision Clock Module Protection

INTRODUCTION

This procedure provides step-by-step instructions to provision the protection settings for the clock modules.

PREREQUISITE PROCEDURES

Obtain all necessary local instructions before provisioning the Clock module protection. Use this procedure if 1:1 redundancy is established with two clock modules.

The applicable prerequisite procedure is one of the following:

- "NTP-003, Clock Module Installation"
- "DLP-743, Provision Clock Module"

CLOCK MODULE PROTECTION PROVISIONING DATA

Provisioning data includes the following:

- Automatic Clock Card Switch
- Automatic Clock Reference Switch
- Minimum Switching Period
- Maximum Switching Threshold
- Clear Number of Switches

PROCEDURE

1. If not already connected, connect the VT100 terminal or PC to the craft port. For details, refer to DLP-715.
2. Logon to the MX2820 system. For details, refer to DLP-716.
3. From the MX2820 Main Menu, select **ACCESS MODULES** and press ENTER.

4. From the Access Module Menus screen, select C for the SMC Clock module, and press ENTER.

   Figure 7-67 shows the Clock module Main Menu screen.

```
Shelf:  1  Slot:  CLK A      ADTRAN MX2820 System                  03/22/05 11:29
Unacknowledged Alarms: NONE                           TID:            HTVLALEXD16



                                  Main Menu

                             1 - Configuration
                             2 - Provisioning
                             3 - Status











   Selection:                                        '?' - System Help Screen
```

Figure 7-67. Clock Module Main Menu

5. From the Main Menu screen, select **PROVISIONING** and press ENTER.

   Figure 7-68 shows the Provisioning menu.

```
Shelf:  1  Slot:  CLK A      ADTRAN MX2820 System                  03/22/05 11:31
Unacknowledged Alarms: NONE                           TID:            HTVLALEXD16



                                 Provisioning

                           1 - Clock Interface
                           2 - Service States
                           3 - Protection
                           4 - Save Provisioning
                           5 - Restore Factory Defaults
                           6 - Card Reset
                           7 - Auto Save         :  Enable
                           8 - Card Pair ID      :  MX2820 SMC







   Selection:                                        '?' - System Help Screen
```

Figure 7-68. Clock Module Provisioning Menu

6. From the Clock Provisioning Menu screen, select **PROTECTION** and press ENTER.

   Figure 7-69 shows the Protection Provisioning menu.

```
Shelf:  1  Slot:  CLK A      ADTRAN MX2820 System                 03/22/05 11:46
Unacknowledged Alarms: NONE                              TID:          HTVLALEXD16



                          Protection Provisioning


                     1 - Perform Manual Card Switch
                     2 - Perform Manual Switch From Secondary Reference

                     3 - Automatic Clock Card Switch        : Enable
                     4 - Automatic Clock Reference Switch   : Enable

                     5 - Minimum Switching Period (sec.)    : 10
                     6 - Maximum Switch Threshold           : 3
                     7 - Clear Number of Switches           : 0




  Selection:                                        '?' - System Help Screen
```

Figure 7-69. Protection Provisioning Menu

7. From the Protection Provisioning menu, select **PERFORM MANUAL SWITCH**.

   Input the letter Y to perform manual protection switch, or input the letter N to escape without performing a manual protection switch, and press ENTER.

8. From the Protection Provisioning menu, select **PERFORM MANUAL SWITCH FROM PRIMARY REFERENCE**.

   This allows the reference to be switched from Primary to Secondary (and back).

   - The Primary reference is the CLKA input.
   - The Secondary reference is the CLKB input.

   Input the letter Y to perform manual protection switch of the reference timing, or input the letter N to escape without performing a manual protection switch, and press ENTER.

9. From the Protection Provisioning menu, select **MINIMUM SWITCHING PERIOD**.

   This parameter determines the number of seconds that must pass before another module switch is allowed. The default is 10 seconds. Input a value from 0 to 3600 to set the Minimum Switch Period (in seconds), and press ENTER.

10. From the Protection Provisioning menu, select **MAXIMUM SWITCH THRESHOLD**.

    This parameter determines the number of times per hour the module is allowed to switch between CLK modules. If in an hour, the modules switch more than the Maximum Switch Threshold allows, the module issues a trap and stops switching modules for the next 24 hours. The default setting is three times per hour. Input a value from 1 to 24 to set the Maximum Switch Threshold, and press ENTER.

11. From the Protection Provisioning menu, select **CLEAR NUMBER OF SWITCHES**.

    This parameter displays (and provides the ability to reset) the running count of protection switches utilized as the basis for activating the “Excessive Switches” alarm.

12. Press Esc as required to return to the MX2820 Main Menu.

FOLLOW-UP PROCEDURES

Once this procedure is complete, return to the procedure which called out this DLP and continue with the tasks indicated.

DLP-745
Provision RADIUS

INTRODUCTION

This procedure provides step-by-step instructions to provision the RADIUS server via the MX2820 SCU Main Menu.

Follow these steps if RADIUS is implemented in the system.

PREREQUISITE PROCEDURES

Obtain all necessary local instructions before provisioning RADIUS.

The applicable prerequisite procedure is the following:

- "NTP-006, SCU Provisioning (System Security)"

RADIUS PROVISIONING DATA

For complete descriptions of the RADIUS provisioning requirements, refer to "UIG-560, RADIUS".

PROCEDURE

1. If not already connected, connect the VT100 terminal or PC to the craft port. For details, refer to DLP-715.
2. Logon to the MX2820 system. For details, refer to DLP-716.
3. From the MX2820 Main Menu, select **SYSTEM CONTROLLER** and press ENTER.
4. Select **PROVISIONING** from the System Controller menu.
5. Select **GENERAL** from the Provisioning menu.
6. Select **SECURITY ADMINISTRATION** from the General menu.

7. Select **RADIUS** from the Security Administration menu.

Figure 7-70 provides an illustration for the RADIUS provisioning menu.

```
Shelf:  1                    ADTRAN MX2820 System                 03/22/05 09:12
Unacknowledged Alarms: CRITICAL                          TID:          HTVLAL28201




        RADIUS

          1 - Server #1 Settings
          2 - Server #2 Settings
          3 - Server #3 Settings
          4 - Server #4 Settings
          5 - Validate Server Connection          : Run RADIUS Test
          6 - RADIUS Authentication (Menus)       : DISABLE
          7 - RADIUS Authentication (TL1)         : DISABLE
          8 - RADIUS SNMP Access                  : DISABLE
          9 - Default Authorization Level         : READ

        Selection :


                                                    '?' - System Help Screen
```

Figure 7-70. RADIUS Provisioning Menu

8. Select **SERVER #1** from the RADIUS menu and press ENTER.

   Figure 7-71 shows the Server #1 Provisioning menu.

```
Shelf:  1                    ADTRAN MX2820 System                 03/22/05 09:20
Unacknowledged Alarms: CRITICAL                          TID:          HTVLAL28201




              RADIUS Server #1 Settings

           1 - Server Address : 200.4.52.1
           2 - Port Number    : 1812
           3 - Shared Secret  :
           4 - Retries        : 4
           5 - Time Out       : 1000(ms)









  Selection :                                       '?' - System Help Screen
```

Figure 7-71. RADIUS Server Provisioning Menu

NOTE

The server settings must match the RADIUS client settings

9. Run the Validate Server Connection option to verify server access.

CAUTION

Failure to validate correct provisioning options and connections could result in system lockout. Should this occur, contact ADTRAN Technical Support.

10. Select **ENABLE** for the desired RADIUS Authentication option (Menus, TL1, and/or SNMP) from this menu to enable RADIUS authentication.
11. Press Esc as required to return to the RADIUS Provisioning menu. Configure other servers as required locally.
12. When RADIUS provisioning is complete, press Esc to return to the MX2820 Main Menu.

FOLLOW-UP PROCEDURES

Once this procedure is complete, return to the procedure which called out this DLP and continue with the tasks indicated.

This page is intentionally blank.

Section 8
Trouble Analysis Procedures

This section provides troubleshooting information for operating company personnel who perform maintenance and trouble analysis tasks for the system.

Contents

Figures

Tables

TAP-100
MX2820 Troubleshooting Guide

INTRODUCTION

This section provides information about the System Controller Unit (SCU) and Multiplexer (MUX) alarms. The SCU manages alarms for the MX2820 system. When a MUX module issues an alarm, the module passes this information to the SCU, where the alarm is indicated by relays and LEDs and added to the alarm log. The SCU also generates shelf-level alarms.

NOTE

Alarms can be acknowledged at the SCU by pressing the ACO button on the SCU front panel or by shorting the ACO contacts (wire-wrap posts) on the back panel.

TROUBLE ANALYSIS PROCEDURE

Analyzing and clearing alarms for the MX2820 system requires the following steps:

- Observe the **ALM** LED status on the SCU front panel.
- Observe of the **ALM**, **DS3/NET STAT**, and **DS1 STAT** LED status on the MUX module front panel.
- Access the System Alarm Log to obtain more details on the alarm condition.
- Determine the cause of the alarm.

Observe the Alarm LED Status on the SCU

Using Table 8-1, determine the type of alarm generated by the SCU.

- A flashing red **ALM** LED indicates a critical alarm is in progress.
- A solid red **ALM** LED indicates either a major or minor alarm is in progress.

Table 8-1. MX2820 SCU LED Descriptions

LED	State	Description
ACT	Solid Green	Everything is OK and operating normally
	Alternating Green/Amber	Everything is OK and console is open
	Solid Red	Self-test failed
	Solid Amber	Software update is in progress
	Alternating Red/Amber	Self-test failed and console is open
	Flashing Red	SCU Module has failed
ALM	Solid Green	No critical, major, or minor alarms in progress
	Flashing Red	Critical alarm in progress
	Solid Red	Major or minor alarm in progress
	Flashing Amber	Critical alarm was highest priority alarm suppressed by ACO
	Solid Amber	Major or minor alarm was highest priority alarm suppressed by ACO

Observe the Alarm LED Status on the MUX Module

Using Table 8-2, determine the type of alarm generated by the MUX Module by observing the **ALM**, **DS3/NET STAT**, and **DS1 STAT** LEDs on the MUX module front panel.

NOTE

In Table 8-2, DS3 refers to the M13 MUX, and NET refers to the STS-1 MUX.

- Flashing red **ALM** and **DS3/NET STAT** LEDs indicate a DS3 critical alarm is in progress.
- Solid red **ALM** and **DS3/NET STAT** LEDs indicate a major or minor DS3 alarm is in progress.
- Flashing red **ALM** and **DS1 STAT** LEDs indicate a DS1 critical, but non-critical system alarm, is in progress.
- Solid red **ALM** and **DS1 STAT** LEDs indicate a major or minor DS1 alarm is in progress.

Table 8-2. MX2820 MUX LED Descriptions

LED	State	Description
ACT	Solid Green	Normal operation
	Alternating Green/Amber	Normal operation but console is open
	Solid Red	Self-test failed
	Solid Amber	Software update in progress
	Alternating Red/Amber	Self-test failed and console open
	Flashing Red	MUX Module has failed
ALM	Solid Green	No critical, major, or minor alarms
	Solid Red	Major or minor alarm in progress
	Flashing Red	Critical alarm in progress
DS3/ NET STAT	Solid Green	Normal (DS3 okay)
	Solid Red	AIS, OOF, RAI, Idle alarms
	Flashing Red	DS3 LOS or DS3 failure (critical)
	One-second Red	A single DS3 line code violation or burst of DS3 line code violations just occurred
	Alternating Red/Green	DS3 XCV threshold exceeded
DS3/ NET TEST	Off	No DS3 tests in progress
	Solid Amber	Locally-originated test
	Flashing Amber	Remote-originated test
DS1 STAT	Off	All DS1s are disabled
	Solid Green	Enabled DS1s normal (all okay)
	Solid Red	Non-critical DS1 alarm in progress
	Flashing Red	DS1 LOS on some enabled line (critical DS1 alarm; non-critical system alarm)
	One-second Red	Single code violation or burst of code violations just occurred in some RX DS1
	Alternating Red/Green	DS1 XCV threshold exceeded
DS1 TEST	Off	No DS1 tests in progress
	Solid Amber	Locally-originated test
	Flashing Amber	Remote-originated test

Access the System Alarm Log

After observing the status of the LEDS, the System Alarm Log can be accessed to obtain more details on the alarm condition.

To access the System Alarm Log, perform the following steps:

1. From the MX2820 Main Menu screen, select **SYSTEM ALARMS** and press ENTER.

   Figure 8-1 shows an example of the System Alarms menu.

```
Shelf:  1                    ADTRAN MX2820 System                  05/04/04 09:529
Unacknowledged Alarms: None                                  TID:      HTVLALEXD16




                    System Alarms

                      1 - Shelf Alarm Status
                      2 - Alarm Logs
                      3 - User-Definable Alarms
                      4 - Alarm Chronology : Ascending









  Selection :                                          '?' - System Help Screen
```

Figure 8-1. MX2820 System Alarms Menu

2. From the System Alarms menu screen select either **SHELF ALARM STATUS** or **ALARM LOGS**, and press ENTER.

   Figure 8-2 shows an example of the Shelf Alarm Status screen for an 19-inch shelf.

```
Shelf:  1                    ADTRAN MX2820 System                 05/04/04 09:29
Unacknowledged Alarms: None                                  TID:      HTVLALEXD16

                             Shelf Alarm Status
          M       Master Log

          S           SCU......... [Major]


          1      A - ............ [None]         B - ............ [None]
          2      A - ............ [None]         B - ............ [None]
          3      A - ............ [None]         B - ............ [None]
          4      A - MX2820 M13.. [Critical]     B - MX2820 M13.. [None]
          5      A - ............ [None]         B - ............ [None]
          6      A - ............ [None]         B - ............ [None]
          7      A - ............ [None]         B - ............ [None]




  Select Log (M-Master, S-SCU, 1..7):
```

Figure 8-2. MX2820 Shelf Alarm Status Screen

Figure 8-3 shows an example of the Alarm Logs screen for an 19-inch shelf.

```
Shelf:  1                    ADTRAN MX2820 System                 05/04/04 09:29
Unacknowledged Alarms: None                                  TID:      HTVLALEXD16

Alarm Log - Master Alarms            Alarms    1 to   11 of   11 Page   1 of   1

Date     Time     Pos Type          Port       Level    Description       Status
10/10/00 00:00:03 SCU MX2820 SCU    Chassis    Major    -48V Bus A Fail   Active
10/10/00 00:00:03 SCU MX2820 SCU    Module     Info     Card Removed      Cleared
10/10/00 00:00:12 4A  MX2820 M13   DS2 #1     Major    OOF               Active
10/10/00 00:00:12 4A  MX2820 M13   DS2 #2     Major    OOF               Active
10/10/00 00:00:12 4A  MX2820 M13   DS2 #3     Major    OOF               Active
10/10/00 00:00:13 4A  MX2820 M13   DS2 #4     Major    OOF               Active
10/10/00 00:00:13 4A  MX2820 M13   DS2 #5     Major    OOF               Active
10/10/00 00:00:14 4A  MX2820 M13   DS2 #6     Major    OOF               Active
10/10/00 00:00:14 4A  MX2820 M13   DS2 #7     Major    OOF               Active
10/10/00 00:00:15 4A  MX2820 M13   DS3        Critical OOF               Active
10/10/00 00:00:15 4A  MX2820 M13   DS3        Critical LOS               Active
----------------------------->>> END OF ALARM LOG <<<-----------------------------




Inverse = Active      * = Unacknowledged      Chronology = Ascending
(N)ext (P)rev (F)irst (L)ast (C)lear (A)cknowledge (S)elect Log (R)eset Log
```

Figure 8-3. MX2820 Alarm Log Screen

Determine the Cause of the Alarm

Utilizing the information from the LEDs and Alarm Log, use the following subsections to further define the nature of the alarm.

SCU ALARM SUMMARY - 1186003LX, 1186003LX

Table 8-3 provides the MX2820 SCU alarm summary.

Table 8-3. SCU Alarm Summary

Alarm	Description	Severity Level
Card Removed	This alarm is set when a module is physically removed from a slot in the shelf. Inserting a module into the slot clears the alarm.	User-definable
AUX1	This alarm is user-definable. The severity level and the description string are also user-definable. Access Identifier (AID) Index and TL1 condition codes are user-definable.	User-definable
AUX2	This alarm is user-definable. The severity level and the description string are also user-definable. AID Index and TL1 condition codes are user-definable.	User-definable
AUX3A	This alarm is user-definable. The severity level and the description string are also user-definable. AID Index and TL1 condition codes are user-definable. NOTE: AUX3A and AUX3B can be used to support the Fan Module alarms.	User-definable
AUX3B	This alarm is user-definable. The severity level and the description string are also user-definable. AID Index and TL1 condition codes are user-definable. This alarm is generated when the SCU receives a cadenced alarm signal on the AUX3 wire-wrap post. NOTE: AUX3A and AUX3B can be used to support the Fan Module alarms.	User-definable

Table 8-3. SCU Alarm Summary (Continued)

Alarm	Description	Severity Level
PWR Bus A Fail	This alarm indicates that the primary power supply has failed (PWR A). AID Index and TL1 condition codes are user-definable. NOTE: If both power supplies fail, the critical relay will switch indicating the shelf is completely without power.	User-definable
PWR Bus B Fail	This alarm indicates that the secondary power supply has failed (PWR B). AID Index and TL1 condition codes are user-definable. NOTE: If both power supplies fail, the critical relay will switch indicating the shelf is completely without power.	User-definable
Device Communication Failure	This alarm indicates an expansion shelf stopped communicating with the SCU	Major

M13 MUX ALARM SUMMARY - 1186002LX

Table 8-4 provides alarm information for the M13 MUX module.

Table 8-4. M13 MUX General Alarm Summary

General Alarms	Description	Severity Level
SWTCH TO PROTECT	The system has switched to the protect module (card B) in the MUX pair.	Alert
MAX SW EXCEEDED	The MUX pair has exceeded the user-provisioned maximum number of protection switch events.	Alert
CARD FAIL	The MUX module has detected a hardware failure.	Minor/Critical *Minor, if a protection switch was successful, Critical if not.*
BTB COMM FAIL	Communication between the two MUX modules in a protected pair has failed.	Minor

DS3 Alarms

Table 8-5 provide information for DS3 alarms.

Table 8-5. M13 MUX DS3 Alarms

DS3 Alarm	Description	Severity Level
AIS	This alarm indicates an Alarm Indication Signal (AIS) is detected on the DS3 input side of the M13 MUX module. AIS alarms occur when consecutive 1010s are received in the information bits. This indicates that there is a transmission fault located either at or upstream from the transmitting terminal.	Alert
LOS	This alarm indicates a Loss-of-Signal (LOS) condition (DS3 failure) is detected on the incoming DS3 signal.	Critical
OOF	This alarm indicates an Out-of-Frame (OOF) condition is detected on the incoming DS3 signal.	Critical
RAI	This alarm indicates the MUX is receiving Remote Alarm Indication (RAI) [yellow] on the DS3 from the network. This alarm is a signal sent back toward the source of a failed transmit circuit. The X-bits (X1 and X2) are set to zero.	Alert
XCV	The unit is receiving excessive code violations from the network, exceeding the XCV threshold parameter.	Alert
IDLE	The DS3 interface is receiving an idle sequence from network.	Alert
TEST	The DS3 interface has been placed into a test (loopback) mode.	Alert

DS2 Alarms

Table 8-6 provides information for DS2 alarms.

Table 8-6. M13 MUX DS2 Alarms

DS2 Alarm	Description	Severity Level
OOF	This alarm indicates an Out-of-Frame (OOF) condition on the DS2.	Major
AIS	This alarm indicates AIS is being received on the DS2. AIS alarms occur when the unit receives unframed all ones.	Alert
RAI	This alarm indicates RAI is being received on the DS2. This alarm is a signal sent back toward the source of a failed transmit circuit. The X-bit is set to zero.	Alert
TEST	The DS2 interface has been placed into a test (loopback) mode.	Alert

DS1 Alarms

Table 8-7 provides information for DS1 alarms.

Table 8-7. M13 MUX DS1 Alarms

DS1 Alarm	Description	Severity Level
LOS	This alarm indicates a DS1 Loss-of-Signal (LOS) on an enabled line.	Major
XCV	This alarm indicates the unit is receiving excessive code violations from the loop (low-speed), exceeding the threshold set by the XCV threshold parameter.	Alert
LOOP AIS	This alarm indicates that all ones are being received on a DS1 from the loop (low-speed) direction.	Alert
CARRIER AIS	This alarm indicates that all ones are being received on a DS1 channel from the network (high-speed) direction.	Alert
TEST	The T1/E1 interface has been placed into a test (loopback) mode.	Alert

Far-End Alarms

Table 8-8 provides information for far-end alarms.

Table 8-8. M13 MUX Far-End Alarms

Far-End Alarm	Description	Severity Level
FE LOS	This alarm indicates the far-end unit has lost the RX signal.	Minor
FE AIS	This alarm indicates the far-end unit is receiving an AIS (blue) alarm condition from the network. AIS alarms occur when consecutive 1010s are received in the information bits. This indicates there is a transmission fault located either at the transmitting terminal or upstream from the transmitting terminal.	Alert
FE OOF	This alarm indicates that the far-end unit has lost framing on the DS3.	Minor
FE IDLE	This alarm indicates the far-end unit is receiving an idle indication on the DS3.	Alert
FE DS3 FAIL SA	This alarm indicates the far-end unit or network is reporting a service affecting (SA) DS3 equipment failure.	Minor
FE DS3 FAIL NSA	This alarm indicates the far-end unit or network is reporting a non-service affecting (NSA) common equipment failure.	Minor
FE CMN EQPT FAIL	This alarm indicates the far-end unit or network is reporting a NSA common equipment failure.	Minor
FE MULT DS1 LOS	This alarm indicates the far-end unit is experiencing a Loss-of-Signal (LOS) on multiple DS1s.	Minor
FE SNG DS1 LOS	This alarm indicates the far-end unit is experiencing an LOS on a single DS1.	Minor
FE DS1 FAIL SA	This alarm indicates the far-end unit is experiencing an SA DS1 equipment failure.	Minor
FE DS1 FAIL NSA	This alarm indicates the far-end unit is experiencing an NSA DS1 equipment failure.	Minor

DS3 Quarter-Hour Threshold Alarms

Table 8-9 provides information for DS3 Performance Monitoring (PM) quarter-hour threshold alarms (alerts). The alarms indicate that the performance monitoring parameter has exceeded the user-provisionable threshold for a 15-minute period.

Table 8-9. M13 MUX DS3 Quarter-Hour Threshold Alarms

DS3 Quarter-Hour Threshold Alarm	Description	Severity Level
QTR CV-L	Code Violation - Line	Alert
QTR ES-L	Errored Seconds - Line	Alert
QTR SES-L	Severely Errored Second - Line	Alert
QTR LOSS-L	Loss of Signal Seconds - Line	Alert
QTR CVP-P	Code Violation - Path; P-bit	Alert
QTR ESP-P	Errored Seconds - Path; P-bit	Alert
QTR SESP-P	Severely Errored Seconds - Path; P-bit	Alert
QTR UASP-P	Unavailable Seconds - Path; P-bit	Alert
QTR CVCP-P	Code Violation - Path; CP-bit	Alert
QTR ESCP-P	Errored Seconds - Path; CP-bit	Alert
QTR SESCP-P	Severely Errored Seconds - Path; CP-bit	Alert
QTR UASCP-P	Unavailable Seconds - Path; CP-bit	Alert
QTR SAS-P	Severely Errored Frame/AIS Seconds	Alert
QTR CVCP-PFE	Code Violation - Path, Far End; CP-bit	Alert
QTR-ESCP-PFE	Errored Seconds - Path, Far End; CP-bit	Alert
QTR-SESCP-PFE	Severely Errored Seconds - Path, Far End; CP-bit	Alert
QTR UASCP-PFE	Unavailable Seconds - Path, Far End; CP-bit	Alert

DS3 Daily Threshold Alarms

Table 8-10 provides information for DS3 Performance Monitoring (PM) daily threshold alarms (alerts). The alarms indicate that the performance monitoring parameter has exceeded the user-provisionable threshold for a 24-hour period.

Table 8-10. M13 MUX DS3 Daily Threshold Alarms

DS3 Daily Threshold Alarm	Description	Severity Level
DAY CV-L	Code Violation - Line	Alert
DAY ES-L	Errored Seconds - Line	Alert
DAY SES-L	Severely Errored Seconds - Line	Alert
DAY LOSS-L	Loss of Signal Seconds - Line	Alert
DAY CVP-P	Code Violation - Path; P-bit	Alert
DAY ESP-P	Errored Seconds - Path; P-bit	Alert
DAY SESP-P	Severely Errored Seconds - Path; P-bit	Alert
DAY UASP-P	Unavailable Seconds - Path; P-bit	Alert
DAY CVCP-P	Code Violation - Path; CP-bit	Alert
DAY ESCP-P	Errored Seconds - Path; CP-bit	Alert
DAY SESCP-P	Severely Errored Seconds - Path; CP-bit	Alert
DAY UASCP-P	Unavailable Seconds - Path; CP-bit	Alert
DAY SAS-P	Severely Errored Frame/AIS Seconds	Alert
DAY CVCP-PFE	Code Violation - Path, Far End; CP-bit	Alert
DAY ESCP-PFE	Errored Seconds - Path, Far End; CP-bit	Alert
DAY SESCP-PFE	Severely Errored Seconds - Path, Far End; CP-bit	Alert
DAY UASCP-PFE	Unavailable Seconds - Path, Far End; CP-bit	Alert

DS1 Quarter-Hour Threshold Alarms

Table 8-11 provides information for DS1 Performance Monitoring (PM) quarter-hour threshold alarms (alerts). The alarms indicate that the performance monitoring parameter has exceeded the user-provisionable threshold for a 15-minute period.

Table 8-11. M13 MUX DS1 Quarter-Hour Threshold Alarms

DS1 Quarter-Hour Threshold Alarm	Description	Severity Level
QTR CV-L	Code Violation - Line	Alert
QTR ES-L	Errored Seconds - Line	Alert
QTR SES-L	Severely Errored Seconds - Line	Alert
QTR LOSS-L	Loss of Signal Seconds - Line	Alert
QTR AISS-P	AIS Seconds - Path	Alert
For P/N 1186002L3 Only:		
QTR CV-L-LS	Code Violation - Line - Low Speed	Alert
QTR ES-L-LS	Errored Seconds - Line - Low Speed	Alert
QTR SES-L-LS	Severely Errored Seconds - Line - Low Speed	Alert
QTR LOSS-L-LS	Loss of Signal Seconds - Line - Low Speed	Alert
QTR CV-P-LS	Code Violation - Path - Low Speed	Alert
QTR ES-P-LS	Errored Seconds - Path - Low Speed	Alert
QTR SES-P-LS	Severely Errored Seconds - Path - Low Speed	Alert
QTR UAS-P-LS	Unavailable Seconds - Path - Low Speed	Alert
QTR AISS-P-LS	AIS Seconds - Path - Low Speed	Alert
QTR CV-P-HS	Code Violation - Path - High Speed	Alert
QTR ES-P-HS	Errored Seconds - Path - High Speed	Alert
QTR SES-P-HS	Severely Errored Seconds - Path - High Speed	Alert
QTR UAS-P-HS	Unavailable Seconds - Path - High Speed	Alert
QTR AISS-P-HS	AIS Seconds - Path - High Speed	Alert

DS1 Daily Threshold Alarms

Table 8-12 provides information for DS1 Performance Monitoring (PM) daily threshold alarms (alerts). The alarms indicate that the performance monitoring parameter has exceeded the user-provisionable threshold for a 24-hour period.

Table 8-12. M13 MUX DS1 Daily Threshold Alarms

DS1 Daily Threshold Alarm	Description	Severity Level
DAY CV-L	Code Violation - Line	Alert
DAY ES-L	Errored Seconds - Line	Alert
DAY SES-L	Severely Errored Seconds - Line	Alert
DAY LOSS-L	Loss of Signal Seconds - Line	Alert
DAY AISS-P	AIS Seconds - Path	Alert
For P/N 1186002L3 Only:		
DAY CV-L-LS	Code Violation - Line - Low Speed	Alert
DAY ES-L-LS	Errored Seconds - Line - Low Speed	Alert
DAY SES-L-LS	Severely Errored Seconds - Line - Low Speed	Alert
DAY LOSS-L-LS	Loss of Signal Seconds - Line - Low Speed	Alert
DAY CV-P-LS	Code Violation - Path - Low Speed	Alert
DAY ES-P-LS	Errored Seconds - Path - Low Speed	Alert
DAY SES-P-LS	Severely Errored Seconds - Path - Low Speed	Alert
DAY UAS-P-LS	Unavailable Seconds - Path - Low Speed	Alert
DAY AISS-P-LS	AIS Seconds - Path - Low Speed	Alert
DAY CV-P-HS	Code Violation - Path - High Speed	Alert
DAY ES-P-HS	Errored Seconds - Path - High Speed	Alert
DAY SES-P-HS	Severely Errored Seconds - Path - High Speed	Alert
DAY UAS-P-HS	Unavailable Seconds - Path - High Speed	Alert
DAY AISS-P-HS	AIS Seconds - Path - High Speed	Alert

STS-1 MUX ALARM SUMMARY - 1186005L1

Table 8-13 provides alarm information for the STS-1 MUX module.

Table 8-13. STS-1 Alarm Condition Descriptions

STS-1 Alarm	Condition Description	Severity Level
LOS	The unit has lost the network receive signal	Critical
LOF	The unit detects a framing loss from the network	Critical
LOP	The unit is unable to detect a valid pointer in the receive signal	Critical
LOMF	The unit detects loss of H4 multiframe from the network	Critical
UEQ-P	The path is unequipped if it is not provisioned (Byte C2 of the STS path overhead is set to zero)	Critical
SLMP	The unit detects a mismatch of the C2 byte	Critical
AIS-L	The unit is receiving a line alarm indication signal (the section terminating equipment generates AIS-L after detecting LOS or LOF)	Alert
AIS-P	The unit is receiving a line alarm indication signal (AIS-P is defined as all ones in bytes H1, H2, and H3 as well as all ones in the entire STS synchronous payload envelope)	Alert
RFI-L	The unit is receiving a line remote failure indication (RFI-L is declared when the incoming line remote defect indication [RDI-L, “110” pattern in bits 6, 7, and 8 of the K2 line overhead byte] lasts for 2.5 ±0.5 seconds	Alert
RFI-P	The unit is receiving a line remote failure indication (RFI-P is declared when the incoming path remote defect indication [RDI-P, “1” in bit 5 of the G1 path overhead byte for contiguous frames] lasts for 2.5 ±0.5 seconds	Alert
TIM-P	A received signal label is mismatched if it does not equal the locally provisioned expected value	Alert
TEST	The STS-1 interface has been placed in a test (loopback) mode	Alert

STS-1 DS1 Alarm Condition Descriptions

Table 8-14 provides information for DS1 alarms.

Table 8-14. STS-1 MUX DS1 Alarms

DS1 Alarm	Description	Severity Level
LOS	This alarm indicates a DS1 Loss-of-Signal (LOS) on an enabled line.	Major
XCV	This alarm indicates the unit is receiving excessive code violations from the loop (low-speed), exceeding the threshold set by the XCV threshold parameter.	Alert
LOOP AIS	This alarm indicates that all ones are being received on a DS1 from the loop (low-speed) direction.	Alert
CARRIER AIS	This alarm indicates that all ones are being received on a DS1 channel from the network (high-speed) direction.	Alert
TEST	The T1/E1 interface has been placed into a test (loop-back) mode.	Alert

STS-1 VT/Port Alarm Condition Descriptions

Table 8-15 provides VT/Port Alarm Condition descriptions.

Table 8-15. VT/Port Alarm Condition Descriptions

VT/Port Alarm	Condition Description	Severity Level
LOP-V	A VT LOP defect is declared when either a valid pointer is not detected in eight consecutive VT superframes, or when eight consecutive VT superframes are detected with the NDF set to “1001” without a valid concatenation indicator. A VT LOP is declared when the VT LOP defect persists for 2.5 ±0.5 seconds	Major
AIS-V	The unit is receiving a VT Path alarm indication signal (VT-Path AIS-P is defined as all ones in bytes V1 and V2, as well as all ones in the entire VT synchronous payload envelope). A VAIS failure is declared when the defect persists for 2.5 ±0.5 seconds	Alert
RFI-V	The unit is receiving a VT Path remote failure indication (RFI-V is declared when the incoming VT Path remote defect indication [VTRDI, “1” in bit 4 of the VT-Path overhead byte, V5, in five contiguous frames] lasts for 2.5 ±0.5 seconds	Alert
SLM-V	A received signal label is mismatched if it does no equal the locally provisioned value or the value “equipped non-specific”	Major
UNEQ-V	The received VT path is unequipped if it is not provisioned (Byte V5 of the received VT path overhead is set to zero)	Major

STS-1 PM Threshold Alarms

Table 8-16 provides information for STS-1 Performance Monitoring (PM) threshold alarms (alerts). The alarms indicate that the performance monitoring parameter has exceeded the user-provisionable threshold for the defined period.

Table 8-16. STS-1 MUX PM Threshold Alarms

Daily Threshold Alarm	Description	Severity Level
CV-L	Code Violation - Line	Alert
ES-L	Errored Seconds - Line	Alert
SES-L	Severely Errored Seconds - Line	Alert
UAS-L	Unavailable Seconds - Line	Alert
CV-S	Code Violation - Section	Alert
ES-S	Errored Seconds - Section	Alert
SES-S	Severely Errored Seconds - Section	Alert
SEFS-S	Severely Errored Framing Seconds - Section	Alert
CV-P	Code Violation - Path	Alert
ES-P	Errored Seconds - Path	Alert
SES-P	Severely Errored Seconds - Path	Alert
UAS-P	Unavailable Seconds - Path	Alert
PPJC-PDET	Positive Pointer Justification Count - STS Path	Alert
NPJC-PDET	Negative Pointer Justification Count - STS Path	Alert
CV-PFE	Far End Code Violation - Path	Alert
ES-PFE	Far End Errored Seconds - Path	Alert
SES-PFE	Far End Severely Errored Seconds - Path	Alert
UAS-PFE	Far End Unavailable Seconds - Path	Alert
CV-LFE	Far End Code Violation - Line	Alert
ES-LFE	Far End Errored Seconds - Line	Alert
SES-LFE	Far End Severely Errored Seconds - Path	Alert
UAS-LFE	Far End Unavailable Seconds - Line	Alert

VT PM Threshold Alarms

Table 8-17 provides information for VT Performance Monitoring (PM) threshold alarms (alerts). The alarms indicate that the performance monitoring parameter has exceeded the user-provisionable threshold for the defined period.

Table 8-17. STS-1 MUX VT PM Threshold Alarms

DS1 Daily Threshold Alarm	Description	Severity Level
CV-V	Code Violation - VT	Alert
ES-V	Errored Seconds - VT	Alert
SES-V	Severely Errored Seconds - VT	Alert
UAS-V	Unavailable Seconds - VT	Alert
CV-VFE	Far End Code Violation - VT	Alert
ES-VFE	Far End Errored Seconds - VT	Alert
SES-VFE	Far End Severely Errored Seconds - VT	Alert
UAS-VFE	Far End Unavailable Seconds - VT	Alert

Clock Module Alarms

Table 8-18 describes the alarms for the MX2820 Clock Module.

Table 8-18. Clock Module Alarms

General Alarm	Description	Severity Level
HO	Holdover: The clock circuitry is locked and no longer tracking the external clock reference	Major
CONTCOM	Card Communication: Communication between the two installed Clock Modules in a protected arrangement has failed	Minor
EQPT	Equipment Failure: A Non-Service Affecting equipment problem has occurred	Minor
IMPROPRMVL	Card Removal: An improper removal of a Clock Module has occurred	Minor/Critical *Minor if protection is available; Critical if not*
PRIFAIL	Primary Clock Fail: The Clock Module has detected a failure condition on the Primary clock input	Minor
SECFAIL	Secondary Clock Fail: The Clock Module has detected a failure condition on the Secondary clock input	Minor
WKSWPR	Switch to Protect: The system has switched to the protect module (card B) in the protected pair	Alert
EWS	Excessive Switches: The number of switches to protection has exceeded the threshold	Alert

Appendix A
Abbreviations and Acronyms

A

ACO ..... Alarm Cutoff
ACT ..... Active
AID ..... Access Identifier
AIS ..... Alarm Indication Signal
ALM ..... Alarm
AMI ..... Alternate Mark Inversion
amp ..... amphenol
ANSI ..... American National Standards Institute
ASYNC ..... Asynchronous
AUX ..... Auxiliary
AWG ..... Average Wire Gauge

B

BERT ..... Bit Error Rate Testing
bps ..... bits per second

C

CAIS ..... Carrier Side Alarm Indication Signal
CCV ..... C-bit Coding Violation
CD ..... Carrier Detect
CES ..... C-bit Errored Seconds
CO ..... Central Office
CRC ..... Cyclic Redundancy Check
CS ..... Clear-to-Send
CSU ..... Channel Service Unit

CTS ..... Clear-to-Send

D

dB ..... Decibel
DC ..... Direct Current
DCD ..... Data Carrier Detect
DDS ..... Digital Data Service
DS1 ..... Digital Signal Level One
DS3 ..... Digital Signal Level Three
DSR ..... Data Set Ready
DSX-1 ..... Digital Signal Cross-Connect, Level 1
DTE ..... Data Terminal Equipment
DTR ..... Data Terminal Ready

E

ES ..... Errored Seconds
Eq ..... Equipment
Eqpt ..... Equipment

F

FCC ..... Federal Communications Commission
FEAC ..... Far-End Alarm Channel

I

IP ..... Internet Protocol

L

LAIS ..... Loop Side Alarm Indication Signal
LAN ..... Local Area Network
LBO ..... Line Build Out
LCV ..... Line Coding Violation
LED ..... Light Emitting Diode
LIU ..... Line Interface Unit
LOF ..... Loss of Framing
LOS ..... Loss of Signal

M

mA ..... milli amperes
MBE..... M-bit Errors
Mbps..... Megabits per second
MIB..... Management Information Base
ms..... Millisecond
MTU ..... Multi-Tenant Unit
MUX..... Multiplexer

N

NC..... Normally Closed
NIU ..... Network Interface Unit
NMS..... Network Management System
NO ..... Normally Open
NRZ..... Non-Return to Zero
NSA..... Non-Service Affecting

O

OCU ..... Office Channel Unit
OOF ..... Out-of-Frame
OOS ..... Out of Service

P

PCV..... P-bit Coding Violation
PES..... P-bit Errored Seconds
*p*F ..... pica Farad
POP..... Point of Presence
PPP ..... Point-to-Point Protocol
PSES..... P-bit Severely Errored Seconds
PVC..... Permanent Virtual Channel

R

RAI..... Remote Alarm Indicator
RD ..... Receive Data
RDL..... Remote Digital Loopback

RL ..... Remote Loopback
RMA ..... Return Material Authorization
RS ..... Request to Send
RTS ..... Request-to-Send
RT ..... Remote Terminal
Rx ..... Receive

S

SA ..... Service Affecting
SCU ..... System Controller Unit
SEFS ..... Severely Errored Framing Seconds
SES ..... Severely Errored Seconds
SNMP ..... Simple Network Management Protocol
SR ..... Data Set Ready
SYNC ..... Synchronous

T

TA ..... Terminal Equipment Available
TCP/IP ..... Transmission Control Protocol/Internet Protocol
TFTP ..... Trivial File Transfer Protocol
TM ..... Test Mode
Tx ..... Transmit

U

UAS ..... Unavailable Seconds

V

VDC ..... Volts DC

W

W ..... Watts

X

XCV ..... Excessive Coding Violations

Appendix B
Warranty

WARRANTY AND CUSTOMER SERVICE

ADTRAN will replace or repair this product within the warranty period if it does not meet its published specifications or fails while in service. Warranty information can be found at www.adtran.com/warranty.

Refer to the following subsections for sales, support, Customer and Product Service (CAPS) requests, or further information.

ADTRAN Sales

Pricing/Availability:

800-827-0807

ADTRAN Technical Support

Pre-Sales Applications/Post-Sales Technical Assistance:

800-726-8663

Standard hours: Monday - Friday, 7 a.m. - 7 p.m. CST
Emergency hours: 7 days/week, 24 hours/day

ADTRAN Repair/CAPS

Return for Repair/Upgrade:

(256) 963-8722

Repair and Return Address

Contact CAPS prior to returning equipment to ADTRAN.

ADTRAN, Inc.
CAPS Department
901 Explorer Boulevard
Huntsville, Alabama 35806-2807

Carrier Networks Division
901 Explorer Blvd.
Huntsville, AL 35806