

MX410/MX412 System Manual

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PRELIMINARY

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Revision History

Revision	Date	Description of Changes
A	June 2005	Initial release
B	August 2005	PPP and MX412 information added

Conventions

The following typographical conventions are used in this document:

[This font](#) indicates a cross-reference link. First-time references to tables and figures are shown in **this font**.

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 silkscreen 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

The MX410 (P/N 1189500L1) and MX412 (P/N 1189512L1) comply with the requirements covered under UL 60950 and NEBS Level 3. The MX410 and MX412 are intended to be installed in a restricted access area only.

The MX410 and MX412 devices comply with Part 15 of the FCC Rules. Operation is subject to the following two conditions:

1. The device may not cause harmful interference.
2. The device must accept any interference received, including interference that may cause undesired operation.

Changes and modifications not expressly approved by ADTRAN could void the user's authority to operate this equipment.

WARNING

The V.35, Ethernet, terminal server, craft port, and FXS port (if present) interfaces are not to be connected to outside plant (OSP) facilities.

CAUTION

Per GR-1089-CORE October 2002, Section 9, this system is designed and intended only for installation in a DC-C (common) Bonding and Grounding system. It is not intended or designed for installation in a DC-I (isolated) Bonding and Grounding system. The ground wire must be of equal or greater ampacity than the wire connected to the VDC return.

The Compliance Codes for the MX410/MX412 units and the MX410 Power Supply Unit (PSU) are provided in the following tables.

Table 1. MX410 and MX412 Compliance Codes

Code	Input	Output
Power Code (PC)	F	C
Telecommunication Code (TC)	X	X
Installation Code (IC)	A	–

Table 2. MX410 Power Supply Unit Compliance Codes

Code	Input	Output
Power Code (PC)	F	C
Telecommunication Code (TC)	–	–
Installation Code (IC)	A	–

Training

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

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MX410/MX412 System Manual

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Section 1

Introduction

PRODUCT OVERVIEW

The MX410/MX412 delivers full DS0 control to service locations, allowing carriers full utilization of DS1 bandwidth. The MX410 interfaces to four long-haul outside plant protected DS1s via RJ-48 connectors, while the MX412 interfaces to 12 DS1s. Data and management on the DS1s can be cross connected on a non-blocking per-DS0 basis to any DS1, V.35 port, and four PPP ports. Data Ethernet connectivity is provided via four PPP connections used for Ethernet network extension throughout the network and Telnet-based terminal server ports.

The MX410 houses up to two hot-swappable Power Supply Units (PSU) that provide power redundancy when two units are deployed. At least one MX410 PSU (P/N 1189501L1) must be inserted into the MX410 for the MX410 to function. The MX412 has an internal PSU.

See [Figure 1-1](#) and [Figure 1-2](#) on page 1-3 for overview diagrams.

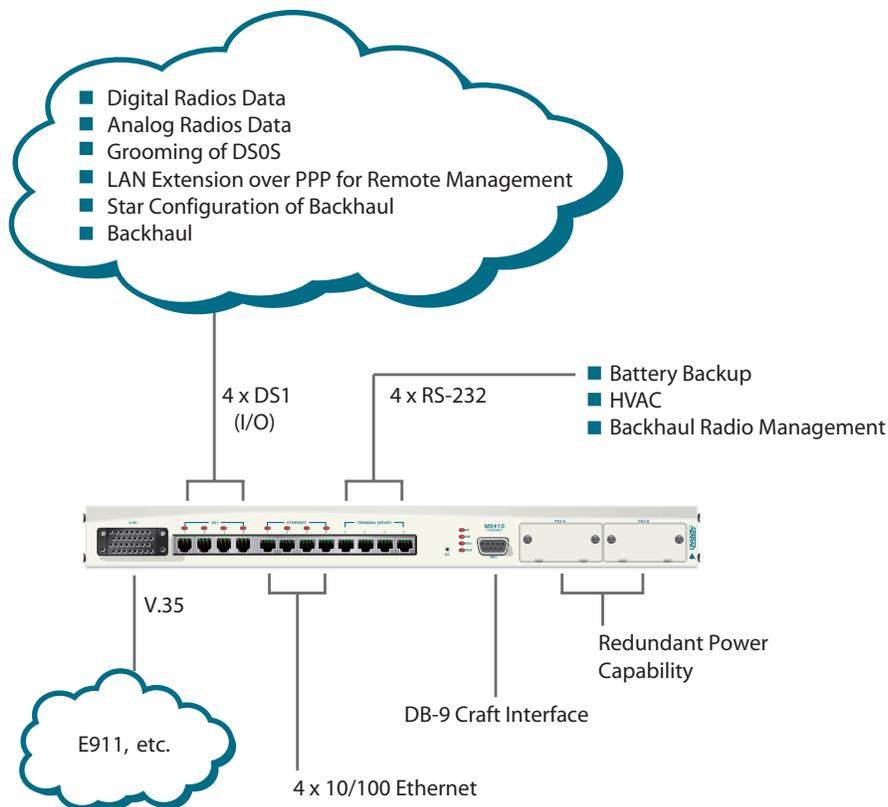


Figure 1-1. MX410 Overview

The major features of the MX410/MX412 are as follows:

- 19-inch wall mounting or rack mounting, one rack unit high
- Front panel data connections
- One V.35 port
- Four RJ-45 long-haul DS1 connections (12 on the MX412) with outside plant protection
- A four-port Ethernet switch
- Non-Blocking DS0 cross connect between all DS1 interfaces and the V.35 port
- RJ-45 10Base-T Ethernet connection
- Terminal server functionality
- FXS port (MX412 only)
- DB-9 craft interface for access to Provisioning, Status, Test, and Alarm menus
- Management via Telnet over Ethernet connection or VT100 through a local RS-232, DB-9, craft port
- End-to-end Ethernet extension over multiple T1s
- Robbed Bit Signaling (RBS) supported on a per DS0 basis
- Hot-swappable PSUs with 1:1 redundancy (MX410 only)
- Independent power feeds with separate returns
- Accepts redundant ± 60 to ± 22 VDC inputs
- Wire-wrap pins for alarms
- Manual and remote initiated loopback modes
- Meets NEBS Level 3
- Comprehensive test features

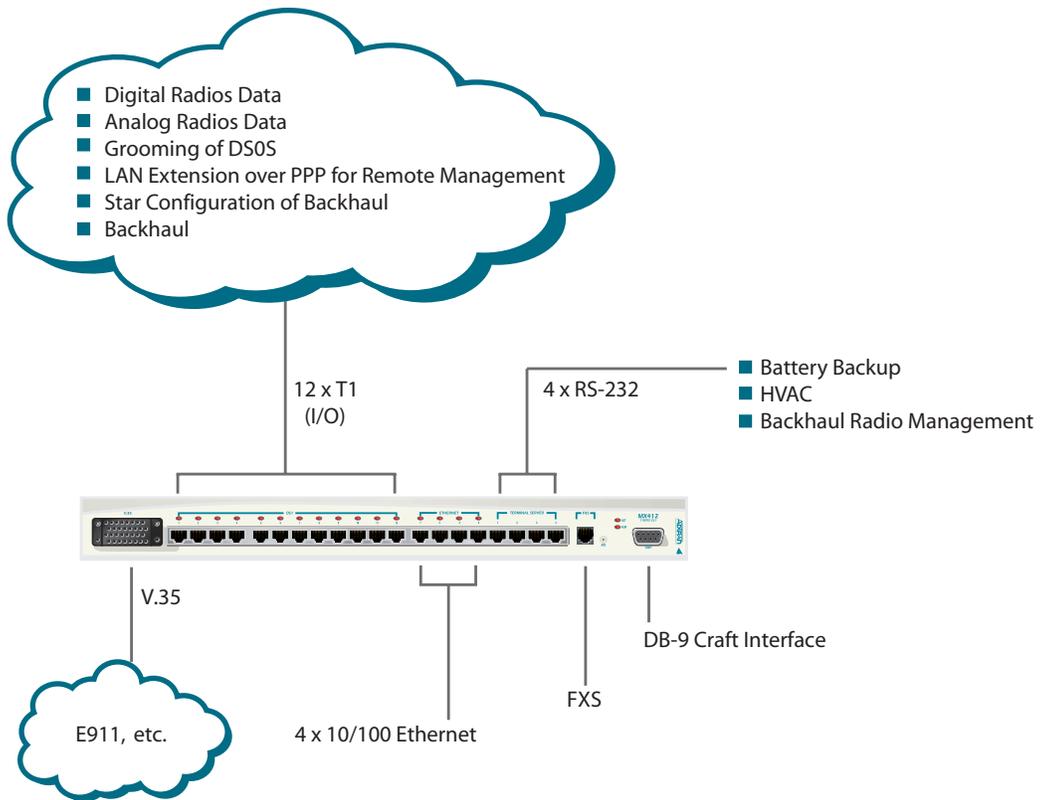


Figure 1-2. MX412 Overview

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Section 2

Engineering Guidelines

GENERAL

This section provides engineering guidelines for network designers who are incorporating an MX410 or MX412 system into their network.

POWER REQUIREMENTS

Table 2-1 provides the current draw at -48 VDC (operating range of -42 VDC to -60 VDC) and ±24 VDC (operating range of ±22 VDC to ±27 VDC) with redundant PSUs installed.

Table 2-1. Current Draw at -48 VDC and ±24 VDC

Part Number	Equipment	Maximum Current Draw at -48 VDC	Maximum Current Draw at ±24 VDC
1189500L1	MX410	0.23 amps	0.41 amps
1189512L1	MX412	0.36 amps	0.76 amps

Table 2-2 provides data for determining the recommended fuse for the fuse and alarm panel that services the MX410/MX412.

Table 2-2. Fuse Recommendations

System Voltage	Recommended Fuse
-48 VDC	2 amps, slow-blow
±24 VDC	2 amps, slow-blow

POWER DISSIPATION

Table 2-3 provides the heat dissipation data at -48 VDC (operating range of -42 VDC to -60 VDC) and ± 24 VDC (operating range of ± 22 VDC to ± 27 VDC) with redundant PSUs installed (MX410 only).

Table 2-3. Heat Dissipation at -48 VDC and ± 24 VDC

Part Number	Equipment	Heat Dissipation at -48 VDC	Heat Dissipation at ± 24 VDC
1189500L1	MX410	11.8 watts	10.5 watts
1189512L1	MX412	17.3 watts	18.2 watts

Section 3

Application Guidelines

INTRODUCTION

This section describes several applications for the MX410/MX412 system. For each application there is a figure illustrating the application, a list of the equipment needed, and an explanation of the basic setup. The MX410 block diagram shows the data path of an MX410 system that implements the following applications:

- [“Drop and Continue Application”](#) on page 3-3
- [“Drop and Insert Application”](#) on page 3-7
- [“Integrated Wireless Access Device or DS0 Grooming”](#) on page 3-12
- [“Remote Management of Other Systems using Terminal Server Ports and Ethernet Connectivity”](#) on page 3-18

MX410 DATA PATH BLOCK DIAGRAM

As shown in **Figure 3-1**, the MX410/MX412 contains a 1/0 cross connect that allows DS0s to be mapped between four DS1s (12 DS1s on the MX412), four PPP ports, and a V.35 port. Refer to “**PPP BCP/IPCP Menu**” on page 5-32 for more information about using PPP.

Any DS0 in DS1 1 can be mapped to any DS0 in DS1 1-4, or any PPP port, or the V.35 port.

Any unmapped DS0 in a DS1 is filled with all ones. Therefore, if an entire T1 is unmapped, framed all ones are sent.

The default mapping of the 1/0 cross connect is for all the DS1s to be unmapped and transmitting framed all ones. No DS0s are dropped to the PPP or V.35 ports.

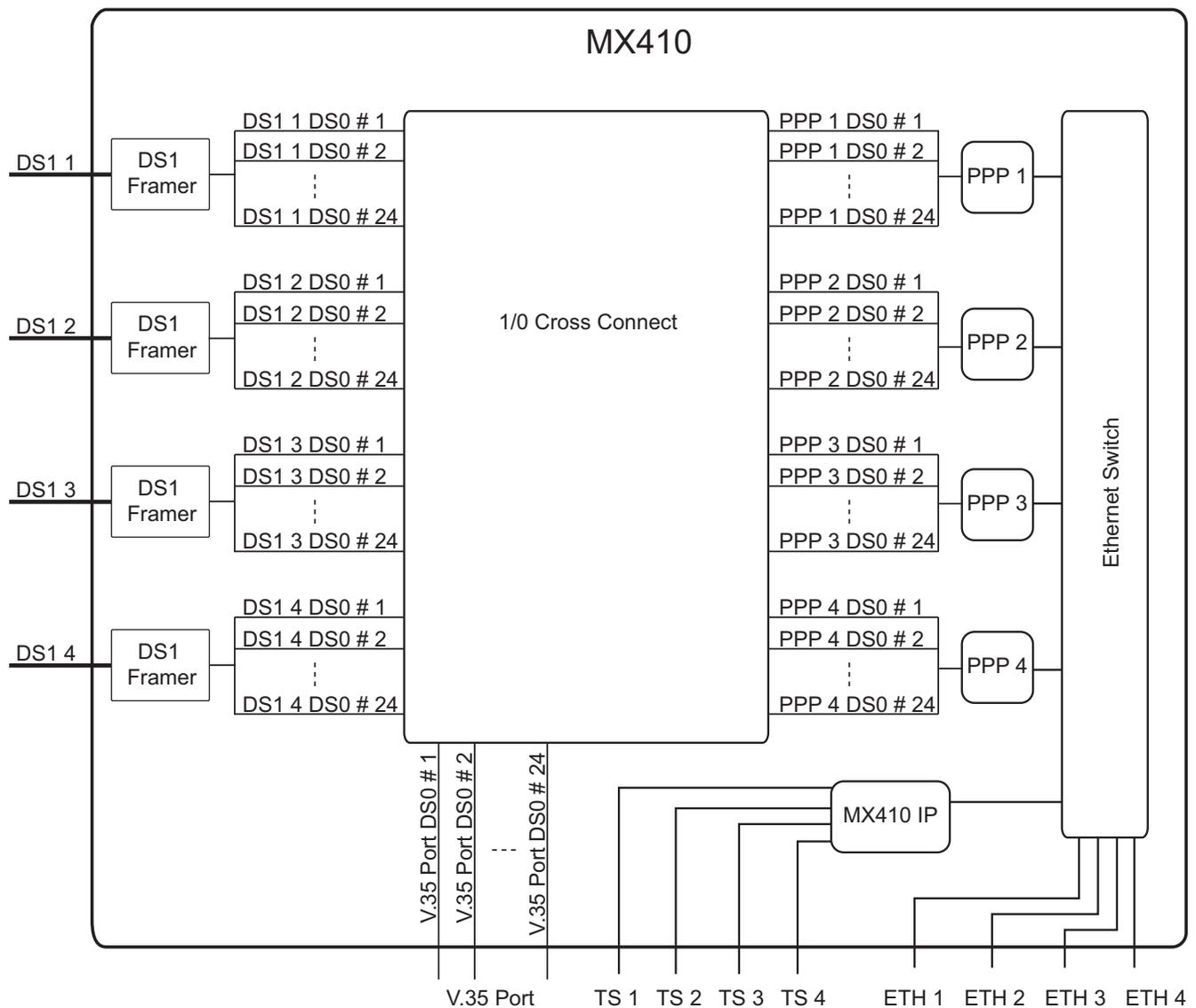


Figure 3-1. MX410 Data Path Block Diagram

Drop and Continue Application

The following applies to Remote Site #1 shown in **Figure 3-2**. In the Drop and Continue Application, any combination of DS0s from one DS1 can be dropped out the other DS1 ports with the remaining DS0s continuing through to the other DS1 interface. This enables the bandwidth of one DS1 to deliver DS0s to several sites using one MX410 at each site.

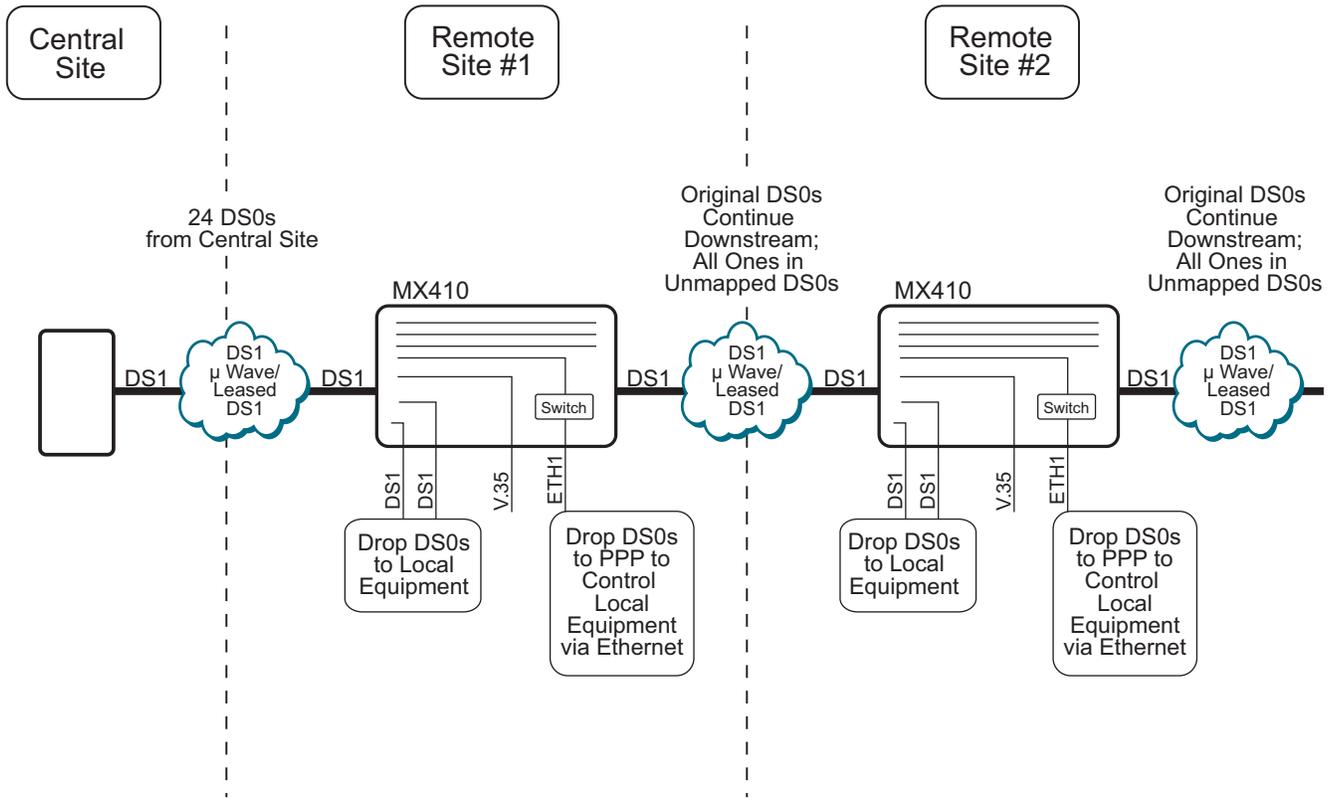


Figure 3-2. Drop and Continue Application Diagram

The equipment needed for a Drop and Continue application is shown in **Table 3-1**.

Table 3-1. Drop and Continue Application - Required Equipment

Part Number	Equipment	Quantity
1189500L1	MX410	1
or		
1189512L1	MX412	1
1189501L1	MX410 PSU (MX410 only)	1 (2 for redundancy)

Setup

Connect the incoming DS1 (the DS1 from which the DS0s are dropped) to the DS1 1 RJ. Connect the outgoing DS1 to the DS1 2 RJ. Connect the other DS1s using the RJ connector on the front panel. For more information, refer to “DS1 Ports” on page 4-6.

Starting from the default blank mapping, the DS0s can be dropped using the Quick Setup menu to the PPP and V.35 ports (see **Figure 3-3**). Select each port (PPP1-4, V.35) to which a DS0 needs to be dropped from the incoming DS1. For each port, select the range of DS0s in DS1 1 to be dropped to that port. To drop DS0s to the other DS1 ports, use the Quick Setup menu to navigate to the Cross-Connect Mapping menu. Select the Map Multiple DS0’s option and then select the range of DS0 and DS1 1 to be dropped to DS1 2 and enable Robbed Bit Signaling if applicable.

Any un-mapped DS0s from the incoming DS1 will transmit All Ones. The incoming DS1 does not have to be DS1 1, but is used only as an example.

The following four figures show an example of setting up a drop and continue application. **Figure 3-3** shows the Quick Setup menu before any DS0s have been dropped.

```
Active Alarms: CRITICAL          MX410          MM/DD/YY HH:MM
                               MINOR          ID:          MX410

                               Quick Setup

Ports
 1 - PPPs
    PPP 1 = DS1 4 DS0 #1

 2 - V.35 =

System
 3 - System ID
 4 - IP Address      : 192.168.100.1
    Subnet Mask     : 255.255.0.0
 5 - Default Gateway : 192.168.1.1
 6 - Date
 7 - Time
                               8 - Cross-Connect Mapping

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

Figure 3-3. Quick Setup Menu

Figure 3-4 shows the Quick Setup menu after DS0s 21-22 have been dropped from DS1 1 to PPP1, DS0s 23-24 have been dropped from DS1 1 to the V.35 port.

```

Active Alarms: CRITICAL          MX410          MM/DD/YY HH:MM
                               MINOR           ID:         MX410

                               Quick Setup

Ports
 1 - PPPs
   PPP 1 = DS1 4 DS0 #1

 2 - V.35 =

System
 3 - System ID
 4 - IP Address      : 192.168.100.1
   Subnet Mask      : 255.255.0.0
 5 - Default Gateway : 192.168.1.1
 6 - Date
 7 - Time
 8 - Cross-Connect Mapping

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

Figure 3-4. Drop and Continue Quick Setup Example

Figure 3-5 shows the DS1 1 Cross-Connect Mapping menu after the PPP1 and V.35 interface have been mapped.

```

Active Alarms: CRITICAL          MX410          MM/DD/YY HH:MM
                               ID:         MX410

                               Cross-Connect Mapping

                               DS1 1

 1 - DS0 #1 =
 2 - DS0 #2 =
 3 - DS0 #3 =
 4 - DS0 #4 =
 5 - DS0 #5 =
 6 - DS0 #6 =
 7 - DS0 #7 =
 8 - DS0 #8 =
 9 - DS0 #9 =
10 - DS0 #10 =
11 - DS0 #11 =
12 - DS0 #12 =

13 - DS0 #13 =
14 - DS0 #14 =
15 - DS0 #15 =
16 - DS0 #16 =
17 - DS0 #17 =
18 - DS0 #18 =
19 - DS0 #19 =
20 - DS0 #20 =
21 - DS0 #21 = PPP 1
22 - DS0 #22 = PPP 1
23 - DS0 #23 = V.35
24 - DS0 #24 = V.35

(T)oggle View (DS1 2, DS1 3, DS1 4, Ports)   25 - Map Multiple DS0's

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

Figure 3-5. Drop and Continue Cross-Connect Mapping Example 1

Figure 3-6 shows the Cross-Connect Mapping menu after the remaining DS0s have been continued to DS1 2 as well as 4 DS0s (13-16) dropped to DS1 3 (1-4) and four other DS0s (17-20) dropped to DS1 4 (1-4).

```

Active Alarms: CRITICAL          MX410          MM/DD/YY HH:MM
                               MINOR            ID:          MX410

                               Cross-Connect Mapping

                               DS1 1

1 - DS0 #1 = DS1 2 DS0 #1      13 - DS0 #13 = DS1 3 DS0 #1
2 - DS0 #2 = DS1 2 DS0 #2      14 - DS0 #14 = DS1 3 DS0 #2
3 - DS0 #3 = DS1 2 DS0 #3      15 - DS0 #15 = DS1 3 DS0 #3
4 - DS0 #4 = DS1 2 DS0 #4      16 - DS0 #16 = DS1 3 DS0 #4
5 - DS0 #5 = DS1 2 DS0 #5      17 - DS0 #17 = DS1 4 DS0 #1
6 - DS0 #6 = DS1 2 DS0 #6      18 - DS0 #18 = DS1 4 DS0 #2
7 - DS0 #7 = DS1 2 DS0 #7      19 - DS0 #19 = DS1 4 DS0 #3
8 - DS0 #8 = DS1 2 DS0 #8      20 - DS0 #20 = DS1 4 DS0 #4
9 - DS0 #9 = DS1 2 DS0 #9      21 - DS0 #21 = PPP 1
10 - DS0 #10 = DS1 2 DS0 #10   22 - DS0 #22 = PPP 1
11 - DS0 #11 = DS1 2 DS0 #11   23 - DS0 #23 = V.35
12 - DS0 #12 = DS1 2 DS0 #12   24 - DS0 #24 = V.35

(T)oggle View (DS1 2, DS1 3, DS1 4, Ports)    25 - Map Multiple DS0's

Selection :                                '?' - System Help Screen

```

Figure 3-6. Drop and Continue Cross-Connect Mapping Example 2

Drop and Insert Application

The following applies to Remote Site #1 shown in **Figure 3-7**. In the Drop and Insert Application DS0s from one DS1 can be dropped out to the other DS1 ports. Then, DS0s from the other DS1 ports can be inserted into the corresponding DS0s in the other DS1. In the example shown, any DS0 not dropped will be mapped to continue on from one DS1 to another. This allows a DS1 to be used to transport DS0s between several sites.

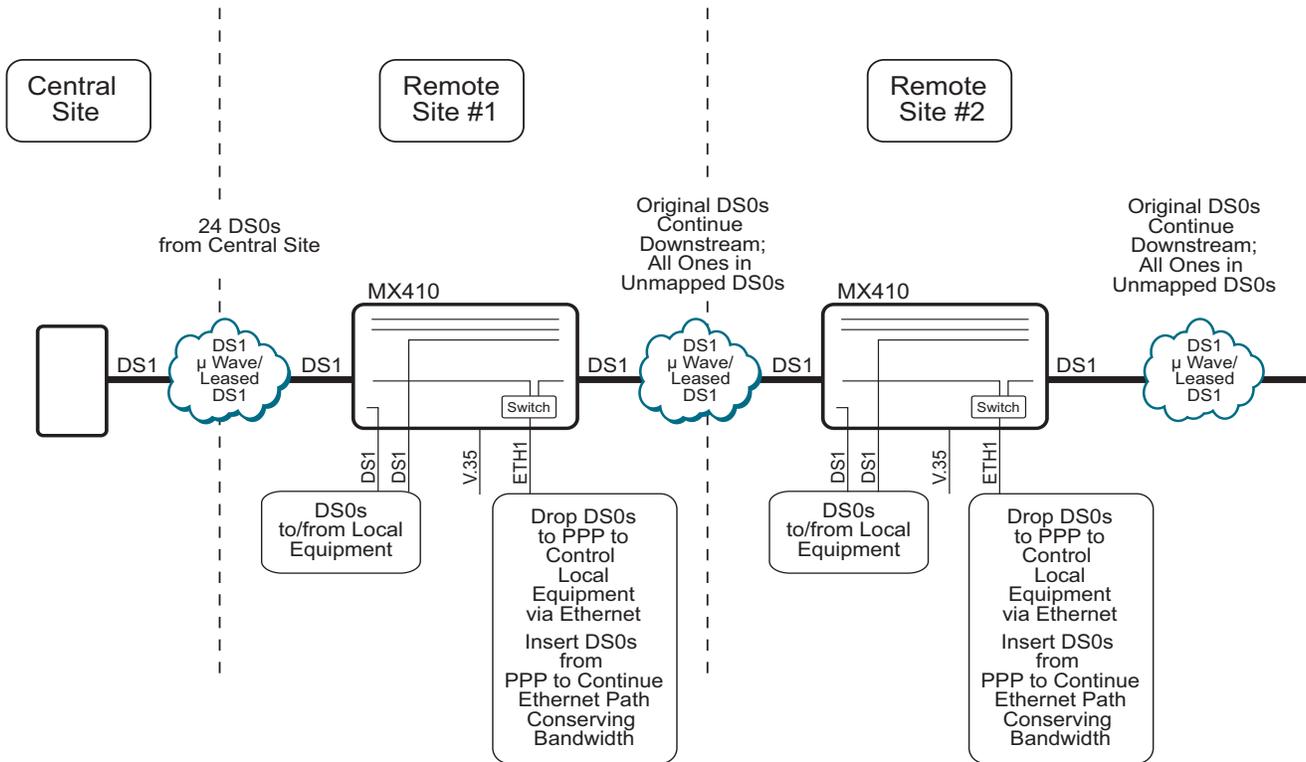


Figure 3-7. Drop and Insert Application Diagram

The equipment needed for a Drop and Insert application is shown in **Table 3-2**.

Table 3-2. Drop and Insert Application - Required Equipment

Part #	Equipment	Quantity
1189500L1	MX410	1
or		
1189512L1	MX412	1
1189501L1	MX410 PSU (MX410 only)	1 (2 for redundancy)

Setup

Connect the DS1 from which the DS0s will be dropped to the DS1 1 RJ. Connect the other DS1 to which the DS0s will be inserted to the DS1 2 RJ. Connect the other DS1s using the other RJ connectors on the front panel. For more information, refer to “[DS1 Ports](#)” on page 4-6

Starting from the default mapping the DS0s can be dropped and inserted using the Quick Setup menu (see [Figure 5-24](#) on page 5-38). Select each port (1-5) to which a DS0 needs to be dropped from the incoming DS1. For each port select the DS0(s) in DS1 1 to be dropped to that port. Then, select each port and DS0 that needs to be inserted into the other DS1. For each DS0 to be inserted select the DS0 in DS1 2 to insert that DS0. Using the Cross-Connect Mapping menu, select each DS0 that is to be dropped to other DS1 ports as well. Select the Map Multiple DS0's option and then select the range of DS0 and DS1 1 to be dropped to DS1 2 and enable Robbed Bit Signaling if applicable.

For each DS0 dropped out of the incoming DS1 (DS1 1 in this example), that does not have a DS0 dropped or inserted into the corresponding DS0 in the other DS1 (DS1 2 in this example), map the remaining DS0s to continue the data downstream. Any unmapped DS0 will transmit all ones.

The following six figures show an example of setting up a drop and insert application. [Figure 3-8](#) shows the Quick Setup menu before any DS0s have been dropped.

```

Active Alarms: CRITICAL          MX410          MM/DD/YY HH:MM
                   MINOR          ID:          MX410

                                Quick Setup

Ports
 1 - PPPS
    PPP 1 = DS1 4 DS0 #1

 2 - V.35 =

System
 3 - System ID
 4 - IP Address      : 192.168.100.1
    Subnet Mask     : 255.255.0.0
 5 - Default Gateway : 192.168.1.1
 6 - Date
 7 - Time
                                8 - Cross-Connect Mapping

Selection :                                '?' - System Help Screen

```

Figure 3-8. Quick Setup Menu

Figure 3-9 shows the Quick Setup menu after DS0s 23-24 have been dropped from DS1 1 to PPP1 and PPP 2 has been inserted into DS0s 23-24 in DS1 2.

```

Active Alarms: CRITICAL          MX410          MM/DD/YY HH:MM
                               MINOR            ID:         MX410

                               Quick Setup

Ports
 1 - PPPs
   PPP 1 = DS1 1 DS0 #23-24
   PPP 2 = DS1 2 DS0 #23-24

 2 - V.35 = DS1 1 DS0 #23-24

System
 3 - System ID
 4 - IP Address      : 192.168.100.1
   Subnet Mask      : 255.255.0.0
 5 - Default Gateway : 192.168.1.1
 6 - Date
 7 - Time
 8 - Cross-Connect Mapping

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

Figure 3-9. Drop and Insert Quick Setup Example

Figure 3-10 shows the Cross-Connect Mapping menu for DS1 1 after mapping the PPPs but prior to mapping the remaining DS0s to be dropped and continued.

```

Active Alarms: CRITICAL          MX410          MM/DD/YY HH:MM
                               MINOR            ID:         MX410

                               Cross-Connect Mapping

                               DS1 1

 1 - DS0 #1 =
 2 - DS0 #2 =
 3 - DS0 #3 =
 4 - DS0 #4 =
 5 - DS0 #5 =
 6 - DS0 #6 =
 7 - DS0 #7 =
 8 - DS0 #8 =
 9 - DS0 #9 =
10 - DS0 #10 =
11 - DS0 #11 =
12 - DS0 #12 =

13 - DS0 #13 =
14 - DS0 #14 =
15 - DS0 #15 =
16 - DS0 #16 =
17 - DS0 #17 =
18 - DS0 #18 =
19 - DS0 #19 =
20 - DS0 #20 =
21 - DS0 #21 =
22 - DS0 #22 =
23 - DS0 #23 = PPP 1
24 - DS0 #24 = PPP 1

(T)oggle View (DS1 2, DS1 3, DS1 4, Ports)   25 - Map Multiple DS0's

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

Figure 3-10. Drop and Insert Cross-Connect Mapping Example 1

Figure 3-11 shows the Cross-Connect Mapping menu after DS0s 1-12 are continued through from DS1 1 to DS1 2 and DS0s 13-23 are dropped from DS1 1 to DS1 3.

```

Active Alarms: CRITICAL          MX410          MM/DD/YY HH:MM
                               MINOR            ID:          MX410

                               Cross-Connect Mapping

                               DS1 1

1 - DS0 #1 = DS1 2 DS0 #1      13 - DS0 #13 = DS1 3 DS0 #1
2 - DS0 #2 = DS1 2 DS0 #2      14 - DS0 #14 = DS1 3 DS0 #2
3 - DS0 #3 = DS1 2 DS0 #3      15 - DS0 #15 = DS1 3 DS0 #3
4 - DS0 #4 = DS1 2 DS0 #4      16 - DS0 #16 = DS1 3 DS0 #4
5 - DS0 #5 = DS1 2 DS0 #5      17 - DS0 #17 = DS1 3 DS0 #5
6 - DS0 #6 = DS1 2 DS0 #6      18 - DS0 #18 = DS1 3 DS0 #6
7 - DS0 #7 = DS1 2 DS0 #7      19 - DS0 #19 = DS1 3 DS0 #7
8 - DS0 #8 = DS1 2 DS0 #8      20 - DS0 #20 = DS1 3 DS0 #8
9 - DS0 #9 = DS1 2 DS0 #9      21 - DS0 #21 = DS1 3 DS0 #9
10 - DS0 #10 = DS1 2 DS0 #10   22 - DS0 #22 = DS1 3 DS0 #10
11 - DS0 #11 = DS1 2 DS0 #11   23 - DS0 #23 = PPP 1
12 - DS0 #12 = DS1 2 DS0 #12   24 - DS0 #24 = PPP 1

(T)oggle View (DS1 2, DS1 3, DS1 4, Ports)    25 - Map Multiple DS0's

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

Figure 3-11. Drop and Insert Cross-Connect Mapping Example 2

Figure 3-12 shows the Cross-Connect Mapping menu for DS1 2 after all ports are dropped and continued from DS1 1.

```

Active Alarms: CRITICAL          MX410          MM/DD/YY HH:MM
                               MINOR            ID:          MX410

                               Cross-Connect Mapping

                               DS1 2

1 - DS0 #1 = DS1 1 DS0 #1      13 - DS0 #13 =
2 - DS0 #2 = DS1 1 DS0 #2      14 - DS0 #14 =
3 - DS0 #3 = DS1 1 DS0 #3      15 - DS0 #15 =
4 - DS0 #4 = DS1 1 DS0 #4      16 - DS0 #16 =
5 - DS0 #5 = DS1 1 DS0 #5      17 - DS0 #17 =
6 - DS0 #6 = DS1 1 DS0 #6      18 - DS0 #18 =
7 - DS0 #7 = DS1 1 DS0 #7      19 - DS0 #19 =
8 - DS0 #8 = DS1 1 DS0 #8      20 - DS0 #20 =
9 - DS0 #9 = DS1 1 DS0 #9      21 - DS0 #21 =
10 - DS0 #10 = DS1 1 DS0 #10   22 - DS0 #22 =
11 - DS0 #11 = DS1 1 DS0 #11   23 - DS0 #23 = PPP 2
12 - DS0 #12 = DS1 1 DS0 #12   24 - DS0 #24 = PPP 2

(T)oggle View (DS1 3, DS1 4, Ports, DS1 1)    25 - Map Multiple DS0's

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

Figure 3-12. Drop and Insert Cross-Connect Mapping Example 3

Figure 3-13 the Cross-Connect Mapping menu after DS0s 13-23 are inserted in DS1 2 from DS1 4. Any unmapped DS0s will be filled with all ones.

```

Active Alarms: CRITICAL          MX410          MM/DD/YY HH:MM
                               MINOR             ID:         MX410

                               Cross-Connect Mapping

                               DS1 2

1 - DS0 #1 = DS1 1 DS0 #1      13 - DS0 #13 = DS1 4 DS0 #1
2 - DS0 #2 = DS1 1 DS0 #2      14 - DS0 #14 = DS1 4 DS0 #2
3 - DS0 #3 = DS1 1 DS0 #3      15 - DS0 #15 = DS1 4 DS0 #3
4 - DS0 #4 = DS1 1 DS0 #4      16 - DS0 #16 = DS1 4 DS0 #4
5 - DS0 #5 = DS1 1 DS0 #5      17 - DS0 #17 = DS1 4 DS0 #5
6 - DS0 #6 = DS1 1 DS0 #6      18 - DS0 #18 = DS1 4 DS0 #6
7 - DS0 #7 = DS1 1 DS0 #7      19 - DS0 #19 = DS1 4 DS0 #7
8 - DS0 #8 = DS1 1 DS0 #8      20 - DS0 #20 = DS1 4 DS0 #8
9 - DS0 #9 = DS1 1 DS0 #9      21 - DS0 #21 = DS1 4 DS0 #9
10 - DS0 #10 = DS1 1 DS0 #10   22 - DS0 #22 = DS1 4 DS0 #10
11 - DS0 #11 = DS1 1 DS0 #11   23 - DS0 #23 = PPP 2
12 - DS0 #12 = DS1 1 DS0 #12   24 - DS0 #24 = PPP 2

(T)oggle View (DS1 3, DS1 4, Ports, DS1 1)    25 - Map Multiple DS0's

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

Figure 3-13. Drop and Insert Cross-Connect Mapping Example 4

Integrated Wireless Access Device or DS0 Grooming

The following applies to Remote Site #1 shown in [Figure 3-14](#) and [Figure 3-15](#). In the Integrated Wireless Access Device Application, bandwidth is conserved by using the MX410 to groom multiple fractional T1s into a single T1. This allows the MX410 to be used as an integrated wireless access device (see [Figure 3-14](#)) or to transport DS0s between several sites (see [Figure 3-15](#)). Refer to “PPP BCP/IPCP Menu” on page 5-32 for more information about using PPP, and refer to “Alarm Pass Thru” on page 5-19 for information about visibility through the cross connect.

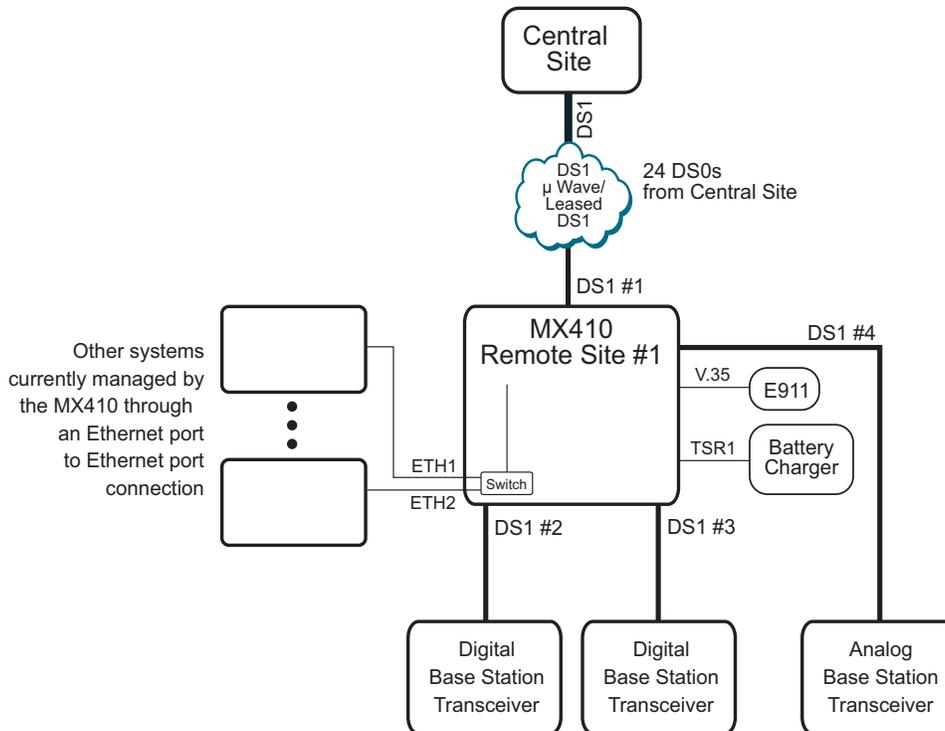


Figure 3-14. Integrated Wireless Access Device Diagram

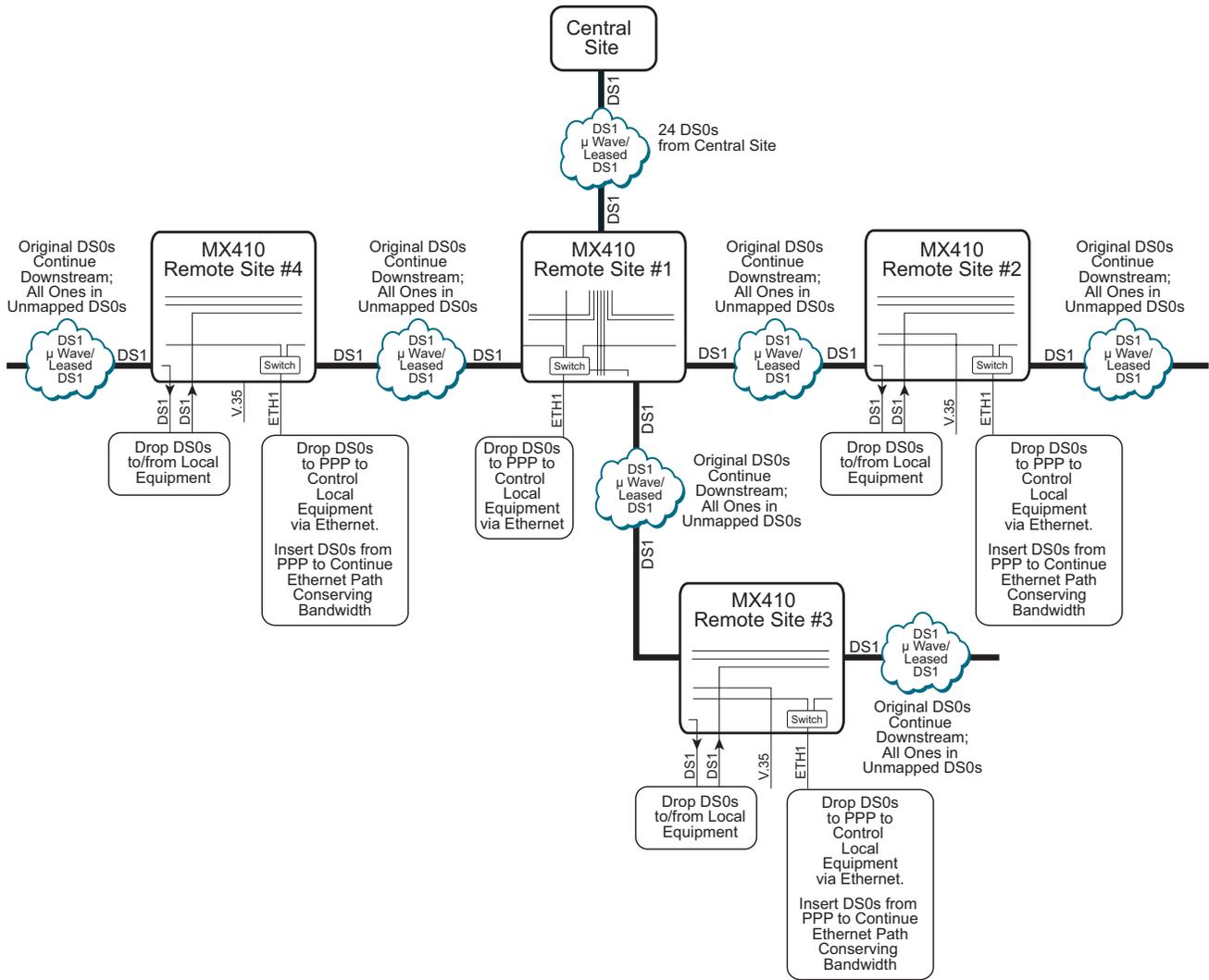


Figure 3-15. Bandwidth Efficiency with DS0 Grooming Diagram

The equipment needed for an Integrated Wireless Access Device or Bandwidth Efficiency with DS0 Grooming application is shown in [Table 3-3](#).

Table 3-3. Integrated Wireless Access Device Application - Required Equipment

Part Number	Equipment	Quantity
1189500L1	MX410	1
or		
1189512L1	MX412	1
1189501L1	MX410 PSU (MX410 only)	1 (2 for redundancy)

Setup

Connect the DS1 from which the DS0s will be dropped to the DS1 1 RJ. Connect the other DS1s to DS1 2, 3 and 4 RJ. For more information, refer to “DS1 Ports” on page 4-6.

Starting from the default mapping the DS0s can be mapped using the Quick Setup menu shown in **Figure 3-16**. Select each port to which a DS0 needs to be dropped from the incoming DS1. For each port select the DS0(s) in DS1 1 to be dropped to that port. Using the Cross-Connect Mapping menu, select each DS0 that are to be mapped from other DS1 ports as well. Select the Map Multiple DS0’s option and then select the range of DS0 and DS1 1 to be dropped to DS1 2 and enable Robbed Bit Signaling if applicable.

For an integrated wireless access device application, map DS0s to the corresponding DS0 in the other DS1 (DS1 2, 3, and 4 in this example). For a grooming application, each DS0 dropped out of the incoming DS1 (DS1 1 in this example), that does not have a DS0 dropped or inserted into the corresponding DS0 in the other DS1 (DS1 2,3 and 4 in this example), map the groomed DS0s to continue the data downstream. Any unmapped DS0 will transmit all ones.

The following six figures show an example of setting up an integrated wireless access device or grooming application. **Figure 3-16** shows the Quick Setup menu before any DS0s have been dropped.

```

Active Alarms: CRITICAL          MX410          MM/DD/YY HH:MM
                   MINOR          ID:             MX410

                                Quick Setup

Ports
 1 - PPPS

 2 - v.35 =

System
 3 - System ID
 4 - IP Address      : 192.168.100.1
   Subnet Mask      : 255.255.0.0
 5 - Default Gateway : 192.168.1.1
 6 - Date
 7 - Time
                                8 - Cross-Connect Mapping

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

Figure 3-16. Quick Setup Menu

Figure 3-17 shows the Quick Setup menu after DS0s 23-24 have been dropped from DS1 1 to PPP1, and PPP 2, 3, and 4 have been inserted into DS0s 23-24 in DS1 2, 3 and 4 respectively. PPP 2, 3, and 4 are typically not used in this fashion for the integrated wireless access device application.

```

Active Alarms: CRITICAL          MX410          MM/DD/YY HH:MM
                               MINOR           ID:          MX410

                               Quick Setup

Ports
 1 - PPPs
    PPP 1 = DS1 1 DS0 #23-24
    PPP 2 = DS1 2 DS0 #23-24
    PPP 3 = DS1 3 DS0 #23-24
    PPP 4 = DS1 4 DS0 #23-24
 2 - V.35 =

System
 3 - System ID
 4 - IP Address      : 192.168.100.1
   Subnet Mask      : 255.255.0.0
 5 - Default Gateway : 192.168.1.1
 6 - Date
 7 - Time
                               8 - Cross-Connect Mapping

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

Figure 3-17. Integrated Wireless Access Device Quick Setup Example

Figure 3-18 shows the Cross-Connect Mapping menu for DS1 1 after mapping the PPPs but prior to mapping the remaining DS0s to be mapped.

```

Active Alarms: CRITICAL          MX410          MM/DD/YY HH:MM
                               MINOR           ID:          MX410

                               Cross-Connect Mapping

                               DS1 1

 1 - DS0 #1 =
 2 - DS0 #2 =
 3 - DS0 #3 =
 4 - DS0 #4 =
 5 - DS0 #5 =
 6 - DS0 #6 =
 7 - DS0 #7 =
 8 - DS0 #8 =
 9 - DS0 #9 =
10 - DS0 #10 =
11 - DS0 #11 =
12 - DS0 #12 =

13 - DS0 #13 =
14 - DS0 #14 =
15 - DS0 #15 =
16 - DS0 #16 =
17 - DS0 #17 =
18 - DS0 #18 =
19 - DS0 #19 =
20 - DS0 #20 =
21 - DS0 #21 =
22 - DS0 #22 =
23 - DS0 #23 = PPP 1
24 - DS0 #24 = PPP 1

(T)oggle View (DS1 2, DS1 3, DS1 4, Ports)    25 - Map Multiple DS0's

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

Figure 3-18. Integrated Wireless Access Device Cross-Connect Map Example 1

Figure 3-19 shows the Cross-Connect Mapping menu after DS0s 1-7 are mapped from DS1 1 to DS1 2, DS0s 8-15 are mapped from DS1 1 to DS1 3, and DS0s 15-22 are mapped from DS1 1 to DS1 4.

```

Active Alarms: CRITICAL          MX410          MM/DD/YY HH:MM
                               MINOR              ID:          MX410

                               Cross-Connect Mapping

                               DS1 1

1 - DS0 #1 = DS1 2 DS0 #1      13 - DS0 #13 = DS1 3 DS0 #6
2 - DS0 #2 = DS1 2 DS0 #2      14 - DS0 #14 = DS1 3 DS0 #7
3 - DS0 #3 = DS1 2 DS0 #3      15 - DS0 #15 = DS1 4 DS0 #1
4 - DS0 #4 = DS1 2 DS0 #4      16 - DS0 #16 = DS1 4 DS0 #2
5 - DS0 #5 = DS1 2 DS0 #5      17 - DS0 #17 = DS1 4 DS0 #3
6 - DS0 #6 = DS1 2 DS0 #6      18 - DS0 #18 = DS1 4 DS0 #4
7 - DS0 #7 = DS1 2 DS0 #7      19 - DS0 #19 = DS1 4 DS0 #5
8 - DS0 #8 = DS1 3 DS0 #1      20 - DS0 #20 = DS1 4 DS0 #6
9 - DS0 #9 = DS1 3 DS0 #2      21 - DS0 #21 = DS1 4 DS0 #7
10 - DS0 #10 = DS1 3 DS0 #3    22 -
11 - DS0 #11 = DS1 3 DS0 #4    23 - DS0 #23 = PPP 1
12 - DS0 #12 = DS1 3 DS0 #5    24 - DS0 #24 = PPP 1

(T)oggle View (DS1 2, DS1 3, DS1 4, Ports)    25 - Map Multiple DS0's

Selection :                               '?' - System Help Screen

```

Figure 3-19. Integrated Wireless Access Device Cross-Connect Map Example 2

Figure 3-20 shows the Cross-Connect Mapping menu for DS1 2 after all ports are mapped from DS1 1.

```

Active Alarms: CRITICAL          MX410          MM/DD/YY HH:MM
                               MINOR              ID:          MX410

                               Cross-Connect Mapping

                               DS1 2

1 - DS0 #1 = DS1 1 DS0 #1      13 - DS0 #13 =
2 - DS0 #2 = DS1 1 DS0 #2      14 - DS0 #14 =
3 - DS0 #3 = DS1 1 DS0 #3      15 - DS0 #15 =
4 - DS0 #4 = DS1 1 DS0 #4      16 - DS0 #16 =
5 - DS0 #5 = DS1 1 DS0 #5      17 - DS0 #17 =
6 - DS0 #6 = DS1 1 DS0 #6      18 - DS0 #18 =
7 - DS0 #7 = DS1 1 DS0 #7      19 - DS0 #19 =
8 - DS0 #8 =                    20 - DS0 #20 =
9 - DS0 #9 =                    21 - DS0 #21 =
10 - DS0 #10 =                  22 - DS0 #22 =
11 - DS0 #11 =                  23 - DS0 #23 = PPP 2
12 - DS0 #12 =                  24 - DS0 #24 = PPP 2

(T)oggle View (DS1 3, DS1 4, Ports, DS1 1)    25 - Map Multiple DS0's

Selection :                               '?' - System Help Screen

```

Figure 3-20. Integrated Wireless Access Device Cross-Connect Map Example 3

Figure 3-21 shows the Cross-Connect Mapping menu for DS1 3.

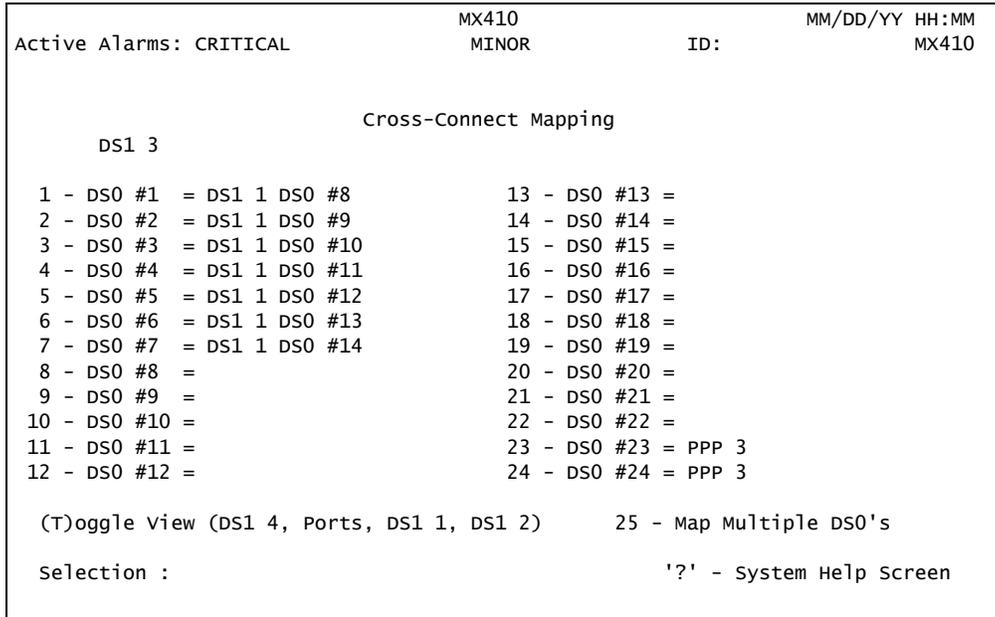


Figure 3-21. Integrated Wireless Access Device Cross-Connect Map Example 4

Figure 3-22 shows the Cross-Connect Mapping menu for DS1 4. Any unmapped DS0s are filled with all ones.

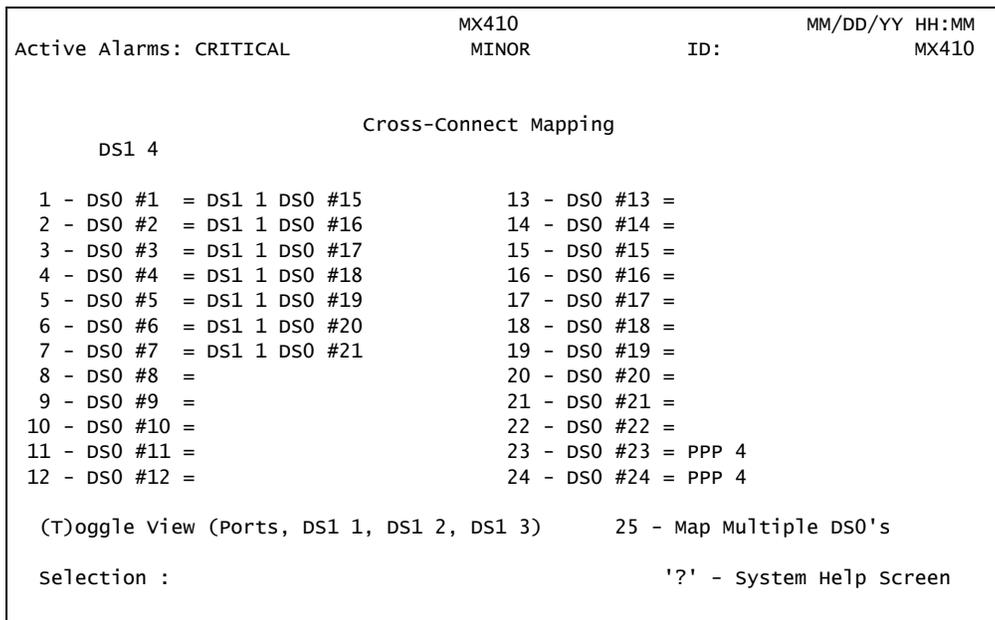


Figure 3-22. Integrated Wireless Access Device Cross-Connect Map Example 5

Remote Management of Other Systems using Terminal Server Ports and Ethernet Connectivity

In this application the Terminal Server ports on the MX410 are used to provide remote management of other non-Ethernet based equipment at the same site. This requires connecting the RS-232 craft ports of the other equipment to the Terminal Server ports of the MX410. Establishing a Telnet session to the MX410 Terminal Server ports establishes access to the other equipment. Up to four external devices can be accessed in this way.

The Ethernet ports on the MX410 are used to provide remote management of the other Ethernet based equipment. This requires connecting the Ethernet ports of the other equipment to the Ethernet ports on the MX410 (see [Figure 3-23](#)). Refer to “PPP BCP/IPCP Menu” on page 5-32 for more information about PPP and IP.

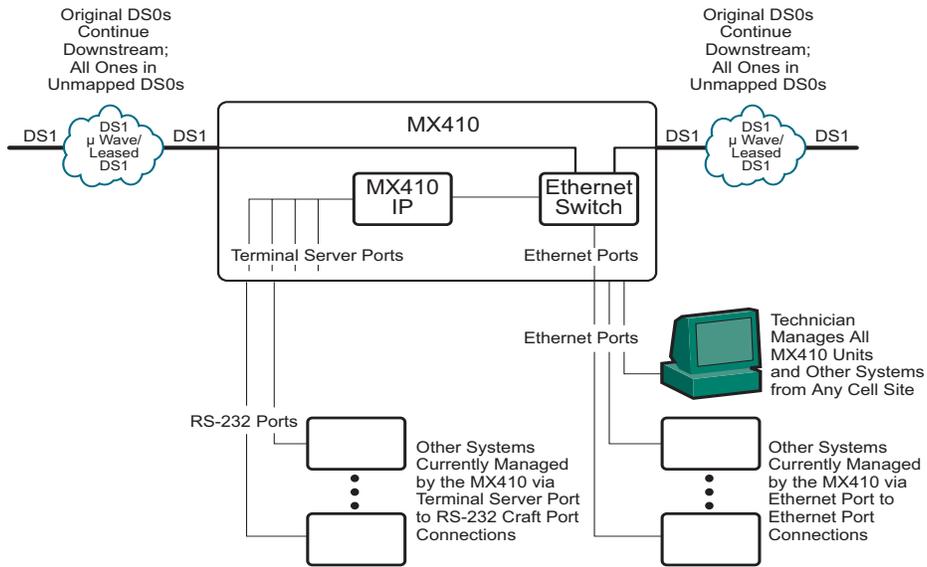


Figure 3-23. MX410 Remote Management of Other Systems

The equipment needed for a Remote Management application is shown in [Table 3-4](#).

Table 3-4. Remote Management Application - Required Equipment

Part Number	Equipment	Quantity
1189500L1 or 1189512L1	MX410	1
1189501L1	MX410 PSU (MX410 only)	1 (2 for redundancy)

Setup

First, connect the RS-232 craft port on the other equipment to the MX410 terminal server port. The pin assignments for each of the RS-232 interfaces are listed in the PORT 1-4 Terminal Server port pin list in [Table 4-5](#) on page 4-8.

The default settings for the terminal server ports are 9600 bps 8 data bits with no parity. These settings must match the craft port settings of the other equipment for the application to work. Baud Rate can be changed in the MX410 Terminal Server menus under Provisioning. Refer to [“Terminal Server Ports Menu”](#) on page 5-25 for more information.

Then, establish a Telnet session to the MX410 with the port number for the particular port to access the other equipment. The default IP address for the MX410 is 192.168.100.1 with a subnet mask of 255.255.0.0. The port numbers default to 2023, 2024, 2025, and 2026 respectively, for each of the four ports. Once the session is established the default username for each port is “port #” (where # is the number of the port) and the default password is “password”.

For Ethernet based devices, simply assign a static IP address to the other equipment (or enable the DHCP server to provide one) and connect its Ethernet port to one of the four switch ports (Ethernet 1 - 4) on the front panel for the MX410. Refer to [“DHCP Server Menu”](#) on page 5-34 for more information about DHCP servers.

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Section 4

Installation

GENERAL

The first three tasks for installing and operating the MX410/MX412 are to unpack, inspect, and install. Those tasks are detailed in this section of the manual, as well as information for mounting the MX410/MX412 into an equipment rack or to a wall, making the proper connections to the front and back panels, identifying the front panel indicators, and adding or removing a Power Supply Unit (PSU) (MX410 only).

RECEIVING INSPECTION

Inspect the MX410/MX412 for any damage that might have occurred in shipment. If damage is suspected, file a claim immediately with the carrier, keep the original packaging for damage verification and/or returning the unit, and contact ADTRAN Customer Service. For warranty information, refer to [“Appendix A, Warranty”](#).

ADTRAN SHIPPING CONTENTS

After unpacking the MX410 or MX412 but before an initial power up, be sure that the following items are present:

- MX410 and MX410 PSU
or
MX412
- Mounting brackets and screws for 19-inch rack or wall installation
 - Ground lug with nut and lock washer
 - Wire-wrap post cover and screw
 - Power connector
 - Blank PSU cover (MX410 only)

RACKMOUNT

For a rackmount installation, perform the following steps:

1. Ensure the mounting brackets to the MX410/MX412 are attached using the two screws provided for each bracket.
 - For 19-inch rack applications, attach the brackets with the short flange parallel with the front of the chassis (see [Figure 4-1](#)).
 - For 23-inch rack applications, attach the brackets with the short flange parallel with the front of the chassis and obtain 23-inch adapter mounting hardware.
2. Connect the frame ground from the frame ground lug on the upper right rear panel of the MX410/MX412 to the equipment rack grounding screw or other appropriate grounding connection before mounting.
3. Use the appropriate rack type screws to mount the MX410/MX412 into the rack.

CAUTION

Care should be taken to not upset the stability of the equipment rack after installation is complete.

NOTE

The unit must be installed in accordance with the requirements of NEC NFPA 70. When mounting the MX410/MX412 in a rack, multiple chassis can be mounted in adjacent rack slots.

WALLMOUNT

For a wallmount installation, perform the following steps:

1. Ensure the mounting brackets to the MX410/MX412 are attached using the two screws provided for each bracket. Attach the brackets with the short flange parallel with the bottom of the MX410/MX412 chassis (see [Figure 4-1](#)).
2. Connect the frame ground from the frame ground lug on the upper right rear panel of the MX410/MX412 to an appropriate grounding connection.
3. Mount the MX410/MX412 vertically with the front panel facing to the left or right side.

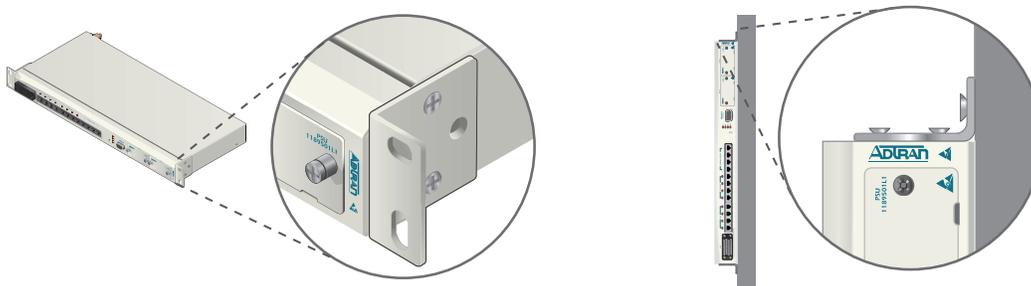


Figure 4-1. Rackmount and Wallmount Orientation

REAR PANEL

The MX410/MX412 rear panel is equipped with wire-wrap pins for external auxiliary inputs, wire-wrap pins for alarms (critical, major, and minor), a frame ground lug, and a single power connector for both DC power feeds (A and B). **Figure 4-2** illustrates the rear panel.

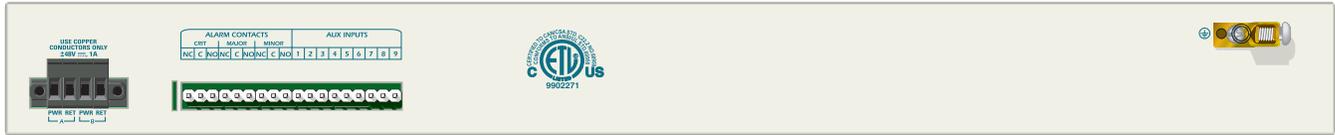


Figure 4-2. MX410/MX412 Rear View

WARNING

The Alarm interfaces and AUX inputs **must not** be metallically connected to interfaces which connect to the Outside Plant or its wiring. These interfaces are designed for use as intra-building interfaces only. The addition of Primary Protectors is not sufficient protection in order to connect these interfaces metallically to OSP wiring.

Power Connection

Figure 4-3 illustrates the DC power pins and power connector. Refer to “Power Up” on page 4-11 for more power information.

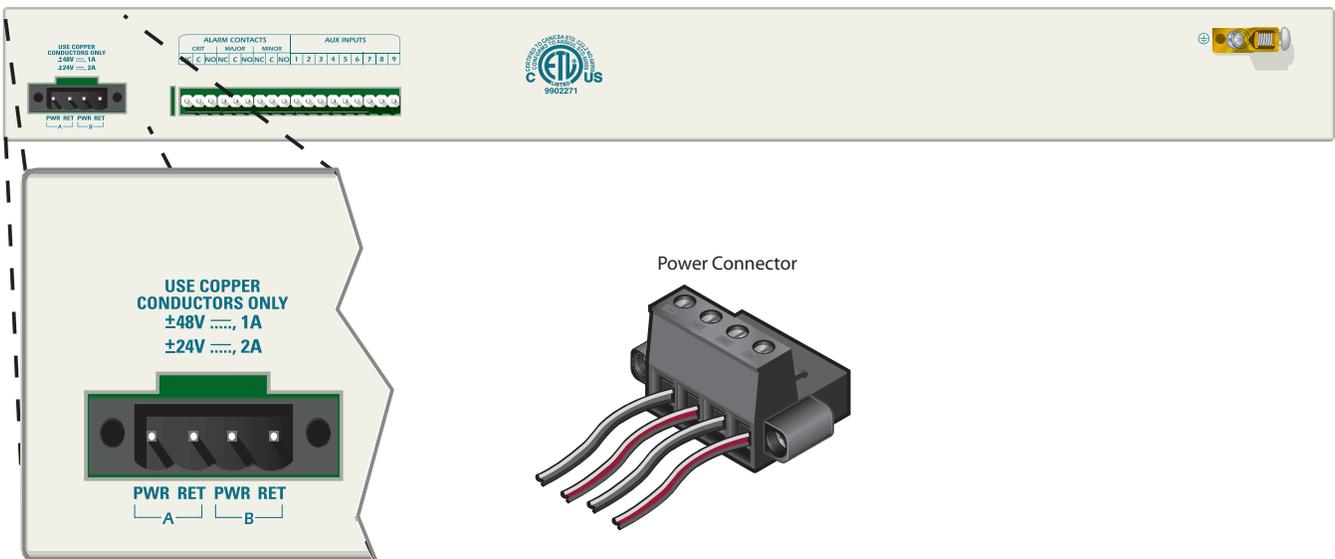


Figure 4-3. DC Power Connections

Alarm Contacts/AUX Inputs

The alarm contacts and auxiliary (AUX) inputs are shown in [Figure 4-4](#).

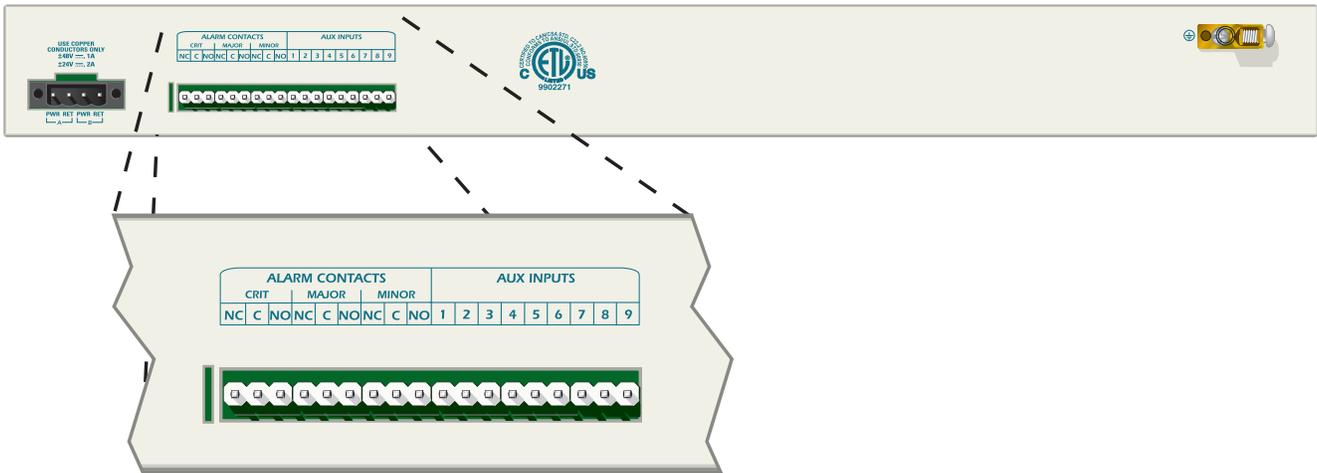


Figure 4-4. Alarm Contacts and AUX Inputs

The alarm interfaces connect to the nine Form C type relays on the MX410/MX412 labeled **CRIT**, **MAJOR**, and **MINOR**. Both NC (Normally Closed) and NO (Normally Open) contacts are provided. Connect the **CRIT** (Critical), **MAJOR**, and **MINOR** alarm leads from the fuse and alarm panel to the **C** (Common) and **NO** or **NC** wire-wrap terminals on the MX410/MX412 rear panel as required.

Auxiliary alarms 1-4 connect to the MX410/MX412 **AUX INPUTS** labeled **1-9**. These pins detect open and closed relay contacts and are not polarity sensitive. [Table 4-1](#) shows the pin assignments for the **AUX INPUTS**.

Table 4-1. AUX Inputs 1-9 Pin List

AUX INPUT	Function	Default Severity Level
1, 2	Alarm 1	Critical
3, 4	Alarm 2	Major
5, 6	Alarm 3	Minor
7, 8	Alarm 4	Alert
9	No Connect	N/A

The alarm severity level can be changed in the Environmental Alarms menu.

After the alarm contact and AUX input connections have been made, install the protective cover over the wire-wrap headers.

FRONT PANEL

The front panels for the MX410 and MX412 are described below.

MX410

The MX410 front panel (see **Figure 4-5**) is equipped with the following:

- One V.35 Port (refer to “V.35 Port” on page 4-6)
- Four DS1 ports (refer to “DS1 Ports” on page 4-6)
- Four Ethernet ports (refer to “Ethernet Ports” on page 4-7)
- Four Terminal Server ports (refer to “Terminal Server Ports” on page 4-8)
- One ACO switch (refer to “ACO Switch” on page 4-8)
- One Craft port (refer to “Craft Port” on page 4-8)
- Two PSU slots (refer to “PSU Slots” on page 4-9)
- LED indicators (refer to “LED Indicators” on page 4-10)

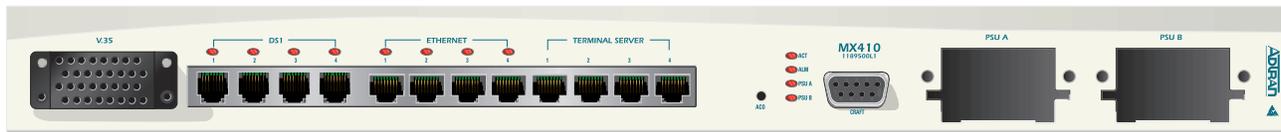


Figure 4-5. MX410 Front Panel

MX412

The MX412 front panel (see **Figure 4-6**) is equipped with the following:

- One V.35 Port (refer to “V.35 Port” on page 4-6)
- Twelve DS1 ports (refer to “DS1 Ports” on page 4-6)
- Four Ethernet ports (refer to “Ethernet Ports” on page 4-7)
- Four Terminal Server ports (refer to “Terminal Server Ports” on page 4-8)
- One ACO switch (refer to “ACO Switch” on page 4-8)
- One Craft port (refer to “Craft Port” on page 4-8)
- One FXS port (refer to “FXS Port” on page 4-9)
- LED indicators (refer to “LED Indicators” on page 4-10)

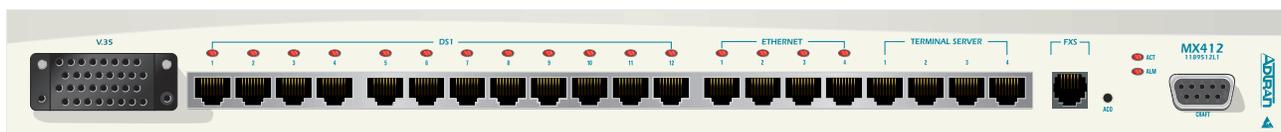


Figure 4-6. MX412 Front Panel

V.35 Port

The V.35 port is a Nx64k serial interface (up to 1.536 Mbps) with a CCITT V.35, 34-pin connector. The V.35 connector pin list is shown in [Table 4-2](#).

Table 4-2. V.35 Port Pin List

Pin	Function	Pin	Function
A	Digital Ground	R	Receive Data to DTE - A1
B	Digital Ground	S	Transmit Data from DTE - B1
C	Request To Send (RTS)	T	Receive Data to DTE - B1
D	Clear To Send (CTS)	U	No Connect
E	Data Set Ready (DSR)	V	Receive Clock to DTE - A1
F	Data Carrier Detect (DCD)	W	No Connect
H	Data Terminal Ready (DTR)	X	Receive Clock to DTE - B1
J	Ring	Y	Transmit Clock to DTE - A1
K	No Connect	AA	Transmit Clock to DTE - B1
L	No Connect	BB	No Connect
N	No Connect	NN	No Connect
P	Transmit Data from Data Terminal Equipment (DTE) - A1		

DS1 Ports

The DS1 interfaces located on the front panel of the MX410/MX412 are RJ-48 connectors. The DS1 connector pin list is shown in [Table 4-3](#).

Table 4-3. RJ-48 Connector Pin List

Pin	Function
1	RX Ring
2	RX Tip
3	No Connect
4	TX Ring
5	TX Tip
6	No Connect
7	No Connect
8	No Connect

Ethernet Ports

The four Ethernet jacks labeled **ETHERNET** located on the MX410/MX412 front panel provide LAN access to the Network. From these ports, devices located on the local area network can be remotely managed. The Ethernet ports have automatic rate detection and perform MDI/MDI-X crossover detection eliminating the need for a crossover cable. The Ethernet ports can be accessed using standard CAT 5 cable with an RJ-45 connector. The pin assignments for the RJ-45 connector are listed in [Table 4-4](#).

WARNING

The Ethernet and Terminal Server Port 1-4 interfaces **must not** be metallically connected to interfaces which connect to the OSP or its wiring. These interfaces are designed for use as intra-building interfaces only. The addition of Primary Protectors is not sufficient protection in order to connect these interfaces metallically to OSP wiring.

Table 4-4. Ethernet Port Pin List

Pin	Function
1	TX+
2	TX-
3	RX+
4	No Connect
5	No Connect
6	RX-
7	No Connect
8	No Connect

Terminal Server Ports

The four Terminal Server port RS-232 interfaces located on the front panel are used to remotely connect to RS-232 managed devices.

CAUTION

The 8-pin modular Terminal Server Port 1-4 jacks should never be connected to a telecommunications network and are intended for connection to RS-232 data interfaces only.

The Terminal Server ports are accessed by establishing a Telnet session to the MX410/MX412 with the TCP Port Number of the particular port. The pin assignments for each of the RS-232 interfaces are listed in [Table 4-5](#).

Table 4-5. Terminal Server Port Pin List

Pin	Function
1	GND
2	No Connect
3	TXD
4	No Connect
5	RXD
6	No Connect
7	No Connect
8	No Connect

ACO Switch

The Alarm Cutoff (**ACO**) Switch turns off audible and visual alarms connected to the alarm relays. Pressing the ACO Switch acknowledges alarms.

Craft Port

The DB-9 (RS-232) **CRAFT** port is used to login and provision the MX410/MX412 through a VT100 terminal or VT100 terminal emulation software such as HyperTerminal or ProComm Plus.

FXS Port

The **FXS** port (MX412 only) provides a 2-wire analog interface between a Voice Frequency (VF) transmission and a signaling facility. The FXS interface provides for simultaneous signaling in each direction for use with 2-wire off-premises station lines, carrier extended PBX trunks, or subscriber line foreign exchanges using a loop start signaling system. FXS options are shown in [Table 4-6](#).

Table 4-6. FXS Options

Mode	Description
Loop Start	Selects ANSI T1.403 FXS Loop Start mode of operation
PLAR D4	Selects Private Line Automatic Ringdown where onhook = 00. Signaling must match the PLAR unit at the distant end.
PLAR D3	Selects Private Line Automatic Ringdown where onhook = 11. Signaling must match the PLAR unit at the distant end.
FX Ringdown	PLAR mode of operation that allows for an FXS Loop Start unit on the distant end.

WARNING

The FXS Port interface **must not** be metallically connected to interfaces which connect to the OSP or its wiring. The FXS interface is designed for use as an intra-building interface only. The addition of Primary Protectors is not sufficient protection in order to connect the FXS interface metallically to OSP wiring.

PSU Slots

The MX410 houses up to two hot-swappable PSUs that can provide power redundancy. At least one MX410 PSU (P/N 1189501L1) must be inserted into the MX410 for the MX410 to function. To remove a PSU, remove the screws that hold it in place and carefully pull the PSU straight out of the MX410. A blank PSU cover (P/N 1189502L1) should be used to cover an unused PSU slot. Refer to [“LED Indicators”](#) on page 4-10 after power is applied and a PSU is inserted for the MX410 status.

The MX412 contains an internal power supply.

LED Indicators

The LEDs on the front panel of the MX410/MX412 indicate the status of the power, DS1, Ethernet, and alarm interfaces. See [Table 4-7](#) for a listing of the LEDs and their indications.

Table 4-7. LED Indication

Label	Status	Description
ACT	Green	Normal operation
	Green/Amber (Alternating)	Normal operation and console session is open
	Amber	Software transfer in progress
	Red/Amber (Alternating)	Self-test failed and console session is open
	Red	Self-test failed
	Flashing Red	Unit failure
ALM	Green	No critical, major, or minor alarms
	Amber	Active acknowledged non-critical alarm
	Flashing Amber	Active acknowledged critical alarm
	Red	Major or minor alarm in progress
	Flashing Red	Critical alarm in progress
PSU (A/B) (MX410 only)	Green	Normal operation
	Red	PSU failure
DS1 (1-4) MX410 (1-12) MX412	Off	Port disabled
	Green	Enabled and normal operation
	Amber	Locally originated test in progress
	Flashing Amber	Remotely originated test in progress
	Red	Non-critical DS1 alarm in progress (for example, AIS)
	Flashing Red	DS1 LOS (critical DS1 alarm; non-critical system alarm)
ETHERNET (1-4)	Off	Link not established
	Green	Link established
	Green/Amber (Alternating)	Activity on the line

TURN-UP

The following sections provide turn-up steps for applying power and logging in to the MX410/MX412.

Power Up

To power up the MX410/MX412, perform the following steps:

1. Connect the MX410/MX412 to a reliably grounded -48 VDC or ± 24 VDC source, which is electrically isolated from the AC source.

NOTE

A readily accessible disconnect device, such as a rackmount fuse and alarm panel that is suitably approved and rated should be incorporated into the fixed wiring.

The branch circuit overcurrent protection should be a slow-blow fuse or circuit breaker rated 2 amps or greater.

- a. Determine which fuse pairs are to supply power to the chassis.
 - b. Remove the fuses from the A and B slots for the pair.
 - c. Pull the power connector straight out from the back of the MX410/MX412.
2. Apply power and check voltages.
 - a. Install appropriate fuses (2 amp slow-blow) in the slots in the fuse and alarm panel that services the MX410/MX412.
 - b. Using a voltmeter, verify that the operating voltage is within the specifications for A or B power feeds.

The A and B input voltage power feeds specifications are as follows:

- -48 VDC systems: -42 VDC to -60 VDC
- -24 VDC systems: -22 VDC to -27 VDC
- $+24$ VDC systems: $+22$ VDC to $+27$ VDC

Place the common (normally black) lead of the voltmeter on the **RET A** post of the DC power terminal block and the DC volts (normally red) lead on the **PWR A** post of the DC power terminal block.

- c. Repeat step 2 for the **RET B/PWR B** connections.

WARNING

Installing the power connector at this stage provides power to the MX410/MX412. The pins and connectors on the rear panel and inside the chassis are powered. Exercise caution to avoid electrical shock.

3. Install the power connector for DC power feeds A and B by connecting **RET A**, **PWR A**, **RET B**, and **PWR B** to the power connector. **PWR** refers to respective -48 VDC or ± 24 VDC power sources, while **RET** refers to respective returns.
 - a. Insert the power wires into the power connector and tighten the hold-down screws on the top of the power connector.
 - b. Insert the power connector into the MX410/MX412 and tighten the two screws on the front of the power connector.
4. Install at least one PSU into the MX410 front panel **PSU A** or **PSU B** slot.
 - a. Line up the PSU with the guide grooves and carefully insert the unit into the MX410 until it seats all the way into the PSU slot of the MX410.
 - b. Tighten the thumb screws to secure the PSU in place.

To remove a PSU, remove the thumb screws that hold the PSU in place and carefully pull the PSU straight out of the MX410.

Refer to [“LED Indicators”](#) on page 4-10 for LED indication of successful power turn-up.

Section 5

User Interface

INTRODUCTION

This section provides detailed information on the following:

- “[System Management](#)” on page 5-1
- “[Logging in to the MX410/MX412](#)” on page 5-2
- “[Menu Structure](#)” on page 5-3
- “[Menu Layout and Navigation](#)” on page 5-4
- “[Menu Tree](#)” on page 5-5
- “[Menu Descriptions](#)” on page 5-11

SYSTEM MANAGEMENT

MX410/MX412 management and provisioning is facilitated by a series of intuitive menus that are accessible on a computer screen. The MX410/MX412 provides two methods for management access:

- “[Craft Interface](#)” on page 5-1
- “[Telnet Session](#)” on page 5-2

Craft Interface

Connection to the MX410/MX412 menus can be made through the DB-9 connector, labeled **CRAFT**, on the front of the MX410/MX412. A DB-9 straight cable is required.

Most personal computers or laptops can run communications software that will emulate a VT100 terminal. Windows programs such as Terminal or HyperTerminal are two such examples in the Windows format, but there are many other adequate, commercially available software packages, virtually all of which allow the PC or laptop to emulate a VT100 terminal. Certain configuration items must be set on a PC or laptop to act as a VT100 terminal for the MX410/MX412 as follows:

1. Set the parameters of the communications software to the following settings:
 - Data Rate: 115200 bps
 - Asynchronous Data Format as follows:
 - Eight data bits

- no parity (none)
 - one stop bit
 - no flow control
2. Set the PC for direct connect on the appropriate communications port (as opposed to dial up connection).
 3. Plug the male end of the data cable into the MX410/MX412. Make connection to the PC or laptop as appropriate for the equipment.

Telnet Session

To access the MX410/MX412, use an appropriate Telnet client to access the management interface of the MX410/MX412 at the configured IP address.

LOGGING IN TO THE MX410/MX412

To logon to the MX410/MX412, perform the following steps:

1. Establish the physical connection to the MX410/MX412 using a craft port session or enter the default IP address “192.168.100.1” with a subnet mask of “255.255.0.0.” to establish a Telnet session.
2. Enter the default username “ADMIN” in all capital letters, and press ENTER.
3. Enter the default password “PASSWORD” in all capital letters, and press ENTER.

NOTE

Login username and password fields are case sensitive. The default values are all uppercase.

MENU STRUCTURE

The menu structure for the MX410/MX412 is a layered menu tree. Each layer of the menu tree is displayed as a menu or a screen. This section defines the terminology used in conjunction with the MX410/MX412 menu system.

NOTE

To view the MX410/MX412 menu tree, refer to [“Menu Tree”](#) on page 5-5.

Menu

A menu is a display that provides numbered selections that are used to navigate to related menus, modify provisioning information, or display information screens. A menu can contain the following objects:

- **Menu Option:** A menu option is indicated by a number, which when selected navigates the display to another menu layer or is used to change the option setting.
- **Read-only Field:** A read-only field displays information that cannot be changed. The information displayed in a read-only field can be static or can be automatically updated by the MX410/MX412.
- **Read-write Field:** A read-write field displays information that when selected can be modified.

Screen

A screen is a display that usually indicates the end of a menu tree path. A screen can contain the following objects:

- **Read-only Field:** A read-only field displays information that cannot be changed. The information displayed in a read-only field can be static or can be automatically updated by the MX410/MX412.
- **Read-write Field:** A read-write field displays information that when selected can be modified.
- **Keyboard Commands:** A keyboard command is a key or combination of keys that are assigned to a function (see [Table 5-1](#)). Keyboard commands are indicated by the required key(s) and a brief description (i.e., CTRL+A - acknowledge all alarms).

MENU LAYOUT AND NAVIGATION

Figure 5-1 illustrates the basic menu layout used in the MX410/MX412 menu system. The MX410/MX412 Menu Layout figure is general in nature, and not all menus contain all of the elements shown in the figure.

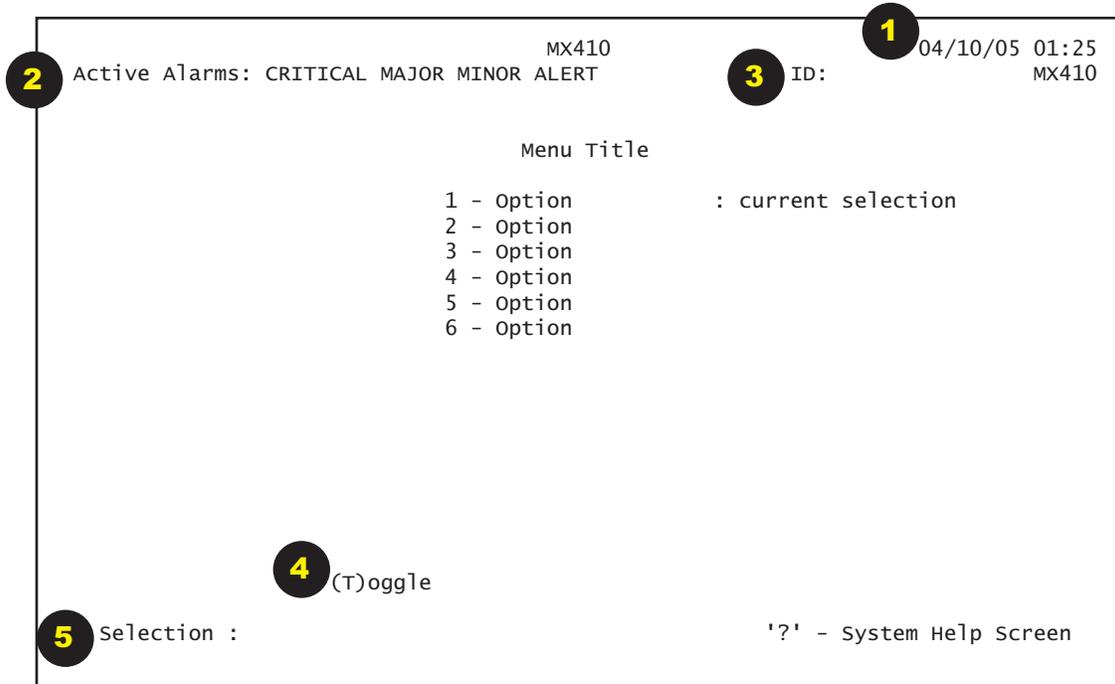


Figure 5-1. MX410/MX412 Menu Layout

1. Current Date and Time: displays the factory set date and time. The date and time can be set from the Quick Setup menu or the General Provisioning menu.
2. Alarm Banner: displays a summary of the currently active alarms. If there are any active Critical Alarms that have not been acknowledged, a flashing reverse video CRITICAL appears in the alarm banner. If there are no active unacknowledged Critical alarms but there are currently active acknowledged critical alarms, a solid reverse video CRITICAL appears in the alarm banner. If there are no active Critical Alarms, nothing will be displayed for CRITICAL in the alarm banner. Major, Minor, and Alert alarm severities are displayed in the same manner. Alarm severities are (in descending order): Critical, Major, Minor, Alert, and Info. Info alarms are not displayed in the menu alarm banner.
3. System ID: A 20-character field that displays the system ID, which can be set from the Quick Setup menu or the General Provisioning menu.
4. Toggle: pressing the T key toggles between interfaces or shows more information.
5. Selection: An echo field that displays user input. Selection values are applied by pressing ENTER. Selection values are cleared by pressing the ESC or BACKSPACE key.

Basic menu navigation is accomplished by selecting the desired option number and then pressing ENTER. To work backward through the menus press the ESC (escape) key. The System Help screen can be accessed from any MX410/MX412 screen or menu by pressing “?”.

Table 5-1 shows the general keyboard commands for the MX410/MX412.

Table 5-1. MX410/MX412 Keyboard Commands

Keyboard Command	Description
BACKSPACE	This keyboard command is used to delete the character to left of the cursor during keyboard input.
ENTER (or Return)	This keyboard command is used to terminate input.
ESC	This keyboard command is used to clear partial input data, or if none, return to previous menu.
CTRL+A (Control and a)	This keyboard command is used to acknowledge all alarms.
CTRL+C or D (Control and c or d)	This keyboard command is used to logout and disconnect.
CTRL+R (Control and r)	This keyboard command is used to refresh the display.

MENU TREE

Menu trees are maps that can be used to locate provisioning options with ease. This subsection provides a detailed set of menu trees for the MX410/MX412. Some of the menu trees span multiple pages, signified by the “(Continued)” at the end of the illustration title.

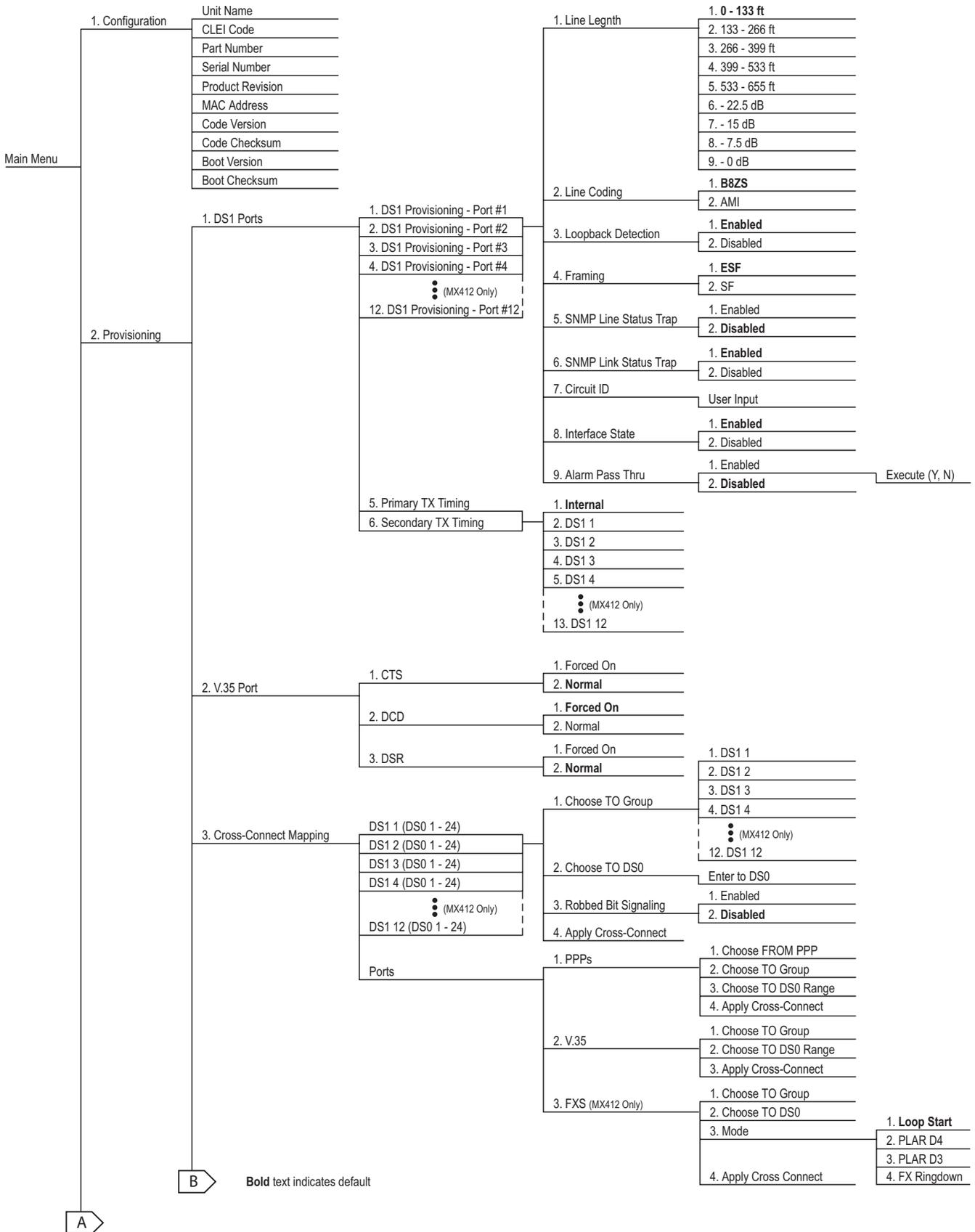


Figure 5-2. MX410/MX412 Menu Tree

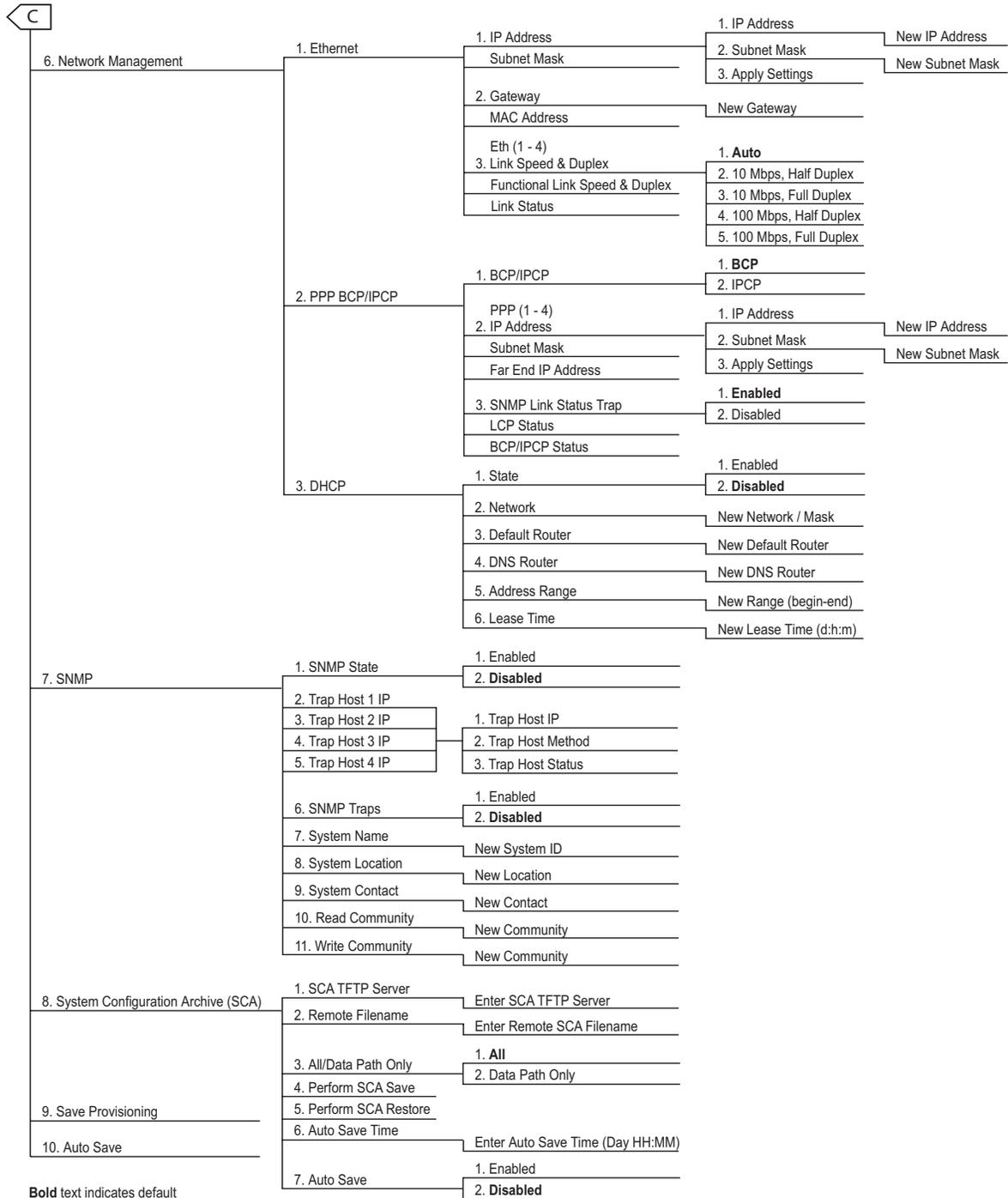


Figure 5-2. MX410/MX412 Menu Tree (Continued)

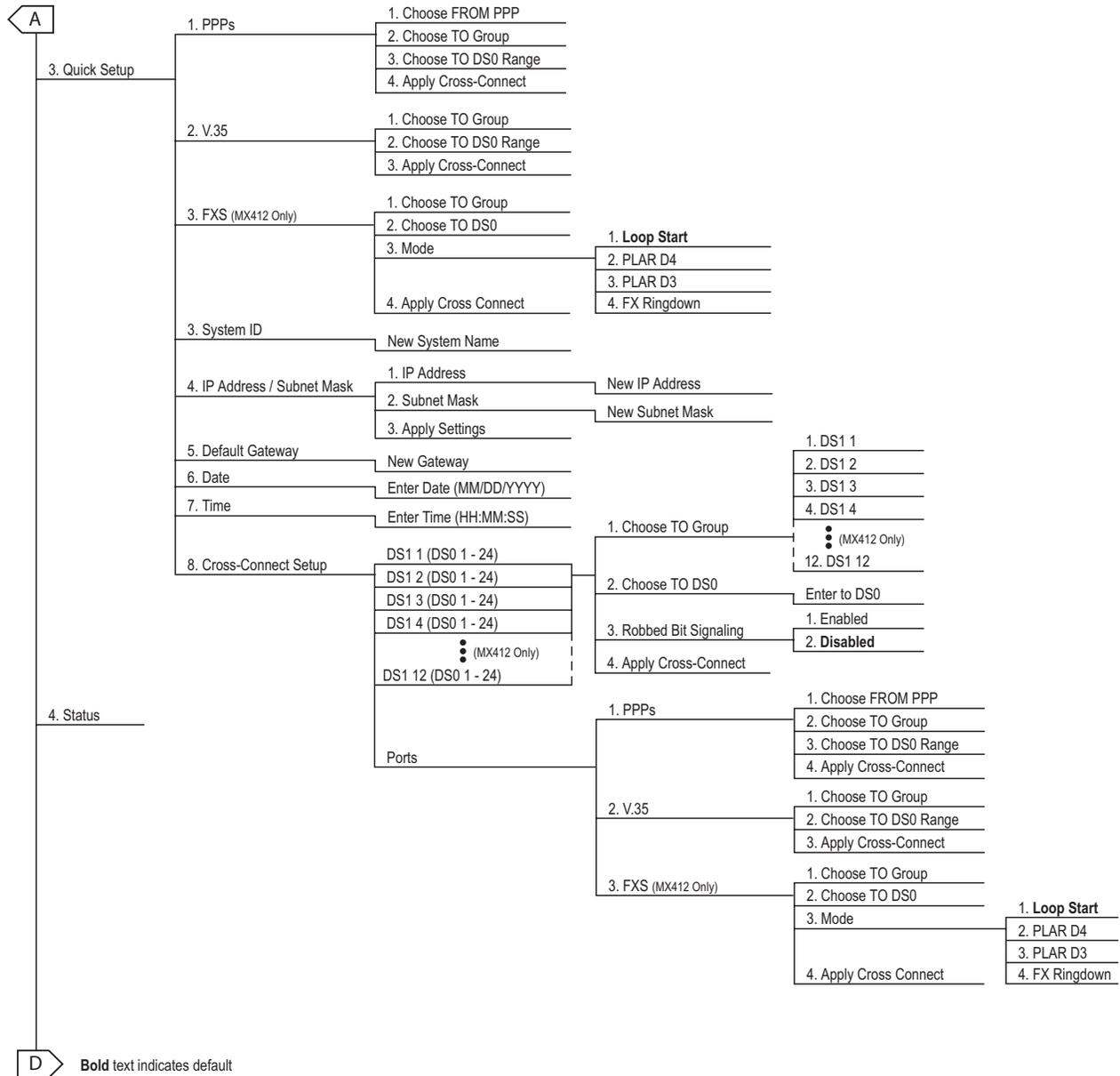


Figure 5-2. MX410/MX412 Menu Tree (Continued)

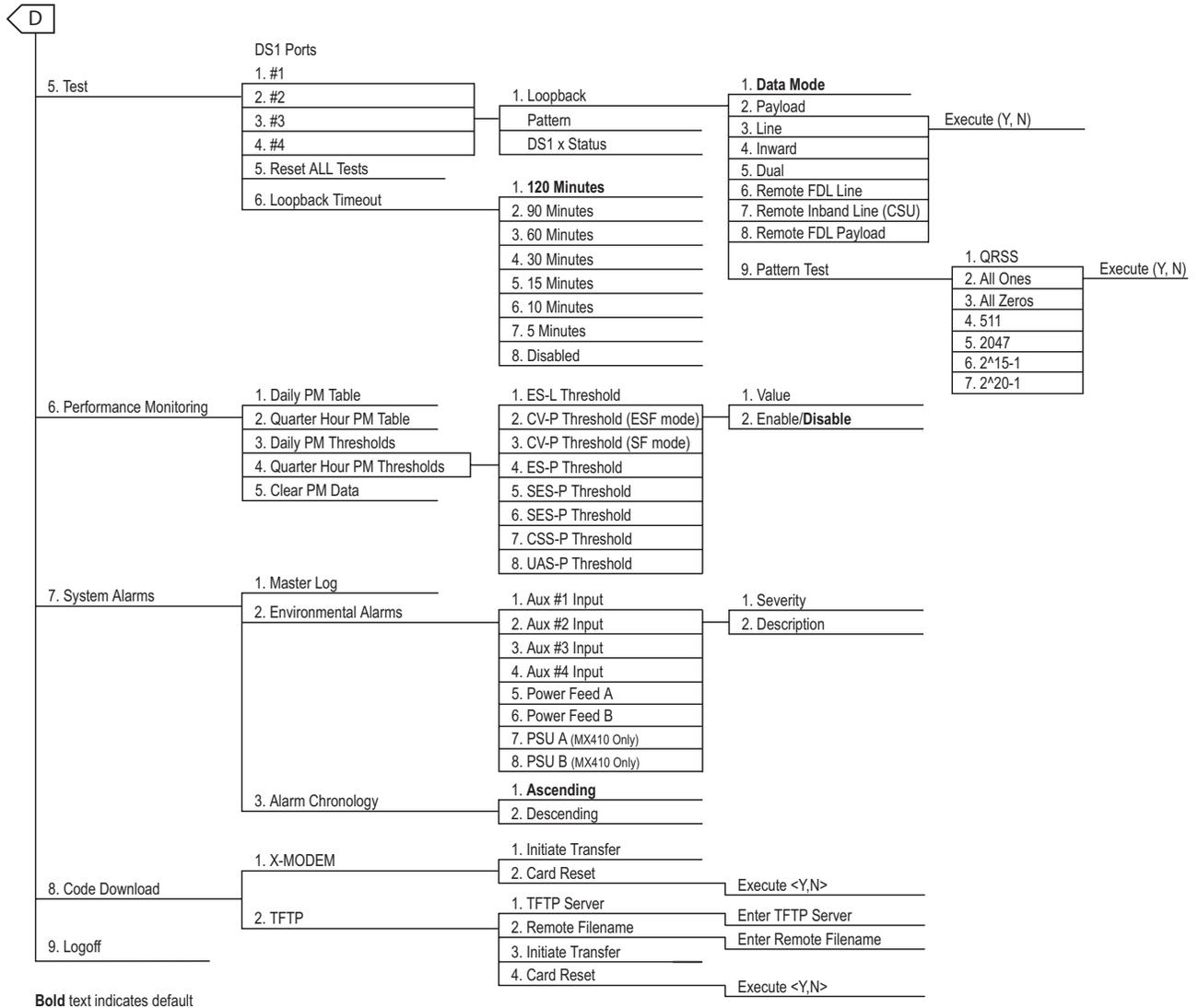


Figure 5-3. MX410/MX412 Menu Tree (Continued)

MENU DESCRIPTIONS

The MX410/MX412 Main Menu (see [Figure 5-4](#)) is the access point to all other operations. Each Main menu item has several functions and submenus that identify and provide access to specific operations and parameters.

```

MX410
Active Alarms: CRITICAL MAJOR MINOR ID: MM/DD/YY HH:MM
MX410

Main Menu

1 - Configuration
2 - Provisioning
3 - Quick Setup
4 - Status
5 - Test
6 - Performance Monitoring
7 - System Alarms

8 - Code Download

9 - Logoff

Selection : '?' - System Help Screen

```

Figure 5-4. MX410/MX412 Main Menu

The MX410/MX412 Main Menu options are shown in [Table 5-2](#).

Table 5-2. MX410/MX412 Main Menu Options

Option	Description	Function
1	Configuration	This option displays the “Configuration Screen” on page 5-12.
2	Provisioning	This option displays the “Provisioning Menu” on page 5-14.
3	Quick Setup	This option displays the “Quick Setup Menu” on page 5-38.
4	Status	This option displays the “Status Screen” on page 5-40.
5	Test	This option displays the “Test Menu” on page 5-42.
6	Performance Monitoring	This option displays the “Performance Monitoring Menu” on page 5-46.
7	System Alarms	This option displays the “System Alarms Menu” on page 5-53.
8	Code Download	This option displays the “Code Download Method Menu” on page 5-55.
9	Logoff	This option is used to end an MX410/MX412 menus session. No further menus, screens, or confirmation dialog boxes are presented.

Configuration Screen

The Configuration Screen (see **Figure 5-5**) displays information about the MX410/MX412. Information such as Code Version changes as upgrades are performed. The CLEI Code and Part Number can be used to search for related information on the ADTRAN website or to order additional parts. Some information from this menu may be required when calling the ADTRAN Technical Support.

```
Active Alarms: CRITICAL          MX410          ID:          MM/DD/YY HH:MM
                                     MX410

                                Configuration

Unit Name       : MX410
CLEI Code       : M3M1310BRA
Part Number     : 1189500L1
Serial Number   : DVTUUTNXXX
Product Revision : B
MAC Address     : XX:XX:XX:XX:XX:XX
Code Version    : B01
Code Checksum   : ADCDEFGH
Boot Version    : B03
Boot Checksum   : 7C22

                                     '?' - System Help Screen
```

Figure 5-5. Configuration Screen

The Configuration screen fields are shown in **Table 5-3**.

Table 5-3. MX410/MX412 Configuration Screen Fields

Field	Description
Unit Name	This field displays the MX410/MX412 unit name.
CLEI Code	This field displays the Common Language Equipment Identifier (CLEI) code of the MX410/MX412.
Part Number	This field displays the MX410/MX412 part number.
Serial Number	This field displays the serial number of the MX410/MX412.
Product Revision	This field displays the hardware product assembly revision of the MX410/MX412.
MAC Address	This field displays the factory programmed Media Access Control (MAC) or physical layer address for the MX410/MX412.
Code Version	This field displays the current firmware revision level of the MX410/MX412.
Code Checksum	This field displays the checksum of the current firmware revision level of the MX410/MX412.
Boot Version	This field displays the Boot ROM software revision code of the MX410/MX412.
Boot Checksum	This field displays the checksum of the Boot ROM software revision code of the MX410/MX412.

Provisioning Menu

The Provisioning Menu (see [Figure 5-6](#)) is used to make provisioning changes to various options.

```
MX410 MM/DD/YY HH:MM
Active Alarms: CRITICAL MAJOR MINOR ID: MX410

Provisioning

1 - DS1 Ports
2 - V.35 Port

3 - Cross-Connect Mapping
4 - Terminal Server Ports

5 - General
6 - Network Management
7 - SNMP
8 - System Configuration Archive (SCA)
9 - Save Provisioning
10 - Auto Save : Enabled

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

Figure 5-6. Provisioning Menu

The Provisioning menu options are shown in [Table 5-4](#).

Table 5-4. Provisioning Menu Options

Option	Description	Function
1	DS1 Ports	This option displays the “ DS1 Ports Menu ” on page 5-16.
2	V.35 Port	This option displays the “ V.35 Port Menu ” on page 5-22.
3	Cross-Connect Mapping	This option displays the “ Cross-Connect Mapping Menu ” on page 5-23.
4	Terminal Server Ports	This option displays the “ Terminal Server Ports Menu ” on page 5-25.
5	General	This option displays the “ General Provisioning Menu ” on page 5-27.
6	Network Management	This option displays the “ Network Management Menu ” on page 5-29.
7	SNMP	This option displays the “ SNMP Menu ” on page 5-35.
8	System Configuration Archive (SCA)	This option displays the “ SCA Update Menu ” on page 5-37.
9	Save Provisioning	This option is used to save current network settings.
10	Auto Save	This option is used to automatically save current network settings at timed intervals.

DS1 Ports Menu

The DS1 Ports Menu (see [Figure 5-7](#)) displays line length, line coding, loopback detection, framing, SNMP line status trap, SNMP link status trap, circuit ID, interface state, and alarm pass thru information for DS1 ports 1-4 (1-12 on the MX412), as well as timing information. Selection of an option invokes other menus to set the option variables. The Toggle command can be used to view more DS1 port information shown in [Figure 5-8](#).

```

MX410
Active Alarms: CRITICAL MAJOR ID: MM/DD/YY HH:MM
MX410

DS1 Ports

Line Length Line Coding Loopback Detect Framing SNMP Line Status Trap SNMP Link Status Trap
1 - 0 - 133 ft B8ZS Enabled ESF Disabled Enabled
2 - 0 - 133 ft B8ZS Enabled ESF Disabled Enabled
3 - 0 - 133 ft B8ZS Enabled ESF Disabled Enabled
4 - 0 - 133 ft B8ZS Enabled ESF Disabled Enabled

5 - Primary TX Timing - Internal
6 - Secondary TX Timing - Internal

(T)oggle for more
'? ' - System Help Screen
Selection :
```

Figure 5-7. DS1 Ports Menu

```

MX410
Active Alarms: CRITICAL MAJOR ID: MM/DD/YY HH:MM
MX410

DS1 Ports

Circuit ID Interface State Alarm Pass Thru
1 - Enabled Disabled
2 - Enabled Disabled
3 - Enabled Disabled
4 - Enabled Disabled

5 - Primary TX Timing - Internal
6 - Secondary TX Timing - Internal

(T)oggle for more
'? ' - System Help Screen
Selection :
```

Figure 5-8. DS1 Ports Menu - Toggled

The DS1 Ports menu options are shown in [Table 5-5](#).

Table 5-5. DS1 Ports Menu Options

Option	Description	Function
1	DS1 Port #1	This option displays the “ DS1 Provisioning Menu ” on page 5-18.
2	DS1 Port #2	This option displays the “ DS1 Provisioning Menu ” on page 5-18.
3	DS1 Port #3	This option displays the “ DS1 Provisioning Menu ” on page 5-18.
4	DS1 Port #4	This option displays the “ DS1 Provisioning Menu ” on page 5-18.
5	Primary TX Timing	This option displays the “ Primary Timing Mode Menu ” on page 5-20.
6	Secondary TX Timing	This option displays the “ Secondary Timing Mode Menu ” on page 5-21.

DS1 Provisioning Menu

The DS1 Provisioning menu (see [Figure 5-9](#)) is used to set the line length, line coding, loopback detection, framing, SNMP line status trap, SNMP link status trap, circuit ID, interface state, and alarm pass thru information for the selected DS1 port.

```
Active Alarms: CRITICAL MAJOR          MX410          ID:          MM/DD/YY HH:MM
                                         MX410

                DS1 Provisioning - Port #1

          1 - Line Length           : 0 - 133 ft
          2 - Line Coding            : 882S
          3 - Loopback Detection     : Enabled
          4 - Framing                : ESF
          5 - SNMP Line Status Trap  : Disabled
          6 - SNMP Link Status Trap  : Enabled
          7 - Circuit ID             :
          8 - Interface State        : Enabled
          9 - Alarm Pass Thru        : Disabled

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

Figure 5-9. DS1 Provisioning Menu

The DS1 Provisioning menu options are shown in [Table 5-6](#).

Table 5-6. DS1 Provisioning Menu Options

Option	Description	Function
1	Line Length	<p>This option sets the line length (line build out) for each port interface according to the distance from the MX410/MX412 to the other device.</p> <p>Options for line length are as follows:</p> <ul style="list-style-type: none"> • 1 - Set line length from 0 to 133 feet • 2 - Set line length from 133 to 266 feet • 3 - Set line length from 266 to 399 feet • 4 - Set line length from 399 to 533 feet • 5 - Set line length from 533 to 655 feet • 6 - -22.5 dB • 7 - -15 dB • 8 - -7.5 dB • 9 - 0 dB
2	Line Coding	<p>This option sets the line code for each individual port interface to match the connected device.</p> <p>Options for line coding are as follows:</p> <ul style="list-style-type: none"> • 1 - AMI • 2 - B8ZS
3	Loopback Detection	This option enables or disables whether a port responds to CSU and FDL loopback requests coming from the network.
4	Framing	<p>This option sets the framing. Options for framing are as follows:</p> <ul style="list-style-type: none"> • 1 - ESF (Extended Super Frame) • 2 - SF (Super Frame).
5	SNMP Line Status Trap	This option enables or disables the SNMP line status trap state.
6	SNMP Link Status Trap	This option enables or disables the SNMP link status trap state.
7	Circuit ID	This option contains a user-configurable text string field to name the selected port. This field accepts up to 32 alphanumeric characters, including spaces and special characters.
8	Interface State	This option is viewed using the Toggle command and sets the interface state to either enabled or disabled.
9	Alarm Pass Thru	This option enables or disables semi-transparency for visibility through the cross connect to remote devices. This option enables the selected DS1 to transmit RAI when any cross-connected DS1 is in alarm or receiving RAI.

Primary Timing Mode Menu

The Primary Timing Mode menu (see [Figure 5-10](#)) is used to set the primary timing mode for the selected DS1 port (1-4 on the MX410 and 1-12 on the MX412).

```

Active Alarms: CRITICAL MAJOR          MX410          MM/DD/YY HH:MM
                                         ID:           MX410

                Primary Timing Mode : Internal

                        1 - Internal
                        2 - DS1 1
                        3 - DS1 2
                        4 - DS1 3
                        5 - DS1 4

Selection :                               '?' - System Help Screen

```

Figure 5-10. Primary Timing Mode Menu

The Primary Timing Mode menu options are shown in [Table 5-7](#).

Table 5-7. Primary Timing Mode Menu Options

Option	Description	Function
1	Internal	This option sets the timing mode to internal.
2	DS1 1	This option sets the timing mode to DS1 1.
3	DS1 2	This option sets the timing mode to DS1 2.
4	DS1 3	This option sets the timing mode to DS1 3.
5	DS1 4	This option sets the timing mode to DS1 4.

CAUTION

The entire MX410/MX412 is timed from a single source and all transmitters are synchronized. Any device attached to the MX410/MX412 should be placed in loop or line timing mode, unless it is providing timing. If an attached device is providing timing, the MX410/MX412 must be configured to use this interface as its primary timing source. If the MX410/MX412 is set for internal timing, all devices connected to it must be set to loop or line timing.

Secondary Timing Mode Menu

The Secondary Timing Mode menu (see [Figure 5-11](#)) is used to set the secondary timing mode for the selected DS1 port (1-4 on the MX410 and 1-12 on the MX412).

```

Active Alarms: CRITICAL MAJOR          MX410          MM/DD/YY HH:MM
                                         ID:           MX410

                Primary Timing Mode : Internal

                        1 - Internal
                        2 - DS1 1
                        3 - DS1 2
                        4 - DS1 3
                        5 - DS1 4

Selection :                               '?' - System Help Screen

```

Figure 5-11. Secondary Timing Mode Menu

The Secondary Timing Mode menu options are shown in [Table 5-8](#).

Table 5-8. Secondary Timing Mode Menu Options

Option	Description	Function
1	Internal	This option sets the timing mode to internal.
2	DS1 1	This option sets the timing mode to DS1 1.
3	DS1 2	This option sets the timing mode to DS1 2.
4	DS1 3	This option sets the timing mode to DS1 3.
5	DS1 4	This option sets the timing mode to DS1 4.

CAUTION

The entire MX410/MX412 is timed from a single source and all transmitters are synchronized. Any device attached to the MX410/MX412 should be placed in loop or line timing mode, unless it is providing timing. If an attached device is providing timing, the MX410/MX412 must be configured to use this interface as its primary timing source. If the MX410/MX412 is set for internal timing, all devices connected to it must be set to loop or line timing.

V.35 Port Menu

The V.35 Port Menu (see [Figure 5-12](#)) is used to provision the V.35 Port.

```

Active Alarms: CRITICAL                MX410                ID: MM/DD/YY HH:MM
                                         MX410
                                         V.35 Port
                                         1 - CTS             : Forced On
                                         2 - DCD             : Forced On
                                         3 - DSR             : Normal

Selection :                               '?' - System Help Screen

```

Figure 5-12. V.35 Port Menu

The V.35 Port menu options are shown in [Table 5-9](#).

Table 5-9. V.35 Port Menu Options

Option	Description	Function
1	CTS	This option sets the CTS (Clear To Send) settings. Options are as follows: <ul style="list-style-type: none"> Normal: The setting matches RTS settings. Forced On: This setting forces CTS to be active.
2	DCD	This option sets the DCD (Data Carrier Detect) settings. Options are as follows: <ul style="list-style-type: none"> Normal: The setting matches the status of the connected DS1. Forced On: This setting forces DCD to be active.
3	DSR	This option sets the DSR (Data Set Ready) settings. Options are as follows: <ul style="list-style-type: none"> Normal: The setting follows DTR settings. Forced On: This setting forces DSR to be active.

Cross-Connect Mapping Menu

The Cross-Connect Mapping menu is used to display DS0 information for the four DS1 ports (12 ports on the MX412), as well as FXS (MX412 only), PPP, and V.35 settings. The Cross-Connect Mapping menu is shown in **Figure 5-13** displaying DS0 mapping for the DS1 1 port. The Toggle command is used to view DS1 2, DS1 3, DS1 4, PPP, and V.35 data. All of the DS1 toggle menus have identical options, and all of the 24 DS0s have identical options for the selected DS1. The Cross-Connect Mapping - Ports toggle menu is shown in **Figure 5-14**.

```

Active Alarms: CRITICAL                MX410                ID:                MM/DD/YY HH:MM
                                         MX410

                                Cross-Connect Mapping
                    DS1 1 - Huntsville T1

1 - DS0 #1 = DS1 1 DS0 #2              13 - DS0 #13 =
2 - DS0 #2 = DS1 1 DS0 #1              14 - DS0 #14 =
3 - DS0 #3 =                            15 - DS0 #15 =
4 - DS0 #4 =                            16 - DS0 #16 =
5 - DS0 #5 =                            17 - DS0 #17 =
6 - DS0 #6 =                            18 - DS0 #18 =
7 - DS0 #7 =                            19 - DS0 #19 =
8 - DS0 #8 =                            20 - DS0 #20 =
9 - DS0 #9 =                            21 - DS0 #21 =
10 - DS0 #10 =                          22 - DS0 #22 =
11 - DS0 #11 =                           23 - DS0 #23 =
12 - DS0 #12 =                           24 - DS0 #24 =

(T)oggle View (DS1 2, DS1 3, DS1 4, Ports)    25 - Map Multiple DS0's

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

Figure 5-13. Cross-Connect Mapping Menu

```

Active Alarms: CRITICAL                MX410                ID:                MM/DD/YY HH:MM
                                         MX410

                                Cross-Connect Mapping
                                Ports
                    1 - PPPs
                      PPP 1 = DS1 4 DS0 #1

                    2 - V.35 =
                    3 - FXS =

(T)oggle View (DS1 1, DS1 2, DS1 3, DS1 4)

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

Figure 5-14. Cross-Connect Mapping - Ports Menu

The Cross-Connect Mapping menu options are shown in [Table 5-10](#).

Table 5-10. Cross-Connect Mapping Menu Options

Option	Description	Function
1-24	DS0 1-24 connections	<p>These options invoke the Change Cross-Connect Mapping menu which is used to provision the cross-connect settings for the selected DS1 port. Options are as follows:</p> <ul style="list-style-type: none"> • 1. Choose TO Group (for DS1 1 through DS1 4/DS1 12) • 2. Choose TO DS0: (enter a value) • 3. Robbed Bit Signaling: select Enabled or Disabled • 4. Apply Cross-Connect: applies the selections made from the Change Cross-Connect Mapping menu.
25	Map Multiple DS0's	<p>This option invokes the Change Cross-Connect Mapping menu which is used to provision the cross-connect settings for multiple DS0s at the same time. Options are as follows:</p> <ul style="list-style-type: none"> • 1. Choose FROM DS0 Range: enter a range • 2. Choose TO Group (for DS1 1 through DS1 4/DS1 12) • 3. Choose TO DS0 Range: enter a range • 4. Robbed Bit Signaling: select Enabled or Disabled • 5. Apply Cross-Connect: applies the selections made from the Change Cross-Connect Mapping menu to all DS0s in the range entered.
Cross-Connect Mapping - Ports		
1	PPPs	<p>This option invokes the Change Cross-Connect Mapping menu, which is used to provision the PPP ports. Options are as follows:</p> <ul style="list-style-type: none"> • 1. Choose FROM PPP (for PPP 1 through PPP 4) • 2. Choose TO Group (for DS1 1 through DS1 4) • 3. Choose TO DS0 Range: enter a range • 4. Apply Cross-Connect
2	V.35	<p>This option invokes the Change Cross-Connect Mapping menu, which is used to provision the V.35 port. Options are as follows:</p> <ul style="list-style-type: none"> • 1. Choose TO Group (for DS1 1 through DS1 4/DS1 12) • 2. Choose TO DS0 Range: enter a range • 3. Apply Cross-Connect
3	FXS (MX412 only)	<p>This option invokes the Change Cross-Connect Mapping menu which is used to provision the FXS port. Options are as follows:</p> <ul style="list-style-type: none"> • 1. Choose TO Group (for DS1 1 through DS1 12) • 2. Choose TO DS0 Range: enter a range • 3. Mode: Select Loop Start, PLAR D4, PLAR D3, or FX Ringdown. Refer to Table 4-6 on page 4-9 for descriptions of these options. • 4. Apply Cross-Connect

Terminal Server Ports Menu

The Terminal Server Ports Menu (see [Figure 5-15](#)) is used to select Terminal Port 1 through Port 4 for provisioning.

```

Active Alarms: CRITICAL                MX410                MM/DD/YY HH:MM
                                         ID:                MX410

                                Terminal Server Ports

                                1 - Port 1
                                2 - Port 2
                                3 - Port 3
                                4 - Port 4

Selection :                               '?' - System Help Screen

```

Figure 5-15. Terminal Server Ports Menu

The Terminal Server Ports menu options are shown in [Table 5-11](#).

Table 5-11. Terminal Server Ports Menu Options

Option	Description	Function
1	Port 1	This option invokes the “Terminal Server Port (1 - 4) Menu” on page 5-26.
2	Port 2	This option invokes the “Terminal Server Port (1 - 4) Menu” on page 5-26.
3	Port 3	This option invokes the “Terminal Server Port (1 - 4) Menu” on page 5-26.
4	Port 4	This option invokes the “Terminal Server Port (1 - 4) Menu” on page 5-26.

Terminal Server Port (1 - 4) Menu

The Terminal Server Port Menu (see [Figure 5-16](#)) is used to provision the Terminal Sever Port selected on the (previous) Terminal Server Ports menu.

```

Active Alarms: CRITICAL                MX410                ID:                MM/DD/YY HH:MM
                                         MX410

Terminal Server Port 1

1 - Terminal State           : Enabled
2 - Baud Rate                : 9600
3 - Telnet Port Number      : 2023
4 - Security                 : Enabled
5 - Username                 : port 1
6 - Password                 : password

Selection :                                '?' - System Help Screen

```

Figure 5-16. Terminal Server Port 1 Menu

The Terminal Server Port (1-4) menu options are shown in [Table 5-12](#).

Table 5-12. Terminal Server Port Menu Options

Option	Description	Function
1	Terminal State	This option enables or disables the terminal state.
2	Baud Rate	This option sets the terminal server baud rate. Options are as follows: <ul style="list-style-type: none"> • 9600 • 19200 • 38400 • 57600 • 115200
3	Telnet Port Number	This option is used to enter a new Telnet port number.
4	Security	This option is used to enable or disable terminal port security.
5	Username	This option is used to assign a username to the selected port number for use when security is enabled.
6	Password	This option is used to assign a password to the selected port number for use when security is enabled.

General Provisioning Menu

The General Provisioning Menu (see [Figure 5-17](#)) is used to provision the craft port Baud rate, the date, time, system ID, auto-logoff inactivity time, to reset the MX410/MX412, and to handle security administration.

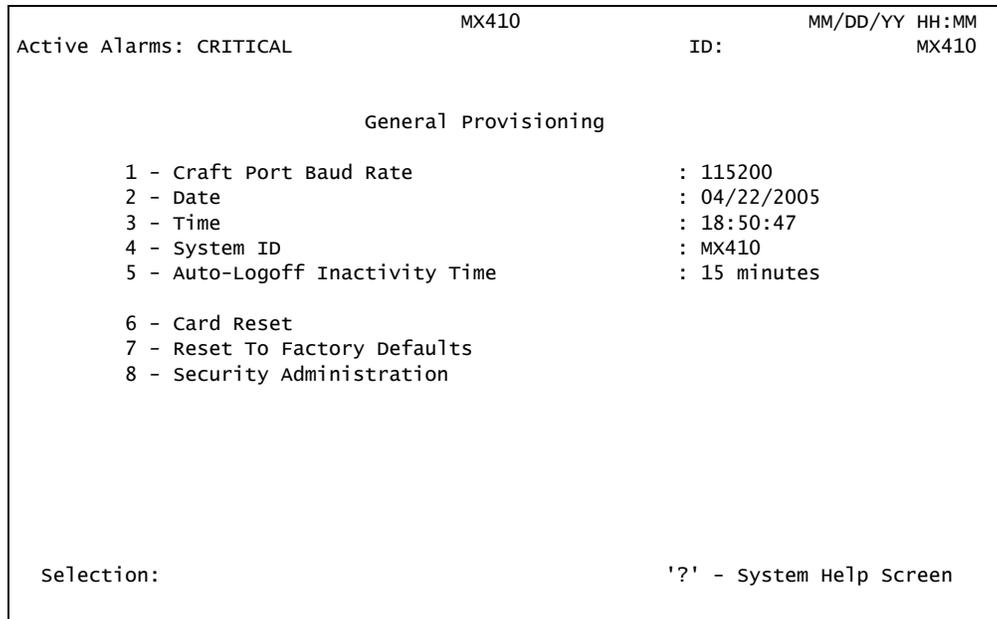


Figure 5-17. General Provisioning Menu

The General Provisioning menu options are shown in [Table 5-13](#).

Table 5-13. General Provisioning Menu Options

Option	Description	Function
1	Craft Port Baud Rate	This option sets the craft port baud rate. Options are as follows: <ul style="list-style-type: none"> • 9600 • 19200 • 38400 • 57600 • 115200.
2	Date	This option is used to enter the date.
3	Time	This option is used to enter the time.
4	System ID	This option defines the alphanumeric name assigned to the MX410/MX412.

Table 5-13. General Provisioning Menu Options (Continued)

Option	Description	Function
5	Auto-Logoff Inactivity Time	<p>This option defines when a menu session automatically terminates due to inactivity. The default setting is 15 Minutes. Options are as follows:</p> <ul style="list-style-type: none"> • 120 Minutes • 90 Minutes • 60 Minutes • 30 Minutes • 15 Minutes • 10 Minutes • 5 Minutes • Disabled
6	Card Reset	This option forces the MX410/MX412 to reset.
7	Reset to Factory Defaults	This option is used to reset factory defaults by logical groups, or reset all factory defaults at once.
8	Security Administration	<p>This option invokes the Security Administration menu, which is used to manage accounts. Options are as follows:</p> <ul style="list-style-type: none"> • Users Currently Logged On: This option displays active usernames, access method and address, and the login time. • Edit User Accounts: This option is used to edit user accounts. • Create New User Account: This option is used to create new user accounts. Options are as follows: <ul style="list-style-type: none"> – User ID: This option is used to enter a new username. – Password: This option is used to enter a new password. – Access Rights: This option is used to select Read, Test, Read/Write, or Admin access privileges. – Apply: This option saves the new user account information. • Restore to Default Accounts: This option is used to restore the accounts default and deletes all previous information by selecting Yes or No. • Access Tech Support Account: This option is used to access the technical support account information by entering a Response Key.

Network Management Menu

The Network Management menu (see [Figure 5-18](#)) is used to provision network information.

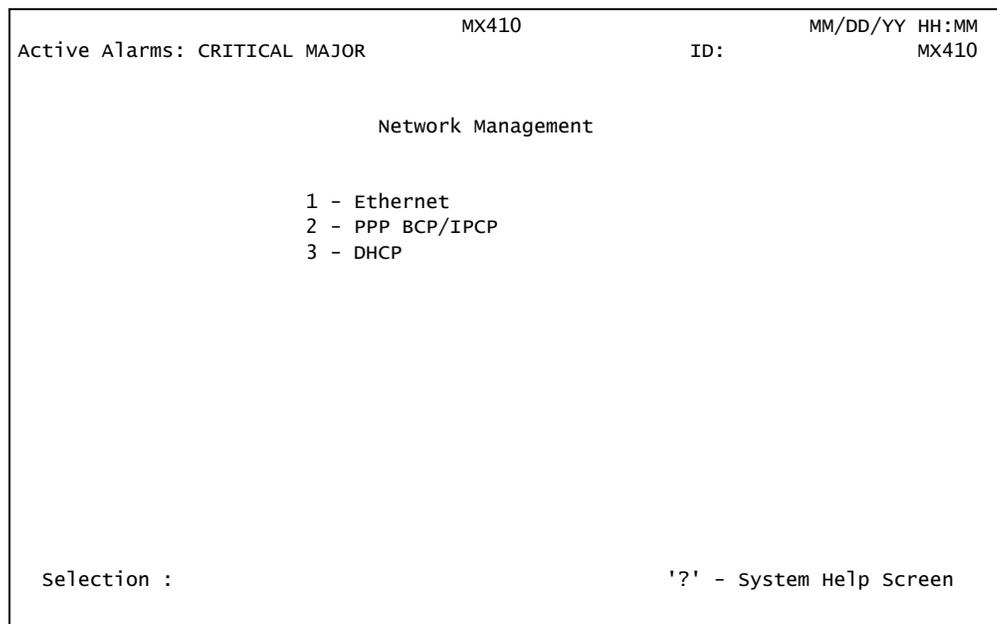


Figure 5-18. Network Management Menu

The Network Management menu options are shown in [Table 5-14](#).

Table 5-14. Network Management Menu Options

Option	Description	Function
1	Ethernet	This option invokes the “Ethernet Menu” on page 5-30.
2	PPP BCP/IPCP	This option invokes the “PPP BCP/IPCP Menu” on page 5-32.
3	DHCP	This option invokes the “DHCP Server Menu” on page 5-34.

Ethernet Menu

The Ethernet Menu (see [Figure 5-19](#)) is used to provision Ethernet information.

```

Active Alarms: CRITICAL          MX410          ID:          MM/DD/YY HH:MM
                                   MX410

                                Ethernet

      1 - IP Address                : 192.168.100.1
        Subnet Mask                 : 255.255.0.0
      2 - Gateway                   : 192.168.1.1
        MAC Address                  : XX:XX:XX:XX:XX:XX

Eth 1

      3 - Link Speed & Duplex       : Auto
        Functional Link Speed & Duplex : Unknown
        Link Status                  : Down

      (T)oggle Between Interfaces

Selection :                          '?' - System Help Screen

```

Figure 5-19. Ethernet Menu

The Ethernet menu options are shown in [Table 5-15](#).

Table 5-15. Ethernet Menu Options

Option	Description	Function
1	IP Address	This option invokes another menu which is used to enter the IP Address and the Subnet Mask for the MX410/MX412. The IP Address is written in the format XXX.XXX.XXX.XXX, where each 3-digit field has a value between 1 and 255.
N/A	Subnet Mask	This field displays the Subnet Mask. A subnet mask is used to reduce the traffic on each subnetwork by confining traffic to only the subnetwork for which it was intended. A subnet mask makes the entire network more manageable. In effect, each subnet functions as though it were an independent network, keeping local traffic local and forwarding traffic to another subnet only if the address of the data is external to the subnet. The Subnet Mask is written in the format XXX.XXX.XXX.XXX, where each 3-digit field has a value between 1 and 255.
2	Gateway	This option invokes another menu which is used to enter the address of the default gateway/router between the internal network and the external network. The Gateway address is written in the format XXX.XXX.XXX.XXX, where each 3-digit field has a value between 1 and 255.

Table 5-15. Ethernet Menu Options (Continued)

Option	Description	Function
	MAC Address	This read-only field displays the Medium Access Control (MAC) Address. MAC Addresses are location-independent (programmed into the card at manufacture, they relocate when the card does). MAC Addresses are contained in the headers of packets and are used to filter and forward packets.
Eth (1-4)		
3	Link Speed & Duplex	This option invokes another menu which is used to select the data rate setting for Ethernet Port (1-4) on the front panel of the MX410/MX412. Options are as follows: <ul style="list-style-type: none"> • 1 - Auto • 2 - 10 Mbps, Half Duplex • 3 - 10 Mbps, Full Duplex • 4 - 100 Mbps, Half Duplex • 5 - 100 Mbps, Full Duplex
N/A	Functional Link Speed & Duplex	This read-only field displays the actual data rate of the port.
N/A	Link Status	This read-only field displays the status of the network as being either Up or Down.

PPP BCP/IPCP Menu

Point-to-Point Protocol (PPP) is commonly used for LAN extension and Remote management connectivity. PPP can use one of two upper layer protocols:

- BCP (Bridge Control Protocol): This protocol routes packets based on MAC addresses and allows broadcast traffic to be passed over the PPP link(s). This protocol enables true LAN Extension to be completed. Any device on the LAN can communicate with any other device with the least amount of configuration by the user.
- IPCP (IP Control Protocol): This protocol is used to for the user to assign an IP address to each interface of the MX410/MX412. This enables dynamic routing of packets based on the IP address and prohibits broadcast traffic from being passed over the PPP link(s). This protocol requires more IP knowledge and configuration of each device on the network to ensure proper IP routing, Default gateway configuration, as well as avoiding conflicts of networks and DHCP configurations. When IPCP is enabled, RIP v2 is the routing protocol used by the MX410/MX412.

If using PPP, the T1/FT1 carrying the PPP link should be configured to ESF and B8ZS.

CAUTION

Only one PPP link can be connected between two devices. If more than one PPP link is connected between two devices, it creates an Ethernet LOOP and causes a Packet Storm across the entire Ethernet network.

The PPP BCP/IPCP menu shown in [Figure 5-20](#) is used to provision the PPP ports.

```

MX410
Active Alarms: CRITICAL MAJOR MINOR ID: MM/DD/YY HH:MM
MX410

PPP BCP/IPCP

1 - BCP/IPCP : BCP

PPP 1

2 - IP Address : unknown
Subnet Mask : unknown

Far End IP Address : unknown

3 - SNMP Link Status Trap : Enabled

LCP Status : Down
BCP/IPCP Status : Down

(T)oggle Between Interfaces

Selection : '?' - System Help Screen

```

Figure 5-20. PPP BCP/IPCP Menu

The PPP BCP/IPCP menu options are shown in [Table 5-16](#).

Table 5-16. PPP BCP/IPCP Menu Options

Option	Description	Function
1	BCP/IPCP	This option is used to select either BCP (Bridge Control Protocol) or IPCP (IP Control Protocol for routing).
PPP (1-4)		
2	IP Address	This option invokes another menu which is used to enter the IP Address, the Subnet Mask for the PPP. The IP Address is written in the format XXX.XXX.XXX.XXX, where each 3-digit field has a value between 1 and 255.
N/A	Subnet Mask	This field displays the PPP Subnet Mask. The Subnet Mask is written in the format XXX.XXX.XXX.XXX, where each 3-digit field has a value between 1 and 255.
N/A	Far End IP Address	This read-only field displays the far-end device IP address.
3	SNMP Link Status Trap	This option invokes another menu which is used to either enable or disable the SNMP link status trap.
N/A	LCP Status	This read-only field displays the Link Control Protocol (LCP) status as Up or Down.
	BCP/IPCP Status	This read-only field displays the BCP/IPCP status as Up or Down.

DHCP Server Menu

The DHCP (Dynamic Host Configuration Protocol) Server menu shown in [Figure 5-21](#), is used to provision DHCP server connections.

```

Active Alarms: CRITICAL MAJOR          MX410          ID:          MM/DD/YY HH:MM
                                         MX410

                                DHCP Server

                                1 - State           : Disabled
                                2 - Network          : Not Set/Not Set
                                3 - Default Router   : Not Set
                                4 - DNS Router       : Not Set
                                5 - Address Range    : 0.0.0.0-255.255.255.255
                                6 - Lease Time (d:h:m) : 0:0:0

Selection :                               '?' - System Help Screen

```

Figure 5-21. DHCP Server Menu

The DHCP Server menu options are shown in [Table 5-17](#).

Table 5-17. DHCP Server Menu Options

Option	Description	Function
1	State	This option is used to enable or disable the DHCP server.
2	Network	This option invokes another menu which is used to enter a network address and mask (scope of DHCP server).
3	Default Router	This option invokes another menu which is used to enter the new DHCP default router address.
4	DNS Router	This option invokes another menu which is used to enter the new DHCP DNS router address.
5	Address Range	This option invokes another menu which is used to enter the range of leased addresses.
6	Lease Time (d:h:m)	This option invokes another menu which is used to enter the expiration of the lease assigned to the DHCP server time in days, hours, and minutes.

SNMP Menu

The SNMP (Simple Network Management Protocol) menu (see [Figure 5-22](#)) is used to provision SNMP information.

```

Active Alarms: CRITICAL MAJOR MINOR          MX410          MM/DD/YY HH:MM
                                                ID:              MX410

                                                SNMP

1 - SNMP State      : Disabled
2 - Trap Host 1 IP  : 0.0.0.0
3 - Trap Host 2 IP  : 0.0.0.0
4 - Trap Host 3 IP  : 0.0.0.0
5 - Trap Host 4 IP  : 0.0.0.0
6 - SNMP Traps      : Disabled
7 - System Name     : MX410
8 - System Location :
9 - System Contact  :
10 - Read Community : public
11 - Write Community: private

Selection :                                '?' - System Help Screen

```

Figure 5-22. SNMP Menu

The SNMP menu options are shown in [Table 5-18](#).

Table 5-18. SNMP Menu Options

Option	Description	Function
1	SNMP State	This option sets the SNMP state to enabled or disabled. When disabled, the MX410/MX412 ignores all incoming SNMP packets, and does not transmit SNMP packets
2	Trap Host 1 IP	This option invokes another menu which is used to enter the Trap Host 1 IP address of an SNMP manager to which the MX410/MX412 sends traps, the method (version 1 traps or version 2 notifications), and enable or disable the trap host.
3	Trap Host 2 IP	This option invokes another menu which is used to enter the Trap Host 2 IP address of an SNMP manager to which the MX410/MX412 sends traps, the method (version 1 traps or version 2 notifications), and enable or disable the trap host.
4	Trap Host 3 IP	This option invokes another menu which is used to enter the Trap Host 3 IP address of an SNMP manager to which the MX410/MX412 sends traps, the method (version 1 traps or version 2 notifications), and enable or disable the trap host.

Table 5-18. SNMP Menu Options (Continued)

Option	Description	Function
5	Trap Host 4 IP	This option invokes another menu which is used to enter the Trap Host 4 IP address of an SNMP manager to which the MX410/MX412 sends traps, the method (version 1 traps or version 2 notifications), and enable or disable the trap host.
6	SNMP Traps	This option displays the user-defined system name and invokes another menu which is used to input alphanumeric characters that identify the name of the MX410/MX412.
7	System Name	This option displays the user-defined system name and invokes another menu which is used to input alphanumeric characters that identify the name of the MX410/MX412.
8	System Location	This option displays the user-defined system location and invokes another menu which is used to input alphanumeric characters that identify the physical location of the MX410/MX412.
9	System Contact	This option displays the user-defined system contact and invokes another menu which is used to input the name of personnel to contact about the MX410/MX412.
10	Read Community	This option invokes another menu which is used to enter the authentication strings used for SNMP management. Input a value that matches the MX410/MX412 to the SNMP manager for read privileges.
11	Write Community	This option invokes another menu which is used to enter the authentication strings used for SNMP management. Input a value that matches the MX410/MX412 to the SNMP manager for write privileges.

SCA Update Menu

The SCA (System Configuration Archive) Update Menu (see [Figure 5-23](#)) is used to update SCA information.

```

Active Alarms: CRITICAL MAJOR          MX410          ID:          MM/DD/YY HH:MM
                                         MX410

          SCA Update

          1 - SCA TFTP Server      : 0.0.0.0
          2 - Remote Filename     :
          3 - All/Data Path Only  : All Provisioning
          4 - Perform SCA Save
          5 - Perform SCA Restore

          6 - Auto Save Time      : wed 10:35
          7 - Auto Save           : Disabled

          Awaiting download.

Selection :                               '?' - System Help Screen

```

Figure 5-23. SCA Update Menu

The SCA Update menu options are shown in [Table 5-19](#).

Table 5-19. SCA Update Menu Options

Option	Description	Function
1	SCA TFTP Server	This option is used to enter the IP address where the SCA server resides.
2	Remote Filename	This option is used to enter the name of a file to save to or restore from the SCA server.
3	All/Data Path Only	This option is used to enter select amount of data to be save SCA server.
4	Perform SCA Save	This option is used to initiate an upload to save provisioning.
5	Perform SCA Restore	This option is used to initiate a download to restore provisioning.
6	Auto Save Time	This option is used to enter the date and time to automatically perform an auto save.
7	Auto Save	This option is used to automatically save SCA provisioning data at a user-specified date and time by selecting enabled or disabled.

Quick Setup Menu

To simplify the installation process, all of the basic configuration options necessary to setup the MX410/MX412 are grouped together on the Quick Setup menu (see [Figure 5-24](#)). The Quick Setup menu allows configuration of such items as DS0 drop assignments, as well as system date, time, and IP Address information.

```

MX410                               MM/DD/YY HH:MM
Unacknowledged Alarms: CRITICAL     ID: MX410

                                Quick Setup

Ports
 1 - PPPs
    PPP 1 =

 2 - V.35 =

System
 3 - System ID
 4 - IP Address      : 192.168.100.1
    Subnet Mask     : 255.255.0.0
 5 - Default Gateway : 192.168.1.1
 6 - Date
 7 - Time
                                8 - Cross-Connect Mapping

Selection :                                '?' - System Help Screen

```

Figure 5-24. Quick Setup Menu

The Quick Setup menu options are shown in [Table 5-20](#).

Table 5-20. Quick Setup Menu Options

Option	Description	Function
Ports		
1	PPPs	This option is used to provision the PPP ports. Options are as follows: <ul style="list-style-type: none"> Choose FROM PPP (for PPP 1 through PPP 4) Choose TO Group (for DS1 1 through DS1 4) Choose TO DS0 Range (enter a range of DS0s) Apply Cross-Connect
2	V.35	This option is used to provision the V.35 port. Options are as follows: <ul style="list-style-type: none"> Choose TO Group (for DS1 1 through DS1 4) Choose TO DS0 Range (enter a range of DS0s) Apply Cross-Connect

Table 5-20. Quick Setup Menu Options (Continued)

Option	Description	Function
3	FXS (MX412 only)	This option is used to provision the FXS port. Options are as follows: <ul style="list-style-type: none"> • Choose TO Group (for DS1 1 through DS1 4) • Choose TO DS0 Range: enter a range • Mode: Select Loop Start, PLAR D4, PLAR D3, or FX Ringdown. Refer to Table 4-6 on page 4-9 for descriptions of these options. • Apply Cross-Connect
System		
3	System ID	This option is used to assign a new system ID.
4	IP Address	This option is used to enter the IP Address for the MX410/MX412. The IP Address is written in the format XXX.XXX.XXX.XXX, where each 3-digit field has a value between 1 and 255.
N/A	Subnet Mask	This option is used to enter the subnet mask, written in the format XXX.XXX.XXX.XXX, where each 3-digit field has a value between 1 and 255.
5	Default Gateway	This option is used to enter the default gateway. The Gateway address is written in the format XXX.XXX.XXX.XXX, where each 3-digit field has a value between 1 and 255.
6	Date	This option is used to enter the date.
7	Time	This option is used to enter the time.
8	Cross-Connect Mapping	This is another path to the Cross-Connect Mapping Menu shown in Figure 5-13 on page 5-23 and contains the same options.

Status Screen

The Status screen (see [Figure 5-25](#)) provides detailed status information about the DS1 Ports, Ethernet Ports, PPP, Timing, and the Power Feed.

Active Alarms: CRITICAL MAJOR		MX410		ID:	MM/DD/YY HH:MM		
					MX410		
Status							
DS1 Ports			PPP Interfaces				
State	Line Status	Test	State	LCP	BCP	IPCP	
1 - Enabled	LOS,TX RAI	Data mode	1 - Disabled	DOWN	DOWN	DOWN	
2 - Enabled	LOS,TX RAI	Data mode	2 - Enabled	DOWN	DOWN	DOWN	
3 - Enabled	LOS,TX RAI	Data mode	3 - Disabled	DOWN	DOWN	DOWN	
4 - Enabled	LOS,TX RAI	Data mode	4 - Disabled	DOWN	DOWN	DOWN	
Ethernet Ports			Auxiliary Alarms				
Status	Speed	Status		Severity			
1 - Up	100 Mbps, Full Duplex	1 - Cleared		N/A			
2 - Up	100 Mbps, Full Duplex	2 - Cleared		N/A			
3 - Down	Unknown	3 - Cleared		N/A			
4 - Down	Unknown	4 - Cleared		N/A			
Power Feed		PSU		Timing Source			
Status	State	Status	Status	Status	Source		
A - Normal	A - Installed	Normal	Primary	- Normal	Internal		
B - Normal	B - Installed	Normal	Secondary	- Normal	Internal		
'? ' - System Help Screen							

Figure 5-25. Status Screen

The Status menu options are shown in [Table 5-21](#).

Table 5-21. Status Screen Fields

Option	Description	Function
DS1 Ports		
1-4	State	This field displays the current state of the four DS1 Ports as either Enabled or Disabled.
	Line Status	This field displays the current line status of the four DS1 ports (12 ports on the MX412). The possible states are as follows: <ul style="list-style-type: none"> • LOS: Loss of Signal • LOF: Loss of Frame (RX Red Alarm) • RX AIS: Receiving Alarm Indication Signal (RX Blue Alarm) • TX AIS: Transmitting Alarm Indication Signal (TX Blue Alarm) • RX RAI: Receiving Remote Alarm Indicator (RX Yellow Alarm) • TX RAI: Transmitting Remote Alarm Indicator (TX Yellow Alarm) • Normal: Indicates no alarms currently active

Table 5-21. Status Screen Fields (Continued)

Option	Description	Function
	Test	This field displays one of the following possible states: <ul style="list-style-type: none"> • Data Mode: Indicates no tests are active • Payload Loopback: Indicates that a payload loopback is in progress • Line Loopback: Indicates that a line loopback is in progress
PPP Interfaces		
1-4	State	This field displays the current state of the four PPP interfaces as either Enabled or Disabled.
	LCP	This field displays the active state of this control protocol as either Up or Down.
	BCP	This field Displays the active state of this control protocol as either Up or Down.
	IPCP	This field Displays the active state of this control protocol as either Up or Down.
Ethernet Ports		
1-4	Status	This field displays the current status as either Up or Down.
	Speed	This field Displays one of the following speeds as active: <ul style="list-style-type: none"> • 10 Mbps, Half Duplex • 10 Mbps, Full Duplex • 100 Mbps, Half Duplex • 100 Mbps, Full Duplex
Auxiliary Alarms		
1-4	Status	This field displays the current alarm status as either Active or Cleared.
	Severity	This field displays the current alarm severity. Severities are defined by the customer and displayed as Critical, Major, Minor, Alert, or Info.
Power Feed		
A/B	Status	This field displays the power feed (which connects to the rear of the MX410/MX412) as either Normal or Failed.
PSU (MX410 Only)		
A/B	State	This field displays the current status of the A/B PSUs as either Installed or Removed.
	Status	This field displays the current status of the A/B PSUs as Normal, Failed (if the PSU is installed), or N/A (if the PSU is not installed).
Timing Source		
Primary/ Secondary	Status	This field displays the status as either Normal or Failed.
	Source	This field Displays internal or DS1 (1-4 on MX410 or 1-12 on MX412).

Test Menu

The Test menu (see [Figure 5-26](#)) provides options for testing the DS1 Ports.

```

Active Alarms: CRITICAL MAJOR      MX410      ID:      MM/DD/YY HH:MM
                                      MX410

                                Test

                                DS1 Ports

                                1 - #1 : Pattern
                                2 - #2 : Data mode
                                3 - #3 : Data mode
                                4 - #4 : Data mode

                                5 - Reset ALL Tests
                                6 - Loopback Timeout: 120 Minutes

Selection :                        '?' - System Help Screen

```

Figure 5-26. Test Menu

The Test menu options are shown in [Table 5-22](#).

Table 5-22. Test Menu Options

Option	Description	Function
DS1 Ports (1-4 on MX410 and 1-12 on MX412)		
1-4	#1 - #4	This option is used to invokes the “ DS1 (Port #) Menu ” on page 5-43.
5	Reset ALL Tests	This option is used to stop all DS1 port testing and resets all DS1 ports to Data Mode.
6	Loopback Timeout	This option is used to set the loopback timeout value. The default value is 120 Minutes and the possible values are as follows: <ul style="list-style-type: none"> • 120 Minutes • 90 Minutes • 60 Minutes • 30 Minutes • 15 Minutes • 10 Minutes • 5 Minutes • Disabled

DS1 (Port #) Menu

The DS1 (Port #) menu (see [Figure 5-27](#)) provides options for testing the DS1 Ports.

```

Active Alarms: CRITICAL MAJOR          MX410          ID:          MM/DD/YY HH:MM
                                         MX410

                                DS1 1

                                1 - Loopback          : Pattern
                                Pattern                : Ones
                                2 - Insert One Bit Error
                                3 - Clear Bit Error Count
                                Patt Sync              : NO SYNC
                                Bit Errors              : 14
                                DS1 1 Status           : LOS,TX RAI

Selection:                               '?' - System Help Screen

```

Figure 5-27. DS1 (Port #) Menu

The DS1 (Port #) menu options are shown in [Table 5-23](#).

Table 5-23. DS1 (Port #) Menu Options

Option	Description	Function
1	Loopback	This option is used to display the current loopback. Selecting this option invokes the “ Port (#) Test Menu ” on page 5-44.
N/A	Pattern	This option is used to display the current pattern type.
2	Insert One Bit Error	This option is present only when a pattern has been selected and inserts one bit error count.
3	Clear Bit Error Count	This option is present only when a pattern has been selected and clears one bit error count.
	Patt Sync	This read-only field displays the pattern synchronization status.
	Bit Errors	This read-only field displays the current number of bit errors.
	DS1 (#) Status	This read-only field displays the current status of the selected port.

Port (#) Test Menu

The Port (#) Test menu (see [Figure 5-28](#)) provides options for testing the DS1 Ports.

```

Active Alarms: CRITICAL MAJOR          MX410          ID:          MM/DD/YY HH:MM
                                         MX410

Port #1 : Pattern

1 - Data Mode
2 - Payload
3 - Line
4 - Inward
5 - Dual
6 - Remote FDL Line
7 - Remote Inband Line (CSU)
8 - Remote FDL Payload
9 - Pattern Test

Selection:                               '?' - System Help Screen

```

Figure 5-28. Port (#) Test Menu

The Port (#1-#4 on MX410, and #1-#12 on MX412) Test menu options are shown in [Table 5-24](#).

Table 5-24. Port (#) Test Menu Options

Option	Description	Function
1	Data Mode	This option indicates that no tests are active.
2	Payload	This option initiates a payload loopback test.
3	Line	This option initiates a line loopback test.
4	Inward	This option initiates an inward loopback test.
5	Dual	This option initiates both line and inward loopback tests.
6	Remote FDL Line	This option transmits a request via the FDL (Facility Data Link) for the remote unit to issue a line loopback (ESF only).
7	Remote Inband Line (CSU)	This option transmits an inband request for the remote unit to issue a line loopback.
8	Remote FDL Payload	This option transmits a request via the FDL for the remote unit to issue a payload loopback (ESF only).
9	Pattern Test	This option invokes the DS1 Test Pattern menu.

DS1 Test Pattern Menu

The DS1 Test Pattern menu (see [Figure 5-29](#)) provides options for testing the DS1 ports using pattern data.

```
Active Alarms: CRITICAL MAJOR          MX410          MM/DD/YY HH:MM
                                         ID:           MX410

                                DS1 1 Test Pattern

                                1 - QRSS
                                2 - All Ones
                                3 - All Zeros
                                4 - 511
                                5 - 2047
                                6 - 2^15-1
                                7 - 2^20-1

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

Figure 5-29. DS1 Test Pattern Menu

The DS1 Test Pattern menu options are all test pattern types. Selecting any of the options invokes a warning menu that test patterns are service affecting and requests execution verification.

Pattern type options are as follows:

- QRSS
- All Ones
- All Zeros
- 511
- 2047
- $2^{15}-1$
- $2^{20}-1$

Performance Monitoring Menu

The Performance Monitoring menu (see [Figure 5-30](#)) provides options for viewing performance data affecting the MX410/MX412 operations. Data is viewed in daily or 15-minute increments.

```

Active Alarms: CRITICAL MAJOR          MX410          ID:          MM/DD/YY HH:MM
                                         MX410

Performance Monitoring

1 - Daily PM Table
2 - Quarter Hour PM Table
3 - Daily PM Thresholds
4 - Quarter Hour PM Thresholds
5 - Clear PM Data

Selection :

'?' - System Help Screen

```

Figure 5-30. Performance Monitoring Menu

The Performance Monitoring menu options are shown in [Table 5-25](#).

Table 5-25. Port (#) Test Menu Options

Option	Description	Function
1	Daily PM Table	This option invokes the “Daily Performance Monitoring Screen” on page 5-48.
2	Quarter Hour PM Table	This option invokes the “Quarter Hour Performance Monitoring Screen” on page 5-48.
3	Daily PM Thresholds	This option invokes the “Daily PM Thresholds Menu” on page 5-49.
4	Quarter Hour PM Thresholds	This option invokes the “Quarter Hour PM Thresholds Menu” on page 5-51.
5	Clear PM Data	This option invokes the “Clear PM Data Menu” on page 5-52.

Performance Monitoring Definitions are listed in [Table 5-26](#).

Table 5-26. Performance Monitoring Definitions

T1 PM Parameter	Definition	Description
CV-L	Code Violation - Line	This parameter indicates the number of Bipolar Violations (BPVs) and Excessive Zeros (EXZs) that have occurred during the accumulation period.
ES-L	Errored Seconds - Line	This parameter indicates the number of seconds for which one or more Line Coding Violations (CV-Ls), 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 CV-Ls 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.
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: <ul style="list-style-type: none"> • FE errors¹ • CS events² • SEF defects³ • AIS defects⁴ ESF Mode: This parameter indicates the number of seconds containing any of the following: <ul style="list-style-type: none"> • CRC-6 errors⁵ • CS events • SEF defects • AIS defects
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.
SAS-P	Severely Errored Frame/AIS Second - Path	This parameter indicates the number of seconds containing one or more SEF defects or one or more AIS defects.
UAS-P	Unavailable Second - Path	This parameter indicates the number of seconds for which the DS1 path contains 10 contiguous SESs.
CSS-P	Controlled Slip Second - Path	This parameter indicates the number of seconds containing one or more controlled frame slips.

1. FE (Frame bit Error): This parameter indicates the occurrence of a frame bit error in the received frame bit pattern.
2. CS (Controlled Slip): This parameter indicates the replication or deletion of the 192 payload bits of a DS1 frame by the receiving unit.
3. SEF (Severely Errored Frame): This parameter indicates that two or more frame bit errors are detected in a window.
4. AIS (Alarm Indication Signal): This parameter indicates the detection of an unframed signal with a 1s density of at least 99.9% for a time.
5. CRC-6 (Cyclic Redundancy Check) error - used in ESF mode only: This parameter indicates the existence of a CRC-6 code that is not identical to the corresponding locally calculated code.

Daily Performance Monitoring Screen

The Daily Performance Monitoring screen (see [Figure 5-31](#)) displays DS1 performance monitoring data in daily increments and in a tabular format.

Active Alarms: CRITICAL MAJOR		MX410		ID:		MM/DD/YY HH:MM	
						MX410	
DS1 Port 1 Daily Performance Monitoring							
	Current	Total	06/22	06/21	N/A	N/A	N/A
CV-L	0	0	0	0	0	0	0
ES-L	52549	134621	86374	48247	0	0	0
SES-L	52549	134621	86374	48247	0	0	0
LOSS-L	52549	134621	86374	48247	0	0	0
CV-P	0	0	0	0	0	0	0
ES-P	0	0	0	0	0	0	0
SES-P	0	0	0	0	0	0	0
SAS-P	0	0	0	0	0	0	0
UAS-P	52549	134621	86374	48247	0	0	0
CSS-P	0	0	0	0	0	0	0
(N)Next DS1, (P)Prev DS1, (E)Enter DS1, (F)Forward, (B)Back, Selection:							

Figure 5-31. Daily Performance Monitoring Screen

Quarter Hour Performance Monitoring Screen

The Quarter Hour Performance Monitoring screen (see [Figure 5-32](#)) displays DS1 performance monitoring data in 15-minute increments and in a tabular format.

Active Alarms: CRITICAL MAJOR		MX410		ID:		MM/DD/YY HH:MM	
						MX410	
DS1 Port 1 Quarter Hour Performance Monitoring							
	Current	Total	15:15	15:00	14:45	14:30	14:15
CV-L	0	0	0	0	0	0	0
ES-L	556	86366	899	900	900	899	900
SES-L	556	86366	899	900	900	899	900
LOSS-L	556	86366	899	900	900	899	900
CV-P	0	0	0	0	0	0	0
ES-P	0	0	0	0	0	0	0
SES-P	0	0	0	0	0	0	0
SAS-P	0	0	0	0	0	0	0
UAS-P	556	86366	899	900	900	899	900
CSS-P	0	0	0	0	0	0	0
(N)Next DS1, (P)Prev DS1, (E)Enter DS1, (F)Forward, (B)Back, Selection:							

Figure 5-32. Quarter Hour Performance Monitoring Screen

Daily PM Thresholds Menu

The Daily PM Thresholds menu (see [Figure 5-33](#)) displays DS1 performance monitoring thresholds data in a tabular format. This menu is used to set the performance monitoring threshold levels and enable or disable an alarms if the threshold is exceeded.

Active Alarms: CRITICAL MAJOR		MX410	ID: MM/DD/YY HH:MM
			MX410
Daily PM Thresholds			
		Threshold	Alarm
1 - ES-L	:	648	Enabled
2 - CV-P (ESF mode)	:	132960	Enabled
3 - CV-P (SF mode)	:	691	Enabled
4 - ES-P	:	648	Enabled
5 - SES-P	:	100	Enabled
6 - SAS-P	:	17	Enabled
7 - CSS-P	:	4	Enabled
8 - UAS-P	:	10	Enabled
9 - Restore ALL DS1 Threshold Defaults			
10 - Enable ALL DS1 Threshold Alarms			
11 - Disable ALL DS1 Threshold Alarms			
Selection :		'?' - System Help Screen	

Figure 5-33. Daily PM Thresholds Menu

The Daily PM Thresholds menu options are shown in [Table 5-27](#).

Table 5-27. Daily PM Thresholds Menu Options

Option	Description	Function
1	ES-L	This option sets the ES-L threshold value. The available threshold range is (1-65535). The default value is 648.
2	CV-P (ESF mode)	This option sets the CV-P ESF threshold value. The available threshold range is (1-1048575). The default value is 132,960.
3	CV-P (SF mode)	This option sets the CV-P SF threshold value. The available threshold range is (1-1048575). The default value is 691.
4	ES-P	This option sets the ES-P threshold value. The available threshold range is (1-65535). The default value is 648.
5	SES-P	This option sets the SES-P threshold value. The available threshold range is (1-65535). The default value is 100.
6	SAS-P	This option sets the SAS-P threshold value. The available threshold range is (1-65535). The default value is 17.
7	CSS-P	This option sets the CSS-P threshold value. The available threshold range is (1-65535). The default value is 691.

Table 5-27. Daily PM Thresholds Menu Options (Continued)

Option	Description	Function
8	UAS-P	This option sets the UAS-P threshold value. The available threshold range is (1-65535). The default value is 10.
9	Restore ALL DS1 Threshold Defaults	This option restores all threshold values to the defaults listed above.
10	Enable ALL DS1 Threshold Alarms	This option enables all daily threshold alarms.
11	Disable ALL DS1 Threshold Alarms	This option disables all daily threshold alarms.

Quarter Hour PM Thresholds Menu

The Quarter Hour PM Thresholds menu (see [Figure 5-34](#)) displays DS1 performance monitoring thresholds data in a tabular format. This menu is used to set the performance monitoring threshold levels and enable or disable an alarms if the threshold is exceeded.

```

Active Alarms: CRITICAL MAJOR          MX410          MM/DD/YY HH:MM
                                         ID:           MX410

                Quarter Hour PM Thresholds

                Threshold      Alarm
1 - ES-L           :           65      Enabled
2 - CV-P (ESF mode) :       13296      Enabled
3 - CV-P (SF mode) :           72      Enabled
4 - ES-P           :           65      Enabled
5 - SES-P          :           10      Enabled
6 - SAS-P          :            2      Enabled
7 - CSS-P          :            1      Enabled
8 - UAS-P          :           10      Enabled

9 - Restore ALL DS1 Threshold Defaults
10 - Enable ALL DS1 Threshold Alarms
11 - Disable ALL DS1 Threshold Alarms

Selection :                               '?' - System Help Screen

```

Figure 5-34. Quarter Hour PM Thresholds Menu

The Quarter Hour PM Thresholds menu options are shown in [Table 5-28](#).

Table 5-28. Quarter Hour PM Thresholds Menu Options

Option	Description	Function
1	ES-L	This option sets the ES-L threshold value. The available threshold range is (1-900). The default value is 65.
2	CV-P (ESF mode)	This option sets the CV-P ESF threshold value. The available threshold range is (1-16383). The default value is 13,296.
3	CV-P (SF mode)	This option sets the CV-P SF threshold value. The available threshold range is (1-16383). The default value is 72.
4	ES-P	This option sets the ES-P threshold value. The available threshold range is (1-900). The default value is 65.
5	SES-P	This option sets the SES-P threshold value. The available threshold range is (1-900). The default value is 10.
6	SAS-P	This option sets the SAS-P threshold value. The available threshold range is (1-900). The default value is 2.
7	CSS-P	This option sets the CSS-P threshold value. The available threshold range is (1-900). The default value is 72.

Table 5-28. Quarter Hour PM Thresholds Menu Options (Continued)

Option	Description	Function
8	UAS-P	This option sets the UAS-P threshold value. The available threshold range is (1-900). The default value is 10.
9	Restore ALL DS1 Threshold Defaults	This option restores all threshold values to the defaults listed above.
10	Enable ALL DS1 Threshold Alarms	This option enables all quarter hour threshold alarms.
11	Disable ALL DS1 Threshold Alarms	This option disables all quarter hour threshold alarms.

Clear PM Data Menu

This option invokes the Clear Performance Monitoring Data menu and requests verification before deleting all previously collected performance monitoring data.

System Alarms Menu

The System Alarms Menu (see [Figure 5-35](#)) provides options for viewing all alarms affecting MX410/MX412 system operations. Alarms may be viewed within the Master Log menu (detailed in the next section). The Environmental Alarms menu contains provisionable options. The Alarm Chronology menu offers the viewing of alarms in either ascending or descending order.

```
Active Alarms: CRITICAL          MX410          ID:          MM/DD/YY HH:MM
                                     MX410

                                System Alarms

                                1 - Master Log

                                2 - Environmental Alarms
                                3 - Alarm Chronology : Ascending

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

Figure 5-35. System Alarms Menu

Master Log Menu

The Master Log Menu (see [Figure 5-36](#)) is used to review and acknowledge alarms.

Date	Time	Type	Port	Level	Description	Status
04/19/05	19:31:24	T1	1	CRITICAL	DS1 LOS	Active
04/19/05	19:31:24	T1	2	CRITICAL	DS1 LOS	Active
04/19/05	19:31:24	T1	3	CRITICAL	DS1 LOS	Active
04/19/05	19:31:24	T1	4	CRITICAL	DS1 LOS	Active
04/23/05	17:10:17	SYSTIMING		MINOR	SRC A FAILED	*Active

----->>> END OF ALARMS <<<-----

Inverse = Active * = Unacknowledged Chronology = Ascending
 (N)ext (P)revious (F)irst (L)ast (C)lear (A)cknowledge

Figure 5-36. Master Log Menu

Terminology and options at the bottom of the menu are explained below:

- **Inverse = Active:** Current active alarms are shown with reverse video text.
- *** = Unacknowledged:** Unacknowledged alarms are shown with an asterisk (*) in the STATUS column.
- **Chronology = Ascending:** Displays the current alarm chronology setting. The alarm chronological sequence can be set to display in ascending or descending order in the System Alarms menu.
- **(N)ext:** Pressing the N key displays the next screen of alarms when all alarms cannot be displayed on one screen.
- **(P)revious:** Pressing the P key displays the previous screen of alarms when all alarms cannot be displayed on one screen.
- **(F)irst:** Pressing the F key displays the first alarms in the current chronological sequence.
- **(L)ast:** Pressing the L key displays the last alarms in the current chronological sequence.
- **(C)lear:** Pressing the C key clears all inactive alarms.
- **(A)cknowledge:** Pressing the A key acknowledges all unacknowledged alarms (which removes asterisks from the menu).

Code Download Method Menu

The Code Download Method menu (see [Figure 5-37](#)) provides options for upgrading the software of the MX410/MX412.

```

Active Alarms: CRITICAL          MX410          MM/DD/YY HH:MM
                                   ID:          MX410

                                Code Download Method

                                1 - X-MODEM
                                2 - TFTP

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

Figure 5-37. Code Download Method Menu

The Code Download Method menu options are shown in [Table 5-29](#).

Table 5-29. Code Download Method Menu Options

Option	Description	Function
1	X-MODEM	<p>This option invokes another menu to initiate an X-Modem transfer. Options are as follows:</p> <ul style="list-style-type: none"> Initiate Transfer: This option initiates the transfer. Once initiated use the VT100 terminal or VT100 emulation software to send the file to the MX410/MX412. Card Reset: This option applies newly downloaded software to the MX410/MX412.
2	TFTP	<p>This option invokes another menu to initiate a TFTP transfer. Options are as follows:</p> <ul style="list-style-type: none"> TFTP Server: This option is used to enter the IP address where the TFTP server resides. Remote Filename: This option is used to enter the filename stored on the TFTP server. Initiate Transfer: This option is used to start the transfer process. Card Reset: This option applies newly downloaded software to the MX410/MX412.

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Appendix A

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