NOKIA

Broadband Systems

D50 Documentation

Volume 6
Craft Terminal

Document Number 17-0105/Rev. 2.0 Release 6.0 Publication date 10/00

© Nokia Networks 2000
All rights reserved.

No part of this publication may be copied, distributed, transmitted, transcribed, stored in a retrieval system, or translated into any human or computer language without the prior written permission of Nokia Networks Oy.

The manufacturer has made every effort to ensure that the instructions contained in the documents are adequate and free of errors and omissions. The manufacturer will, if necessary, explain issues which may not be covered by the documents. The manufacturer's liability for any errors in the documents is limited to the correction of errors and the aforementioned advisory services.

The documents have been prepared to be used by professional and properly trained personnel, and the customer assumes full responsibility when using them. The manufacturer welcomes customer comments as part of the process of continual development and improvement of the documentation in the best way possible from the user's viewpoint. Please submit your comments to the nearest Nokia sales representative.

Adobe and Acrobat are registered trademarks, and Reader is a trademark of Adobe Systems Incorporated.

BEA and WebLogic are registered trademarks of BEA Systems, Inc.

CORBA and Object Management Group are registered trademarks; and IIOP, OMG, ORB, and Object Request Broker are trademarks of Object Management Group, Inc., registered in the United States.

Inprise and VisiBroker are registered trademarks of Inprise Corporation in the United States and other countries.

Java, JDBC, JRE, Sun, Sun Microsystems, and Solaris are trademarks or registered trademarks of Sun Microsystems, Inc. in the United States and other countries.

Microsoft and Windows NT are registered trademarks of Microsoft Corporation in the United States and/or other countries.

NOKIA is a registered trademark of Nokia Corporation.

Oracle is a registered trademark and Oracle8 is a trademark of Oracle Corporation.

Pentium is a registered trademark of Intel Corporation in the United States and other countries.

Any other trademarks mentioned in the documents are the property of their respective owners.

Document Number 17-0105/Rev. 2.0 **Release 6.0** **Publication date 10/00**

VOLUME 6 CRAFT TERMINAL

Contents

Nokia High Speed Access Products Inc. Proprietary Data

Introduction to D50 Documentation

Introduction

D50 documentation provides complete detailed instructions on how to install, test, and turn up a D50 System. This documentation complies with all requirements in Telcordia Technologies Technical Reference documents GR-454 *Generic Requirements for Supplier-Provided Documentation*, and IP-10260 *Standards for Task Oriented Practices (TOPS)*.

Target Audience

D50 documentation volumes are written at different levels of detail based on the reader's needs. Below is a list of the various volumes and the intended target audience for each.

Number	Title	Target Audience
Volume 1	General Information	Anyone with a need to understand more about the D50 System and planning requirements.
Volume 2	Installation	Installation and Testing Technicians, and Engineers (Detailed Level Procedures, or DLPs).
Volume 3	Commissioning	Testing Technicians and Engineers (DLPs).
Volume 4	Provisioning	Provisioning Technicians and Engineers (DLPs).
Volume 5	Maintenance and Testing	Maintenance and Testing Technicians and Engineers (DLPs).
Volume 6	Craft Terminal	Testing and Installation Technicians and Engineers (Reference manual for Craft Terminal).
Volume 7	Element Manager	Network Operations and Management Technicians (Reference manual for Element Manager).

Information Mapping Style

All documents are written in Information Mapping style, which presents information in small units or blocks. Each information block is identified by a subject label in the left margin and is separated from the next information block by a horizontal line. Subject labels make it easy for the reader to scan the document and to find information on a specific subject.

Each DLP lists the required equipment and tools to perform the job, and provides step by step instructions (supported by graphics where appropriate) to help the reader perform each task.

Section 1 Overview and Installation

Contents

List of Figures

List of Tables

Chapter 1
Craft Terminal Overview

Introduction

Craft Terminal is a stand-alone craft interface application which operates on a desktop personal computer, laptop, or notebook using Microsoft® Windows NT® operating system. Craft Terminal communicates directly with the D50, using Simple Network Management Protocol (SNMP) through either a serial communications port using Point-to-Point Protocol (PPP) or a 10BaseT Ethernet connection using IP protocol.

Craft Terminal communicates over the serial or Ethernet connection to the Network Management Processor (NMP) card.

References for Craft Terminal

The Craft Terminal document includes the following external references:

Table 1-1: References

Reference Volume	Functional Area(s)	Referencing Object(s)	Reference Detail
Commissioning	Installation, Test and Turn-up	n/a	Section 5—*Test and Commissioning*, Chapter 2—“Using Craft Terminal for Test and Commissioning,” and Chapter 3—“Craft Terminal Direct Ethernet Connection”
Maintenance and Testing	Alarm Conditions	MCS, LCS; Trunk, MLA, Broadband Tributary, LSM, and Line Cards	Section 1—*System Monitoring*, Chapter 2—“Conditions”
Maintenance and Testing	System Performance Monitoring	MLA2, MLAT1, MLAT3, LSMT1, LSMT3, and Line Cards	Section 1—*System Monitoring*, Chapter 3—“Performance Monitoring”

Table 1-1: References (continued)

Reference Volume	Functional Area(s)	Referencing Object(s)	Reference Detail
Maintenance and Testing	Card Replacement Procedures	MCS and LCS	Section 2—*Card Replacement*, Chapter 1—“Replace Identical Cards,” page 2-1, OR Chapter 2—“Replace an Existing Card with Different Card Type,” page 2-5, OR Chapter 3—“Correct an Attribute Mismatch Condition,” page 2-15
Provisioning	Provisioning Parameters, Ranges, and Values	Trunk, MLA, Broadband Tributary, and Line Cards	Section 4—*Appendices*, Appendix A—“Provisioning Parameters”
Provisioning	General Provisioning Concepts	Trunk and Line Cards	Section 1—*Provisioning Concepts* (See Chapter for specific referencing object)

When to Use Craft Terminal

Craft Terminal is used to perform the following functions:

- Installation of a D50.
- Troubleshooting of a D50 that cannot communicate with *Element Manager* Element Management System.
- Troubleshooting D50 problems in the field where it is inconvenient to bring Element Manager to the D50.

For additional information on commissioning procedures using Craft Terminal, see the volume titled Commissioning.

For details on troubleshooting procedures using Craft Terminal, see the volume titled Maintenance and Testing, Section 1—*System Monitoring*, Chapter 2—“Conditions.”

For Craft Terminal software installation and execution troubleshooting tips, see Appendix A—“Craft Terminal Troubleshooting Tips,” page 7-1.

Compatibility

Craft Terminal Release 6.0 is backward compatible to Release 5.1 D50 system software only. A lower version of Craft Terminal (Release 5.0 and lower) can be loaded on the same platform with Craft Terminal Release 6.0 to manage a previous release of D50 system software. The lower version of Craft Terminal must be loaded into a different directory from the Craft Terminal Release 6.0 software.

D50 System Installation

When you initially install a D50 system, use Craft Terminal to perform the following functions:

- Perform commissioning of the D50 system.
- Configure the system so that it can communicate with Element Manager.

Every effort is made to ensure that the D50 system is a reliable, ready-to-run product. However, commissioning of the D50 system is required to verify the following system functions:

- The D50 Master Control Shelf (MCS) must be able to communicate with all the parts of the multiplexer.
- All cards must operate correctly.

After you complete commissioning of the D50 system, the Network Operations Center (NOC) will take on the primary responsibility for managing the system, using Element Manager.

Diagnosing D50 Communication Problems

Element Manager is the preferred way of diagnosing problems with a D50 system that is already in service. However, Craft Terminal may be the appropriate tool for troubleshooting a D50 system problem in certain situations, for example:

- The Local Area Network (LAN) that connects Element Manager to the D50 system multiplexer stops communicating.
- A technician is trying to troubleshoot a problem in the field.
- The D50 system loses its IP address, losing the ability to communicate over the LAN.
- A network element with the same IP address as the D50 system is inadvertently added to the LAN.
- The D50 system's LAN transceiver fails.

Installing Craft Terminal

Craft Terminal connects to the MCS in two distinct ways: either a serial port connection, or an Ethernet connection. The subsequent chapters provide the necessary instructions for installing Craft Terminal on a computer running Microsoft Windows NT with a serial port connection. The chapters apply as follows:

Table 1-2: D50 Craft Terminal – Minimum System Requirements

Requirement	Decription
Operating System	Microsoft Windows NT Workstation 4.0 or later
Computer	PC capable of running the required versions of Microsoft Windows (Pentium®[1] recommended)

Table 1-2: D50 Craft Terminal – Minimum System Requirements

RAM	32 MB recommended
Hard disk space	6 MB for Craft Terminal software (and at least 20 MB of free disk space after installation)
CD-ROM drive	Standard
Display	VGA compatible (Super VGA recommended)
Pointing device	Microsoft Windows compatible mouse or pointing device
Printer (optional)	Microsoft Windows compatible printer
Interface ports	■ Serial port ■ Ethernet port (optional)

[1] Pentium is a registered trademark of Intel Corporation in the United States and other countries.

Table 1-3: Installation Instructions for Serial Port Connection

Craft Terminal via Serial Port
■ Set serial communications port parameters. ■ Add a modem. ■ Install Remote Access Service (RAS). ■ Install Simple Network Management Protocol (SNMP) services. ■ Install Dial-Up networking. ■ Install the Craft Terminal application software.

Note: Procedure tables that outline the installation process in detail for both the serial port and Ethernet connection can be found in the volume, Commissioning, Section 5—*Test and Commissioning*, Chapter 2—"Using Craft Terminal for Test and Commissioning," and Chapter 3—"Craft Terminal Direct Ethernet Connection", respectively.

Before you begin installing Craft Terminal software, Microsoft Windows NT should be installed on your computer with Service Pack 4 or greater. For additional information about completing any options in the Setup and Protocols dialog windows, see your Microsoft Windows NT documentation.

Note: Setup and configuration for earlier versions of Microsoft Windows NT may differ from the descriptions provided in the Craft Terminal documentation.

Before you begin installation, make sure that you have the following components:

Table 1-4: Before You Begin Installation

Installation Components for Serial Connection
■ Craft Terminal software installation media (CD-ROM). ■ Serial cable for connecting your computer to the MCS (if connecting serially). ■ Serial cable adapter (depending on the connection interface).

Your computer must meet the following minimum requirements:

Table 1-5: Minimum System Requirements

Craft Terminal System
■ 486 or Pentium® computer capable of running Microsoft Windows NT (Pentium recommended). ■ 6 MB of available hard disk space. ■ 32MB of available system memory (RAM). ■ CD-ROM Drive. ■ Microsoft Windows NT operating system software, version 4.0. ■ Pointing device (mouse).

Check Port Settings

Before proceeding with installation, use the following steps to check the serial communication port settings:

1. On the **Start** menu on the taskbar, select **Settings**, then select **Control Panel**.
2. In the Control Panel window, click the **Ports** icon to display the **Ports** dialog box.

Figure 1-1: Control Panel, Ports Icon

3 Select the (serial communications) port you plan to use to connect to Craft Terminal (e.g., COM1).

Important! Be sure that you are clear which physical port is to be used for communicating with the Craft Terminal application.

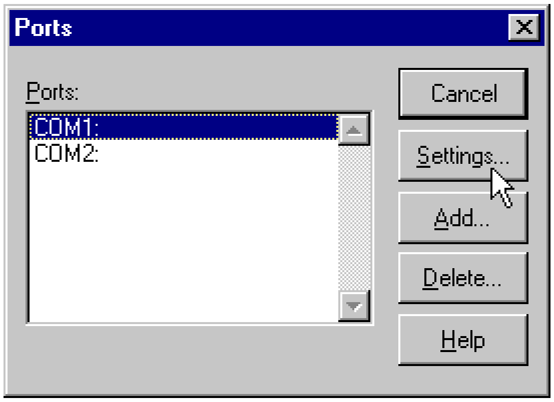


Figure 1-2: (Serial Communications) Ports Dialog Box

4 Click the **Settings** button to display the port **Settings for COM#** dialog box.

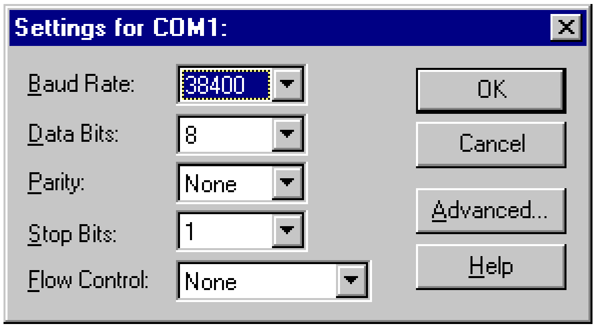


Figure 1-3: Port Settings Dialog Box

5 Verify the parameters are set as follows:

– **Baud rate** set to **38400**.

– **Data bits** set to **8**.

– **Parity** set to **none**.

– **Stops bits** set to **1**.

– **Flow control** set to **none**.

Click the **OK** button to return to the Windows desktop.

Chapter 2
Add a Modem

Introduction

When using a serial connection, Craft Terminal communicates with the D50 using Point-to-Point Protocol (PPP). For Craft Terminal to communicate with the D50 through a serial port connection, you must set certain parameters in the **Modems** control panel, and also set up Dial-Up Networking.

> **Note:** Dial-Up Networking requires that a modem be configured, although you will not actually use a modem to communicate with the D50.

Depending on how Windows NT® is configured on your workstation, the windows and dialog boxes that display during installation may vary from those described in the following installation sections. See your Windows documentation for more details.

Procedure

On the taskbar, click the **Start** button (usually located at the lower left corner of your PC screen). Point to **Settings,** click **Control Panel**, and double-click the **Modems** icon.

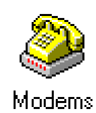


Figure 1-4: Modems Icon

The **Install New Modem** dialog box appears. Select the *Don't detect my modem* ... check box, then click the **Next** button.

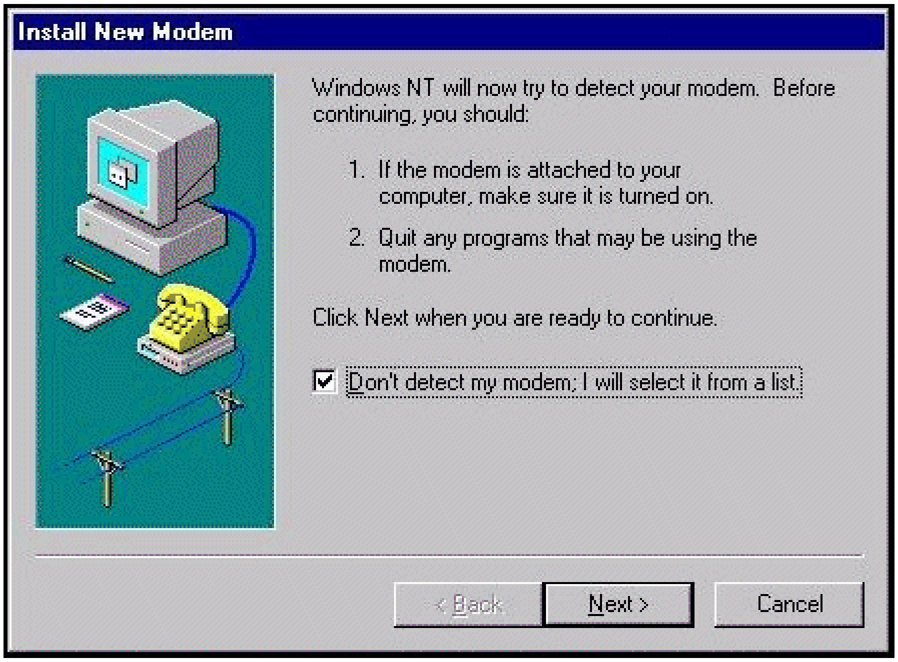


Figure 1-5: Install New Modem Dialog Box

The next **Install New Modem** dialog box appears. In the **Manufacturers** list box, Select Standard Modem Types. In the **Models** list box, select Dial-Up Networking Serial Cable between 2 PCs, then click the **Next** button.

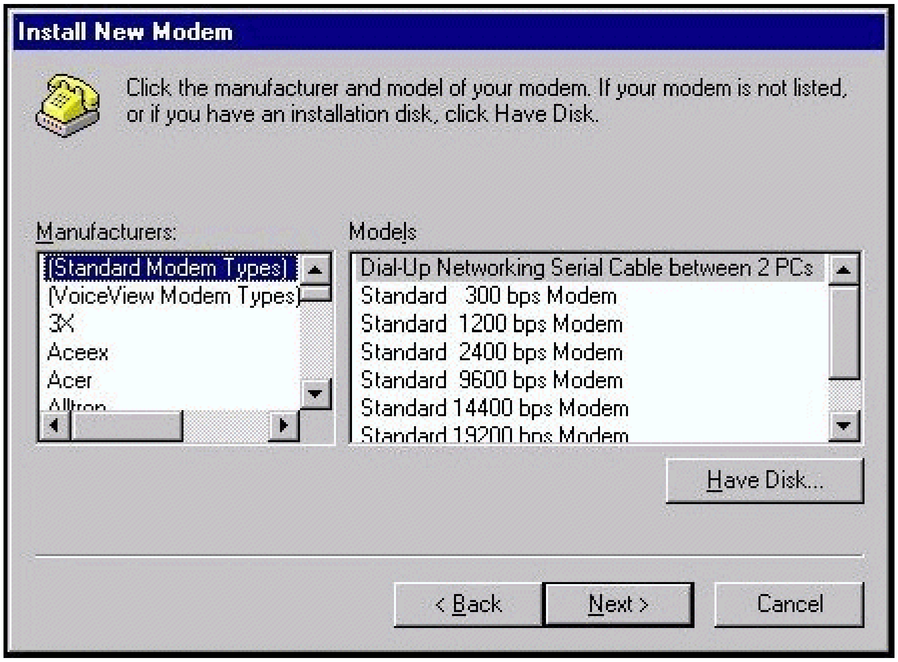


Figure 1-6: Modem Selection View

The next **Install New Modem** dialog box appears. Select a COM port (dependent upon availability of serial ports on your computer) and click the **Selected Ports** option, then click the **Next** button.

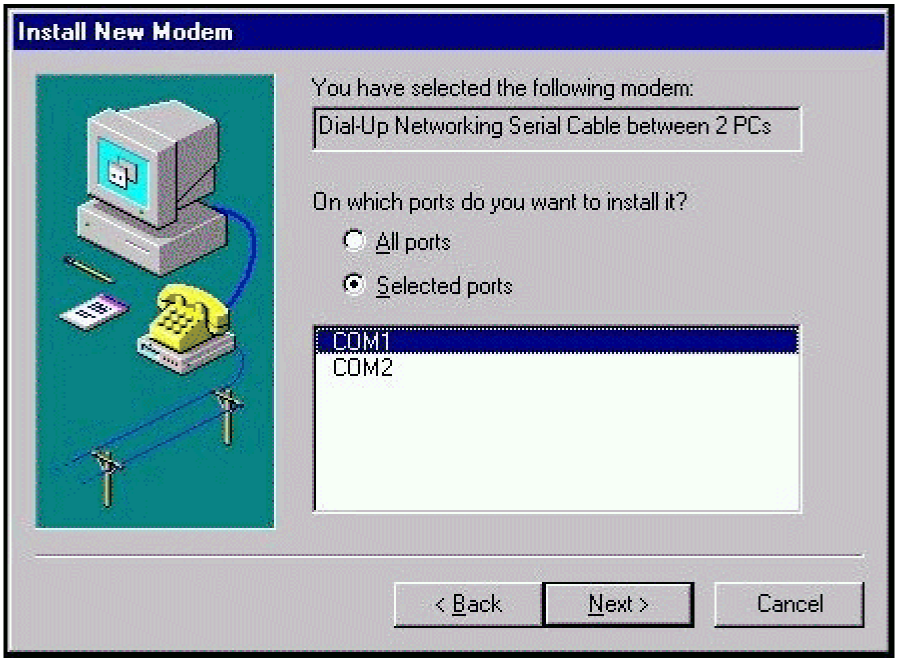


Figure 1-7: Com Port Selection View

The **Install New Modem** dialog box displays a message indicating that the modem has been set up successfully. Click the **Finish** button.

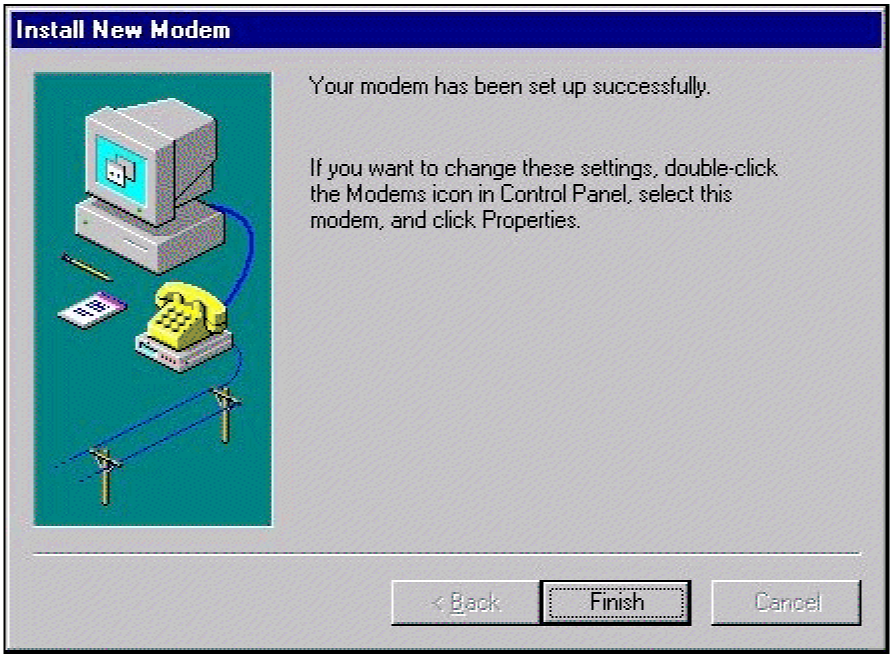


Figure 1-8: Final View

After the modem/serial connection has been set up, you must configure the connection speed rate and preferences. In the **Modems Properties** dialog box, click the **Properties** button.

Figure 1-9: Modem Properties Dialog Box

The **Dial-Up Networking Serial Cable…** dialog box will appear, with the General tab page on top. From the **Maximum Speed** list, select 38400, then click the Connection tab.

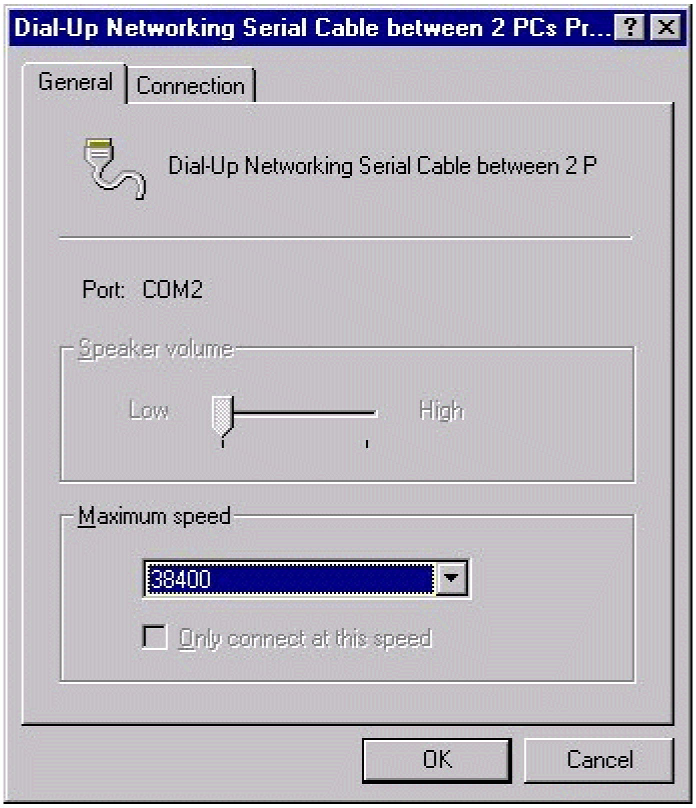


Figure 1-10: General Tab, Properties Selection View

Clicking the Connection tab displays the following tab page, where you can set the following parameters:

- From the **Data bits** list, select 8.
- From the **Parity** list, select None.
- From the **Stop bits** list, select 1.

After setting the parameters, click the **OK** button.

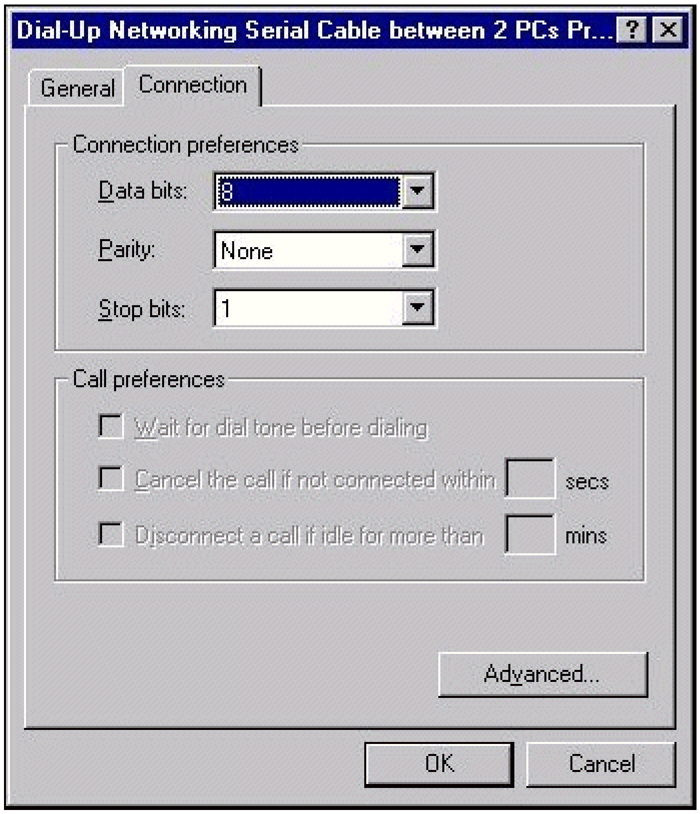


Figure 1-11: Connection Tab

The **Modems Properties** dialog box displays. Click the **Close** button to finish.

Note: The next two dialog boxes will appear only if RAS (Remote Access Service) is currently installed.

After you have set up the dial-up networking, the **Modem Setup** dialog box will appear. Click the **Yes** button.

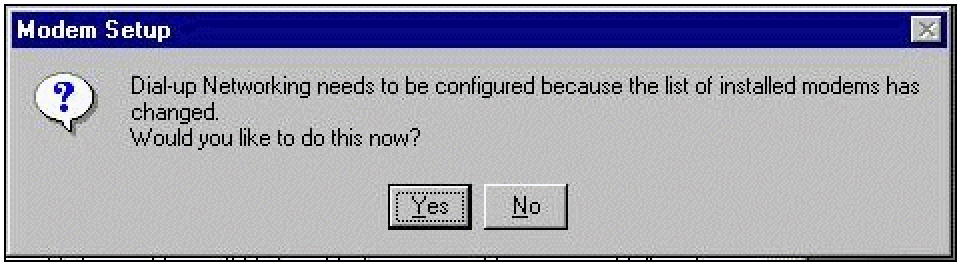


Figure 1-12: Modem Setup, Confirm Configuration Message

The Remote Access Setup dialog box will appear. Click the **Continue** button.

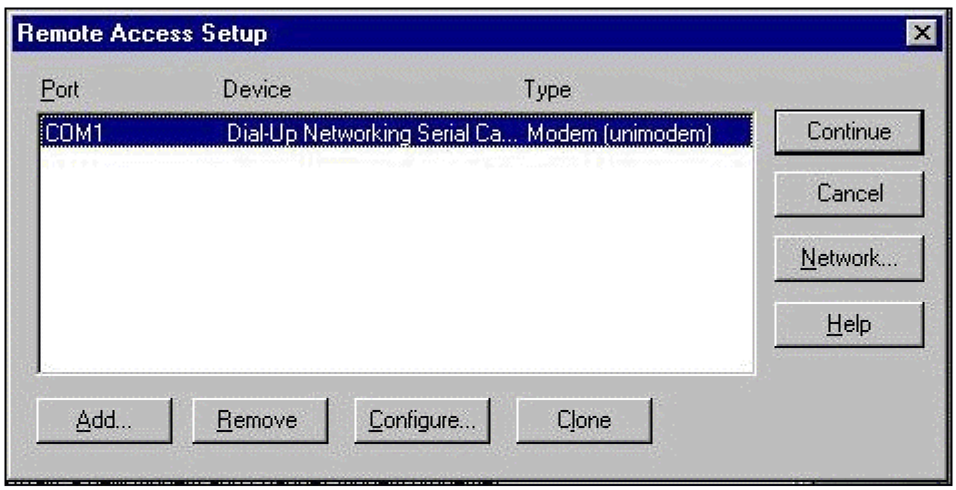


Figure 1-13: Remote Access Setup Dialog Box

You can now install RAS and Simple Network Management Protocol (SNMP) Service.

Chapter 3
Add Remote Access Service (RAS)

Introduction

If RAS and Simple Network Management Protocol (SNMP) services are already installed, you can go to the chapter on Installing SNMP and set the properties, then go to the chapter on Adding Dial-Up Networking.

Note: If using the Ethernet connection only, RAS does not need to be installed.

Procedure

From the taskbar, click the **Start** button (located at the lower left corner of your PC screen). Point to **Settings,** click **Control Panel**, and double-click the **Network** icon.

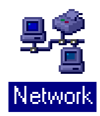


Figure 1-14: Network Icon

The **Network** dialog box appears. Click the Services tab to display the following tab page, then click the **Add** button.

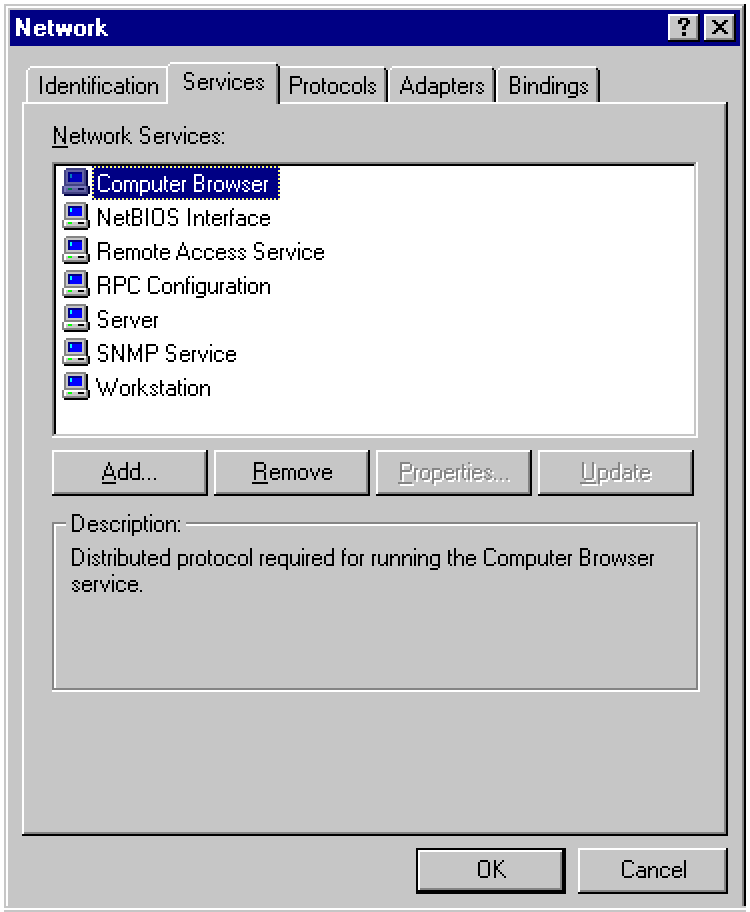


Figure 1-15: Network Dialog Box, Services Tab

The **Select Network Service** dialog box will appear. From the **Network Service** list, select Remote Access Service, then click the **OK** button.

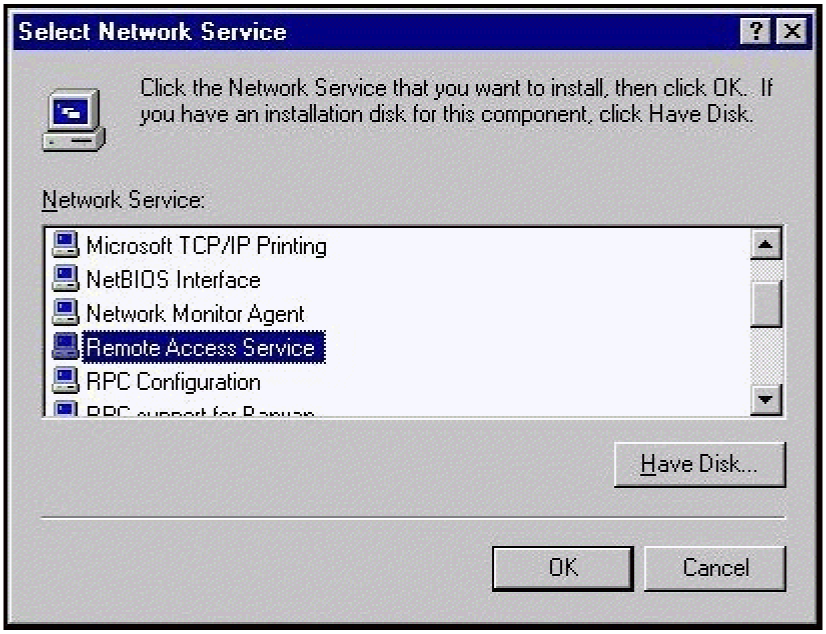


Figure 1-16: Select Network Service Dialog Box

The Windows NT® Setup dialog box will appear. You can enter a new path or just click the **Continue** button to use the default path.

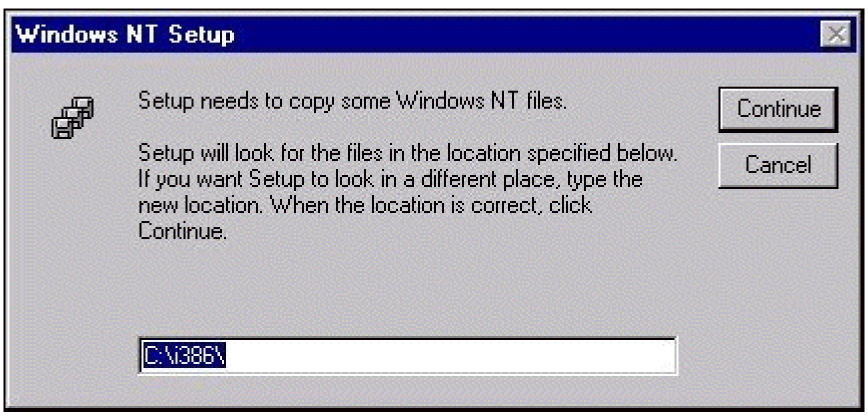


Figure 1-17: Windows NT Setup Message

The Add RAS Device dialog box will appear. From the **RAS Capable Devices** list, select the device that you configured in the *Add a Modem* section, then click the **OK** button.

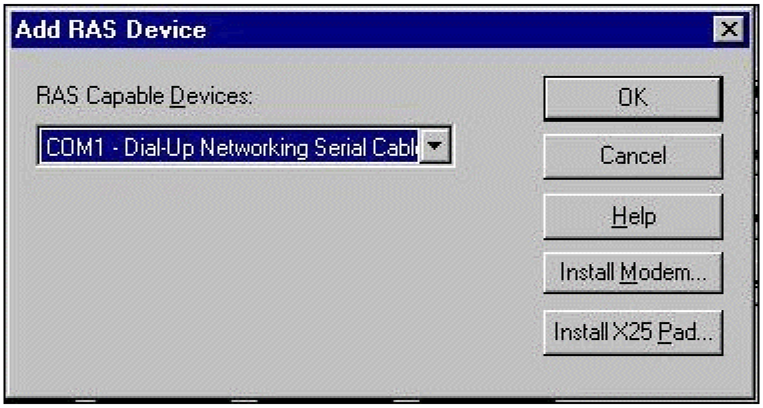


Figure 1-18: Add RAS Device Dialog Box

The Remote Access Setup dialog box will appear. Select the port/device/type that you configured in the *Add a Modem* section, then click the **Continue** button.

Introduction

If Simple Network Management Protocol (SNMP) Services appears in the Services tab page (as shown in the following example), then SNMP is already installed. You must still check the SNMP Properties to ensure they are set correctly; see the SNMP Properties dialog box, Agent tab under the Procedure heading in this chapter. Click the **OK** button, then go to the chapter on Dial-Up Networking.

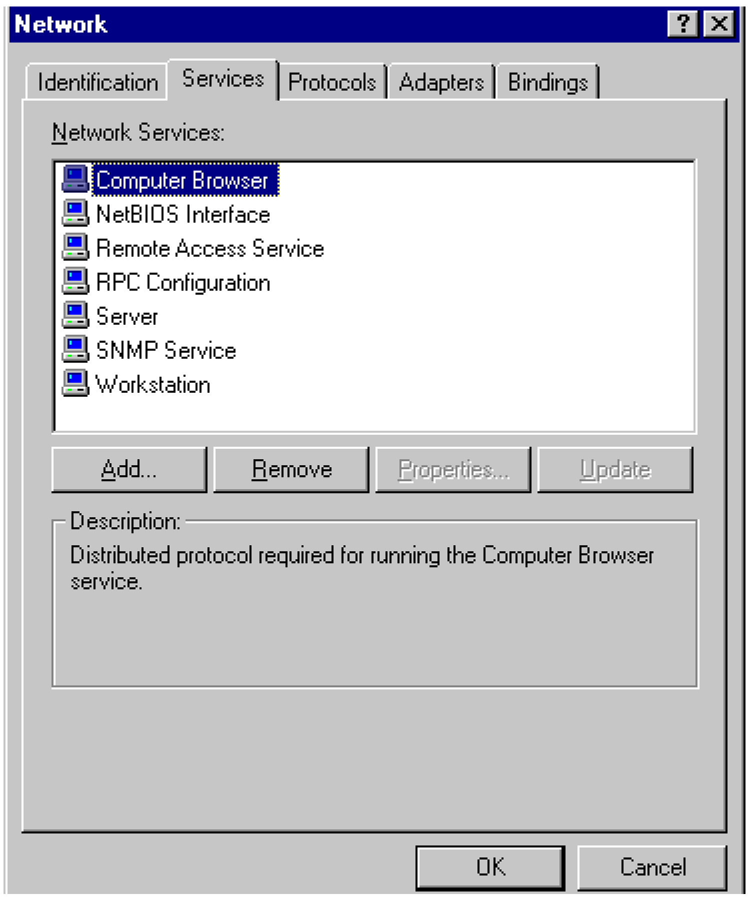


Figure 1-19: Network Dialog Box, Services Tab

Procedure

If the **Network Services** list does not include SNMP Services, click the **Add** button to install SNMP services.

The Select Network Service dialog box appears, which includes a list of available network services. From the Network Service list, select **SNMP Service**, then click the **OK** button.

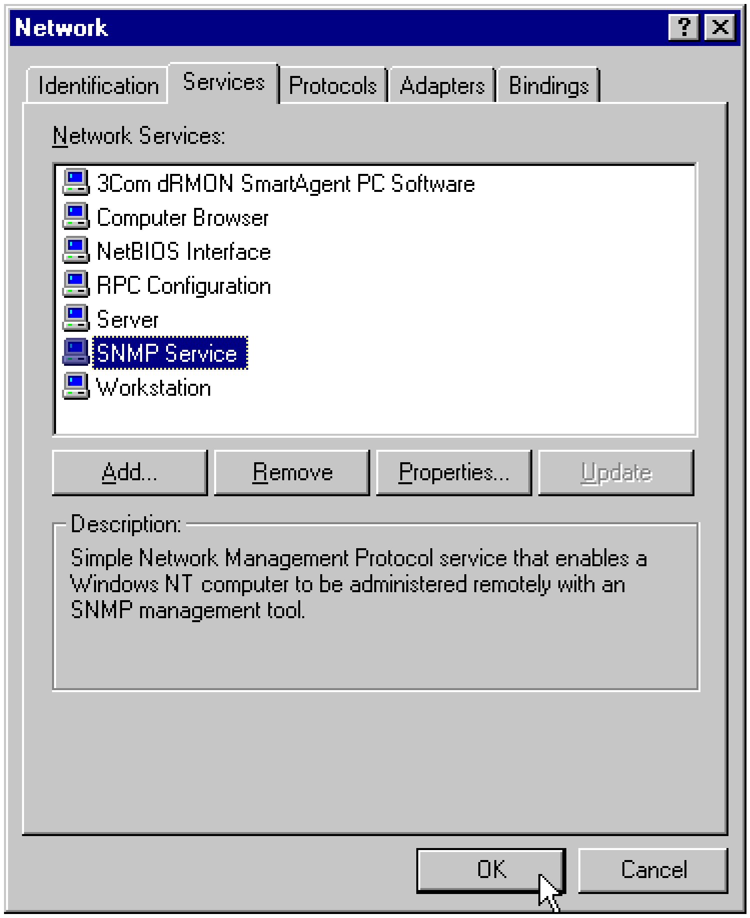


Figure 1-20: Select Network Service Dialog Box

The Windows NT® Setup dialog box displays. You can enter a path or just click **Continue** button to accept the default path.

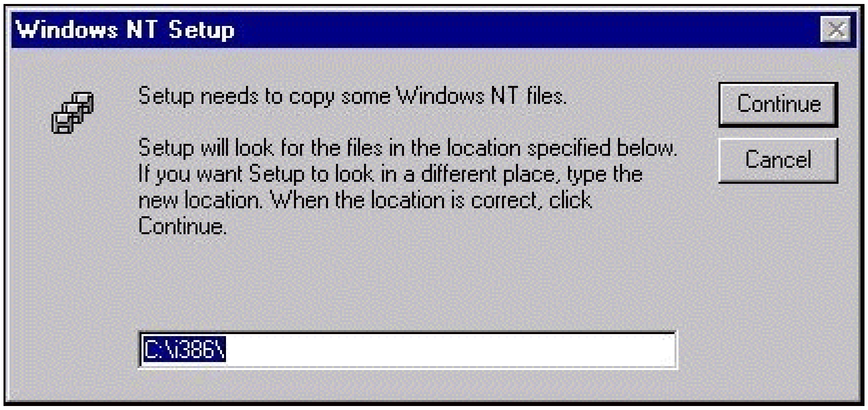


Figure 1-21: Windows NT Setup Dialog Box

The Microsoft® SNMP Properties dialog box appears, with the Agent tab on top.

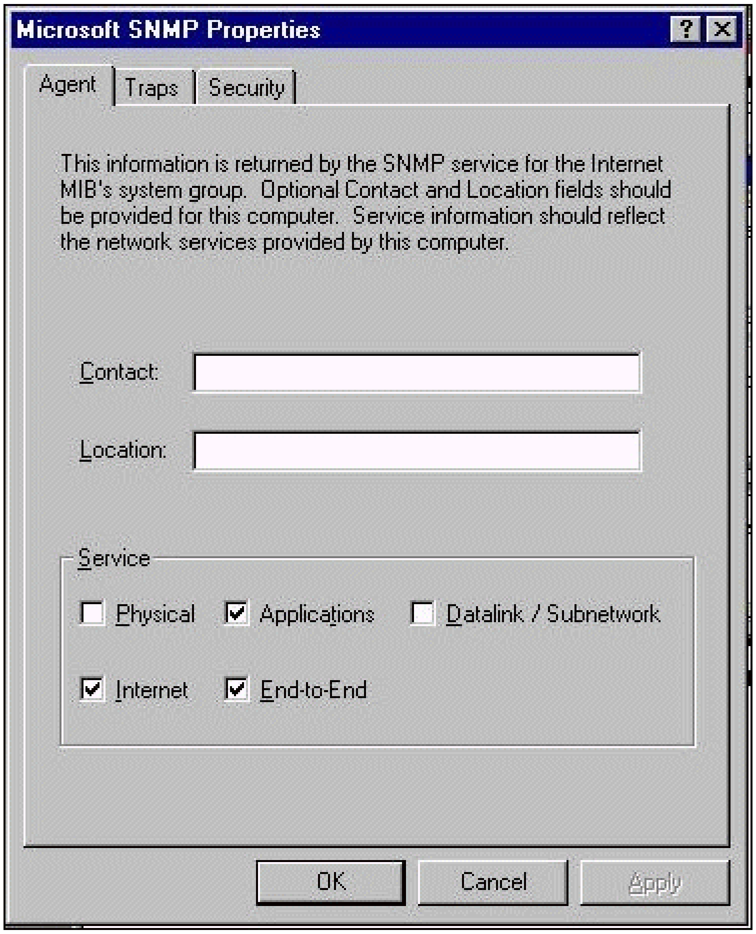


Figure 1-22: SNMP Properties Dialog Box, Agent Tab

Both the **Contact** and **Location** boxes can be left blank. In the **Service** group, select the **Applications**, **Internet**, and **End-to-End** check boxes, then click the **OK** button. After the Network dialog box reappears, click the **Close** button.

A message displays prompting you to reboot your computer so that the settings will take effect. Click the **Yes** button to reboot immediately.

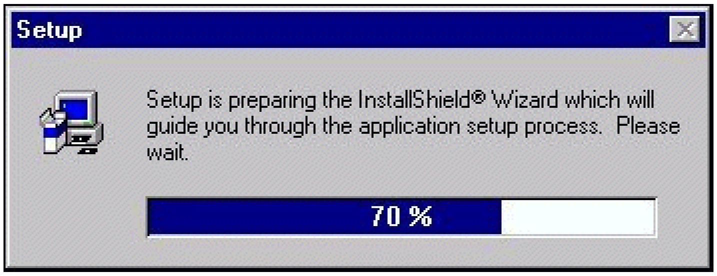


Figure 1-23: RAS/SNMP Services Setup message

A Setup message status message displays, showing the progress as the services are set up. When your computer finishes rebooting, RAS and SNMP Services installation is complete.

Chapter 5
Add Dial-Up Networking

Introduction

This chapter describes how to add dial-up networking for a serial connection. Dial-up networking provides a simple method for setting up connections in Microsoft® Windows NT®.

Procedure

On the taskbar, click the **Start** button (usually located at the lower left corner of your PC screen). Point to **Programs**, then select **Accessories**, then **Dial-Up Networking**.

If dial-up networking is already set up for one or more connections, the Dial-Up Networking dialog box will appear. If the phonebook is empty or if this is the first time opening this utility, a Dial-Up Networking message displays indicating that the phonebook is empty.

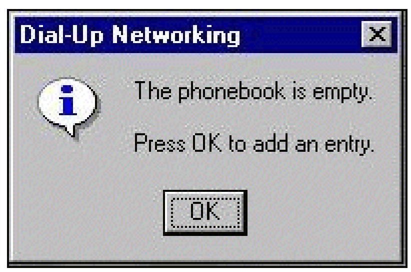


Figure 1-24: Dial-Up Networking Dialog Box

If the Dial-Up Networking dialog box is displayed, click the **New** button. If the “empty phonebook” message is displayed, click the **OK** button.

If your system does not have entries, Dial-Up Networking automatically opens the New Network Phonebook Entry Wizard dialog box; however, you should use the single-screen method instead of the Wizard.

Click the **I know all about phonebook entries...** check box; after this option is selected, the Wizard will not appear when making subsequent entries.

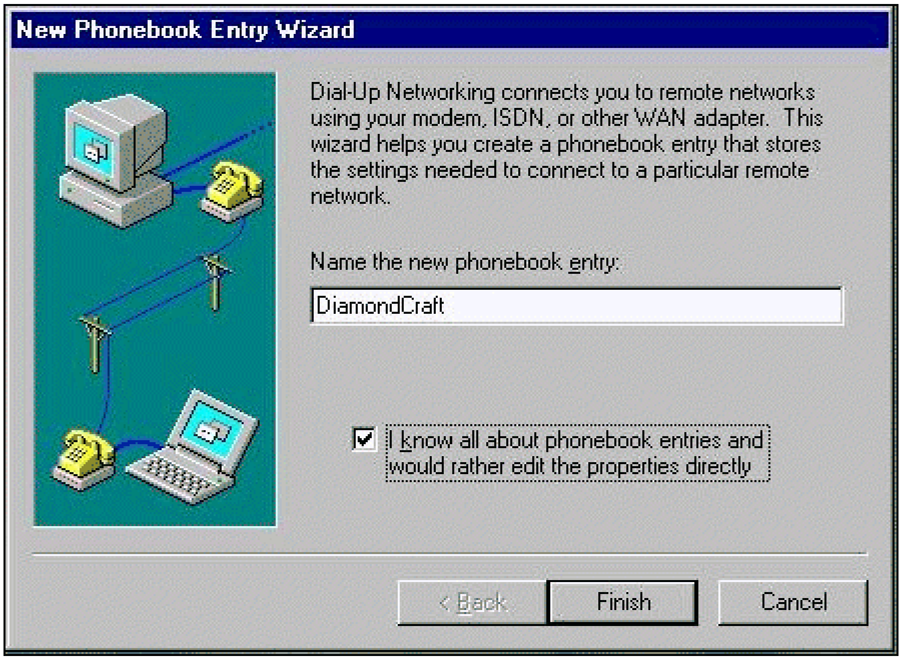


Figure 1-25: New Phonebook Entry Wizard Dialog Box

The New Phonebook Entry dialog box will appear, with the Basic tab page on top. In the E**ntry name** box, enter *DiamondCraft*.

> **Note:** Craft Terminal was known as DiamondCraft in D50 Release 4.0 and earlier. Although the product name has been changed to Craft Terminal, you must enter DiamondCraft in the Entry name box.

From the **Dial Using** list, select Dial-Up Networking Serial Cable between 2 PCs (COM1), then click the **Configure** button.

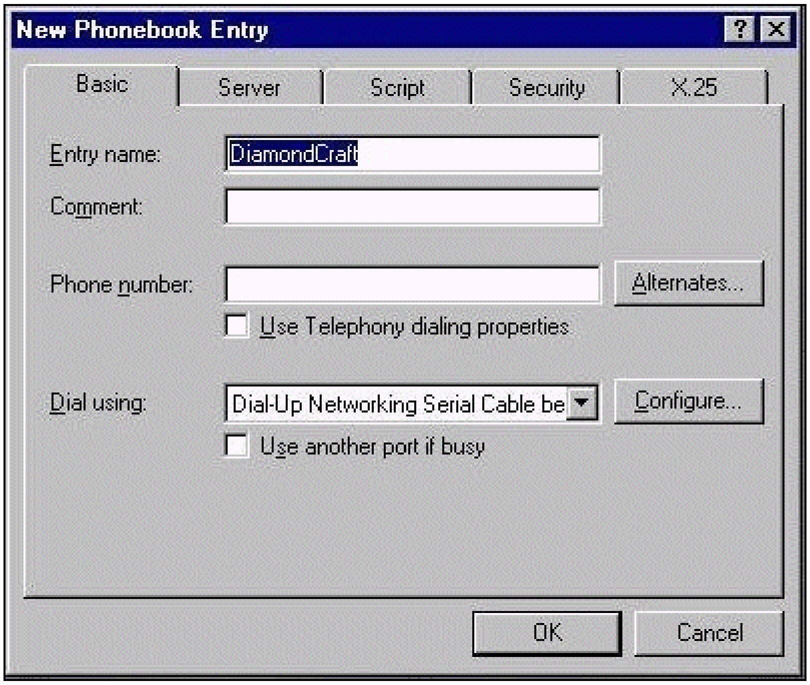


Figure 1-26: New Phonebook Entry Dialog Box, Basic Tab

The Modem Configuration dialog box appears. In the **Initial speed** list, select 38400. In the **Hardware Features** group, make sure that all options are disabled (as in the following example), then click the **OK** button.

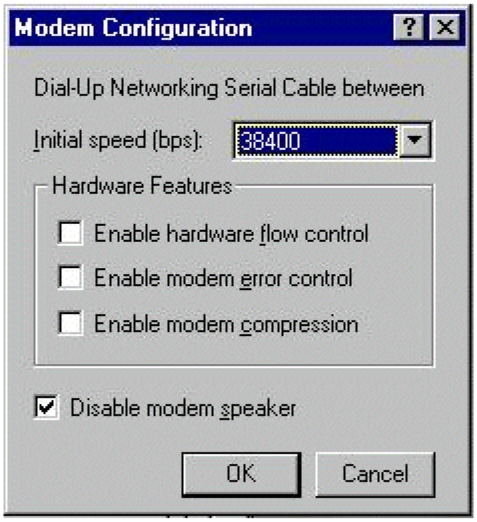


Figure 1-27: Modem Configuration Dialog Box

Click the Server tab to display the following tab page. In the **Dial-up server type** list, select PPP: Windows NT, Windows 95 Plus, Internet. In the **Network protocols** group, select TCP/IP and disable all the following options:

- IPX/SPX compatible.
- NetBEUI.
- Enable software compression.
- Enable PPP LCP extensions.

Click the **TCP/IP Settings** button.

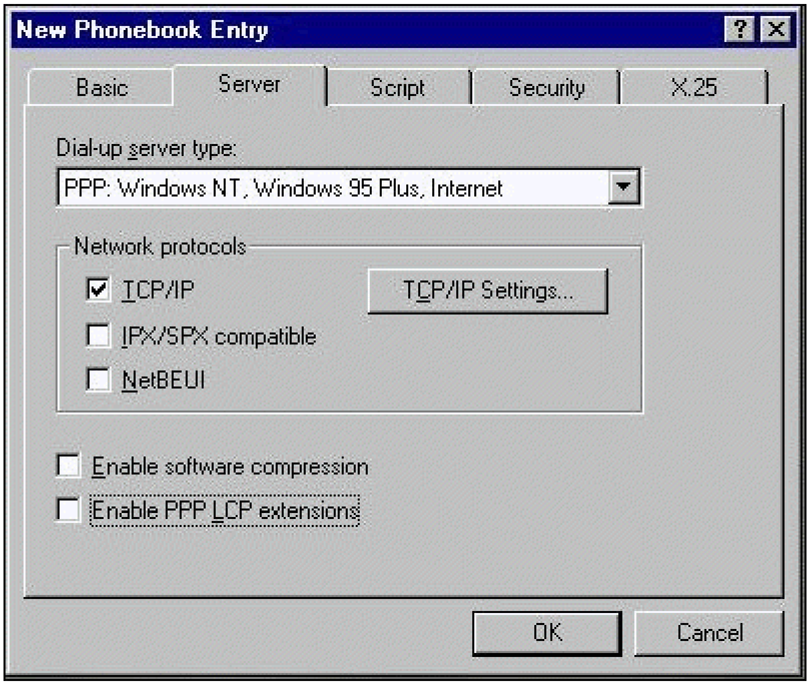


Figure 1-28: New Phonebook Entry Dialog Box, Server Tab

The PPP TCP/IP Settings dialog box appears. Enable the following options:

- Server assigned IP address.
- Server assigned name server addresses.
- Use IP header compression.

Make sure the Use default gateway on remote network option is disabled, then click the **OK** button.

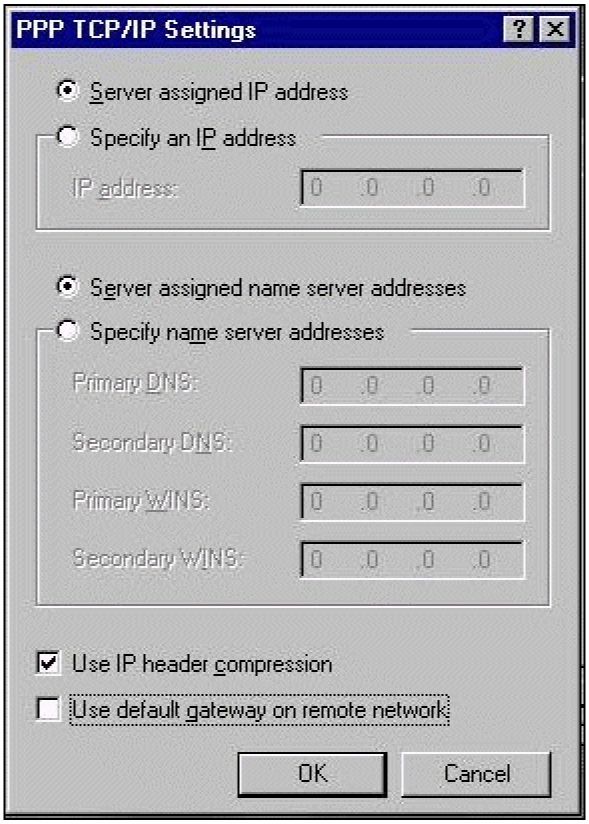


Figure 1-29: PPP TCP/IP Settings Dialog Box

Click the Security tab to display the following tab page. In the **Authentication and encryption policy** group, select the Accept any authentication... option, then click the **OK** button.

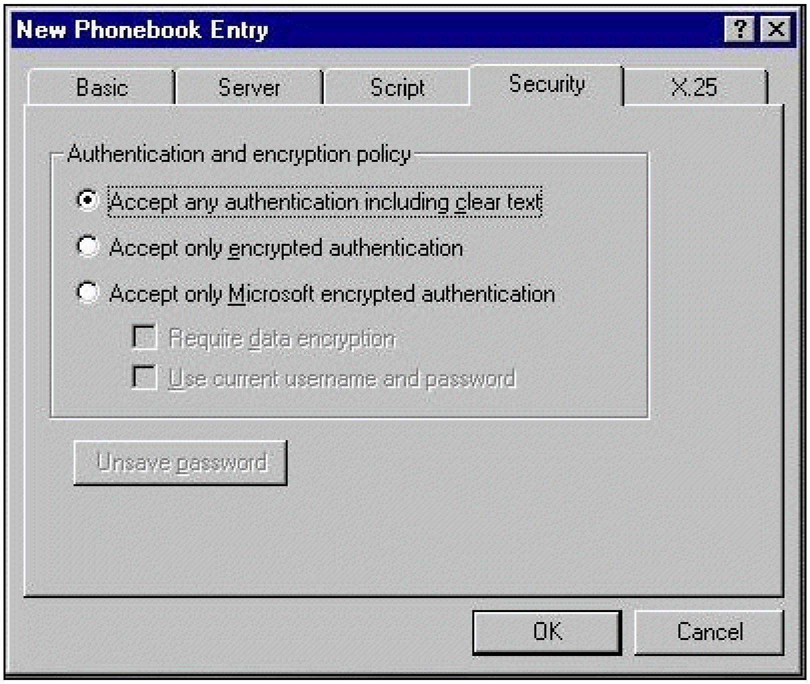


Figure 1-30: New Phonebook Entry Dialog Box, Security Tab

When the Dial-Up Networking dialog box appears, click the **Close** button.

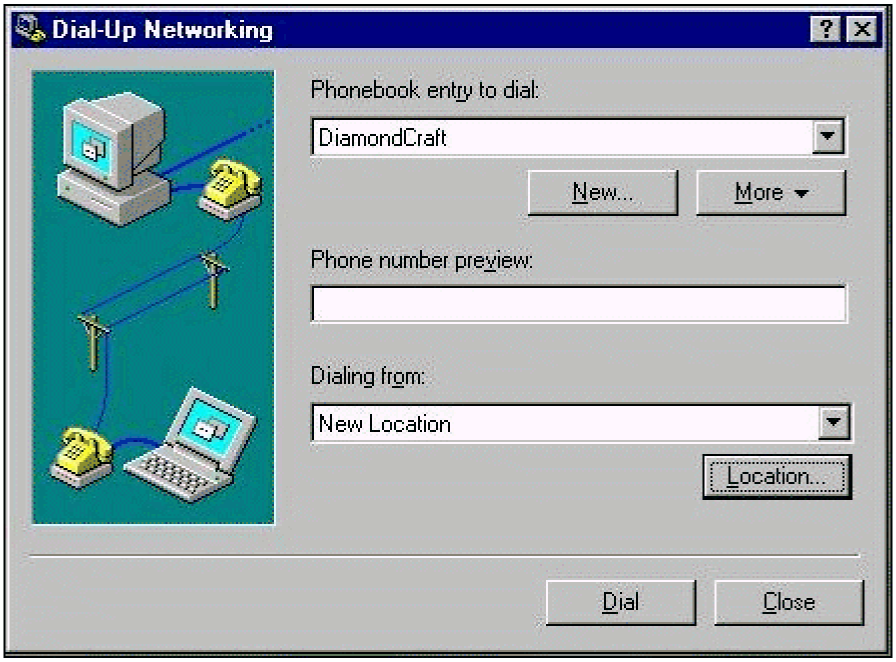


Figure 1-31: Dial-Up Networking Dialog Box, Confirmation View

The setup for Dial-Up networking is complete.

Chapter 6
Installing/Removing Craft Terminal Software

Introduction

Craft Terminal is a standard Microsoft® Windows® application. Use the procedures in this chapter to install Craft Terminal software on a PC (desktop, laptop or notebook), and to remove the software if necessary.

As for any installation, ensure that there are no software applications running before beginning the installation process.

Installing Craft Terminal Software

Insert the installation CD into the CD drive.

On the taskbar, click the **Start** button (usually located at the lower left corner of your PC screen). From the Start menu, select Run. The Run dialog box appears.

Type path name for the Craft Terminal Setup.exe file (as shown in the following example), then click the **OK** button.

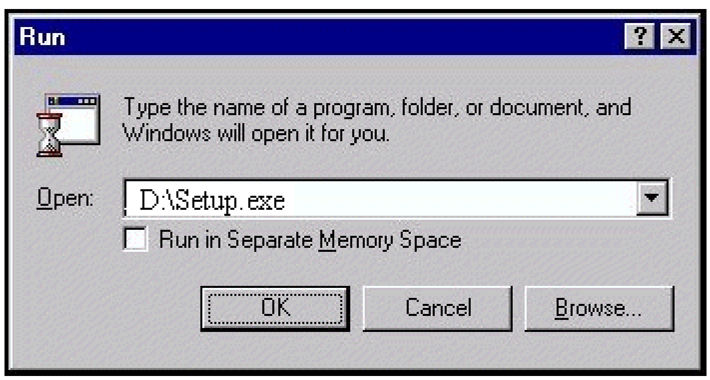


Figure 1-32: Run (Application) Dialog Box

The **Setup** dialog box appears, providing instructions for completing the setup process. If installation fails before completion, start the installation process over from the beginning.

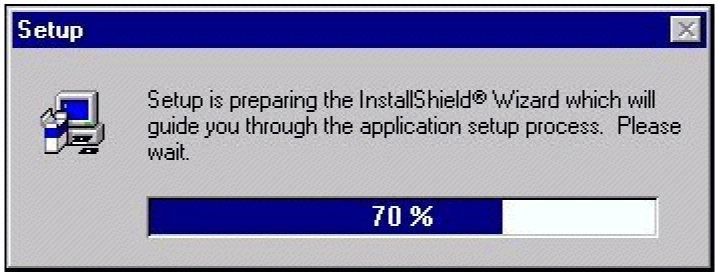


Figure 1-33: Setup Dialog Box

A Setup status message displays the progress as Craft Terminal is installed on your machine, then a message displays indicating that setup is complete.

Craft Terminal software is now installed to the specified drive. The installation automatically adds Craft Terminal to the Windows programs list. To start Craft Terminal, click the **Start** button on the taskbar, select **Programs**, then select Craft Terminal.

You can also install the Craft Terminal program icon on your desktop. Use the following procedure.

1. Open Windows NT Explorer and navigate to the Craft Terminal folder.
2. Click on the *Craft Terminal.exe* file, hold down the left mouse button, and drag the file to the Windows desktop.

   Windows creates a shortcut icon for Craft Terminal. You can now start Craft Terminal by double-clicking the Shortcut to Craft Terminal icon.

Figure 1-34: Craft Terminal Icon

Note: You must reinstall any Windows NT service packs that were installed at the time Craft Terminal was installed. For details, see your Windows documentation. For troubleshooting tips, see the volume titled Commissioning.

Removing Craft Terminal Software

To remove the Craft Terminal software from a PC, use the Add/Remove Programs control panel.

On the taskbar, click the **Start** button (usually located at the lower left corner of your PC screen). Point to **Settings,** click **Control Panel**, and double-click the **Add/Remove Programs** icon.

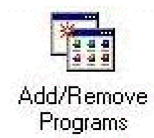


Figure 1-35: Add/Remove Programs Icon

In the list of installed software, select Craft Terminal and click the **Add/Remove** button. From this point, Windows provides online instructions for removing the application.

Serial Port Connection

The D50 Master Control Shelf (MCS) includes a serial port connection (J2) located on the left side of the MCS. This port corresponds to the Network Management Processor (NMP) slot in the MCS. For details on how to connect Craft Terminal to the D50 system through a serial port, see the volume titled Commissioning.

SECTION 2 CRAFT TERMINAL USER INTERFACE

Contents

List of Figures

List of Tables

Chapter 1
General Description of the User Interface

Introduction

Craft Terminal provides a standard Windows Graphical User Interface (GUI) and Simple Network Management Protocol (SNMP) to provide the user with an interface to the D50.

User Interface Object Naming Convention

The following table provides you with the ability to map the Craft Terminal user interface object names to the D50 equipment names.

Table 2-1: D50 Equipment/Object Naming Conventions

D50 Equipment Names	User Interface Names
MCS - Master Control Shelf	MCS
LCS - Line Card Shelf	LCS
RLCS - Remote Line Card Shelf	LCS
D50 RAM - Remote Access Module	LCS
NMP - Network Management Processor	NMP
MCP - Master Control Processor	MCP
DS3 Trunk Card	DS3T
DS3T2 Trunk Card	DS3T2
DS3TQ Trunk Card	DS3TQ
OC3 Trunk Card	OC3T
OC3T2 Trunk Card	OC3T2
OC3T2M Trunk Card	OC3T2
OC3T2L Trunk Card	OC3T2
OC3TQ Trunk Card	OC3TQ
MLA - Master Line Card Adapter	MLA
MLA2 - Master Line Card Adapter	MLA2

Table 2-1: D50 Equipment/Object Naming Conventions (continued)

D50 Equipment Names	User Interface Names
MLA2S - Master Line Card Adapter	MLA2
MLA2L - Master Line Card Adapter	MLA2
MLAT3 - Master Line Card Adapter	MLAT3
MLAT1 - Master Line Card Adapter	MLAT1
OC3L - Broadband Tributary Card	OC3L
DS3L - Broadband Tributary Card	DS3L
LSM - Line Card Shelf Multiplexer	LSM
LSM2 - Line Card Shelf Multiplexer	LSM2
LSMT3 - Line Card Shelf Multiplexer	LSMT3
LSMT1 - Line Card Shelf Multiplexer	LSMT1
CAP4 Line Card	CAP4
DMT4 Line Card	DMT4
DMT4F Line Card	DMT4F
DMT8-2 Line Card	DMT8
SDSL8 Line Card	SDSL
SDSL8+ Line Card	SDSL8+
IDSL8 Line Card	IDSL

Objects in the Craft Terminal GUI

The Craft Terminal GUI consists of various objects that represent the D50's physical components on the screen. Each component is represented as an object in the D50 GUI. For example, the Master Control Shelf (MCS), Line Card Shelf (LCS), and individual cards. The objects in the GUI look like the physical components of a D50 system; for example, the Rack object looks like the physical rack, with an MCS and twelve LCSs.

The following types of objects are included in the Craft Terminal user interface.

D50 Node. Allows you to work with an entire D50 system and its support data. For example, the name of the node and the save function. In the interface, the node looks similar to the physical D50, showing an MCS and LCSs mounted in a rack.

Shelf. Allows you to work with basic configuration and status information for the MCS or an LCS. In the interface, a shelf looks like a physical shelf, showing all the card slots and representations of the cards provisioned in the shelf.

Card. Allows you to work with configuration and status information for the card. The card interfaces consist of sets of tab pages, and include address information at the top of the display.

Ports. Allows you to work with configuration, status, and performance monitoring information for individual ports. Port data is separate from card data. The port interfaces consist of sets of tab pages.

Connection. Allows you to work with status and configuration information for a virtual connection setup between a line card and the trunk protection group. The connection interface includes sets of tab pages as well as dialog boxes.

Link. Allows you to work with status and configuration information for the Link A and Link Z that make up a connection. Link A is always on a line card and Link Z is always on a trunk card. The link interface consists of a set of dialog boxes.

You can also display the following optional items:

- **Toolbar.** Located directly below the menu bar, provides quick access to commonly used system functions.
- **Status bar.** Located at the bottom of the window, displays system status messages.
- **Error bar.** Located above the Status bar, displays system error messages.

Craft Terminal provides some control over the components that display in the Craft Terminal window, and the appearance of those components. You can perform the following actions to change the appearance of the Craft Terminal window:

- Hide or display the toolbar, status bar, and error bar by making selections on the View menu.
- Hide or display a D50 rack, MCS, or any of the LCSs by making selections on the View menu.
- Size the window by clicking with the left mouse button on the edges of the window and dragging the edges of the object.
- Size any object views to accommodate the size of your screen, just as you would size the window.
- Move equipment locator group objects to different locations in the Craft Terminal window, by clicking on them with the left mouse button and dragging them with the mouse button held down; release the mouse button to “drop” the object in its new position.

The following example shows the Craft Terminal user interface with the various components labeled.

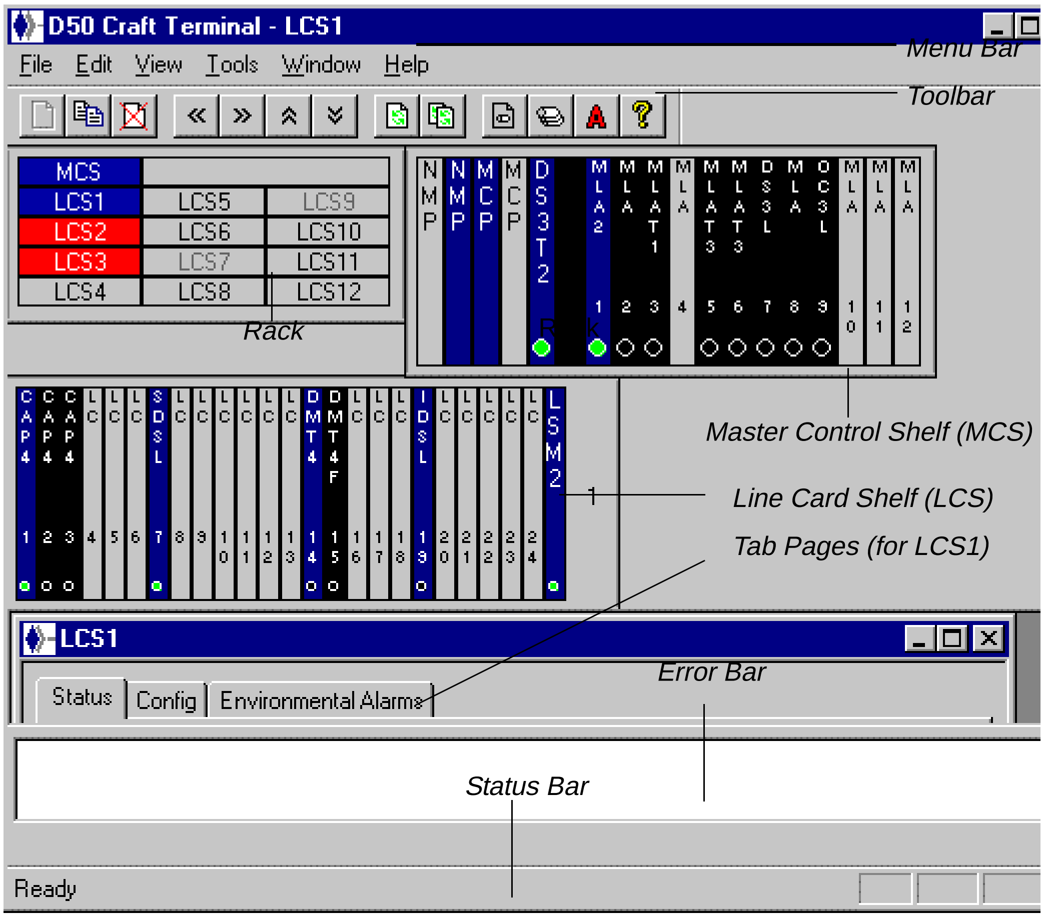


Figure 2-1: Craft Terminal User Interface

Displaying Equipment Locator Groups

To display the equipment locator groups for the D50 rack, the MCS, and the LCSs, select the object you want to view from the View menu, as shown in the following example.

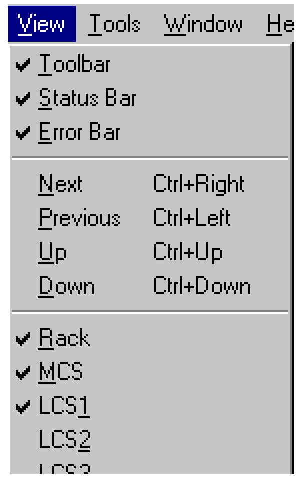


Figure 2-2: View Menu

Objects with checks next to them are selected for display.

An Example D50 System

When you view a D50 using Craft Terminal, you won't always see the same set of objects displayed in the same way. What objects you do see depends on several factors:

- The individual D50 you are viewing; how many shelves are provisioned, how the slots in the shelves are provisioned, and the state of the individual cards (for example, whether they are alarmed or not).
- What objects were displayed the last time the D50 was viewed. When you exit from Craft Terminal, it saves the last view for that specific D50. The same objects are presented the next time you view the same D50 system. The View menu allows you to specify which objects are displayed.

The following example shows a typical view of a D50 system.

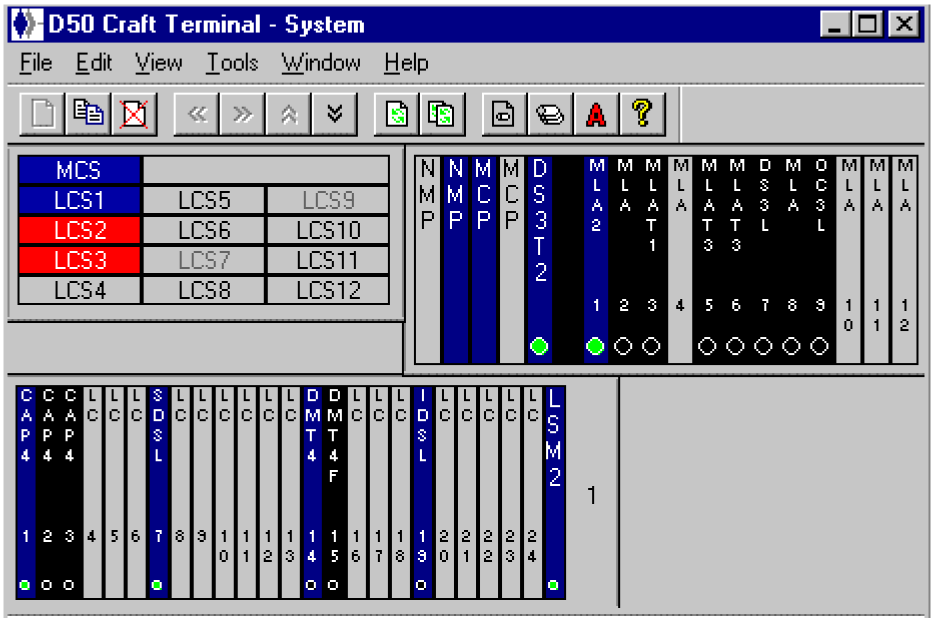


Figure 2-3: Sample D50 Display in Craft Terminal

The example system shows the rack at upper left, the MCS at upper right, and an LCS below. System components that are unprovisioned are shown in gray. Note that this example does not show the error or status bars, or any detailed sets of tab pages for the shelves, cards, or ports.

The rack for this system contains three provisioned LCSs: LCS1, LCS2, and LCS3. The rest of the LCSs are not provisioned.

The MCS is provisioned for the following cards:

- One NMP (Network Management Processor) card.
- One MCP (Master Control Processor) card out of the two possible in the 1:1 protection group (the card shown in gray is disabled and inoperable).
- One trunk card, which provides connection to the ATM backbone.
- Several MLA (Master Line Card Adapter) cards, each providing a broadband interface between the MCS and one LCS. The different types of MLA cards provide interfaces for different signals.
- Broadband tributary cards (OC3L and DS3L), each providing a broadband interface to standard ATM network equipment.

The MCS shown still has slots available for several more MLA-type cards.

The LCS is provisioned for the following cards:

- An assortment of CAP, DMT, IDSL, and SDSL line cards, providing various types of DSL (Digital Subscriber Line) facilities for the D50.
- An LSM (Line Card Shelf Multiplexer) card. The LSM-type cards provide a broadband interface between the LCS and the MCS. The LSM2 card in the example system shown communicates with an MLA2 card in the MCS using an OC3 interface. This means that LCS1 must be connected to the MLA2 card in first MLA slot of the MCS.

Displaying Tab Pages

Detail information for the system is displayed and modified using sets of tab pages. The following objects in the Craft Terminal interface display sets of tab pages:

- Each shelf in the rack.
- Each card in a shelf (MCS or LCS).
- Each port on a card.

To display the set of tab pages for a shelf, click that shelf (the MCS or any of the LCSs) in the rack object with the left mouse button.

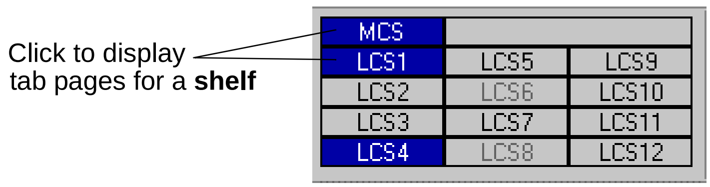


Figure 2-4: Rack Object

To display the set of tab pages for a *card*, click that card in the shelf object (either the MCS or one of the LCSs) with the left mouse button.

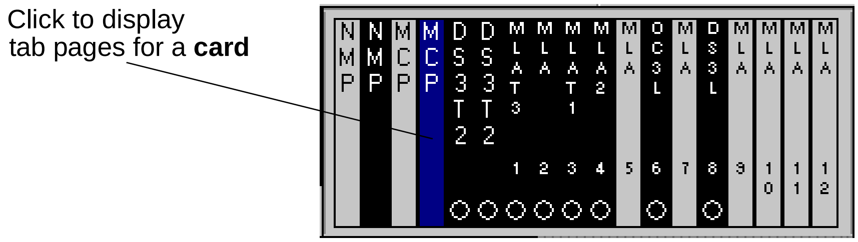


Figure 2-5: MCS Object

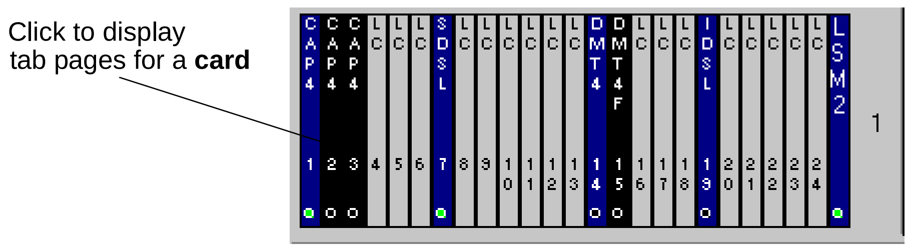


Figure 2-6: LCS Object

Note: Before you can display the set of tab pages for an object, the rack or shelf containing that object must be displayed by selecting it on the View menu.

For information on the tab pages for each card, see the chapter on that card; for example, for information on the tab pages for the MCP card, see the MCP chapter.

Port detail information is accessed by clicking the port indicator on a card. Click the port indicator on a line card to display a bar that contains the individual ports—the number of ports depends on the type of line card. If a card has only one port, click on the single port indicator to open the port object view; this applies only to some of the cards on the MCS. All line cards have multiple ports.

The following example shows the four ports of a DMT4 line card located in slot 14 of an LCS.

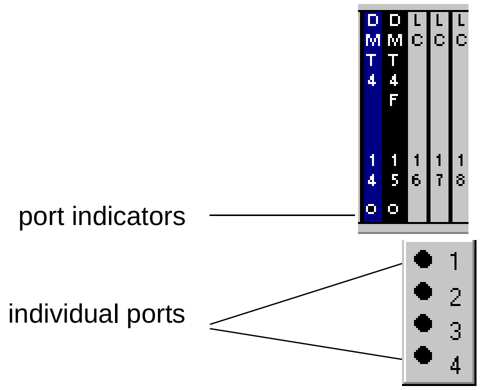


Figure 2-7: Port Indicator and Individual Ports

The color of each individual port indicates its status. Click any port to view and work with provisioning information for the port.

Information for the selected port is displayed as a set of tab pages. The number of tab pages, and the information included on them, depends on which card is being viewed. For details on the port tab pages for each type of card, see the chapter on that card type. For example, the tab pages for the DMT4 port are described in the DMT4 Card and Ports chapter.

Tab Page Controls

On each tab page, Craft Terminal displays both system data and controls that allow you to work with the system. Some of the data is read-only, which means that you cannot change it; it is strictly informational. Some of the data can be configured by the user. The following table summarizes display and control features found on the Craft Terminal tab pages.

Table 2-2: Tab Page Controls

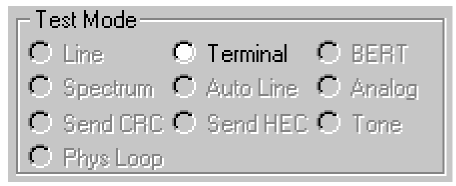
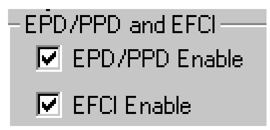
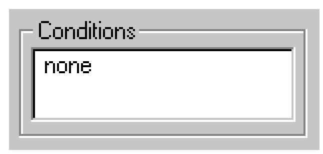
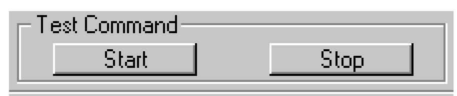
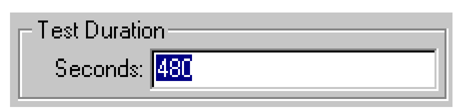
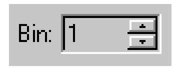
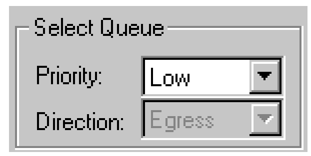
Name	Purpose	Example
Radio button	Select only one of several mutually **exclusive** options. Click to select/deselect.	
Check box	Select one or more **non-exclusive** options. Click to select/deselect.	
Non-scrolling list box	Display read-only information, for example condition messages.	
Command buttons	Perform an action, for example create a new card; display other controls such as dialog boxes. Click to perform the action.	
Edit box	Allow alphanumeric input. Click in the box to type new values.	

Table 2-2: Tab Page Controls (continued)

Name	Purpose	Example
Spin box	Scroll through a set of fixed values to select a value. Click the up or down buttons to scroll.	
Combo box	Select an option from a scrollable list. Click the down arrow to display the list and click an option to select it.	

Many of the tab page controls are displayed in functional groups with a descriptive titles; the radio buttons shown in the table of examples allow you to select various loopback testing modes, and so are contained in a group titled **Test Mode**.

Connection data is displayed by selecting **Show Connections** from the Tools menu and double-clicking a connection ID. A connection may also be displayed by selecting the Connection tab for a line card port and double-clicking a connection ID. A new connection can be created by selecting **New Connection** from the Tools menu, or by clicking the **New Connection** command button in the Connection dialog box. A line card must be configured before you can use it to create a connection. For details see Chapter 9—“Connection Dialog Boxes,” page 6-145.

Chapter 2
Menus, Toolbars, and Object Views

Introduction

This chapter describes the different commands and displays in Craft Terminal. This chapter includes the following categories of information:

- Menus and toolbars.
- All object views (shelves, trunk cards, line cards, and ports).
- How to use online help.

Menus and Toolbars

The Craft Terminal user interface includes a menu bar and a toolbar located near the top of the window. Menus are displayed by clicking the menu title with the left mouse button; you can then select options from the menu by clicking on them. The toolbar may be displayed or hidden by selecting Toolbar on the View menu.

Figure 2-8: Craft Terminal Menu Bar and Toolbar

An Error bar and Status bar are displayed at the bottom of the window; these features may also be displayed or hidden by selecting them on the View menu. The toolbar and the error bar can be moved anywhere in the Craft Terminal window by clicking on the bar with the left mouse button, then holding the button down and dragging the bar to a new location.

The following tables summarize the menu options available on each Craft Terminal menu.

Table 2-3: File Menu Commands and Functions

Command	Toolbar Icon	Keyboard Shortcut	Function
New	None	Ctrl + N	Planned for future release.
Open Again		Ctrl + O	Opens a new object view addressing the same object as the currently selected object view.
Close		None	Closes the currently selected object view.
Save	None	Ctrl + S	Saves the new settings to non-volatile memory.
Exit	None	None	Exits the application.

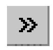
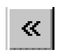
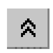
Table 2-4: Edit Menu Commands and Functions

Command	Toolbar Icon	Keyboard Shortcut	Function
Undo	None	Ctrl + Z	Planned for future release.
Cut	None	Ctrl + X	Planned for future release.
Copy	None	Ctrl + C	Planned for future release.
Paste	None	Ctrl + V	Planned for future release.

Table 2-5: View Menu Commands and Functions

Command	Toolbar Icon	Keyboard Shortcut	Function
Toolbar	None	None	Controls whether to display the toolbar or not.
Status Bar	None	None	Controls whether to display the status bar or not.

Table 2-5: View Menu Commands and Functions (continued)

Command	Toolbar Icon	Keyboard Shortcut	Function
Error Bar	None	None	Controls whether to display the error bar or not.
Next		Ctrl + Right arrow	View the next object. For example, the next line card (dialog box) in the line card shelf.
Previous		Ctrl + Left arrow	View the previous object. For example, the previous line card (dialog box) in the line card shelf.
Up		Ctrl + Up arrow	View the higher level component's (or object) dialog box.
Down		Ctrl + Down arrow	View the lower level component's (or object) dialog box.
Rack[1]	None		Displays the D50 Rack object view.
MCS	None		Displays the MCS object view.
LCS (1–12)	None		Displays the selected LCS object views. This option will be disabled if there is a broadband card (DS3L or OC3L) in the matching slot, since broadband cards cannot connect to LCSs.

[1] Right-clicking with the mouse pointer on the MCS or an LCS in the rack view displays the selected item.

Table 2-6: Tools Menu Commands and Functions

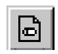
Command	Toolbar Icon	Function
Show Connections …		Displays all connections on this D50.
New Connection		Creates a new connection. The new connection defaults to the first LCS, card, and port.
Show Traffic Descriptors...	None	Show all reserved and user-defined traffic descriptors.
New Traffic Descriptors	None	Create a new traffic descriptor.
Active Alarms		Displays the Active Alarms dialog box.
Options…	None	Displays a window that lets you set the application timeout and polling intervals. It also provides the ability to set certain dialog display options.
Initialize System…	None	Initializes the D50. Use this command to set the system’s IP address, IP Mask and Gateway.
Edit Trap Destinations	None	Editor to add managed interface IP destinations to receive trap information.
Event Viewer	None	View traps (see *Edit Trap Destinations*).
Backup	None	Backs up the D50 current settings and values.
Restore	None	Restores the D50 from the settings and values stored in the last backup.

Table 2-7: Window Menu Commands and Functions

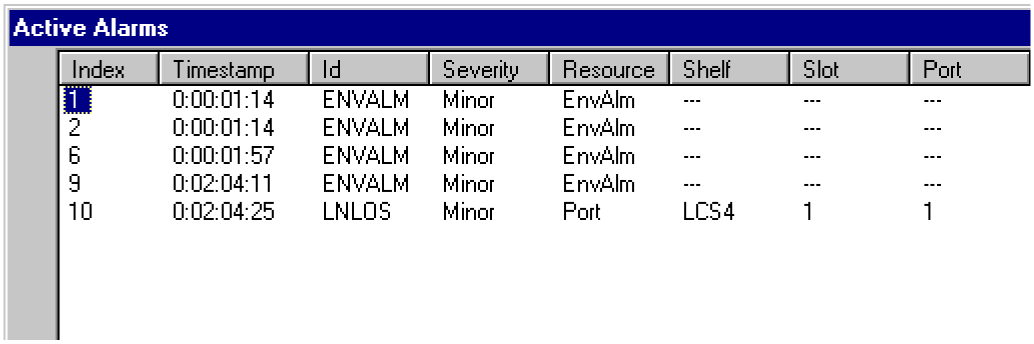
Command	Toolbar Icon	Function
Cascade	None	Makes a Windows cascade of the object views.
Tile	None	Puts all the object views on the screen at once, shrinking each of them to a uniform size.
Arrange Icons	None	Arranges all object view icons on the screen in a regular format.
Refresh		Refreshes the data in the active dialog box.
Refresh All		Requests an immediate “poll” for all of the currently visible objects. The data is refreshed in the active dialog boxes.
Close All	None	Closes all application windows.

Table 2-8: Help Menu Commands and Functions

Command	Toolbar Icon	Function
Help Topics	None	Displays the Craft Terminal help system.
About application…		Displays the version of Craft Terminal you are using.

Active Alarms List

The Active Alarms List allows you to view active alarms. Select Active Alarms from the Tools menu (or click the Active Alarm button on the toolbar) to display the following dialog box.



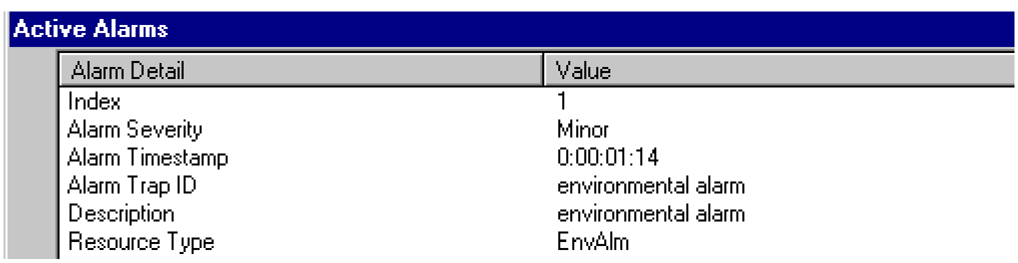
Index	Timestamp	Id	Severity	Resource	Shelf	Slot	Port
1	0:00:01:14	ENVALM	Minor	EnvAlm	---	---	---
2	0:00:01:14	ENVALM	Minor	EnvAlm	---	---	---
6	0:00:01:57	ENVALM	Minor	EnvAlm	---	---	---
9	0:02:04:11	ENVALM	Minor	EnvAlm	---	---	---
10	0:02:04:25	LNLOS	Minor	Port	LCS4	1	1

Figure 2-9: Active Alarms Dialog Box

The Active Alarms list includes the following information for each alarm:

- Index number for the alarm.
- Timestamp (when the alarm was reported).
- ID for the alarm type, for example Environmental Alarm.
- Severity of the alarm, for example Minor.
- Resource affected, for example Port.
- Address for the shelf reporting the alarm (if applicable).
- Address for the slot reporting the alarm (if applicable).
- Address for the port reporting the alarm (if applicable).

Select an alarm from the list and click the **Details** button (or double-click an alarm) to display the following details window. Click the **Refresh** button to manually refresh the list. Click the **Close** button to close the dialog box.



Alarm Detail	Value
Index	1
Alarm Severity	Minor
Alarm Timestamp	0:00:01:14
Alarm Trap ID	environmental alarm
Description	environmental alarm
Resource Type	EnvAlm

Figure 2-10: Active Alarms Detail

The Active Alarms detail dialog box displays information detail for the selected alarm. The information included in this dialog box is dependent on the type of alarm.

Click the **Show List** button to return to the list window. Click the **Refresh** button to manually refresh the alarm information. Click the **Close** button to close the dialog box.

Color Code for Graphical Elements

The graphical elements in the Craft Terminal user interface display in different colors, depending on their status. The colors used to indicate each status are described in the following table.

Table 2-9: Graphical Element Colors as Status Indicators

Color	Condition/status
Green	Enabled, operable
Red	Alarmed, inoperable[1]
Yellow	Alarmed[2]
Black	Disabled, inoperable (locked)
Gray	Not configured
Orange	Degraded
Dark blue	Configured, unlocked, no alarms
Light blue	Configured, unequipped

[1] For descriptions of alarm conditions, see the volume titled Maintenance and Testing, Section 1—*System Monitoring*, Chapter 2—“Conditions.”

[2] Yellow may be set as an option, instead of red.

Online Help

Windows-style online help is available for Craft Terminal by selecting **Help Topics** on the Help menu. The Contents tab page displays initially.

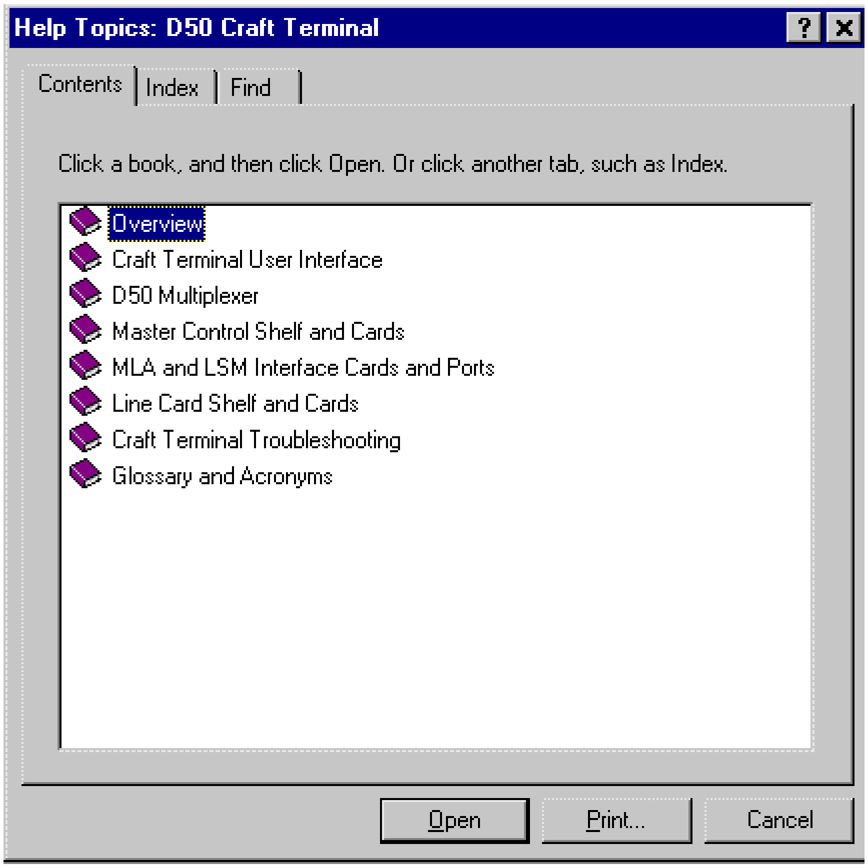


Figure 2-11: Craft Terminal Help Dialog Box, Contents Tab

The Contents tab includes all the chapters and topics in the Craft Terminal help system, arranged in a hierarchy like the chapters of the Craft Terminal documentation user guide. Click any chapter to display the topics within it.

Click the Index tab to display the following tab page.

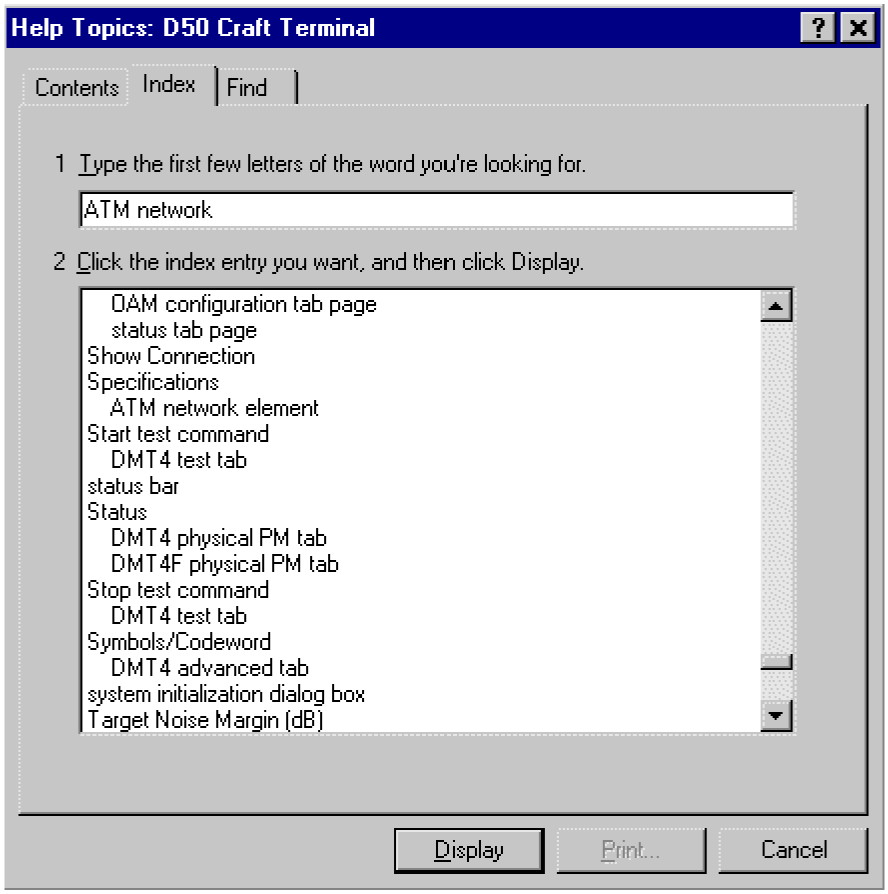


Figure 2-12: Craft Terminal Help Dialog Box, Index Tab

The Index tab includes all the indexed terms in the help system. Type a term to search for in the box at the top of the tab, and the system will scroll to that term in the list (or the nearest matching term). You can also scroll down the list to search for terms, then click the **Display** button to display the help topic for the selected term. You can also double-click a term to display the topic for it.

Click the Find tab to display the following dialog box.

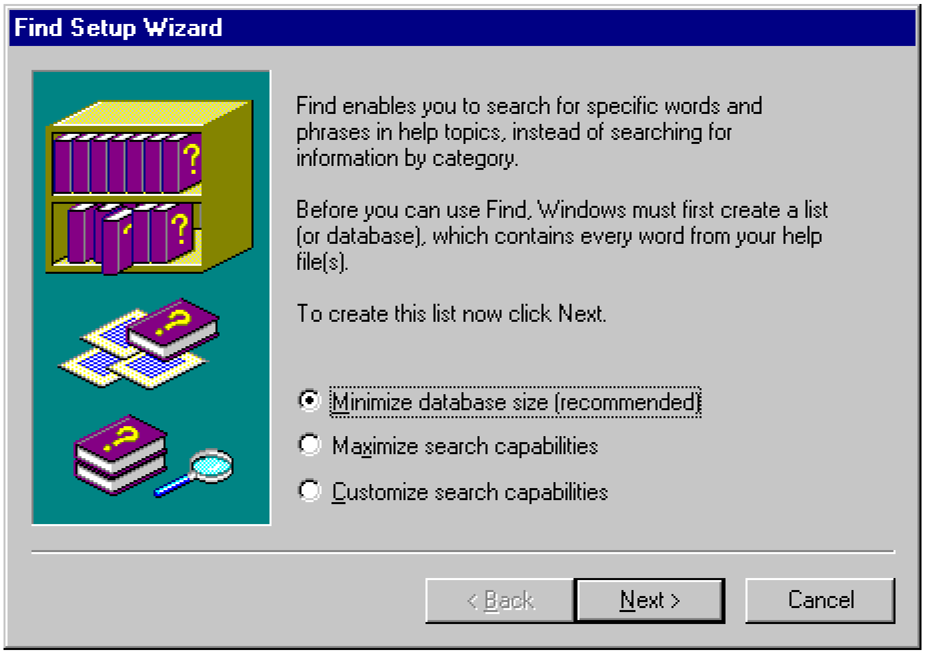


Figure 2-13: Find setup Wizard Dialog Box

The Find tab provides the capability to perform a full-text search of every word in the help system; first, however, it must build the database. This usually takes just a few moments. Select an option and click the **Next** button to continue.

Figure 2-14: Find Setup Wizard Dialog Box, Finish View

Click the **Finish** button to finish creating the database.

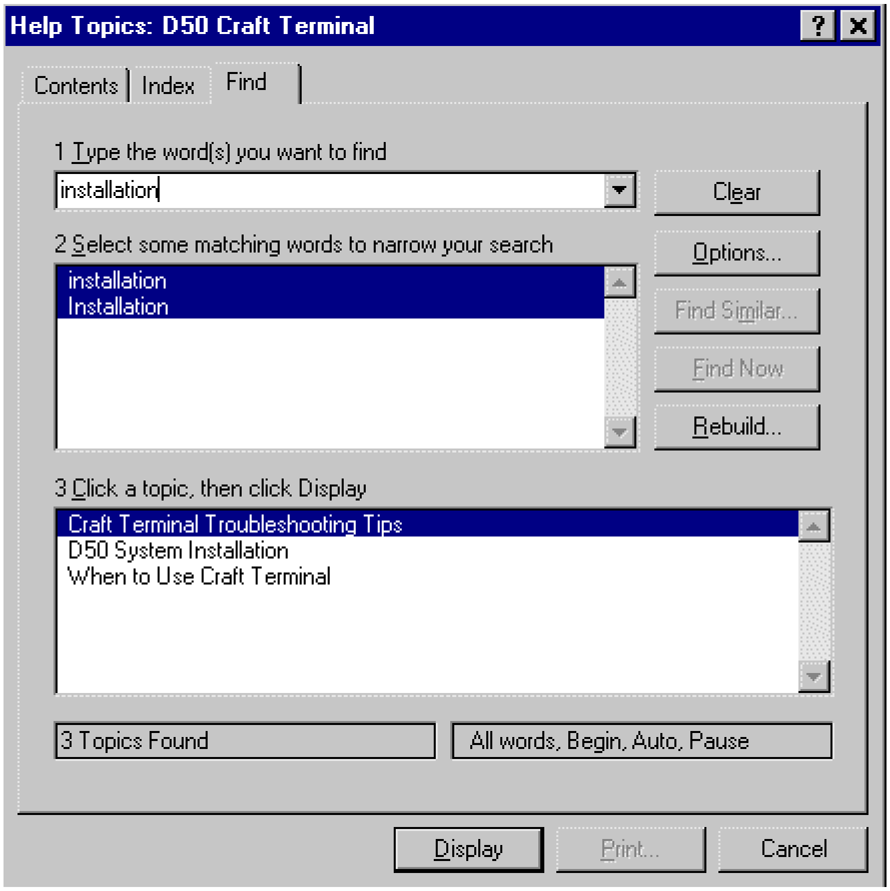


Figure 2-15: Craft Terminal Help Dialog Box, Find Tab

Type the term you want to find in the text box at the top of the tab. The list in the middle of the tab displays all matching terms, and the list at the bottom of the tab displays all the topics that contain the term. You can also scroll down the list to search for terms, then click the **Display** button to display the help topic for the selected term. You can also double-click a term to display the topic for it. Click the **Options** button to set various search options for the database.

SECTION 3 D50 MULTIPLEXER

Contents

List of Figures

List of Tables

Chapter 1
Network Element

Introduction

To display the tab pages for the D50 network element, click on the rack object anywhere except on a shelf.

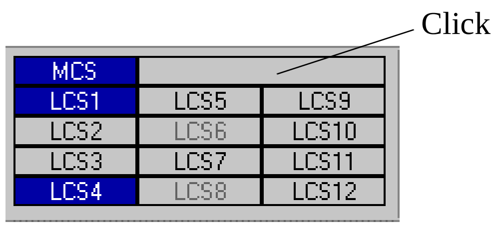


Figure 3-1: Display system tabs from the rack

Click on the rack to display the following set of tab pages.

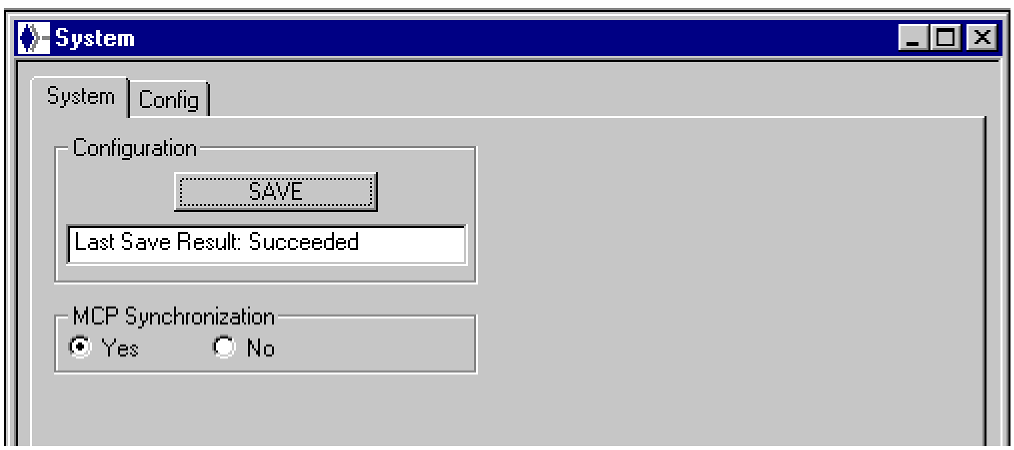


Figure 3-2: D50 System Tab Page

Note: The D50 accepts commands from Craft Terminal on a real-time basis. However, changes are **not** applied to the D50's non-volatile memory (the MIB) until you issue the save command.

The **Save** button allows you to save all transactions in the MIB in case the NMP or MCP cards fail, or in case of a power failure. Use the Save command periodically during your Craft Terminal session.

The D50 immediately accepts commands from Craft Terminal, but until the transaction is committed by issuing the Save command (by clicking the **Save** button or selecting **Save** from the File menu) these changes are not permanently saved to the multiplexer’s MIB.

> **Note:** Changes that have been saved to a D50’s MIB will be recoverable even if the system loses power, however settings that have not been saved to the MIB will be lost.

After you click the **Save** button, a confirmation dialog box displays. Click the **Yes** button to save the changes to the D50 system (to the MIB).

When you click the **Save** button, then click the **Yes** button in the confirmation dialog box, MIB changes are stored in permanent memory. If you exit without saving, you can still start Craft Terminal again and then save. However, if you exit without saving the changes, and the D50 loses power, changes made since the last save will be lost.

Click the Config tab to display the system Configuration tab page.

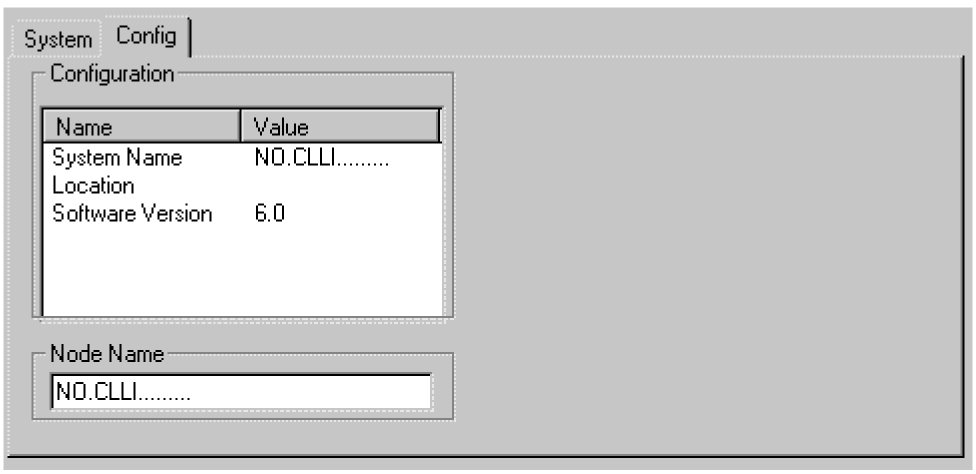


Figure 3-3: D50 Network Element, Configuration Tab Page

The Configuration tab page displays the name of the system, its location, and the release number for the D50 system software. This tab also displays the node name for the D50.

Initializing the System

To initialize the D50 system, select **Initialize System** from the **Tools** menu.

Figure 3-4: Tools Menu

The System Initialization dialog box will display, as shown in the following example.

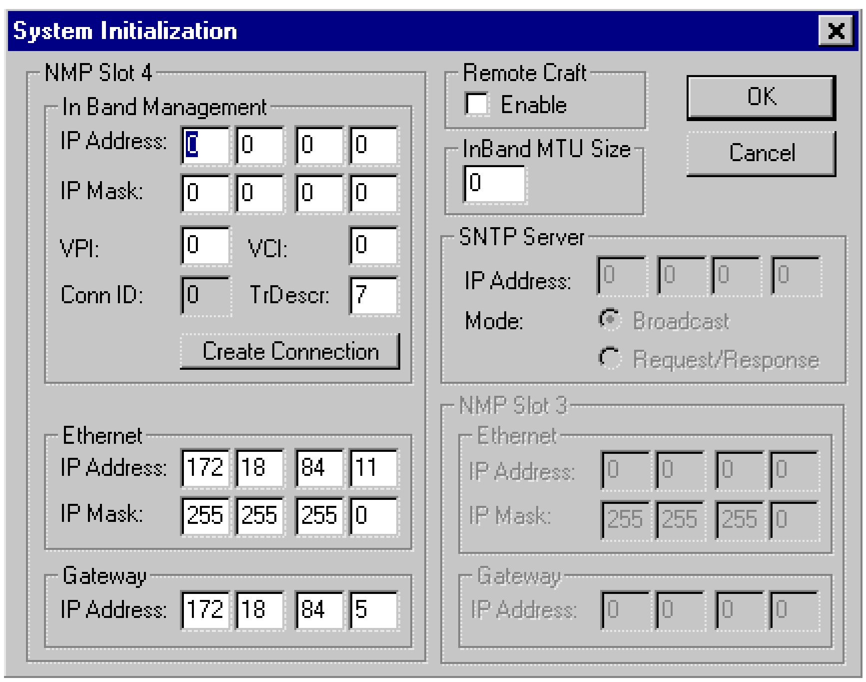


Figure 3-5: System Initialization Dialog Box

Using the System Initialization dialog box, you can set up network management in either of two ways:

- In-Band Network Management.
- Ethernet connection.

Either option may be used with either Craft Terminal or the Element Manager.

For details on how to connect Craft Terminal to a D50 system through a serial port, see the volume titled Commissioning.

When you initially start the system by double-clicking the Craft Terminal icon on your desktop, you must specify whether to connect using a serial cable or Ethernet connection. The Connection dialog box prompts you for the connection type.

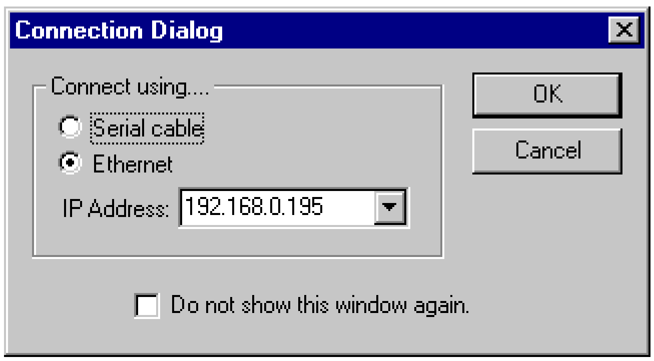


Figure 3-6: Connection Dialog Box

Use the radio buttons to select either serial cable or Ethernet connection, and select an IP address from the drop-down list. You can also enter a new IP address.

Whether you connect using a serial cable connection or an Ethernet connection, you use the System Initialization dialog box to set the In-Band Network Management parameters. Both methods are described in the following sections.

In-Band Network Management. In-Band Network Management provides a communications interface between either the Element Manager or Craft Terminal, and the D50 System. This interface is defined as “in-band” because the user communicates with the D50 System over a provisioned permanent virtual circuit (PVC) terminated at the trunk interface. Setup for In-Band Network Management requires entry of IP Address information, plus VPI/VCI information.

Enter the IP Address, IP Mask, VPI, VCI, and Traffic Descriptor (TrDesc) in the InBand Network Management section of the System Initialization dialog box. Click the **Create Conn** command button. A number will appear in the Connection ID box. Click **OK**.

> **Note: Traffic Descriptor (TrDesc).** Select a traffic descriptor type within bandwidth limits. The VPI/VCI bandwidth configuration does not exceed a maximum of 128 Kbps for D50 with DS3T2 or OC3T2 trunk cards. The VPI/VCI bandwidth configuration does not exceed a maximum of 512 Kbps for D50 with DS3TQ or OC3TQ trunk cards. For traffic descriptor defaults, see **Traffic Descriptors**, page 3-5.

Ethernet. To setup Network Management over an Ethernet 10BaseT connection, enter the IP Address, IP Mask, and Gateway IP Address for Ethernet and NMP Slot 4. Click the **OK** command button. Return to the **System** tab page of the **System** dialog box. Click the **Yes** option button in the **MCP Synchronization** dialog box and click the **SAVE** command button to permanently save the IP address information in the D50 Management Information Base (MIB).

> **Note:** The NMP slot 3 card is for a future release. IP Address, IP Mask and Gateway information are not required for slot 3 until the card is installed.
> The IP Address must be established via Craft Terminal so the Element Manager or Craft Terminal can communicate with the D50 over a TCP/IP data network. IP address information is provided by the local Network Administrator. Before you can set up the InBand Network Management connection, you must verify with your Network Administrator that the network router or switch has been provisioned as follows:
> – VPI/VCI information matches the In-band settings to be entered through Craft Terminal.
> – VPI/VCI bandwidth configuration does not exceed a maximum of 128 Kbps.

Remote Craft: Disabled by default. This interface allows Craft Terminal access from a Remote Access Module (D50 RAM). For details, see the volume titled Installation.

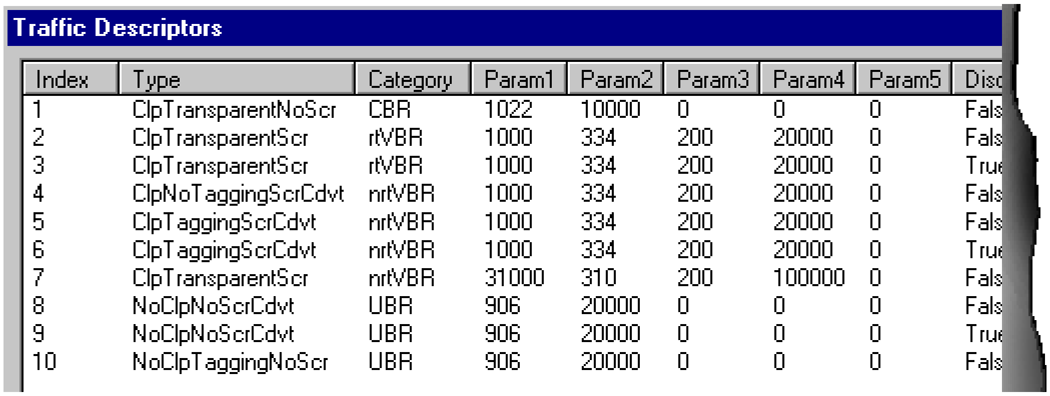
InBand MTU Size. The In-band Maximum Transmission Unit (MTU) allows the user to configure the in-band channel size. Do not modify this value unless instructed by your Network Administrator. Previous to Release 6.0, this value was fixed at 1500 bytes. The configurable range is from 68 to 1500 bytes.

SNTP Server. Unused.

NMP Slot 3. Unused.

Traffic Descriptors

Select **Show Traffic Descriptors** tool menu option to view or **New Traffic Descriptor** to create Asynchronous Transfer Mode Quality of Service (ATM QoS) traffic descriptors. ATM QoS enables network and service providers to provide service differentiation over the network and individual digital subscriber lines (DSL). For a detailed discussion on ATM QoS and inherent traffic descriptors, see the volume titled Provisioning, Section 1—*Provisioning Concepts*, Chapter 12—“ATM QoS Provisioning.”



Traffic Descriptors

Index	Type	Category	Param1	Param2	Param3	Param4	Param5	Disc
1	ClpTransparentNoScr	CBR	1022	10000	0	0	0	Fals
2	ClpTransparentScr	rtVBR	1000	334	200	20000	0	Fals
3	ClpTransparentScr	rtVBR	1000	334	200	20000	0	True
4	ClpNoTaggingScrCdvt	nrtVBR	1000	334	200	20000	0	Fals
5	ClpTaggingScrCdvt	nrtVBR	1000	334	200	20000	0	Fals
6	ClpTaggingScrCdvt	nrtVBR	1000	334	200	20000	0	True
7	ClpTransparentScr	nrtVBR	31000	310	200	100000	0	Fals
8	NoClpNoScrCdvt	UBR	906	20000	0	0	0	Fals
9	NoClpNoScrCdvt	UBR	906	20000	0	0	0	True
10	NoClpTaggingNoScr	UBR	906	20000	0	0	0	Fals

Figure 3-7: Show Traffic Descriptors

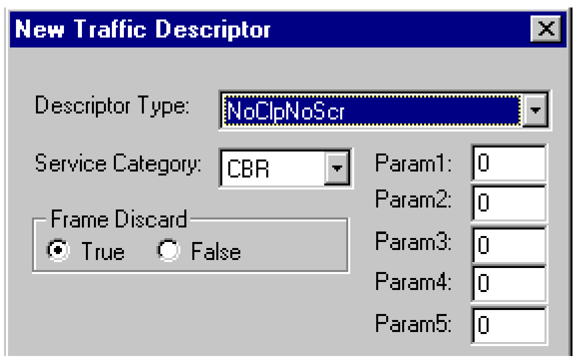


Figure 3-8: New Traffic Descriptor

Traffic descriptors use standard traffic management parameters (e.g., cell loss ratio, cell transfer delay, peak cell rate, etc.) to describe characteristics for ATM connections. These characteristics provide criteria, along with a category of service (e.g., constant bit rate, variable bit rate, unspecified bit rate, etc.), for negotiating and sustaining permanent virtual circuit (PVC) connections. For connection details, see Chapter 9—“Connection Dialog Boxes,” page 6-145.

The New Traffic Descriptor dialog box allows the user to view and set new traffic descriptor parameters.

- **Traffic Descriptor Type.** The traffic descriptor type indicates a specific set of connectivity characteristics based on standard traffic management contracts. Depending on the traffic type chosen, a distinct group of parameters display. The parameter group follows the standard traffic contract scheme. For details, see Table 3-1: Traffic Descriptor Types, page 3-7.
- **Service Category.** The traffic descriptor class of service.
- **Frame Discard.** Allow for frame discard (true or false). Frame discard is also known as Early Packet Discard (EPD).
- **Peak Cell Rate (PCR).** A traffic parameter in cells per second that characterizes the maximum source transmission rate. The fraction 1/PCR represents the time between two cells over a given virtual connection. PCR is assigned to all service categories. It can only be set at a speed lower than the port connection speed.
- **Sustainable Cell Rate (SCR).** An ATM traffic parameter in cells per second that characterizes a bursty source and specifies a maximum average rate at which cells can be sent over a given ATM virtual connection.
- **Maximum Burst Size (MBS).** A traffic parameter that specifies the maximum number of cells in a burst that can be transmitted at the peak rate assuming that, at the beginning of the burst, the receiving buffers are empty.
- **CDVT.** Cell Delay Variance Tolerance specifies the acceptable tolerance to cell-by-cell variations of the CDV (jitter). The CDVT is typically very low for CBR and VBR-rt connections, a bit higher for VBR-nrt connections and very high for UBR connections. This is provisionable for each virtual connection.

The following table presents traffic descriptor type (traffic contract) templates as a base for creating ATM QoS traffic descriptors. The ten pre-defined traffic descriptors shown in Figure 3-7: Show Traffic Descriptors, page 3-6 and Figure 3-8: New Traffic Descriptor, page 3-6 are based on these templates.

Table 3-1: Traffic Descriptor Types

QoS Service Category	Traffic Descriptor Type	Traffic Parameters	Description
CBR (Constant Bit Rate)	ClpTransparentNoScr (CBR.1)	Parameter 1: PCR (Peak Cell Rate) in cells/second for CLP (Cell Loss Priority)=0+1 traffic; Parameter 2: CDVT (Cell Delay Variance Tolerance) in tenths of microseconds. Parameters 3, 4 and 5 are not used.	Traffic conformance is based on the CLP-transparent model with no SCR (Sustainable Cell Rate). In a CLP-transparent model, the network disregards the CLP bit.

Table 3-1: Traffic Descriptor Types (continued)

QoS Service Category	Traffic Descriptor Type	Traffic Parameters	Description
VBR (Variable Bit Rate)	ClpTransparentScr (VBR.1)	Parameter 1: PCR in cells/second for CLP=0+1; Parameter 2: SCR CLP=0+1; Parameter 3: MBS (Maximum Burst Size) in cells; Parameter 4: CDVT in tenths of microseconds. Parameter 5: Not used	Traffic conformance is based on the CLP-transparent model with SCR. In a CLP-transparent model, the network disregards the CLP bit.
	ClpTaggingScrCdvt (VBR.2)	Parameter 1: PCR in cells/second for CLP=0+1; Parameter 2: SCR in cells/second for CLP=0 traffic; Parameter 3: MBS in cells; Parameter 4: CDVT in tenths of microseconds. Parameter 5 is not used.	Traffic conformance is based on CLP with SCR without tagging.
	ClpNo TaggingScrCdvt (VBR.3)	Parameter 1: PCR in cells/second for CLP=0+1; Parameter 2: SCR in cells/second for CLP=0 traffic, excess tagged[1] as CLP=1; Parameter 3: MBS in cells; Parameter 4: CDVT in tenths of microseconds. Parameter 5 is not used.	Traffic conformance is based on CLP with SCR.
UBR (Unspecified Bit Rate)	NoClpNoScrCdvt (UBR.1)	Parameter 1: PCR in cells/second for CLP=0+1; Parameter 2: CDVT in tenths of microseconds Parameters 3, 4 and 5 are not used.	Traffic conformance is based on no CLP and no SCR.
	NoClpTaggingNoScr (UBR.2)	Parameter 1: PCR in cells/second for CLP=0+1; Parameter 2: CDVT in tenths of microseconds. Parameters 3, 4 and 5 are not used.	Traffic conformance is based on no CLP with tagging and no SCR.

[1] Tagging is a process of setting the CLP bit of cells entering an ATM network to 1 because they do not conform to the subscribed traffic descriptor. These marked cells can be dropped based on the network congestion.

Setting System Options

You can configure the timeout period for requests to the D50. You can also configure the polling interval for refreshing open objects. The polling interval can be set to 0, which means that the window will not automatically refresh. The performance monitoring tabs, for example ATM PM, Queue Manager PM, and Physical PM, do **not** refresh automatically; these tabs all include a **Refresh** button which must be clicked to refresh the data manually. See the chapters on individual cards for more information on working with the performance monitoring tabs.

To set the Options, select **Options** from the Tools menu, enter the Timeout and Polling intervals, set the **Dialog display** options, then click the **OK** button.

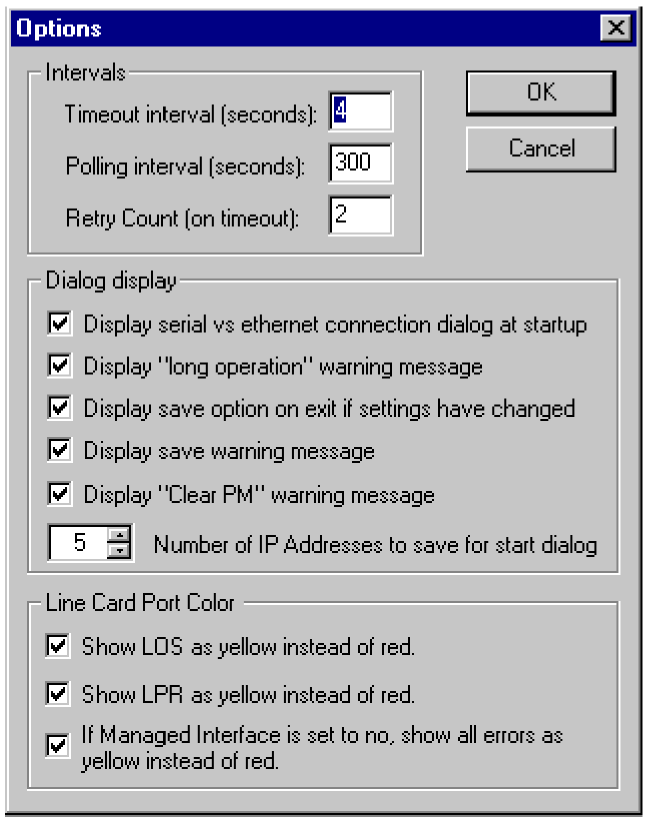


Figure 3-9: Options Dialog Box

The **Intervals** group allows you to specify timeout, polling intervals, and a retry count for the system. The polling interval can be overridden on individual tabs by clicking the **Refresh** command button to refresh the data manually. The default for timeout is 10 seconds. The default for polling is 5 minutes. The polling interval can be set to 0, which means that the data will **not** refresh automatically. The default for retry count is 2.

The **Dialog display** group allows you to select whether or not to automatically display certain dialog boxes and system messages. By default, all these options are enabled. This group also allows you to select the number of IP addresses to store in the list that displays in the Connection dialog box. Use the spin buttons to select any number between 1 and 50.

> **Note:** If you enter more than the specified number of IP addresses in the Connection dialog box, the system deletes existing addresses from the list (starting with the oldest) to make room for new addresses. The system does **not** issue a warning before deleting addresses from the list.

The **Line Card Port Color** group allows you to select options for displaying port conditions. By default all these options are enabled. The last option (**If Managed Interface is set to no . . .**) interacts with a set of option buttons, called the **Managed Interface** buttons, on each port's Status tab. The **Managed Interface** buttons allow you to specify whether or not to actively manage the port. If the managed interface option is enabled (the default), conditions on the port (for example, an LOF condition) are reported as alarms in the alarm list. If this option is not enabled, conditions on the port will not be reported.

If (in the Options dialog box) the **If Managed Interface is set to no . . .** option is enabled, **and** the managed interface option on an individual port is disabled, any conditions that are reported for that port will display yellow instead of red.

Introduction

Craft Terminal supports multiplexer-wide event reporting based on a trap mechanism. A trap is a method used to isolate an abnormal condition or operation. A total of 250 trapped events are stored and FIFO (first-in, first-out) aging occurs after 250 trapped event occurrences.

The event reporting function has two components:

- A *Trap Destination* editor that allows you to provision destination parameters for a particular management interface to receive D50 traps.
- An *Event Viewer* window that displays trapped events to the management interface specified via the trap destination editor.

System Setup

For event reporting, the Craft Terminal host machine requires the following setup:

- **SNMP Trap Service** started on your host machine. This can be set to start automatically each time the PC is turned on.
- **Windows NT Service Pack 4** or greater.

Trap Destination Editor

The trap destination editor allows the user to define to which management interfaces the multiplexer reports events (unless traps are disabled for a particular device).

> **Note:** You must specify a trap desination in order to receive event reporting data. Otherwise, you will not get the necessary information to accurately know the state of the network.

Selecting the tool menu, *Edit Trap Destinations* item displays the Edit Trap Destinations dialog box.

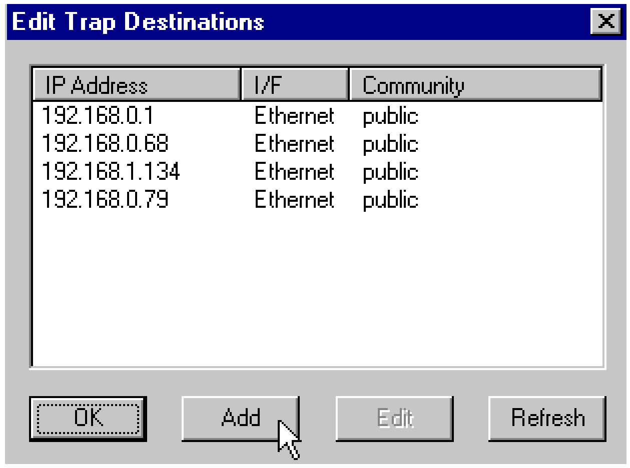


Figure 3-10: Edit Trap Destinations Dialog Box

The **Edit Trap Destinations** dialog box displays a table of existing trap destinations. Each destination is identified by **IP Address**, type of interface (**I/F**), and a **Community** name.

The control button definitions are as follows:

- **OK.** Apply any changes and close the dialog box.
- **Add.** Add a new trap destination entry.
- **Edit.** Show details of, modify, or mark to delete as necessary an existing trap destination entry. This control button is grayed-out (unselectable) until you select an existing trap destination entry.
- **Refresh.** Refresh the *Edit Trap Destinations* dialog box information.

Clicking **Add** or **Edit** displays the Add/Edit Trap Destination dialog box.

Figure 3-11: Add/Edit Trap Destination Dialog Box

The **Add/Edit Trap Destination** dialog box entries are as follows:

- **IP Address.** The IP address of the management interface to receive event reporting.
- **Interface.** A radio button set that identifies the management interface connectivity (**Ethernet** or **In-band**).
- **Community Name (optional).** The community name can be used to further identify a management interface. The default setting is "blank."
- **Delete Entry.** A checkbox that indicates to delete the given trap destination entry. The checkbox is grayed-out (unselectable) if you are adding a new trap destination entry.

The control button definitions are as follows:

- **OK.** Apply any changes and close the dialog box.
- **Cancel.** Cancel the current session and close the dialog box.

Event Viewer Window

The event viewer window displays trapped events at the management interface specified via the trap destination editor. You can resize this window and the (columnar) fields contained within.

Select the tool menu, *Event Viewer* item to display the Event Viewer window.

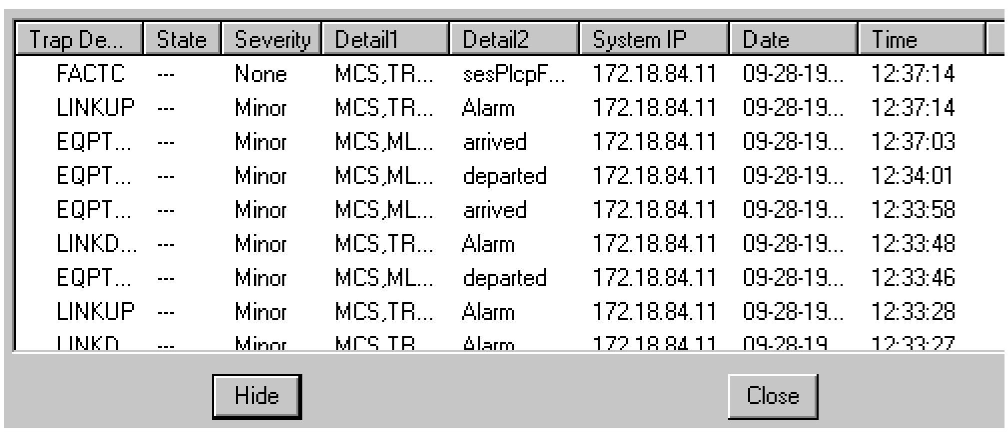


Figure 3-12: Event Viewer Window

The **Event Viewer** window displays a table of trapped events. The field definitions are as follows:

- **TrapDesc.** A general description of the trapped event.
- **State.** The current state of the trapped event.
- **Severity.** The severity associated with the trapped event (**Critial**, **Major**, or **Minor**).
- **Detail1**. An object locator description (e.g., shelf/card position).
- **Detail2**. A finer description of the trapped event than the general *TrapDesc* value.
- **SystemIP.** The multiplexer IP address that generated the trapped event.
- **Date.** The date the trapped event is received at the management interface.

- **Time.** The time the trapped event is received at the management interface.

The control button definitions are as follows:

- **Hide.** Hide the window from view. The window is hidden until reception of a new trap event.
- **Close.** Close the window.

The following event reporting sample shows in the *Event Viewer* window an **EQPTST** (equipment status) trap description, **Minor** severity, **departed** detail descriptor event report for the **MCS/MLA8** (MCS/8th-position MLA) object. The *MCS MLA Slot16 (MLA8)* window shows that the user changed the administrative state to **Unlocked** for an unequipped card. This is an abnormal operation which calls for an event report.

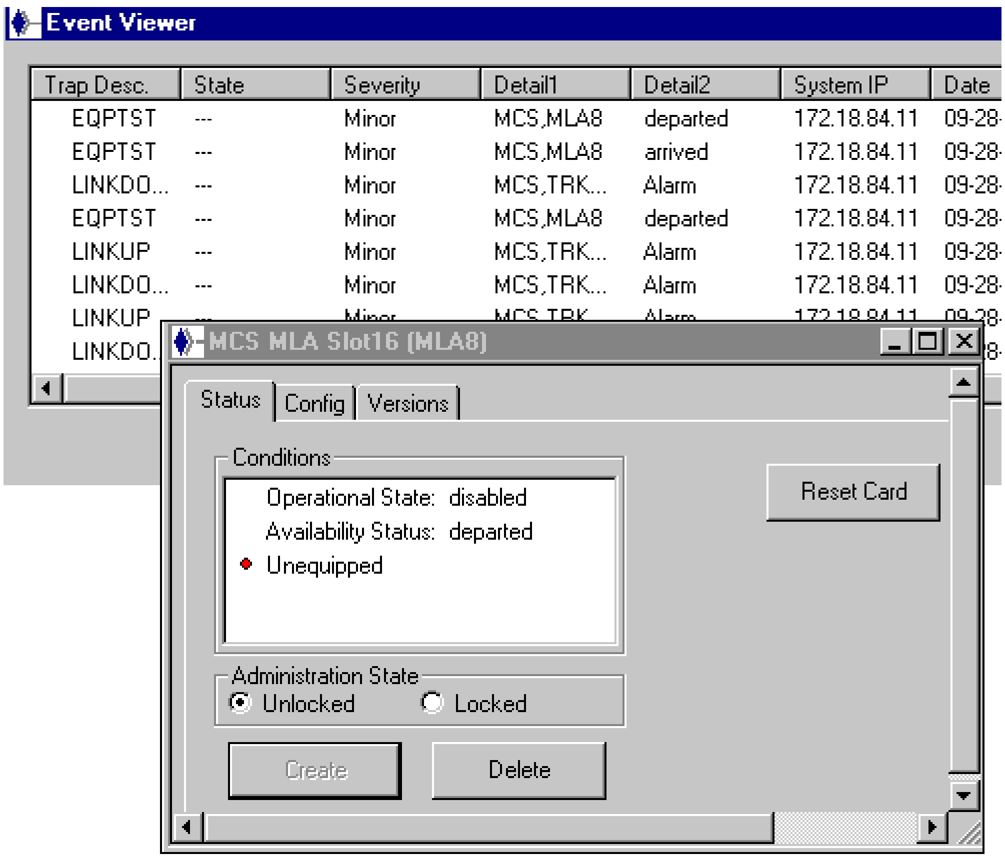


Figure 3-13: Event Reporting Sample

SECTION 4 MASTER CONTROL SHELF AND CARDS

Contents

List of Figures

Nokia High Speed Access Products Inc. Proprietary Data

Chapter 1
Master Control Shelf (MCS)

Introduction

The MCS contains the central control and communication functions for the D50 system, and communicates with either the Line Card Shelves (LCSs), up to twelve for each D50 system, or with other standard ATM equipment. A single MCS can communicate with both LCSs and CPE, depending on which cards are installed. Communication with other standard ATM equipment requires either DS3L or OC3L cards.

Select MCS on the View menu to display the MCS object.

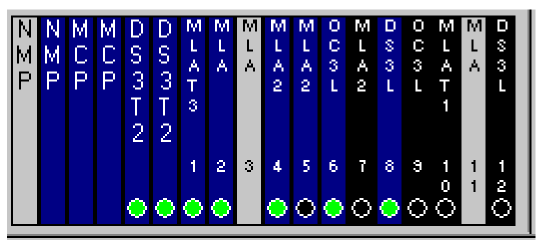


Figure 4-1: MCS Object (example configuration)

The MCS can contain the following cards:

- **NMP (Network Management Processor).** The MCS holds one NMP card, in slot 4.
- **MCP (Master Control Shelf Processor).** The MCS can hold two MCP cards, in slots 5 and 6.
- **Trunk cards.** The MCS can hold two DS3 or OC3 trunk cards in a 1:1 protection group, in slots 7 and 8.
- **MLA (Master Line Card Adapter).** The MCS can hold up to twelve MLA cards in logical slots MLA1 through MLA12; the physical slots are 9 through 20. The MCS support any combination of the various types of Master Line Card Adapter cards, or broadband tributary cards.

For details on the various cards, see the chapter on that card type.

Card Replacement Procedures

Card replacement may be necessary at some point in time in your system. If so, please read the following relevant reference(s) in the volume titled Maintenance and Testing:

- Section 2—*Card Replacement*, Chapter 1—“Replace Identical Cards,” page 2-1, OR
- Section 2—*Card Replacement*, Chapter 2—“Replace an Existing Card with Different Card Type,” page 2-5, OR

- Section 2—*Card Replacement*, Chapter 3—“Correct an Attribute Mismatch Condition,” page 2-15.

An *Attribute Mismatch* condition occurs when the system recognizes one of the following discrepancies:

- a card is inserted into a slot that is provisioned for a different card type.
- a card software revision is more recent than that of the active MCP card (i.e., a card with Release 6.0 software is inserted into a system with the MCP running Release 5.1 software).

The *Attribute Mismatch* condition appears in the Conditions box on the Card Status tab.

MCS Interface

Click the MCS object in the multiplexer (rack) equipment locator group to display the following set of tabs:

- Status.
- Config.
- Environmental Alarms.

MCS Status Tab Page

The Status tab page displays initially.

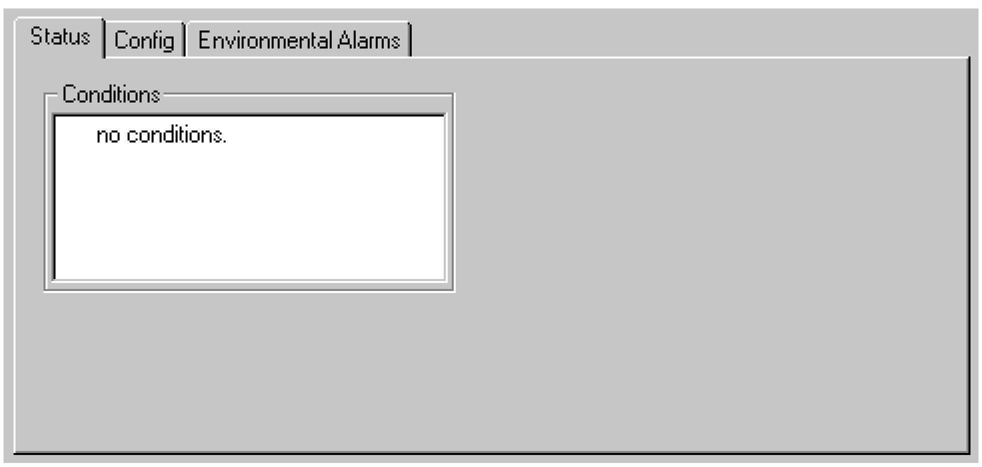


Figure 4-2: MCS Status Tab

The **Conditions** list box displays conditions for the shelf, basically a summary of conditions for all the cards on the MCS. Data in the **Conditions** list box is refreshed periodically by the system. The data can also be updated by clicking the Refresh icon on the toolbar.

MCS Configuration Tab Page

Click the Config tab to display the following tab page.

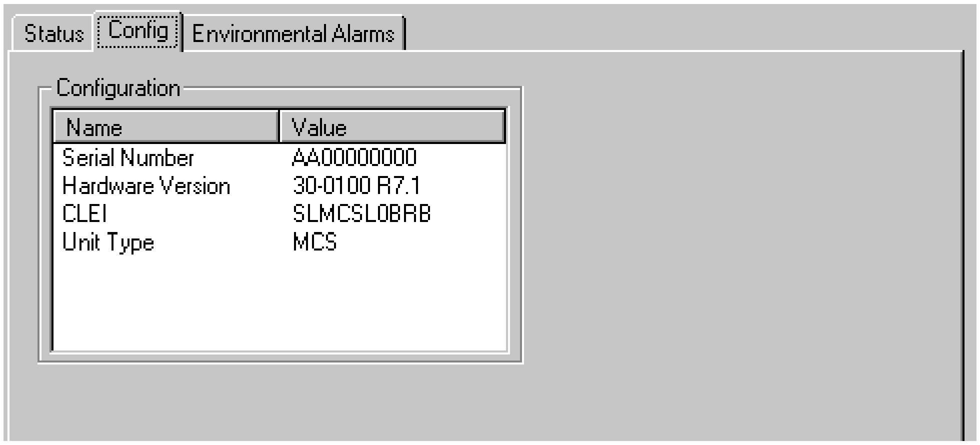


Figure 4-3: MCS Configuration Tab

The **Configuration** box lists the Serial Number, Hardware Version, CLEI, and unit type for the shelf.

MCS Environmental Alarms Tab Page

Click the Environmental Alarms tab to display the following tab page.

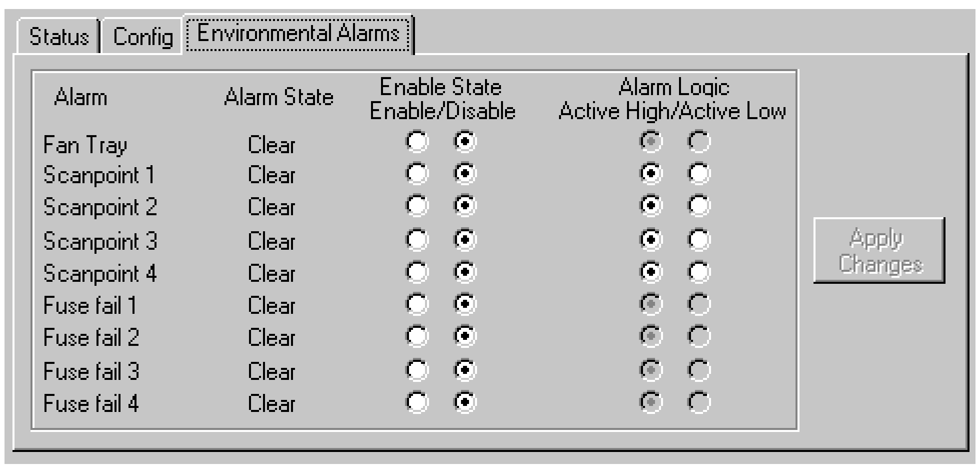


Figure 4-4: MCS Environmental Alarms Tab

The Environmental Alarms tab lists a number of system components for which alarms can be enabled. The **Alarm State** column displays the current state of each component. For Scanpoints 1 through 4, you can set **Alarm Logic** to Active High or Active Low; these relate to remote alarm inputs on the MCS alarm board.

After making any changes to the options, the **Apply Changes** button becomes active. Clicking this button displays a warning that asks if you want to make changes to the system configuration. Click the **OK** button to save the changes to the MIB, or the **Cancel** button to cancel the action.

Chapter 2
MCP Card

Introduction

The MCP (Master Control Processor) card is the central control and communications for the D50 system. The MCP stores program and provisioning database information.

A Master Control Shelf (MCS) may contain two MCP cards. The MCP cards are located in slots 5 and 6 of the MCS.

MCP Card Interface

Click an MCP card in an MCS equipment locator group to display the following set of tabs:

- Status.
- Configuration.
- Versions.

MCP Card Status Tab Page

The Status tab page displays initially.

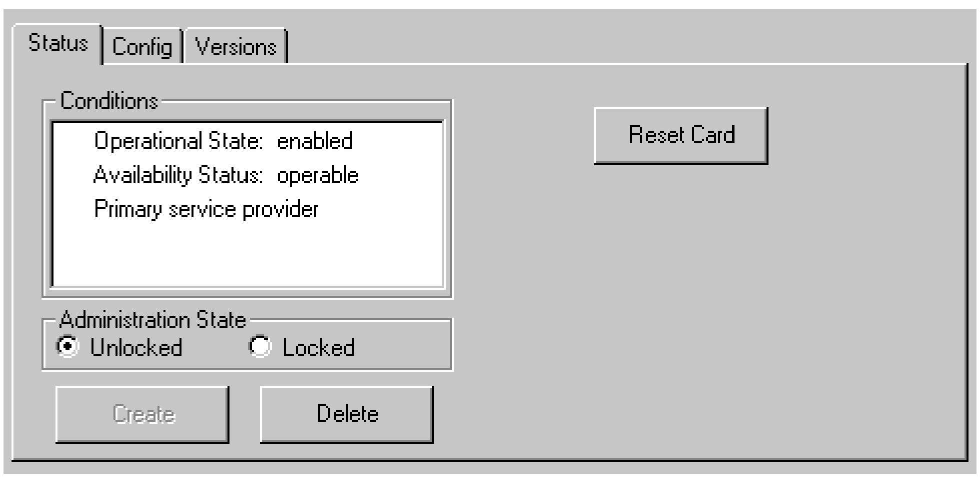


Figure 4-5: MCP Card Status Tab

- The **Conditions** list box displays conditions associated with the selected card. Data in the **Conditions** list box is refreshed by the system at user-specified intervals; the interval can be set to 0, which means that the data will **not** automatically refresh. You can specify the polling interval by selecting Options on the Tools menu. The data can also be updated by clicking the Refresh icon on the toolbar.

Nokia High Speed Access Products Inc. Proprietary Data

- The **Administration State** group allows you to control whether or not the card is available for service. **Unlocked** makes the card available if there are no other conditions blocking its use. **Locked** makes the card unavailable for service; cards should be locked when being configured, when making hardware upgrades, or when testing.

  Note: If a card is locked, any alarms for that card will **not** display in the Active Alarms list; however, the alarm conditions will display in the **Conditions** box on the card's Status tab. If an alarm condition exists and the unlocked option is selected, an alarm will then be displayed in the Active Alarms list. For descriptions of alarm conditions, see the volume titled Maintenance and Testing, Section 1—*System Monitoring*, Chapter 2—"Conditions."
- The **Create** button is only enabled if you click on an unprovisioned slot. Click this button to create a new MCP card.
- The **Delete** command button is only enabled if you click on a provisioned card. Click this button and a warning message displays that indicates the card is about to be deleted from the system. You can either click the **OK** button to proceed, or the **Cancel** button to cancel the operation.
- Click the **Reset Card** button to physically reset the card. Click this button and a warning message displays asking if you are sure you want to reset the card. You can click the **OK** button to proceed or the **Cancel** button to cancel the operation.

MCP Card Configuration Tab Page

Click the Config tab to display the following tab page.

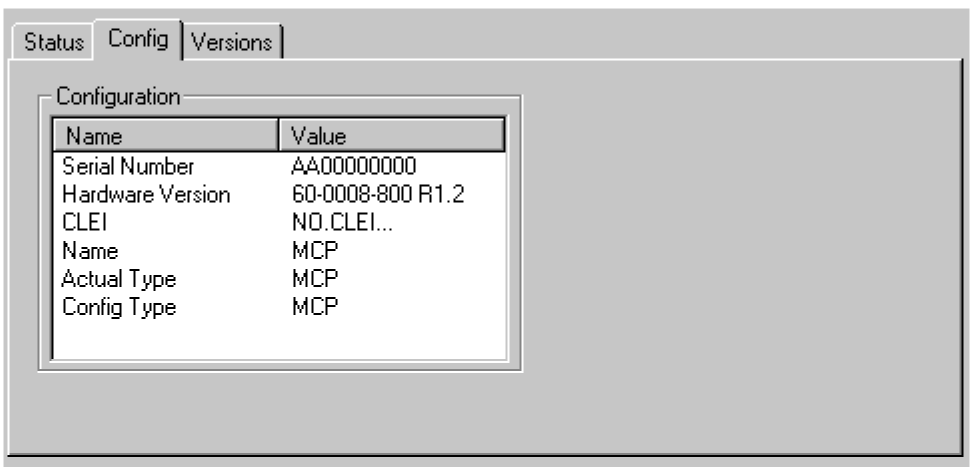


Figure 4-6: MCP Card Configuration Tab

- The **Configuration** list box shows the Serial Number, Hardware Version, CLEI code, Name, and the Actual and Configured card Type.

MCP Card Versions Tab Page

Click the Versions tab to display the following tab page.

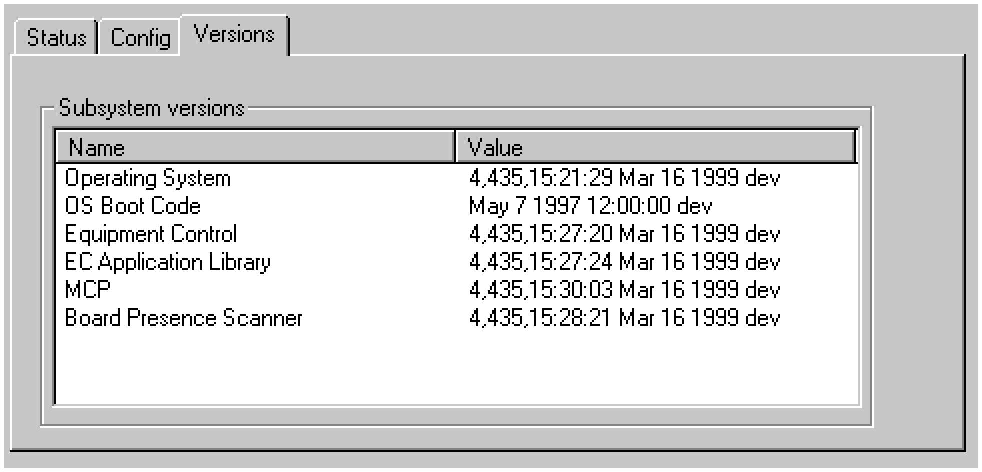


Figure 4-7: MCP Card Versions Tab

- The **Subsystem Versions** group lists the subsystems, their version numbers, and the dates when they were created.

Introduction

The NMP (Network Management Processor) card controls the D50 network management interfaces and provides the protocol support for communication for Element Manager and Craft Terminal.

A Master Control Shelf (MCS) may contain one NMP card. The NMP card is located in slot 4 of the MCS.

NMP Card Interface

Click an NMP card in an MCS equipment locator group to display the following set of tabs:

- Status.
- Configuration.
- Versions.

NMP Card Status Tab Page

The Status tab page displays initially.

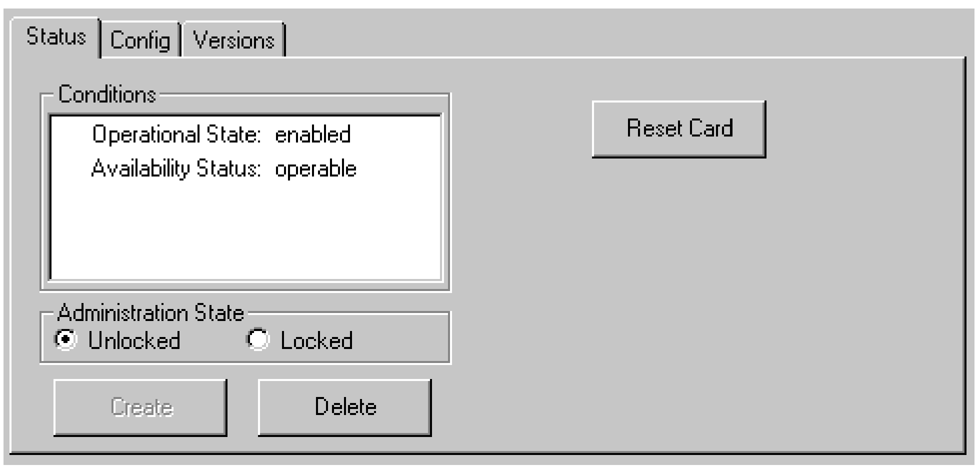


Figure 4-8: NMP Card Status Tab

The **Conditions** list box displays conditions associated with the selected card. Data in the **Conditions** list box is refreshed by the system at user-specified intervals; the interval can be set to 0, which means that the data will **not** automatically refresh. You can specify the

polling interval by selecting Options on the Tools menu. The data can also be updated by clicking the Refresh icon on the toolbar.

The **Administration State** group allows you to control whether or not the card is available for service. **Unlocked** makes the card available if there are no other conditions blocking its use. **Locked** makes the card unavailable for service; cards should be locked when being configured, when making hardware upgrades, or when testing.

> **Note:** If a card is locked, any alarms for that card will **not** display in the Active Alarms list; however, the alarm conditions will display in the **Conditions** box on the card's Status tab. If an alarm condition exists and the unlocked option is selected, an alarm will then be displayed in the Active Alarms list. For descriptions of alarm conditions, see the volume titled Maintenance and Testing, Section 1—*System Monitoring*, Chapter 2—"Conditions."

The **Create** button is only enabled if you have clicked on an unprovisioned slot. Click this button to create a new NMP card.

The **Delete** command button is only enabled if you have clicked on a provisioned card. Click this button and a warning message displays indicating the card is about to be deleted from the system. You can either click the **OK** button to proceed, or the **Cancel** button to cancel the operation.

Click the **Reset Card** button to physically reset the card. Click this button and a warning message displays asking if you are sure you want to reset the card. You can click the **OK** button to proceed or the **Cancel** button to cancel the operation.

NMP Card Configuration Tab Page

Click the Config tab to display the following tab page.

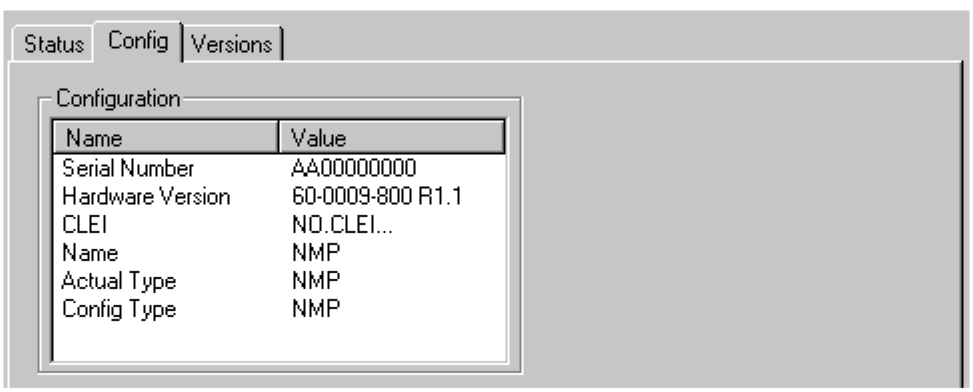


Figure 4-9: NMP Card Configuration Tab

The **Configuration** list box shows the Serial Number, Hardware Version, CLEI code, Name, and the Actual and Configured card Type.

NMP Card Versions Tab Page

Click the Versions tab to display the following tab page.

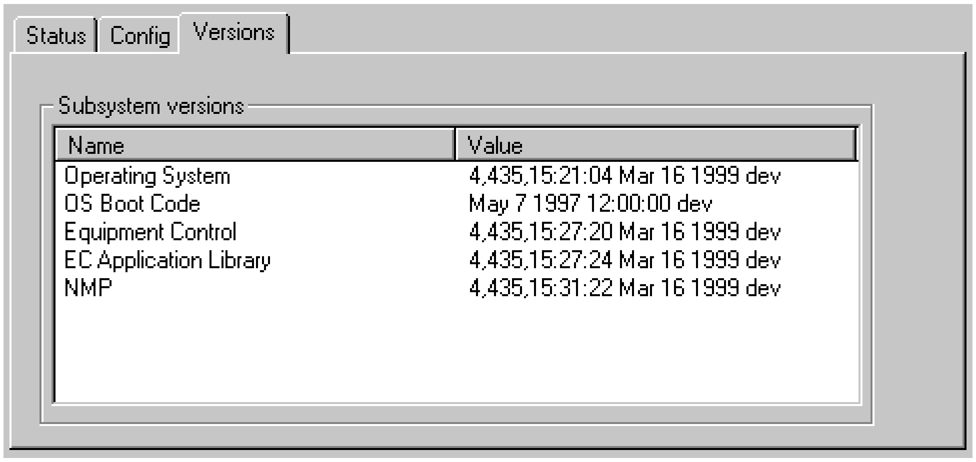


Figure 4-10: NMP Card Versions Tab

The **Subsystem Versions** group lists the subsystems, their version numbers, and the dates when they were created.

Chapter 4
DS3 Trunk Cards

Introduction

The DS3 trunk card provides the GR499 compliant, metallic DS-3 interface to connect the D50 system to a DS-3 based data network. It also contains the downstream address translation, second level of multiplexing, and timing generation functions for the D50 system. The DS3 terminates the DS-3 formatted ATM data stream to and from the ATM data network. The DS-3 functions of frame formatting, cell delineation and serial to parallel conversion are contained in an ATM physical layer device in the DS3 trunk card.

The Master Control Shelf (MCS) contains two DS3 cards in a 1:1 protection group. Slot 8 in the MCS contains the working card, and slot 7 contains the protection card. The protection card monitors the internal data path to prevent failures.

On the downstream (egress) path, if a cell's VPI/VCI address identifies the cell as user data, the VPI portion of the cell header is replaced with an internal multiplexer address to facilitate routing through the D50 system. A routing tag is also inserted, which is used by the DS3 card to determine the destination for the cell. The DS3 translator checks for OAM cells and processes them based on associated data. The translator supports Alarm Indication Signal (AIS), Remote Defect Indicator (RDI) and loopback Operations and Maintenance (OAM). All other OAM cells are discarded by the address translator[1].

The input path is multiplexed into twelve 8-bit parallel ports for the MLA (Master Line Card Adapter) card slots and to a queue connected to the upstream data path. The downstream-to-upstream path is used for routing OAM and Embedded Operations Channel (EOC) cells out of the DS3 trunk and for routing test cells to the microprocessor. The MLA ports operate at a 25 MHz rate.

On the upstream (ingress) path, cells enter the D50 with their final ATM network VPI/VCI addresses. Buffers are located on the individual MLA circuit cards in the upstream path. Flow control feedback is implemented across the interface between the trunk card and the MLA slots. The D50 polls the MLA slot circuit cards for buffer status and implements a service algorithm to ensure fairness. A service interval is provided for each of the 12 MLA ports and the downstream to upstream path. Cells with their test indicator bit set are extracted from the upstream path and placed in a microprocessor port queue. The remainder of the aggregated ATM cell stream is applied directly to the ATM physical layer device.

---

[1] The DS3TQ trunk card will support OAM loopback tests, AIS, or RDI conditions in Release 7.0.

Fault information is stored in registers in the D50; the DS3 card uses this information for performance monitoring purposes.

The DS3 card uses its internal system clocks and references.The system references are frequency locked to the on-board DS3 carrier TCXO (20-PPM stability) on initial power up. The system references may also be frequency locked to the DS3 frame pulse (if available), or to an external office reference. The DS3 card provides an 8 KHz and a 19.44 MHz system reference. It also provides a 25 MHz bus clock. The bus clock is not locked to the system reference.

The metallic full-duplex uni-directional DS-3 signals connect to the D50 at the backplane connectors. The DS-3 signal is switched on the backplane to either the main or protect DS3 card. The DS-3 signals enter the DS3 circuit card at the backplane connector. These signals are then applied to a DS3 Line Interface Module that provides the analog line to the digital terminal (DS3 PHY layer device) interface.

The D50 system supports the following types of DS3 cards:

- **DS3T.** The basic DS3 card, does not support priority queueing Quality of Service Version 4.0 (QoSV4).
- **DS3T2.** The DS3T2 card provides support for QoSV4. For details, see **DS3 Port DS3T Tab Page**.
- **DS3TQ.** The DS3TQ card supports end-to-end ATM QoS for the different service categories of Constant Bit Rate (CBR), Variable Bit Rate real-time (VBR-rt), Variable Bit Rate non-real-time (VBR-nrt), and Unspecified Bit Rate (UBR). ATM QoS provisioning details for this card are available in the volume titled Provisioning, Section 1—*Provisioning Concepts*, Chapter 12—“ATM QoS Provisioning.”

  Note: Additional provisioning information can be located in the volume titled Provisioning, Section 4—*Appendices*, Appendix A—“Provisioning Parameters.”

DS3 Card Interface

Click a DS3 card in the MCS equipment locator group to display the following set of tabs:

- Status.
- Configuration.
- Versions.
- Protection Group Status.
- Protection Group.

DS3 Card Status Tab Page

The Status tab page displays initially.

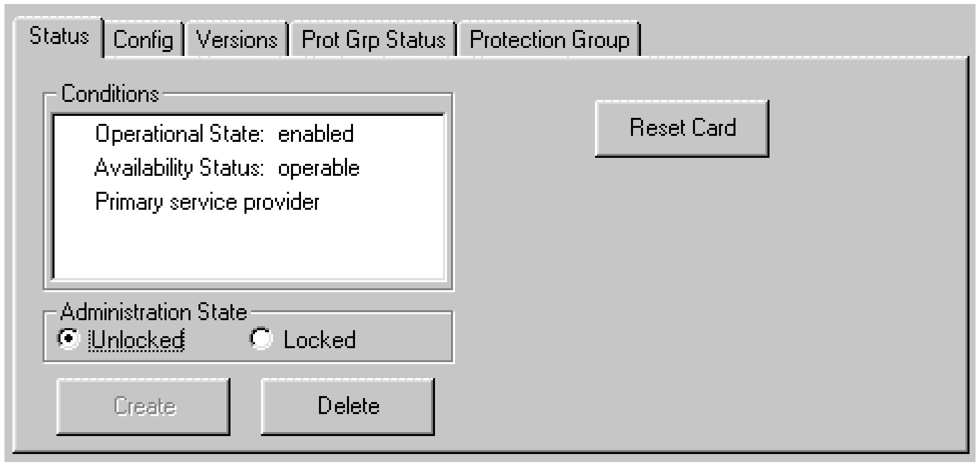


Figure 4-11: DS3 Card Status Tab

The **Conditions** list box displays conditions associated with the selected card. Data in the **Conditions** list box is refreshed by the system at user-specified intervals; the interval can be set to 0, which means that the data will **not** automatically refresh. You can specify the polling interval by selecting Options on the Tools menu. The data can also be updated by clicking the Refresh icon on the toolbar.

The **Administration State** group allows you to control whether or not the card is available for service. **Unlocked** makes the card available if there are no other conditions blocking its use. **Locked** makes the card unavailable for service; cards should be locked when being configured, when making hardware upgrades, or when testing.

> **Note:** If a card is locked, any alarms for that card will **not** display in the Active Alarms list; however, the alarm conditions will display in the **Conditions** box on the card's Status tab. If an alarm condition exists and the unlocked option is selected, an alarm will then be displayed in the Active Alarms list. For descriptions of alarm conditions, see the volume titled Maintenance and Testing, Section 1—*System Monitoring*, Chapter 2—"Conditions."

The **Create** button is only enabled if you have clicked on an unprovisioned slot. Click this button to display a list of cards you can create.

The **Delete** command button is only enabled if you have clicked on a provisioned card. Click this button and a warning message displays indicating the card is about to be deleted from the system. You can either click the **OK** button to proceed, or the **Cancel** button to cancel the operation.

Click the **Reset Card** button to physically reset the card. Click this button and a warning message displays asking if you are sure you want to reset the card. You can click the **OK** button to proceed or the **Cancel** button to cancel the operation.

DS3 Card Configuration Tab Page

Click the Config tab to display the following tab page.

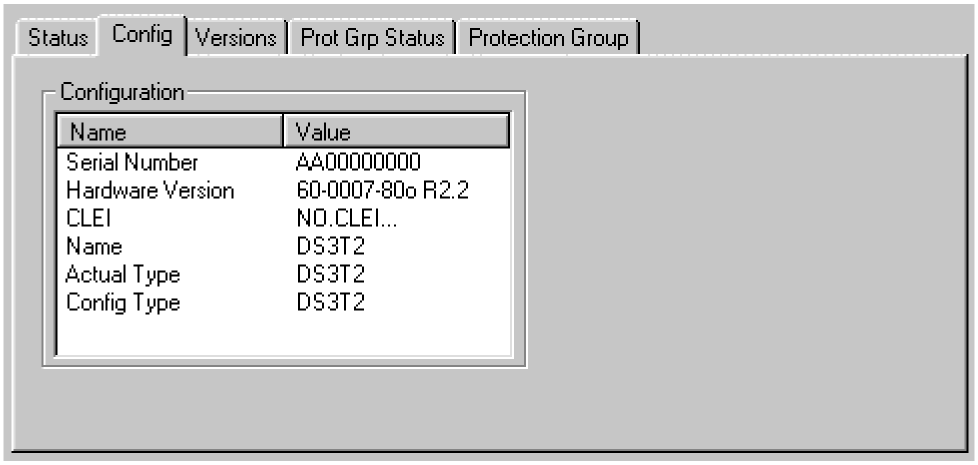


Figure 4-12: DS3 Card Configuration Tab

The **Configuration** list box shows the Serial Number, Hardware Version, CLEI code, Name, and the Actual and Configured card Type.

DS3 Card Versions Tab Page

Click the Versions tab to display the following tab page.

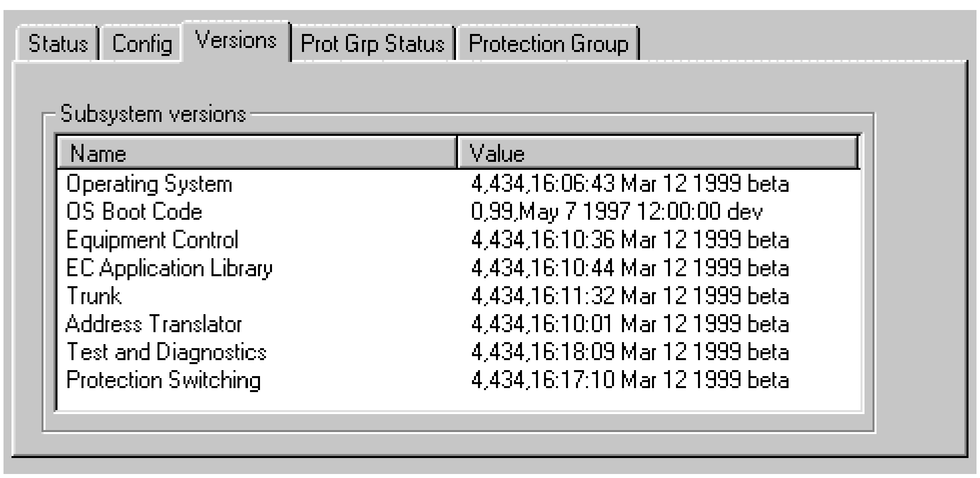


Figure 4-13: DS3 Card Versions Tab

The **Subsystem Versions** group lists the subsystems, their version numbers, and the dates when they were created.

DS3 Card Protection Group Status Tab Page

Click the Prot Grp Status tab to display the following tab page.

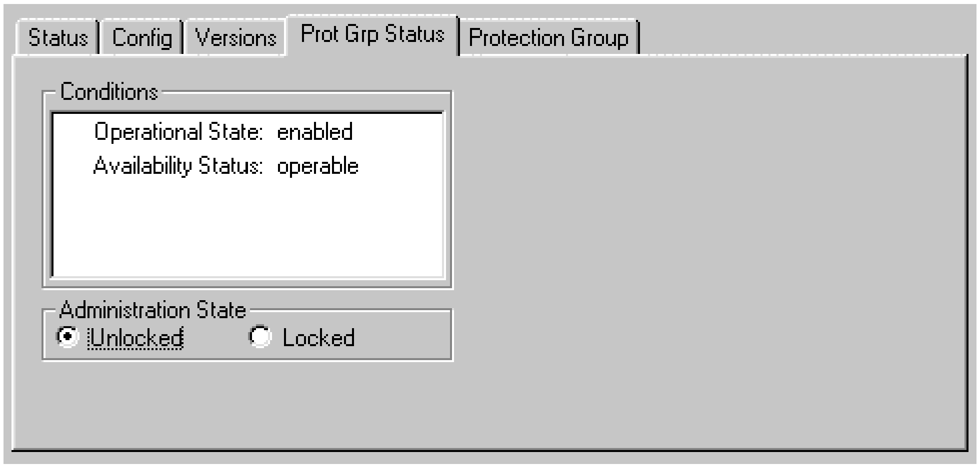


Figure 4-14: DS3 Card Protection Group Status Tab

The **Conditions** list box displays conditions associated with the selected card. Data in the **Conditions** list box is refreshed by the system at user-specified intervals; the interval can be set to 0, which means that the data will **not** automatically refresh. You can specify the polling interval by selecting Options on the Tools menu. The data can also be updated by clicking the Refresh icon on the toolbar.

The **Administration State** group allows you to control whether or not the card is available for service. **Unlocked** makes the card available if there are no other conditions blocking its use. **Locked** makes the card unavailable for service; cards should be locked when being configured, when making hardware upgrades, or when testing.

> **Note:** If a card is locked, any alarms for that card will **not** display in the Active Alarms list; however, the alarm conditions will display in the **Conditions** box on the card's Protection Group Status tab. If an alarm condition exists and the unlocked option is selected, an alarm will then be displayed in the Active Alarms list. For descriptions of alarm conditions, see the volume titled <u>Maintenance and Testing</u>, Section 1—*System Monitoring*, Chapter 2—"Conditions."

DS3 Card Protection Group Tab Page

Click the Protection Group tab to display the following tab page.

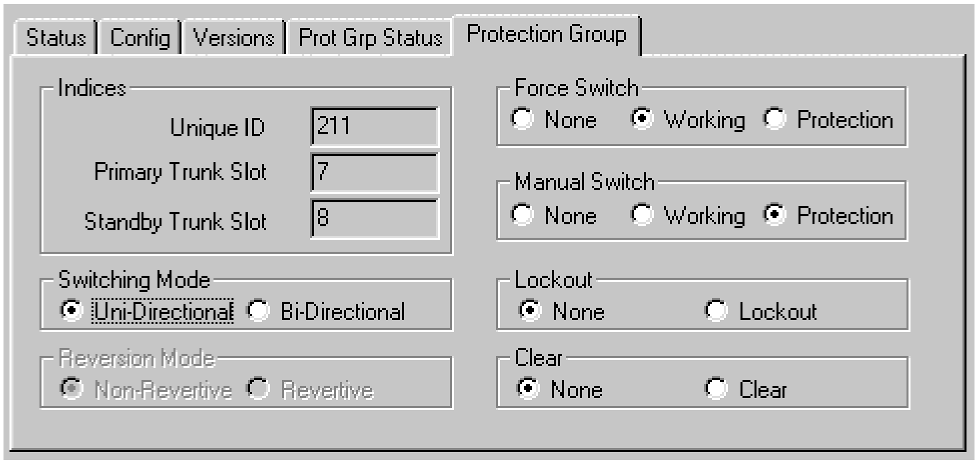


Figure 4-15: DS3 Card Protection Group Tab

The Protection Group tab page is used to set parameters for the 1:1 protection group for the two trunk cards.

The **Indices** group displays the **Unique ID** for the protection group, and the numbers of the primary and standby slots.

Primary Trunk Slot is the physical MCS slot of the currently active trunk card and **Standby Trunk Slot** is the inactive slot. Slots 7 and 8 are reserved for trunk cards (either DS3 or OC3). The left slot (Slot 7) is designated the protection slot, and the right slot (Slot 8) is designated the working slot.

The **Switching Mode** group specifies the points of control for protection switching:

- **Uni-Directional.** Controlled by the multiplexer only.
- **Bi-Directional.** This feature is not supported.

In the Uni-Directional switching mode, protection switching will **not** consider far-end requests when determining whether to perform a manual switch.

The **Reversion Mode** group is not enabled for this card.

The terms **working** and **protection** refer to slot provisioning—**not** to which card is currently in active or standby status. The left slot (Slot 7) is designated the protection slot, and the right slot (Slot 8) is designated the working slot.

The **Force Switch**, **Manual Switch**, **Lockout**, and **Clear** groups allow you to select options for protection switching that involve both the multiplexer (near end) and the ATM network (far end) of the trunk. Protection switching considers these options in the following order of priority:

1. **Clear.** User-initiated, will clear only user-initiated protection request.
2. **Lockout.** User-initiated, will clear only user-initiated protection request.

3 **Force.** User-initiated, will clear only user-initiated protection request.
4 **Signal failure.** System-initiated.
5 **Manual.** User-initiated, will clear only user-initiated protection request.
6 **Signal degrade.** System-initiated.

The **Clear** group allows you to clear the state of the protection switching software. Click the **Clear** radio button to clear the state of the software, then click the **None** radio button to enable the protection switching. You can then proceed with a manual or forced switch selection. This procedure is useful if the system does not seem to be responding to selecting protection switching options.

The **Lockout** group controls whether trunk card protection switching is enabled.

- **None.** Enables protection switching (default).
- **Lockout.** Disables protection switching.

Forced switching causes protection switching regardless of trunk conditions. The **Force Switch** group allows you to select which trunk slot becomes active upon a forced switch.

- **None.** Disables forced protection switching (default). **Always** select this option after selecting either **Working** or **Protect** in order to allow future changes to the switching options.
- **Working.** Causes switching to the working trunk slot (Slot 8).
- **Protect**. Causes switching to the protection trunk slot (Slot 7).

Manual switching causes protection switching, but is dependent on trunk conditions. The **Manual Switch** group allows you to select which trunk slot becomes active upon a manual switch.

- **None.** Disables manual protection switching (default). **Always** select this option after selecting either **Working** or **Protect** in order to allow future changes to the switching options.
- **Working.** Causes switching to working trunk slot (Slot 8), based on trunk conditions.
- **Protect.** Causes switching to protection trunk slot (Slot 7), based on trunk conditions.

DS3 Port Interface

Click the port connection on the DS3 card to display the DS3 port interface.

The DS3 port object view contains the following tabs:

- Status.
- Test.
- DS3T.
- DS3 Thresholds.
- Physical PM.
- ATM PM.

DS3 Port Status Tab Page

The Status tab displays initially.

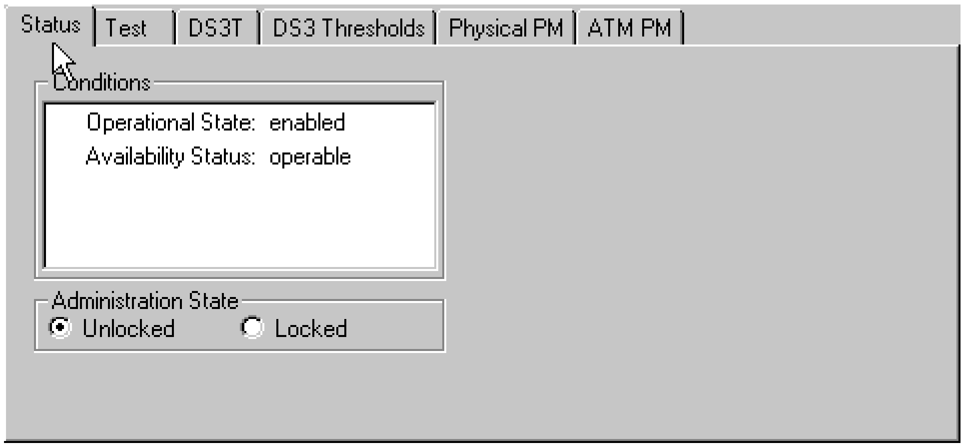


Figure 4-16: DS3 Port Status Tab

The **Conditions** list box displays conditions associated with the selected port. Data in the **Conditions** list box is refreshed by the system at user-specified intervals; the interval can be set to 0, which means that the data will **not** automatically refresh. You can specify the polling interval by selecting Options on the Tools menu. The data can also be updated by clicking the Refresh icon on the toolbar.

The **Administration State** group allows you to control whether or not the port is available for service. **Unlocked** makes the port available if there are no other conditions blocking its use. **Locked** makes the port unavailable for service; ports should be locked when being configured, when making hardware upgrades, or when testing.

> **Note:** If a port is locked, any alarms for that port will **not** display in the Active Alarms list; however, the alarm conditions will display in the **Conditions** box on the port's Status tab. If an alarm condition exists and the unlocked option is selected, an alarm will then be displayed in the Active Alarms list. For descriptions of alarm conditions, see the volume titled Maintenance and Testing, Section 1—*System Monitoring*, Chapter 2—"Conditions."

DS3 Port Test Tab Page

Click the Test tab to display the following tab page.

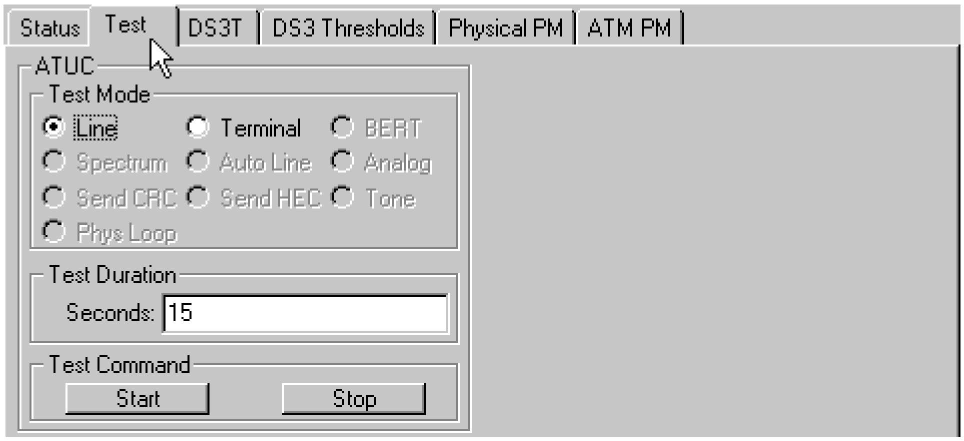


Figure 4-17: DS3 Port Test Tab

The Test tab allows you to perform testing on the DS3 card.

The **Test Mode** group allows you to select the type of testing to perform:

- **Line.** Test the line to the subscriber's network interface—no data into the system.
- **Terminal.** Test the line to the subscriber's modem—no data out of the system.

Test Duration sets the interval in seconds that the system should wait before stopping the test. The *Test Duration* default is 15 seconds. The **Test Command** buttons **Start** and **Stop** testing.

> **Important! All diagnostic tests interrupt data flow through the system. Do not perform on a D50 System that is providing service. Only use diagnostic tests during commissioning procedures or in a lab environment to isolate trouble in the system. If using in-band management, a diagnostic test will cut off the D50's control of the management station; the timeout should be set appropriately.**

For additional information on Diagnostic Test Modes, see the volume titled Maintenance and Testing.

DS3 Port DS3T Tab Page

Click the DS3T tab to display the following tab page.

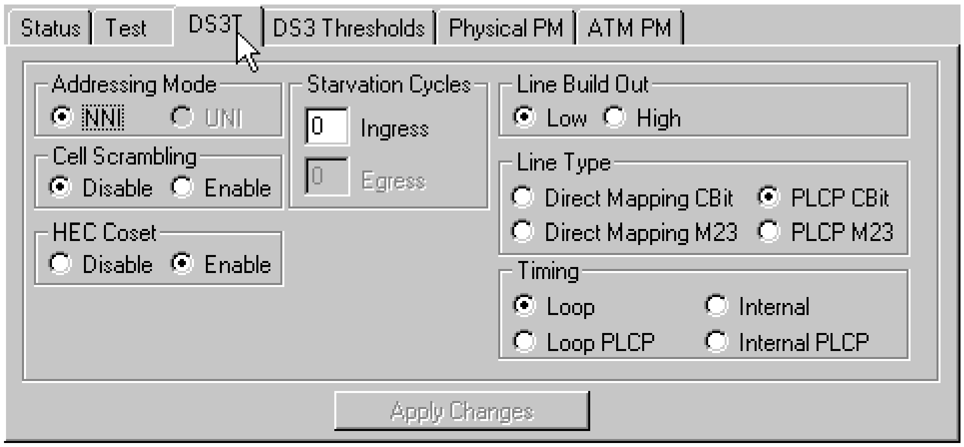


Figure 4-18: DS3 Port DS3T Tab

The **Addressing Mode** group indicates the mode, Network Node Interface (NNI) or Universal Network Interface (UNI). This parameter is not provisionable by the user and is always set to the NNI option (as shown in the example).

The **Cell Scrambling** group allows you to enable cell scrambling, which prevents false error detection on the cell payload. Since direct mapping uses the Header Error Check (HEC) for cell delineation, a five-byte pattern with valid ATM cell overhead may appear in the payload. Enabling cell scrambling reduces the possibility of false lock.

The **Starvation Cycles**[2] group allows you to specify the number of QoSV4 starvation cycles in the ingress direction. This field allows you to allocate a specified percentage of service to low-priority traffic.

> **Note:** This group is enabled only for the DS3T2 and DS3TQ cards. For the DS3T card, this group is not enabled.

The percentage of bandwidth available for low-priority traffic is calculated by the system as one divided by the value of this field plus one [1/(starvation cycles + 1)], for example:

- If the value for this field is set to 0 (zero), no bandwidth is guaranteed to be available for low-priority traffic.
- If the value for this field is set to 1, then 1/(1+1), or 50% of available bandwidth is available for low-priority traffic.
- If the value for this field is set to 2, then 1/(2+1), or 33% of available bandwidth is available for low-priority traffic.

[2] "Priority queuing QoSV4 starvation cycles are not applicable to a D50/D50e Release 6.0 system supporting ATM QoS."

The **HEC Coset** group allows you to enable Header Error Check (HEC) coset, which ensures non-zero values for HECs in idle ATM cells. HEC is an 8-bit field, the last byte of the ATM cell header; it allows a receiver to detect (and possibly correct) transmission errors in the cell header. HEC coset is used for integrity checking only, and only counts HEC errors that cannot be corrected.

The **Line Build Out** group allows you to select either **Low** or **High** buildout, which adjusts equalization to reflect the length of the DS3 cable. The DS3 trunk Line Interface Unit (LIU) supports two levels of line build out (this is the length of the coax cable from the MCS backplane to the other end of the DS3 connection, the router or ATM switch):

- **Low** is used for coax cables shorter than 50 feet (default).
- **High** is used for coax cables between 50 and 450 feet in length.

The **Line Type** group allows you to select a DS3 framing format.

- **Direct Mapping CBit** provides the most data throughput and is the preferred operating mode. Some equipment does not support this mode, in which case one of the Physical Layer Convergence Protocol (PLCP) modes should be selected. For this mode, enable both Cell Scrambling and HEC Coset.
- **Direct Mapping M23** is typically only used with older equipment. For this mode, enable both Cell Scrambling and HEC Coset.
- **PLCP CBit** (the default) is the preferable mode of the two PLCP modes, since it provides better performance monitoring (PM) information. For this mode, disable Cell Scrambling and enable HEC Coset.
- **PLCP M23** is typically only used with older equipment. For this mode, disable Cell Scrambling and enable HEC Coset.

The **Line Timing** group allows you to select the type of timing resource for the signal:

- **Loop.** The system extracts timing from the DS-3 signal.
- **Internal.** The system supplies timing from an internal source.
- **Loop PLCP.** The system extracts timing from PLCP.
- **Internal PLCP.** The system supplies timing from an internal PLCP source.

Note: The HEC coset, line type, and line timing options selected must match the options set on the ATM router or switch at the far end of the loop.

DS3 Port DS3 Thresholds Tab Page

Click the DS3 Thresholds tab to display the following tab page.

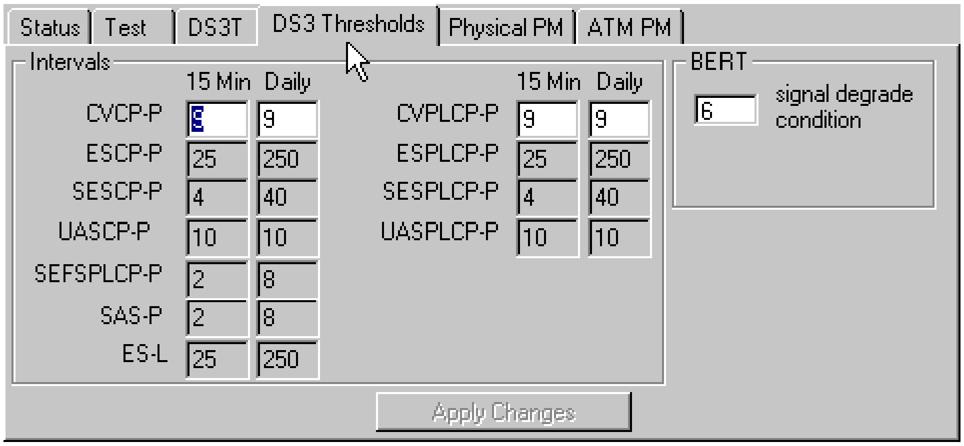


Figure 4-19: DS3 Port DS3 Thresholds Tab

The **Intervals** group allows you to specify several error rate thresholds, for both 15-minute and daily intervals:

- **CVCP-P.** Code Violation-Path is the count of CP-bit parity errors occurring in the accumulation period.
- **CVPLCP-P.** Code Violation-PLCP-Path is the count of BIP-8 code errors in the accumulation period.

The **BERT** (Bit Error Rate Threshold) group allows you to set the threshold for the signal degrade condition.

Note: This group is enabled only for the DS3T2 and DS3TQ cards. For the DS3T card, this group is not enabled.

For provisioning parameter tables, see the volume titled Provisioning.

After making changes to any of the thresholds, the **Apply Changes** button becomes enabled. Click this button to apply the changes to the MIB.

DS3 Port Physical PM Tab Page

Click the Physical PM tab to display the following tab page.

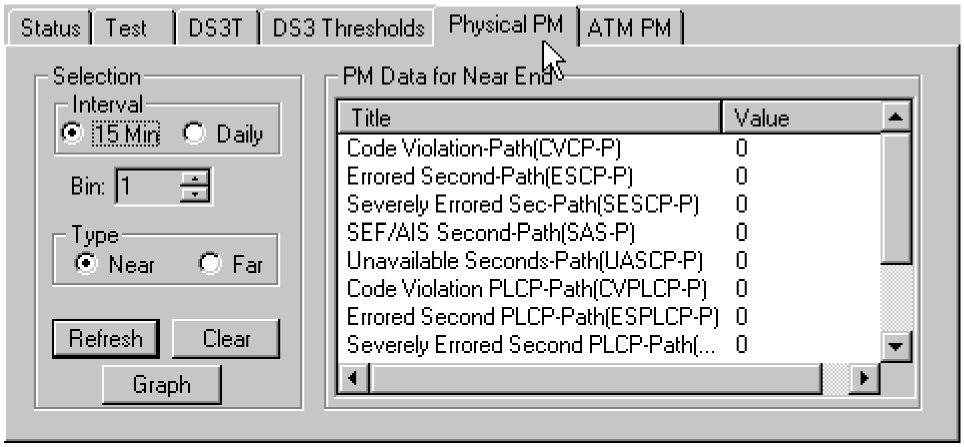


Figure 4-20: DS3 Port Physical PM Tab

The **Physical PM** tab page provides performance monitoring data for the DS3 port.

The **Interval** group allows you to select either 15-minute or Daily intervals for performance monitoring.

You can track up to 12 bins of performance data in 15-minute intervals. Bin number 1 contains data for the current 15-minute interval. Bin number 2 contains data for the previous 15-minute interval and so on. In the **Bin** spin box, set the Bin value (1 to 12).

You can track 2 bins of data in daily intervals. Bin number 1 contains data for the current day. Bin number 2 contains data for the previous daily interval. In the **Bin** spin box, set the Bin value (1 or 2).

The **Type** group allows you to specify whether to monitor near-end or far-end PM data.

The **PM Data for . . .** group displays the names and values for the parameters listed. The title of this group changes to reflect the option selected in the **Type** group. The list includes values for the following parameters:

- Code Violation-Path (CVCP-P).
- SEF/AIS Second-Path (SAS-P).
- Errored Second-Path (ESCP-P).
- Severely Errored Second-Path (SESCP-P).
- Unavailable Seconds-Path (UASCP-P).
- Errored Second-Line (ES-L).
- Code Violation PLCP-Path (CVPLCP-P).
- Errored Second PLCP-Path (ESPLCP-P).
- Severely Errored Second PLCP-Path (SESPLCP-P).
- Severely Errored Framing Second PLCP-Path (SEFSPLCP-P).

- Unavailable Second PLCP-Path (UASPLCP-P).
- Status.

The data will **not** refresh automatically; click the **Refresh** command button to display data for the specified interval. Click the **Clear** command button to clear all performance data. Click the **Graph** button to display the data in graphical format.

The **Status** in the **Data** list box will always be either Valid or Invalid. A value of Invalid indicates that the data has not been accumulated for the full time of a given interval because a bin has been reset; invalid data should not be used to resolve performance issues.

DS3 Port ATM PM Tab Page

Click the ATM PM tab to display the following tab page.

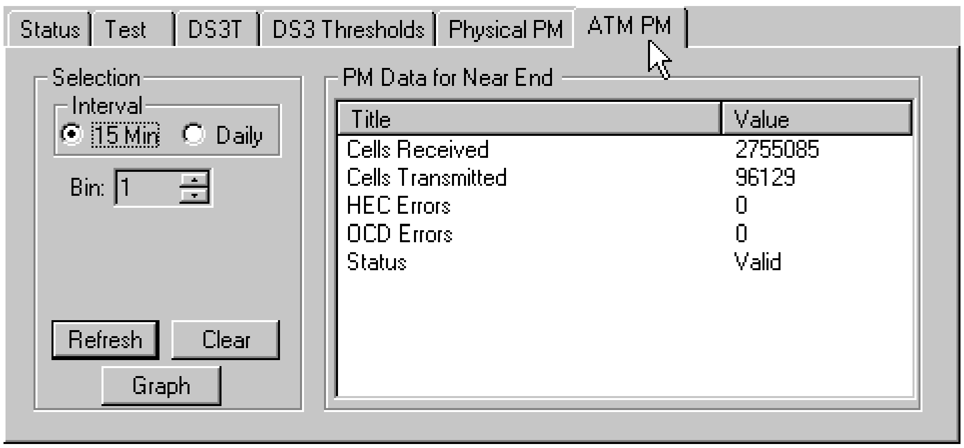


Figure 4-21: DS3 Port ATM PM Tab

The **ATM PM** (Performance Monitoring) tab page provides information on cells received, cells transmitted, cells dropped, and the status. The **Interval** group allows you to specify either 15-minute or Daily PM monitoring intervals.

You can track up to 12 bins of performance data in 15-minute intervals. Bin number 1 contains data for the current 15-minute interval. Bin number 2 contains data for the previous 15-minute interval and so on. In the **Bin** spin box, set the Bin value (1 to 12).

You can track 2 bins of data in daily intervals. Bin number 1 contains data for the current day. Bin number 2 contains data for the previous day. In the **Bin** spin box, set the Bin value (1 or 2).

The data will **not** refresh automatically; click the **Refresh** command button to display data for the specified interval. Click the **Clear** command button to clear all performance data. Click the **Graph** button to display the data in graphical format.

The **Status** in the **Data** list box will always be either Valid or Invalid. A value of Invalid indicates that the data has not been accumulated for the full time of a given interval because a bin has been reset; invalid data should not be used to resolve performance issues.

The Graph window displays when you click the **Graph** button from a number of different tab pages. The options included on the Graph window vary slightly depending on the set of data that is being graphed. As an example, the DS3 ATM PM Graph window is shown below.

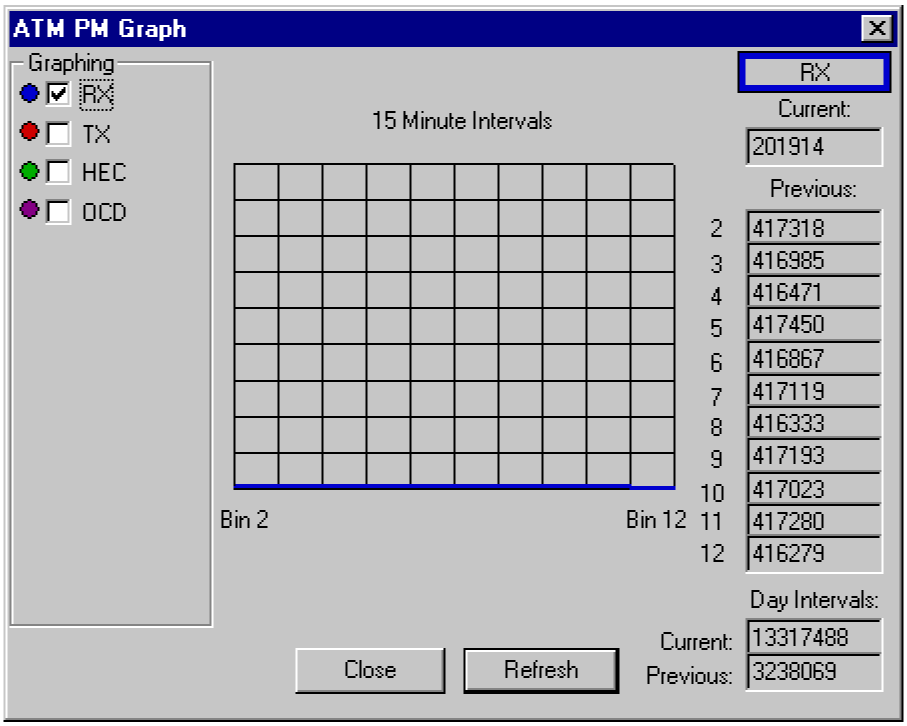


Figure 4-22: Graph Window, ATM PM

The **Graphing** group includes a list of parameters that vary depending on the window from which the Graph window was accessed.

The Graph window includes a grid where the line graphs are displayed. The grid can display any combination of the available parameters—each parameter displays in a different color to make it easier to view the information. The grid is divided into 15-minute intervals, and labelled by bin number.

The **Graph Invalid Data** check box displays below the grid if data for any of the intervals in the selected bin is invalid. Invalid data displays as a dashed line; valid data displays as a solid line. If you do not want to view invalid data, click the check box to deselect it.

The following numeric data is displayed on the right side of the Graph window:

- Current data for the current 15-minute interval and current day.

- Historic data for the eleven previous 15-minute bins and for the previous day.

Click the **Close** command button to close the window, or the **Refresh** command button to refresh the display.

Chapter 5
OC3 Trunk Cards

Introduction to OC3

The OC3 provides a GR-253 compliant Synchronous Optical Network (SONET) interface for connecting the D50 system to an OC3-based data network. It also provides egress address translation, second level multiplexing, and timing resources. The OC3 terminates the OC3-formatted ATM data stream to and from the ATM data network.

If a cell's VPI/VCI address identifies the cell as user data, the VPI portion of the cell header is replaced with an internal multiplexer address to facilitate routing through the D50 system. A routing tag is also inserted, which is used by the OC3 card to determine the destination for the cell. The OC3 translator checks for Operations and Maintenance (OAM) cells and processes them based on associated data. The translator supports Alarm Indication Signal (AIS), Remote Defect Indicator (RDI), and loopback OAM[1].

The Master Control Shelf (MCS) contains two OC3 cards in a 1:1 protection group. MCS slot 8 contains the working card, and slot 7 contains the protection card.

Upstream data is multiplexed into twelve MLA (Master Line Card Adapter) card slots and to a queue connected to the ingress data path. The downstream-to-upstream path is used for routing OAM and Embedded Operations Channel (EOC) cells out of the OC3 trunk and for routing test cells to the microprocessor. There is no flow control feedback across the interface between the trunk card and the MLA card slots downstream. The MLA ports operate at a 25 MHz rate.

Fault information is stored in registers in the multiplexer; this information is used by the OC3 card for performance monitoring purposes.

The OC3 card generates system clocks and references. The system references are frequency locked to the on-board OC3 carrier TCXO (20 PPM stability) on initial power up. The system references may also be frequency locked to the OC3 frame pulse (if available), or to an external office reference. The OC3 card provides an 8 KHz and a 19.44 MHz system reference. It also provides a 25 MHz bus clock. The bus clock is not locked to the system reference.

The OC3 card types are as follows:

- **OC3T.** The basic OC3 card, does not support Quality of Service Version 4.0 (QoSV4).
- **OC3T2.** The OC32 card provides support for QoSV4. For details, see the description of the **OC3 Port OC3T Tab Page**.

---

[1] The OC3TQ trunk card will support OAM loopback tests, AIS, or RDI conditions in Release 7.0.

- **OC3TQ.** The OC3TQ card supports end-to-end ATM QoS for the different service categories of Constant Bit Rate (CBR), Variable Bit Rate real-time (VBR-rt), Variable Bit Rate non-real-time (VBR-nrt), and Unspecified Bit Rate (UBR). ATM QoS provisioning details for this card are available in the volume titled Provisioning, Section 1—*Provisioning Concepts*, Chapter 12—"ATM QoS Provisioning."

  Note: Additional provisioning information can be located in the volume titled Provisioning, Section 4—*Appendices*, Appendix A—"Provisioning Parameters."

OC3 Card Interface

Click an OC3 card in the MCS equipment locator group to display the following tabs:

- Status.
- Configuration.
- Versions.
- Protection Group Status.
- Protection Group.

OC3 Card Status Tab Page

The Status tab page displays initially.

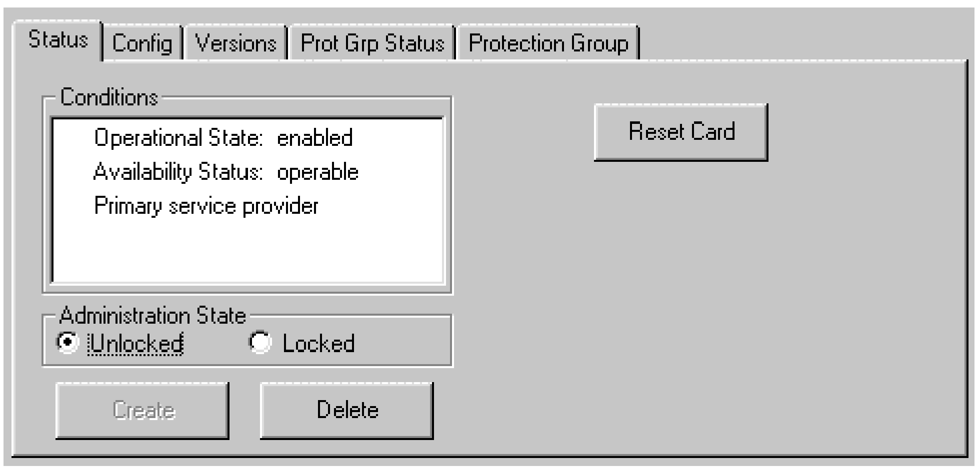


Figure 4-23: OC3 Card Status Tab

The **Conditions** list box displays conditions associated with the selected card. Data in the **Conditions** list box is refreshed by the system at user-specified intervals; the interval can be set to 0, which means that the data will **not** automatically refresh. You can specify the polling interval by selecting Options on the Tools menu. The data can also be updated by clicking the Refresh icon on the toolbar.

The **Administration State** group allows you to control whether or not the card is available for service. **Unlocked** makes the card available if there are no other conditions blocking its use. **Locked** makes the card unavailable for service; cards should be locked when being configured, when making hardware upgrades, or when testing.

> **Note:** If a card is locked, any alarms for that card will **not** display in the Active Alarms list; however, the alarm conditions will display in the **Conditions** box on the card's Status tab. If an alarm condition exists and the unlocked option is selected, an alarm will then be displayed in the Active Alarms list. For descriptions of alarm conditions, see the volume titled <u>Maintenance and Testing</u>, Section 1—*System Monitoring*, Chapter 2—"Conditions."

The **Create** button is only enabled if you have clicked on an unprovisioned slot. Click this button to display a list of cards you can create.

The **Delete** command button is only enabled if you have clicked on a provisioned card. Click this button and a warning message displays indicating the card is about to be deleted from the system. You can either click the **OK** button to proceed, or the **Cancel** button to cancel the operation.

Click the **Reset Card** button to physically reset the card. Click this button and a warning message displays asking if you are sure you want to reset the card. You can click the **OK** button to proceed or the **Cancel** button to cancel the operation.

OC3 Card Configuration Tab Page

Click the Config tab to display the following tab page.

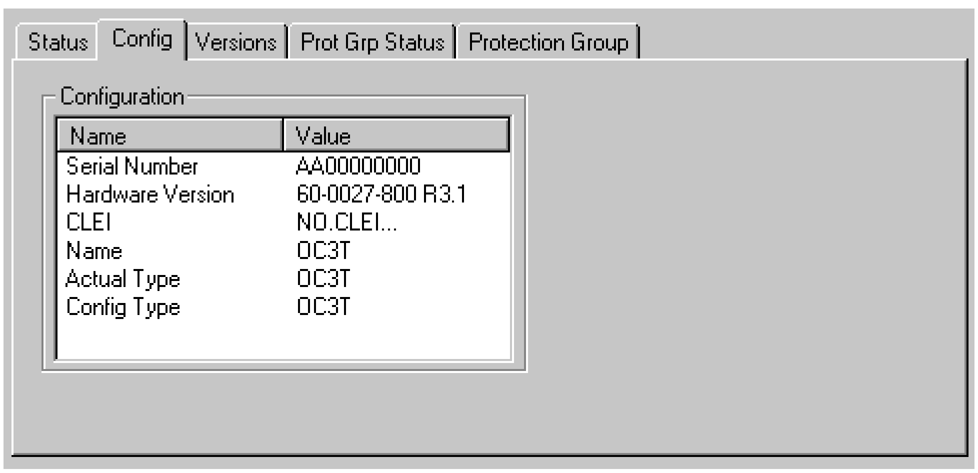


Figure 4-24: OC3 Card Configuration Tab

The **Configuration** list box shows the Serial Number, Hardware Version, CLEI code, Name, and the Actual and Configured card Type.

OC3 Card Versions Tab Page

Click the Versions tab to display the following tab page.

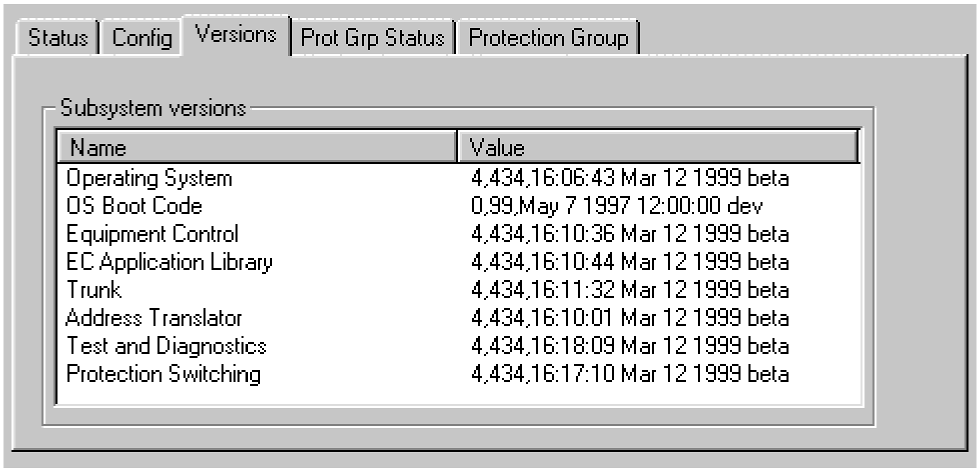


Figure 4-25: OC3 Card Versions Tab

The **Subsystem Versions** group lists the subsystems, their version numbers, and the dates when they were created.

OC3 Card Protection Group Status Tab Page

Click the Prot Grp Status tab to display the following tab page.

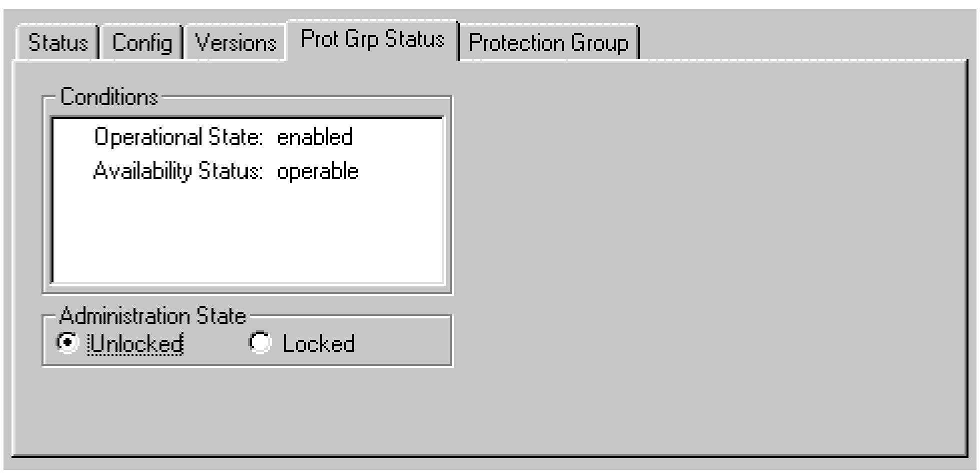


Figure 4-26: OC3 Card Protection Group Status Tab

The **Conditions** list box displays conditions associated with the selected card. Data in the **Conditions** list box is refreshed by the system at user-specified intervals; the interval can be set to 0, which means that the data will **not** automatically refresh. You can specify the

polling interval by selecting Options on the Tools menu. The data can also be updated by clicking the Refresh icon on the toolbar.

The **Administration State** group allows you to control whether or not the port is available for service. **Unlocked** makes the port available if there are no other conditions blocking its use. **Locked** makes the port unavailable for service; ports should be locked when being configured, when making hardware upgrades, or when testing.

> **Note:** If a card is locked, any alarms for that card will **not** display in the Active Alarms list; however, the alarm conditions will display in the **Conditions** box on the card's Protection Group Status tab. If an alarm condition exists and the unlocked option is selected, an alarm will then be displayed in the Active Alarms list. For descriptions of alarm conditions, see the volume titled Maintenance and Testing, Section 1—*System Monitoring*, Chapter 2—"Conditions."

OC3 Card Protection Group Tab Page

Click the Protection Group tab to display the following tab page.

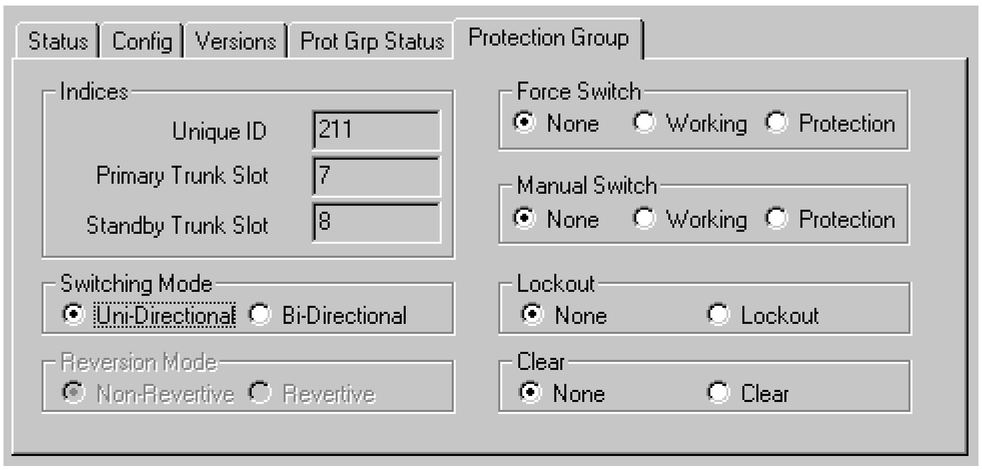


Figure 4-27: OC3 Card Protection Group Tab

The Protection Group tab page is used to set parameters for the 1:1 protection group for the two trunk cards.

The **Indices** group displays the **Unique ID** for the protection group, and the numbers of the primary and standby slots.

Primary Trunk Slot is the MCS slot of the currently active trunk card and **Standby Trunk Slot** is the inactive slot. Slots 7 and 8 are reserved for trunk cards. The left slot (Slot 7) is designated the protection slot, and the right slot (Slot 8) is designated the working slot.

The **Switching Mode** group specifies the points of control for protection switching:

- **Uni-Directional.** Controlled by the multiplexer only.
- **Bi-Directional.** This feature is not supported.

In the Uni-Directional switching mode, protection switching will **not** consider far-end requests when determining whether to perform a manual switch.

The **Reversion Mode** group is not enabled for this card.

The terms **working** and **protection** refer to slot provisioning—**not** to which card is currently in active or standby status. The left slot (Slot 7) is designated the protection slot, and the right slot (Slot 8) is designated the working slot.

The **Force Switch**, **Manual Switch**, **Lockout**, and **Clear** groups allow you to select options for protection switching that involve both the multiplexer (near-end) and the ATM network (far-end) of the trunk. Protection switching considers these options in the following order of priority:

1. **Clear.** User-initiated, will clear only user-initiated protection request.
2. **Lockout.** User-initiated, will clear only user-initiated protection request.
3. **Force.** User-initiated, will clear only user-initiated protection request.
4. **Signal failure.** System-initiated.
5. **Manual.** User-initiated, will clear only user-initiated protection request.
6. **Signal degrade.** System-initiated.

The **Clear** group allows you to clear the state of the protection switching software. Click the **Clear** radio button to clear the state of the software, then click the **None** radio button to enable the protection switching. You can then proceed with a manual or forced switch selection. This procedure is useful if the system does not seem to be responding to selecting protection switching options.

The **Lockout** group controls whether trunk card protection switching is enabled.

- **None.** Enables protection switching (default).
- **Lockout.** Disables protection switching.

Forced switching causes protection switching regardless of trunk conditions. The **Force Switch** group allows you to select which trunk slot becomes active upon a forced switch.

- **None.** Disables forced protection switching (default). **Always** select this option after selecting either **Working** or **Protect** in order to allow future changes to the switching options.
- **Working.** Causes switching to the working trunk slot (Slot 8).
- **Protect**. Causes switching to the protection trunk slot (Slot 7).

Manual switching causes protection switching, but is dependent on trunk conditions. The **Manual Switch** group allows you to select which trunk slot becomes active upon a manual switch.

- **None.** Disables manual protection switching (default). **Always** select this option after selecting either **Working** or **Protect** in order to allow future changes to the switching options.
- **Working.** Causes switching to working trunk slot (Slot 8), based on trunk conditions.
- **Protect.** Causes switching to protection trunk slot (Slot 7), based on trunk conditions.

OC3 Port Interface

Click the port connection on the OC3 card to display the OC3 port interface.

The OC3 port object view contains the following tabs:

- Status.
- Test.
- OC3T.
- OC3 Thresholds.
- Trace Data.
- Physical PM.
- ATM PM.

These tabs are described in the following sections.

OC3 Port Status Tab Page

The Status tab displays initially.

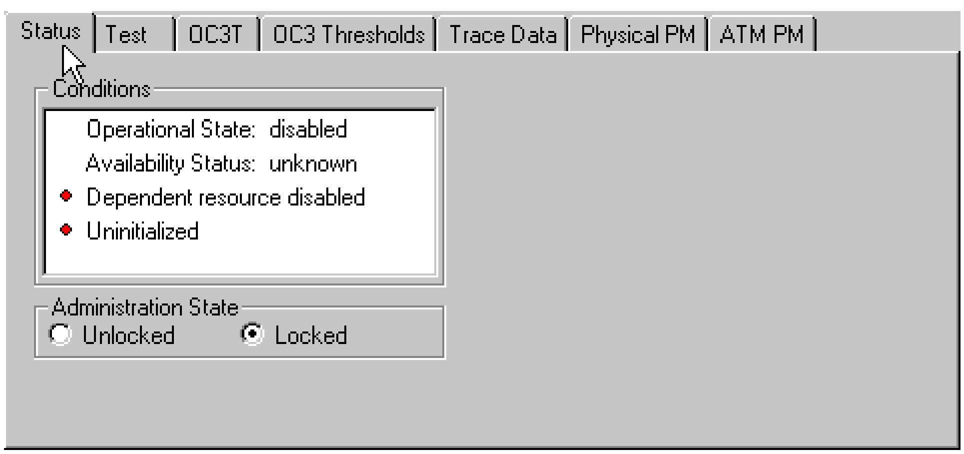


Figure 4-28: OC3 Port Status Tab

The **Conditions** list box displays conditions associated with the selected port. Data in the **Conditions** list box is refreshed by the system at user-specified intervals; the interval can be set to 0, which means that the data will **not** automatically refresh. You can specify the

polling interval by selecting Options on the Tools menu. The data can also be updated by clicking the Refresh icon on the toolbar.

The **Administration State** group allows you to control whether or not the port is available for service. **Unlocked** makes the port available if there are no other conditions blocking its use. **Locked** makes the port unavailable for service; ports should be locked when being configured, when making hardware upgrades, or when testing.

> **Note:** If a port is locked, any alarms for that port will **not** display in the Active Alarms list; however, the alarm conditions will display in the **Conditions** box on the port's Status tab. If an alarm condition exists and the unlocked option is selected, an alarm will then be displayed in the Active Alarms list. For descriptions of alarm conditions, see the volume titled Maintenance and Testing, Section 1—*System Monitoring*, Chapter 2—"Conditions."

OC3 Port Test Tab Page

Click the Test tab to display the following tab page.

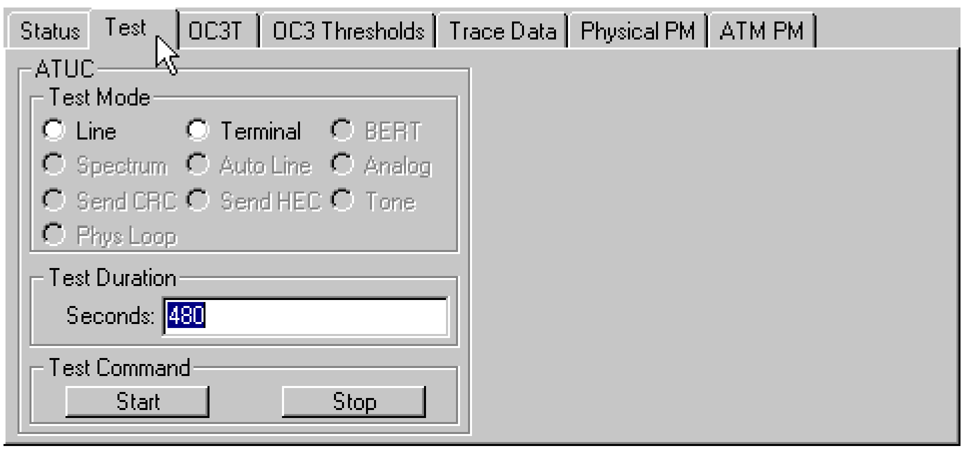


Figure 4-29: OC3 Port Test Tab

The Test tab allows you to perform testing on the OC3 card.

The **Test Mode** group allows you to select the type of testing to perform:

- **Line.** Test the line to the subscriber's network interface—no data into the system.
- **Terminal.** Test the line to the subscriber's modem—no data out of the system.

Test Duration sets the interval in seconds that the system should wait before stopping the loopback test. The *Test Duration* default is 60 seconds. The **Test Command** buttons **Start** and **Stop** testing.

> **Important! All diagnostic tests interrupt data flow through the system. Do not perform on a D50 that is providing service. Only use diagnostic tests during commissioning procedures or in a lab environment to isolate trouble in the system. If using in-band management, a diagnostic test will cut off the D50's control of the management station; the test timeout should be set appropriately.**

For additional information on Diagnostic Test Modes, see the volume titled Maintenance and Testing.

OC3 Port OC3T Tab Page

Click the OC3T tab to display the following tab page.

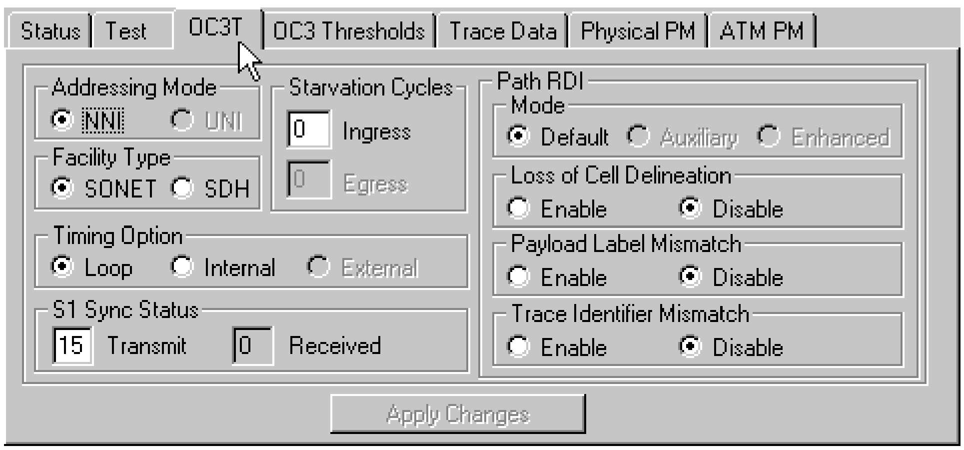


Figure 4-30: OC3 Port OC3T Tab

The **Addressing Mode** group indicates the mode, Network Node Interface (NNI) or Universal Network Interface (UNI). This parameter is not provisionable by the user and is always set to the NNI option (as shown in the example).

The **Facility Type** group allows you to specify whether the facility is SONET (Synchronous Optical Network) or SDH (Synchronous Digital Hierarchy is always used with the D50e). SONET is the ANSI standard, and SDH is the ITU (International Telecommunications Union) standard.

> **Note:** If SDH is selected in the **Facility Type** group, the **Path RDI** group title on this tab changes to **HP RDI** (High Order Path RDI). On the OC3 Thresholds tab, the **Interval** titles change as follows: Section changes to RS (Regenerator Section), Line changes to MS (Multiplex Section), and Path changes to HP (High Order Path). These changes in the interface reflect ITU standards for terminology.

The ATM router/switch side must be configured as the same facility type (SONET or SDH) as the D50, otherwise an LOP (Loss of Pointer) condition occurs.

> **Note:** The LOP condition refers to the loss of the pointer byte in the path overhead. The SONET and SDH standard are roughly the same as far as ATM payload is concerned, but there are several differences in the way they handle overhead bytes. SDH facilities use two (S1 and S0) bits in the H1 (pointer byte) path overhead to identify the payload type (as defined in 3.1.4 ITU G-709). SONET facilities never use S1/S0 bits. If an SDH facility receives a payload containing the H1 byte from the SONET end (this will happen if the router/switch side and the D50 are configured as different facility types), it misinterprets the payload type and declares an LOP condition.

The **Starvation Cycles**[2] group allows you to specify the number of starvation cycles in the ingress direction. This field allows you to allocate a specified percentage of service to low-priority traffic.

> **Note:** This group is enabled only for the OC3T2 and OC3TQ cards. For the OC3T card, this group is not enabled.

The percentage of bandwidth available for low-priority traffic is calculated by the system as one divided by the value of this field plus one [1/(starvation cycles + 1)], for example:

- If the value for this field is set to 0 (zero), no bandwidth is guaranteed to be available for low-priority traffic.
- If the value for this field is set to 1, then 1/(1+1), or 50% of available bandwidth is available for low-priority traffic.
- If the value for this field is set to 2, then 1/(2+1), or 33% of available bandwidth is available for low-priority traffic.

The **Timing Option** group allows you to specify whether to use loop timing (indicating that the D50 will extract timing from the OC3 signal) or internal timing (indicating that the D50 will use another internal timing source).

The **S1 Synch Status** group displays the numbers of transmitted and received S1 bits. Valid values for the **Transmit** field are 1 through 15 (the default is 15). The **Received** field is read-only.

The Remote Defect Indicator (RDI) is a byte that is sent from one end of a link to the other, to acknowledge the detection or an LOS (Loss of Signal), LOF (Loss of Frame), LOP (Loss of Pointer), or AIS (Alarm Indication Signal) condition at the other end. The RDI can be initiated from either end (the D50 or the router). The **Path RDI** group allows you to specify additional conditions for which an RDI will be sent upstream. In the **Mode** group, only the **Default** option is enabled.

> **Note:** If **SDH** is selected in the **Facility Type** group, the **Path RDI** group title changes to **HP RDI** (High Order Path RDI).

[2] "Priority queuing QoSV4 starvation cycles are not applicable to a D50/D50e Release 6.0 system supporting ATM QoS."

You can enable any of the following conditions:

- **Loss of Cell Delineation** (LCD).
- **Payload Label Mismatch**.
- **Trace Identifier Mismatch**.

LCD and Payload Label Mismatch conditions are far less severe than LOS, LOF, LOP, or AIS conditions, so enabling RDI for these conditions is optional. By default, both the available options are disabled. If either of the groups of Path RDI conditions (LCD or Payload Label Mismatch) are enabled, an RDI will be sent upstream upon detection of the specified condition.

If you change any of the provisioning parameters, the **Apply Changes** command button is enabled. Click this button to immediately apply the changes to the system.

> **Note:** Changes should only be applied on a port that is disabled. To cancel any changes and return the parameters to the original values, close the window without clicking the **Apply Changes** command button.

OC3 Port OC3 Thresholds Tab Page

Click the OC3 Thresholds tab to display the following tab page.

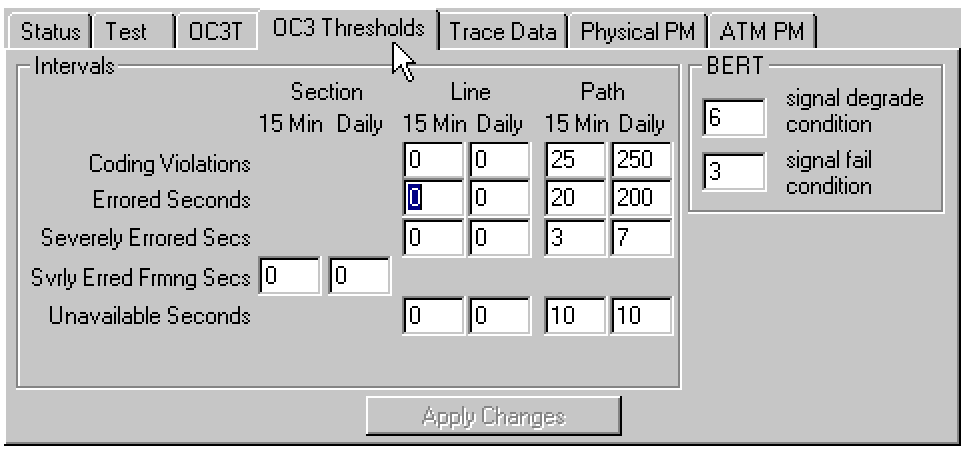


Figure 4-31: OC3 Port OC3 Thresholds Tab

The **Intervals** group allows you to specify several Line and Path error rate thresholds, for both 15-minute and daily intervals:

- **Code Violation** is the count of CP-bit parity errors occurring in the accumulation period.
- **Errored Seconds** is the count of seconds containing one or more CP-bit parity errors, one or more SEF defects, or one or more AIS defects.
- Severely Errored Secs is the count of seconds containing more than 44 CP-bit parity errors, one or more SEF defects, or one or more AIS defects.

- **Svrly Erred Frmng Secs** is the count of seconds containing one or more SEF defects or one or more AIS defects.
- **Unavailable Seconds** is the count of one second intervals during which the OC3 path is unavailable

  Note: If SDH is selected in the **Facility Type** group on the OC3T tab, the **Interval** titles on this tab change as follows: Section changes to RS (Regenerator Section), Line changes to MS (Multiplex Section), and Path changes to HP (High Order Path).

The **BERT** (Bit Error Rate Threshold) group allows you to set thresholds for the *signal degrade* and *signal fail conditions.*

For provisioning parameter tables, see the volume titled Provisioning.

After making changes to any of the thresholds, the **Apply Changes** button becomes enabled. Click this button to apply the changes to the MIB.

OC3 Port Trace Data Tab Page

Click the Trace Data tab to display the following tab page.

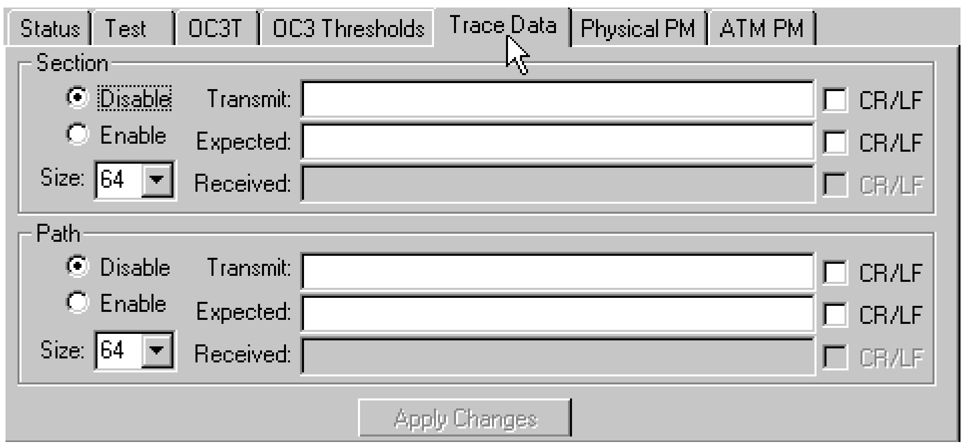


Figure 4-32: OC3 Port Trace Data Tab

The Trace Data tab allows you to specify a data pattern to send out to the router/switch. Trace data patterns are typically used to identify the node addresses for each end of a link. You can specify a trace data pattern for the section and the path.

If **Section** group is enabled, you can define trace data patterns for the section. The D50 sends the pattern specified in the **Transmit** box out to the router/switch, then compares the received section trace data with the pattern specified in the **Expected** box. If the **Received** data does not match, a Section Trace Mismatch condition is reported.

If the **Section** group is disabled, any mismatch condition is cleared.

The **Size** box allows you to specify the number of bytes (either 16 or 64) to enter for the trace data patterns. If set to 64 bytes, the CR/LF (Carriage Return/Line Feed) should be inserted in byte 63/64 by selecting the **CR/LF** check box. If set to 16 bytes, the pad characters 0x00 are automatically inserted following the input characters, and a CR/LF is automatically inserted in byte 63/64.

The **Path** group options work the same way as the **Section** group options, but are used to set up trace data for the path. If the received data does not match, a Path Trace Mismatch condition is reported.

OC3 Port Physical PM Tab Page

Click the Physical PM tab to display the following tab page.

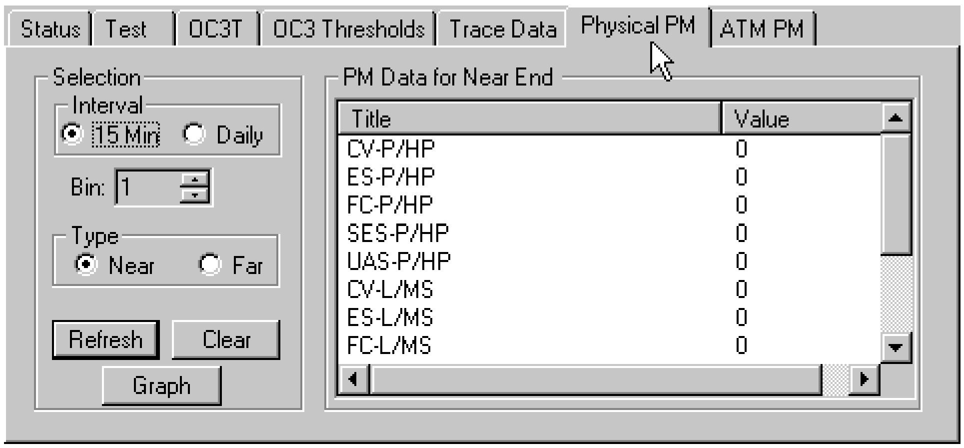


Figure 4-33: OC3 Port Physical PM Tab

The Physical PM tab page provides performance monitoring data for the OC3 port. The **Interval** group allows you to select either 15-minute or Daily intervals for performance monitoring.

You can track up to 12 bins of performance data in 15-minute intervals. Bin number 1 contains data for the current 15-minute interval. Bin number 2 contains data for the previous 15-minute interval and so on. In the **Bin** spin box, set the Bin value (1 to 12).

You can track 2 bins of data in daily intervals. Bin number 1 contains data for the current day. Bin number 2 contains data for the previous daily interval. In the **Bin** spin box, set the Bin value (1 or 2).

The **Type** group allows you to specify whether to monitor near-end or far-end data.

The **PM Data for . . .** group displays the names and values for the parameters listed. The title of this group changes to reflect the option selected in the **Type** group. This list includes values for the following parameters:

- CV-P/HP (Code Violation-Path/High Order Path).
- ES-P/HP (Errored Second-Path/High Order Path).
- FC-P/HP. Unused.
- SES-P/HP (Severely Errored Second-Path/High Order Path).
- UAS-P/HP (Unavailable Seconds-Path/High Order Path).

- CV-L/MS (Code Violation-Line/Multiplexer Section).
- ES-L/MS (Errored Second-Line/Multiplexer Section).
- FC-L/MS. Unused.
- SES-L/MS (Severely Errored Second-Line/Multiplexer Section).
- UAS-L/MS (Unavailable Seconds-Line/Multiplexer Section).
- Status.

The data will **not** automatically refresh; you must click the **Refresh** command button to refresh the data manually. Click the **Clear** command button to clear all the performance data for this port. Click the **Graph** button to display the data in graphical format.

The **Status** in the **Data** list box will always be either Valid or Invalid. A value of Invalid indicates that the data has not been accumulated for the full time of a given interval because a bin has been reset; invalid data should not be used in resolving performance issues.

OC3 Port ATM PM Tab Page

Click the ATM PM tab to display the following tab page.

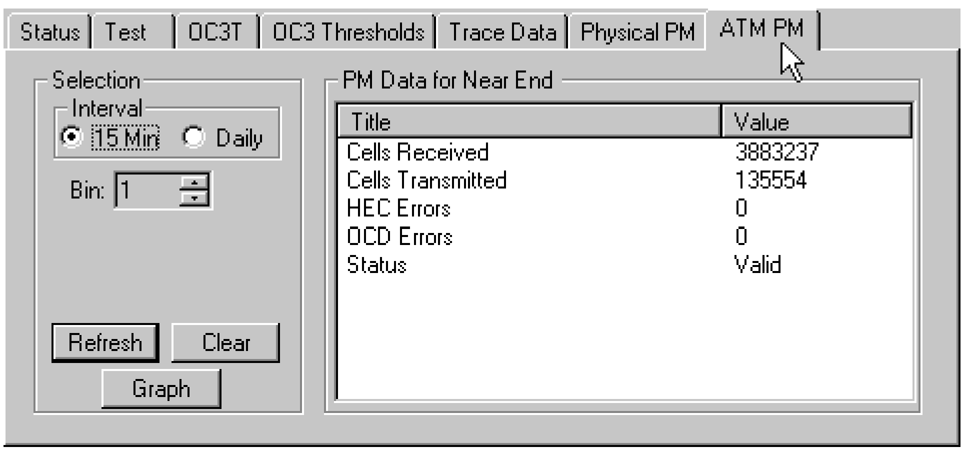


Figure 4-34: OC3 Port ATM PM Tab

The **ATM PM** (Performance Monitoring) tab page provides information on cells received and transmitted, HEC and OCD errors, and the status. The **Interval** group allows you to select either 15-minute or Daily intervals for performance monitoring.

You can track up to 12 bins of performance data in 15-minute intervals. Bin number 1 contains data for the current 15-minute interval. Bin number 2 contains data for the previous 15-minute interval and so on. In the **Bin** spin box, set the Bin value (1 to 12).

You can track 2 bins of data in daily intervals. Bin number 1 contains data for the current day. Bin number 2 contains data for the previous day. In the **Bin** spin box, set the Bin value (1 or 2).

The data will **not** refresh automatically; click the **Refresh** command button to display data for the specified interval. Click the **Clear** command button to clear all performance data. Click the **Graph** button to display the data in graphical format.

The **Status** in the **Data** list box will always be either Valid or Invalid. A value of Invalid indicates that the data has not been accumulated for the full time of a given interval because a bin has been reset; invalid data should not be used to resolve performance issues.

The Graph window displays when you click the **Graph** button from a number of different tab pages. The options included on the Graph window vary slightly depending on the set of data that is being graphed. As an example, the OC3 ATM PM Graph window is shown below.

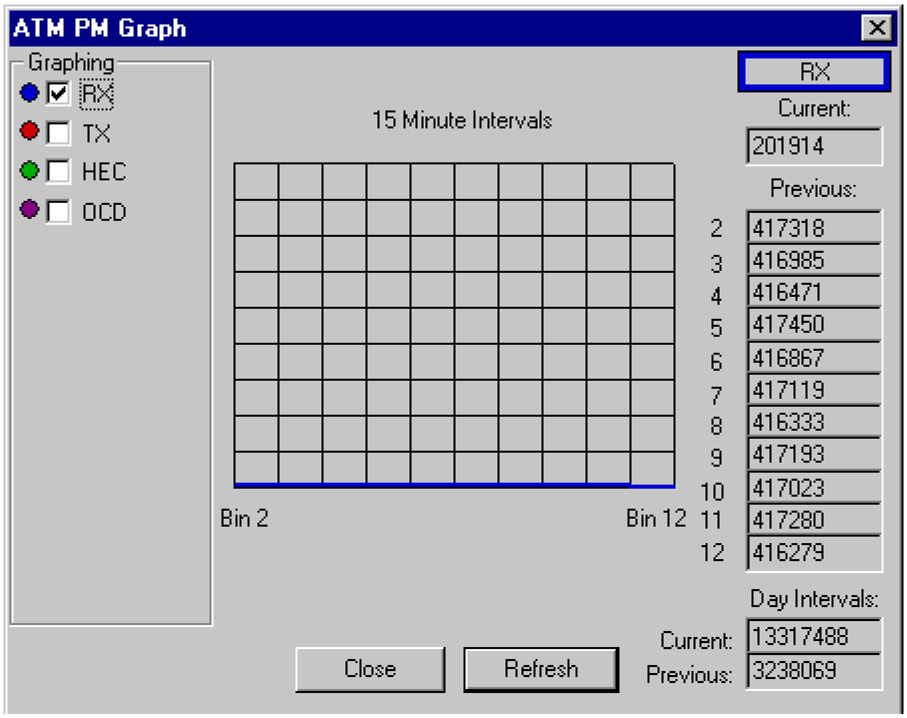


Figure 4-35: Graph Window, ATM PM

The **Graphing** group includes a list of parameters that vary depending on the window from which the Graph window was accessed.

The Graph window includes a grid where the line graphs are displayed. The grid can display any combination of the available parameters—each parameter displays in a different color to make it easier to view the information. The grid is divided into 15-minute intervals, and labelled by bin number.

The **Graph Invalid Data** check box displays below the grid if data for any of the intervals in the selected bin is invalid (not shown in this example). Invalid data displays as a dashed line; valid data displays as a solid line. If you do not want to view invalid data, click the check box to deselect it.

The following numeric data is displayed on the right side of the Graph window:

- Current data for the current 15-minute interval and current day.
- Historic data for the eleven previous 15-minute bins and for the previous day.

Click the **Close** command button to close the window, or the **Refresh** command button to refresh the display.

SECTION 5 MLA AND LSM INTERFACE CARDS AND PORTS

Contents

List of Figures

List of Tables

Nokia High Speed Access Products Inc. Proprietary Data

Chapter 1
MLA and LSM Cards

Introduction

There are two categories of broadband interface cards:

- MLA (Master Line Card Adapter) cards, which provide a Line Card Shelf (LCS) interface. The LCS types are local LCS, Remote LCS (RLCS), or D50 Remote Access Module (D50 RAM).
- Broadband tributary cards provide standard ATM User Network Interface (UNI) that supports provisionable VPI/VCI mappings to the D50 trunk card, allowing ATM cells to be aggregated from other ATM network equipment.

There are several types of MLA cards for different types of interfaces. For each MLA card type, there is a corresponding Line Card Shelf Multiplexer (LSM) card type, as shown in the following table. The broadband tributary card types connect to standard ATM network equipment rather than to an LSM card.

Table 5-1: MLA/LSM Cards, Signal, and Interface Equipment Types

MLA Card Types	LSM Card Types	Signal Type	Interface Equipment
MLA, MLA2[1]	LSM2[2]	OC-3	LCS, RLCS
MLAT1	LSMT1	DS-1	LCS, RLCS, D50 RAM
MLAT3	LSMT3	DS-3	LCS, RLCS, D50 RAM
OC3L	None	OC-3	Standards-based ATM
DS3L	None	DS-3	Standards-based ATM

[1] MLA2L (long-haul) and MLA2S (single-mode intermidiate reach) are available in Release 6.0.

[2] LSM2S and LSM2L are available in Release 6.0.

MLA Cards and Ports

A Master Control Shelf (MCS) can hold up to twelve MLA cards, providing the interface for up to twelve LCSs.

At the MCS, each MLA card provides an interface to one line card shelf: LCS, RLCS, or D50 RAM. At each line card shelf, the MLA card interfaces directly with an LSM card. Each line card shelf holds one LSM card. Each LSM card multiplexes and de-multiplexes ATM cell streams for the shelf's remaining line cards.

Broadband Tributary Cards

Broadband tributary cards provide a standard ATM UNI interface that supports provisionable VPI/VCI mappings to the D50 trunk card, allowing ATM cells to be aggregated from standard ATM network equipment.

There are two types of broadband tributary cards:

- **OC3L.** Provides a SONET OC-3 interface with a 3-priority 64K cell buffer in both the ingress and egress directions.
- **DS3L.** Provides a DS-3 interface with a 3-priority 64K cell buffer in both the ingress and egress directions.

Only one difference distinguishes the port interface for the broadband tributary cards and the MLA cards; on the OC3T tab page (for the OC3L card) and the DS3T tab page (for the DS3L card), the **Addressing Mode** group defaults to the UNI option rather than to the Network Node Interface (NNI) option. For the broadband tributary cards, UNI is the only available option. For the MLA cards, NNI is the only available option.

To create virtual connections between broadband tributary cards and the D50 trunk, see **Broadband Tributary Port Connections**, page 5-33.

> **Note:** Flexibility is built in for future releases to support connections bypassing the trunk interface. However, Release 6.0 currently supports only connections flowing through the trunk interface at the "Link Z" side of a connection.

MLA/LSM Interface

There are four types of MLA and LSM cards that provide the interface between the MCS and LCS:

- **MLA/LSM2.** Provides an OC-3 interface. The MLA card has a single-priority, 2K cell ingress buffer and does **not** support priority queueing Quality of Service (QoSV4). The LSM2 has a 3-priority 64K cell buffer (supporting QoSV4). The buffers are in the ingress direction only.
- **MLA2/LSM2.** Like the MLA/LSM2 card, but the MLA2 card has a 3-priority 64K cell buffer (supporting QoSV4). The MLA2 buffers are in both ingress and egress directions.
- **MLAT1/LSMT1.** Like the MLA2/LSM2 cards, but provides a quad DS-1 Inverse Multiplexed (IMUX) interface, with one IMUX port and four DS-1 ports. The 3-priority buffers support priority queueing QoSV4.
- **MLAT3/LSMT3.** Like the MLA2/LSM2 cards, but provides a DS-3 interface. The 3-priority buffers support priority queueing QoSV4.

The ports on the MLA/LSM cards all display a similar interface, with some different tabs and some differences in which fields are enabled on the tabs. These differences are described briefly in the following paragraphs; more details are provided in the descriptions of the individual tabs.

All four MLA/LSM port interfaces (MLA/LSM2, MLA2/LSM2, MLAT1/LSMT1, and MLAT3/LSMT3) include fields that support priority queueing QoSV4, but they are only active for the MLA2/LSM2, MLAT1/LSMT1 and MLAT3/LSMT3 cards. These fields are included on the following tabs:

- Queue Congestion (not LSM2).
- Queue Congestion PM (not LSM2).
- Queue Manager (not LSM2).
- ATM PM (Performance Monitoring).

The MLAT3/LSMT3 port interfaces are similar to the MLA2/LSM2 port interfaces, except for the following different tabs:

- The MLAT3/LSMT3 ports include a DS3T tab instead of an OC3T tab.
- The MLAT3/LSMT3 ports include a DS3 Thresholds tab instead of an OC3 Thresholds tab.

The MLAT1/LSMT1 port interfaces are similar to the MLA2/LSM2 port interfaces. Unlike the other MLA/LSM cards, the MLAT1/LSMT1 cards display five individual ports when the port connection is clicked—one Inverse Multiplex (IMUX) port and four DS-1 ports. Clicking one of these ports displays a port interface similar to that for the MLA2/LSM2 cards.

The IMUX port interface is similar to the MLA2/LSM2 port interface, but supports the DS-1 interface with the following additional tabs:

- DS1.
- DSL Thresholds.
- DSL Frame Thresholds.
- Actuals.

Since it supports DS-1, the IMUX port interface does not include the OC3T tab or the OC3 Thresholds tab as does the MLA2/LSM2 port interface.

The DS-1 port interface is the same as that for the IMUX port, except that it does not include the ATM PM tab.

MLA/LSM Card Interface

Click an MLA card in the MCS equipment locator group or an LSM card in an LCS group to display the following tabs:

- Status.
- Config.
- Versions.

MLA/LSM Card Status Tab Page

The Status tab page displays initially.

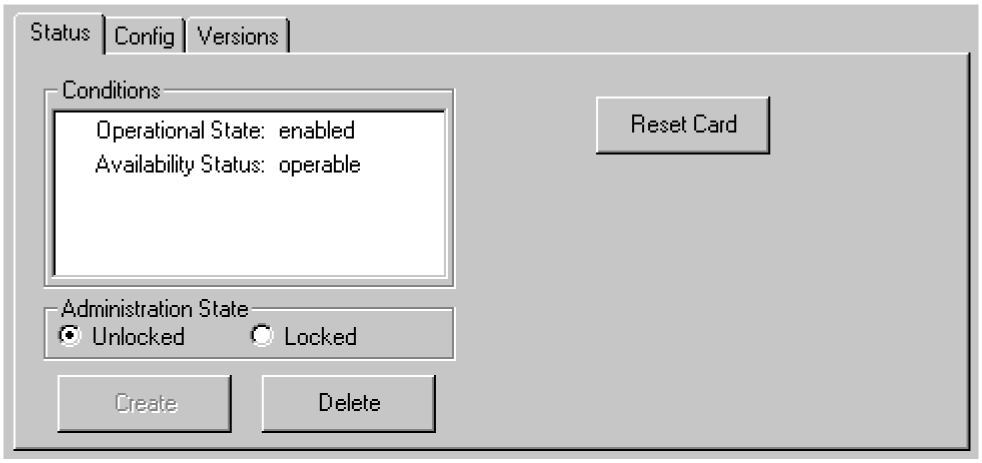


Figure 5-1: MLA/LSM Card Status Tab

The **Conditions** list box displays conditions associated with the selected card. Data in the **Conditions** list box is refreshed by the system at user-specified intervals; the interval can be set to 0, which means that the data will **not** automatically refresh. You can specify the polling interval by selecting Options on the Tools menu. The data can also be updated by clicking the Refresh icon on the toolbar.

The **Administration State** group allows you to control whether or not the card is available for service. **Unlocked** makes the card available if there are no other conditions blocking its use. **Locked** makes the card unavailable for service; cards should be locked when being configured, when making hardware upgrades, or when testing.

> **Note:** If a card is locked, any alarms for that card will **not** display in the Active Alarms list; however, the alarm conditions will display in the **Conditions** box on the card's Status tab. If an alarm condition exists and the unlocked option is selected, an alarm will then be displayed in the Active Alarms list. For descriptions of alarm conditions, see the volume titled Maintenance and Testing, Section 1—*System Monitoring*, Chapter 2—"Conditions."

The **Create** button is only enabled if you have clicked on an unprovisioned slot. Clicking this button displays a list of line cards you can create. Select the type of MLA or LSM card that you want to create from the list.

The **Delete** command button is only enabled if you have clicked on a provisioned card. Clicking this button will display a warning message that the card is about to be deleted from the system, and you can either click the **OK** button to proceed with deleting the card, or click the **Cancel** button to cancel the operation.

Click the **Reset Card** button to physically reset the card. Clicking this button displays a warning asking if you are sure you want to reset the card. Click the **OK** button to proceed or the **Cancel** button to cancel the action.

> **Important! Resetting an MLA card interrupts data flow to the LCS or CPE equipment downstream. Resetting an LSM card interrupts data flow to all line cards in the LCS served by that LSM.**

MLA/LSM Card Config Tab Page

Click the Config tab to display the following tab page.

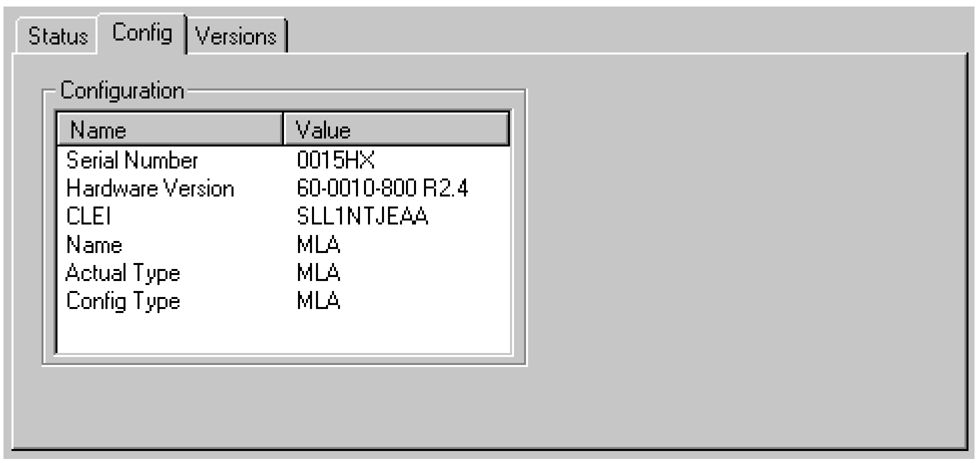


Figure 5-2: MLA/LSM Card Configuration Tab

The Configuration list box shows the Serial Number, Hardware Version, CLEI code, Name, and Type (Actual and Configured) for the card. This example shows the tab for an MLA card, but the Configuration tabs for all the various types of MLA and LSM cards include the same categories of information.

MLA/LSM Card Versions Tab Page

Click the Versions tab to display the following tab page.

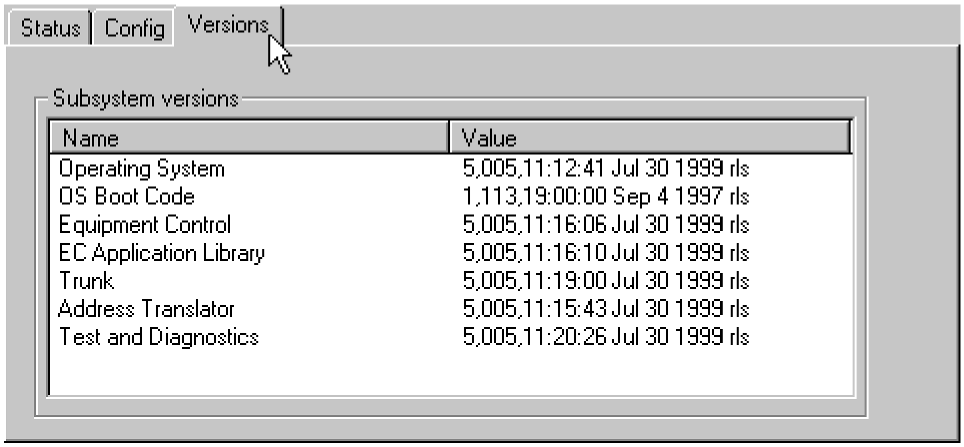


Figure 5-3: MLA/LSM Card Versions Tab

The Versions tab lists the various names and values of the subsystem versions.

MLA/LSM Ports

Click an MLA/LSM2, MLA2/LSM2, MLAT1/LSMT1 or MLAT3/LSMT3 Port indicator in the MCS equipment locator group to display a set of tab pages. The different types of ports display different sets of tabs, as described in the following sections.

The MLA and MLA2 port object views contain the following tabs:

- Status.
- Test.
- OC3T.
- OC3 Thresholds.
- Physical PM.
- ATM PM.
- Queue Manager.
- Queue Congestion.
- Queue Congestion PM.

The LSM2 port object views contain all the tabs that the MLA port object view includes, except for the following tabs:

- Queue Manager.
- Queue Congestion.
- Queue Congestion PM.

The MLAT3/LSMT3 port interfaces are the same, except that the OC3T and OC3 Thresholds tabs are replaced by the DS3T and DS3 Thresholds tabs; this interface supports ingress congestion and queue tabs.

The MLAT1/LSMT1 port interfaces initially display a set of ports instead of a set of tabs, one IMUX port and four individual DS-1 ports. The IMUX port interface is the same as the MLA/LSM port interface, except that the OC3T and OC3 Thresholds tabs are replaced by the DS1, DSL Thresholds, and DSL Frame Thresholds tabs. This interface also includes an Actuals tab.

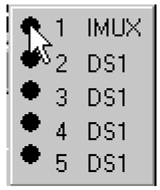


Figure 5-4: MLAT1/LSMT1 Port Interface

The DS-1 port interface is the same as the IMUX port interface, except that it does not include the ATM PM tab.

MLA/LSM Port Status Tab Page

The Status tab displays initially.

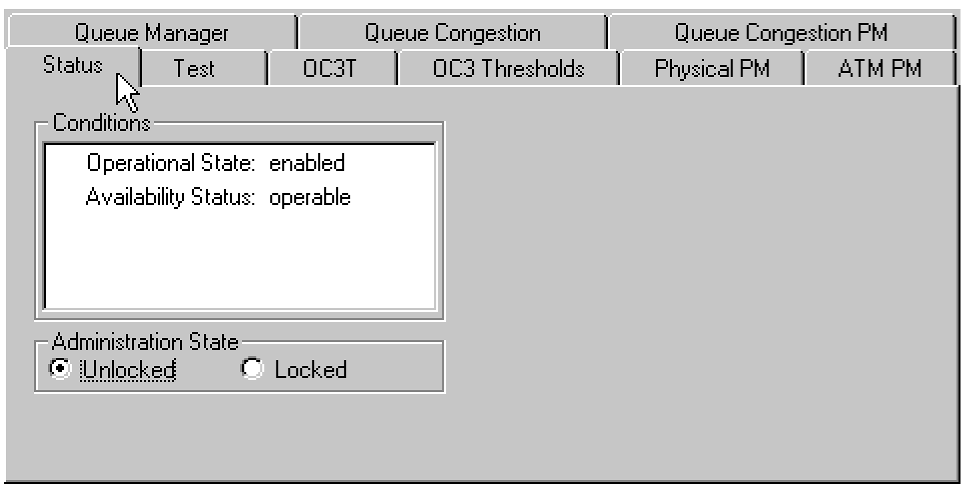


Figure 5-5: MLA Port Status Tab

Note: The LSM port Status tab has the same look-and-feel as the MLA port, but the LSM port interface is different in that it does not include Queue Manager, Queue Congestion, or Queue Congestion PM tabs.

The **Conditions** list box displays conditions associated with the selected port. Data in the **Conditions** list box is refreshed by the system at user-specified intervals; the interval can be set to 0, which means that the data will **not** automatically refresh. You can specify the

polling interval by selecting Options on the Tools menu. The data can also be updated by clicking the Refresh icon on the toolbar.

The **Administration State** group allows you to control whether or not the port is available for service. **Unlocked** makes the port available if there are no other conditions blocking its use. **Locked** makes the port unavailable for service; ports should be locked when being configured, when making hardware upgrades, or when testing.

> **Note:** If a card is locked, any alarms for that card will **not** display in the Active Alarms list; however, the alarm conditions will display in the **Conditions** box on the card's Status tab. If an alarm condition exists and the unlocked option is selected, an alarm will then be displayed in the Active Alarms list. For descriptions of alarm conditions, see the volume titled Maintenance and Testing, Section 1—*System Monitoring*, Chapter 2—"Conditions."

MLA/LSM Port Test Tab Page

Click the Test tab to display the following tab page.

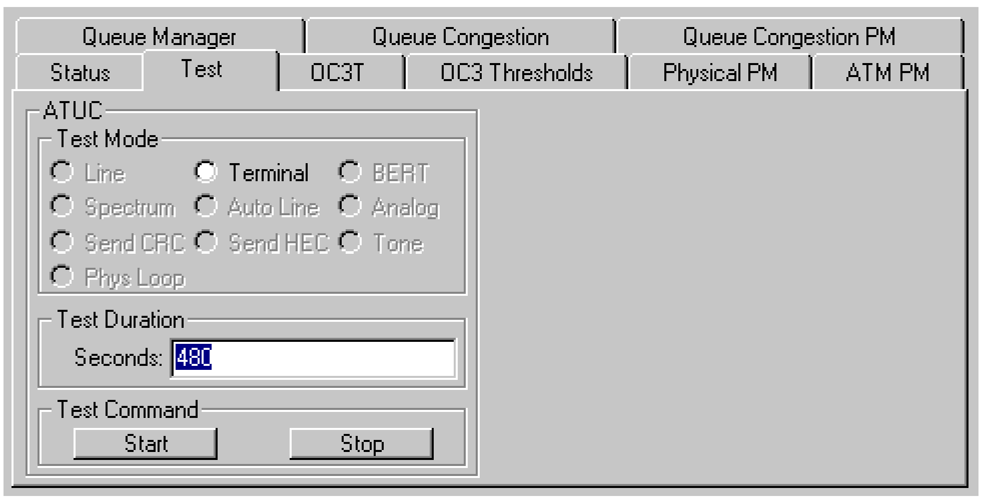


Figure 5-6: MLA Port Test Tab

The Test tab enables testing for the MLA and LSM cards.

> **Note:** The LSM port Test tab is the same as the MLA port Test tab except that LSM card ports also support **Line** test mode.

The **ATUC Test Mode** groups allow you to select the type of testing to perform:

- **Line.** Test the line to the subscriber's network interface—no data into the system.
- **Terminal.** Test the line to the subscriber's modem—no data out of the system.

Test Duration sets the interval in seconds that the system should wait before stopping the test. The **Test Command** buttons **Start** and **Stop** testing.

Table 5-2: Test Duration Table

Card Type	Port Type	Default Test Duration (in seconds)
MLA	OC3	480
MLA2	OC3	480
MLAT1	IMUX	28800
MLAT1	DS1	28800
MLAT3	DS3	60
LSM	OC3	480
LSM2	OC3	480
LSMT1	IMUX	28800
LSMT1	DS1	28800
LSMT3	DS3	60

Important! All diagnostic tests interrupt data flow through the system. Do not perform on a D50 that is providing service. Only use diagnostic tests during commissioning procedures or in a lab environment to isolate trouble in the system.

For additional information on Diagnostic Test Modes, see the volume titled Maintenance and Testing.

MLA/LSM Port OC3T/DS3T/DS1 Tab Pages

Depending on which type of MLA/LSM port you are working with, you can display one of the following tab pages:

- The OC3T tab page (MLA/LSM2 and MLA2/LSM2 cards only).
- The DS3T tab page (MLAT3/LSMT3 cards only).
- The DS1 tab page (MLAT1/LSMT1 cards only).

These tabs are all used to provision the various signals for the cards' ports, as shown in the following table.

Table 5-3: MLA/LSM Card Pairs and Signal Types

MLA/LSM Interconnect Pair	Signal Provisioning Tab Page	Signal Type
MLA/LSM2	OC3T	OC-3
MLA2/LSM2	OC3T	OC-3
MLAT1/LSMT1	DS1	DS-1
MLAT3/LSMT3	DS3T	DS-3

MLA/LSM Port OC3T Tab Page

If you are working with the MLA/LSM2 or MLA2/LSM2 cards, click the OC3T tab to display the following tab page.

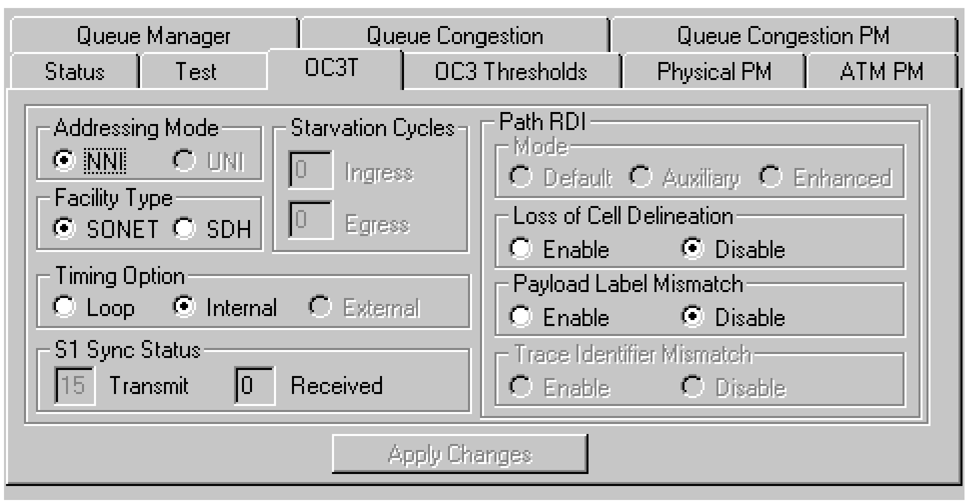


Figure 5-7: OC3T Tab (MLA/LSM2 and MLA2/LSM2 Port)

The OC3T tab page enables provisioning of the OC3 signal on the MLA/LSM and MLA2/LSM2 ports.

The **Addressing Mode** group box indicates the mode selected, either Network Node Interface (NNI) or Universal Network Interface (UNI). This parameter is not provisionable by the user, but depends instead on the card type:

- For MLA/LSM interconnect cards, this parameter is always set to the NNI option.
- For the OC3L broadband card, this parameter is always set to the UNI option.

The **Facility Type** group allows you to specify whether the facility is SONET (Synchronous Optical Network) or SDH (Synchronous Digital Hierarchy). SONET is the ANSI standard, and SDH is the ITU (International Telecommunications Union) standard.

Note: If SDH is selected in the **Facility Type** group, the **Path RDI** group title on this tab changes to **HP RDI** (High Order Path RDI). On the OC3 Thresholds tab, the **Interval** titles change as follows: Section changes to RS (Regenerator Section), Line changes to MS (Multiplex Section), and Path changes to HP (High Order Path). These changes in the interface reflect ITU terminology standards.

The facility type (SONET or SDH) must be the same at both the far and near-end to avoid and LOP (Loss of Pointer) condition.

Note: The LOP condition refers to the loss of the pointer byte in the path overhead. The SONET and SDH standard are roughly the same as far as ATM payload is concerned, but there are several differences in the way they handle overhead bytes.

SDH facilities use two (S1 and S0) bits in the H1 (pointer byte) path overhead to identify the payload type (as defined in 3.1.4 ITU G-709). SONET facilities never use S1/S0 bits. If an SDH facility receives a payload containing the H1 byte from the SONET end (this will happen if the far- and near-end are configured with different facility types), it misinterprets the payload type and declares an LOP condition.

The **Timing Option** group allows you to specify whether to use loop timing (indicating the D50 will extract transmit timing from the OC3 signal) or internal timing (indicating the D50 will use the trunk as its timing source).

The **S1 Synch Status** group displays the numbers of transmitted and received S1 bits. These fields are read-only.

The Remote Defect Indicator (RDI) is a byte that is sent from one end of a link to the other, to acknowledge the detection or an LOS (Loss of Signal), LOF (Loss of Frame), LOP (Loss of Pointer), or AIS (Alarm Indication Signal) condition at the other end. The RDI can be initiated from either end (the D50 or the router). The **Path RDI** group allows you to specify additional conditions for which an RDI will be sent upstream.

Note: If **SDH** is selected in the **Facility Type** group, the **Path RDI** group title changes to **HP RDI** (High Order Path RDI).

You can enable either or both of the following conditions:

- **Loss of Cell Delineation:** Loss of Cell Delineation (LCD) condition.
- **Payload Label Mismatch:** Payload Label Mismatch (PLM) condition. An RDI will be sent to the far-end connection upon detection of this condition.

The **Mode** and **Trace Identifier Mismatch** options are not enabled for the MLA/LSM cards.

LCD and Payload Label Mismatch conditions are far less severe than LOS, LOF, LOP, or AIS conditions, so enabling RDI for these conditions is optional. By default, both the available options are disabled. If either of the groups of Path RDI conditions (LCD or

Payload Label Mismatch) are enabled, an RDI will be sent upstream upon detection of the specified condition.

If you change any of the provisioning parameters, the **Apply Changes** command button is enabled. Click this button to immediately apply the changes to the system.

Note: Changes should only be applied on a port that is disabled. To cancel any changes and return the parameters to the original values, close the window without clicking the **Apply Changes** command button.

MLAT3/LSMT3 Port DS3T Tab Page

If you are working with the MLAT3/LSMT3 cards, click the DS3T tab to display the following tab page.

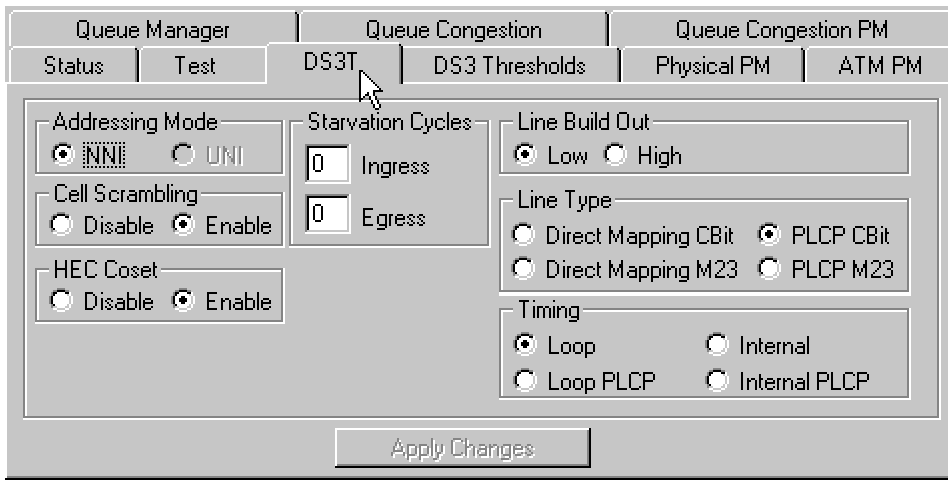


Figure 5-8: DS3T Tab (MLAT3/LSMT3 Port)

The **Addressing Mode** group box indicates the mode selected, either Network Node Interface (NNI) or Universal Network Interface (UNI). For MLA/LSM cards this option is always set to NNI. This parameter is not provisionable by the user, but depends instead on the card type:

- For MLA/LSM interconnect cards, this parameter is always set to NNI.
- For the DS3L and OC3L broadband cards, this parameter is always set to UNI.

The **Cell Scrambling** radio buttons disable or enable a feature that prevents false error detection on the cell payload. Since direct mapping uses the HEC for cell delineation, it is possible that a five-byte pattern with valid ATM cell overhead will appear in the payload. Scrambling reduces the possibility of false lock.

The **Starvation Cycles**[1] group allows you to specify the number of starvation cycles in both the ingress and egress directions. This field allows you to allocate a specified amount of service for low-priority traffic. The percentage of bandwidth available for low-priority traffic is calculated by the system as one divided by the value of this field plus one [1/(starvation cycles + 1)], for example:

- If the value for this field is set to 0 (zero), no bandwidth is guaranteed to be available for low-priority traffic.
- If the value for this field is set to 1, then 1/(1+1), or 50% of the available bandwidth is available for low-priority traffic.
- If the value for this field is set to 2, then 1/(2+1), or 33% of the available bandwidth is available for low-priority traffic.

The **HEC Coset** group allows you to disable or enable Header Error Check (HEC) coset. When enabled, this feature ensures non-zero values for HECs in idle ATM cells. HEC is an 8-bit field (the last byte) of the ATM cell header, and it allows a receiver to detect (and possibly correct) transmission errors in the cell header. It is used for checking integrity only and counts only HEC errors that cannot be corrected.

The **Line Build Out** group allows you to select either **Low** or **High** buildout, which adjusts equalization to reflect the length of the DS3 cable. The DS3 trunk Line Interface Unit (LIU) supports two levels of line build out (this is the length of the coax cable from the MCS backplane to the other end of the DS3 connection, the router or ATM switch):

- **Low** is used for coax cables shorter than 50 feet (default).
- **High** is used for coax cables between 50 and 450 feet in length.

The **Line Type** group allows you to select a DS3 frame format.

- **Direct Mapping CBit** provides the most data throughput and is the preferred operating mode. Some equipment does not support this mode, in which case one of the PLCP modes should be selected. Cell Scrambling and HEC Coset should be enabled.
- **Direct Mapping M23** is typically only used with older equipment. Cell Scrambling and HEC Coset should be enabled when this mode is selected.
- **PLCP CBit** (the default) is the preferable mode of the two PLCP (Physical Layer Convergence Protocol) modes, since it provides better performance monitoring (PM) information. Cell Scrambling should be disabled and HEC Coset should be enabled.
- **PLCP M23** is typically only used with older equipment. Cell Scrambling should be disabled and HEC Coset should be enabled.

[1] "Priority queuing QoSV4 starvation cycles are not applicable to a D50/D50e Release 6.0 system supporting ATM QoS."

The **Line Timing** group enables you to select the type of timing resource for the signal.

- **Loop.** The system extracts timing from the DS-3 signal.
- **Internal.** The system supplies timing from an internal source.
- **Loop PLCP.** The system extracts timing from PLCP.
- **Internal PLCP.** The system supplies timing from an internal PLCP source.

Note: The HEC coset, line type, and line timing options selected must match the options set on the ATM router or switch at the far-end of the loop.

MLAT1/LSMT1 IMUX Port DS1 Tab Page

If you are working with the MLAT1/LSMT1 IMUX port, click the DS1 tab to display the following tab page.

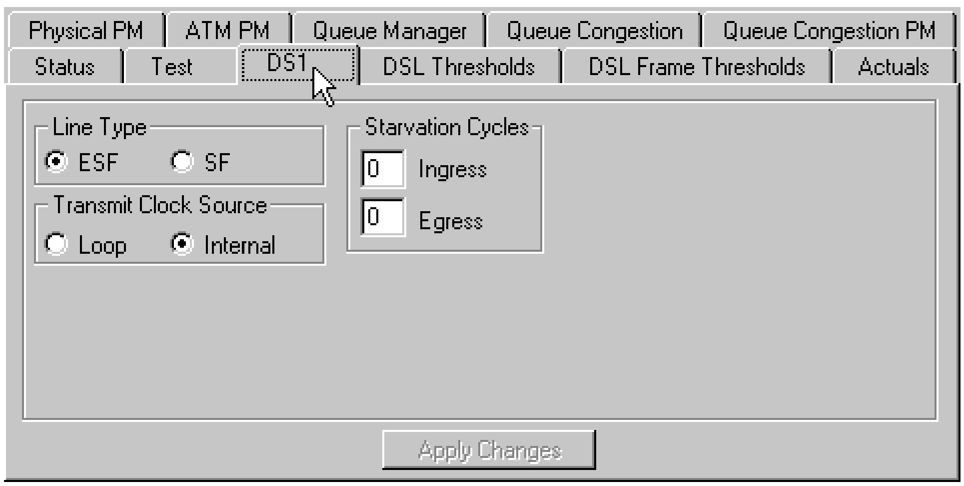


Figure 5-9: DS1 Tab (MLAT1/LSMT1 IMUX Port)

The **Line Type** group allows you to select a DS1 framing format:

- **ESF.** Extended Super Frame (default).
- **SF.** Super Frame. Used with some older equipment.

The **Transmit Clock Source** group enables you to select the type of timing resource for the signal.

- **Loop.** The system extracts timing from the DS-1 signal.
- **Internal**. The system supplies timing from an internal source.

The **Starvation Cycles** group allows you to specify the number of starvation cycles in both the ingress and egress directions. This field allows you to allocate a specified amount of service for low-priority traffic. The percentage of bandwidth available for low-priority traffic is calculated by the system as one divided by the value of this field plus one [1/(starvation cycles + 1)], for example:

- If the value for this field is set to 0 (zero), no bandwidth is guaranteed to be available for low-priority traffic.
- If the value for this field is set to 1, then 1/(1+1), or 50% of the available bandwidth is available for low-priority traffic.
- If the value for this field is set to 2, then 1/(2+1), or 33% of the available bandwidth is available for low-priority traffic.

MLAT1/LSMT1 DS1 Port DS1 Tab Page

If you are working with a MLAT1/LSMT1 DS1 port, click the DS1 tab to display the following tab page.

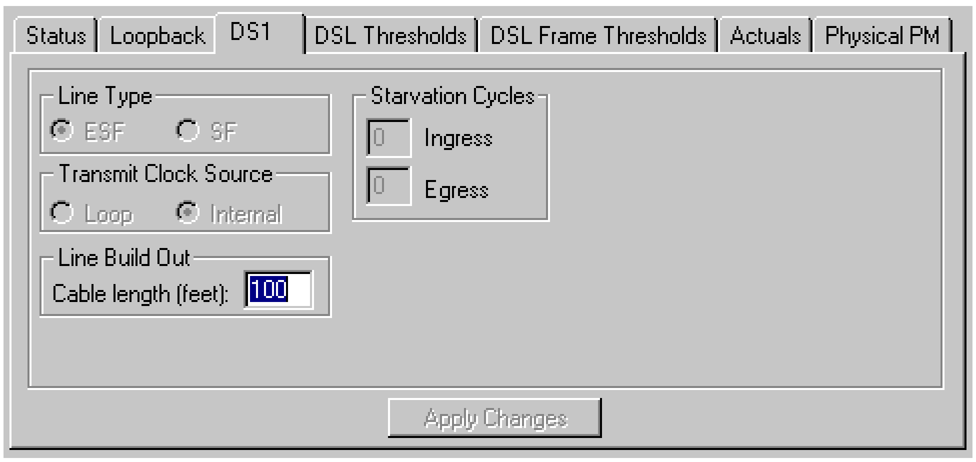


Figure 5-10: DS1 Tab (MLAT1/LSMT1 DS1 Ports)

The **Line Build Out** group allows you to specify a cable length (in feet). The default is 100 (feet).

The rest of the fields are not enabled for the DS-1 ports.

MLA/LSM Port OC3/DS3/DSL Thresholds Tabs

Depending on which type of MLA/LSM ports you are working with, you can display the OC3 Thresholds tab page (MLA/LSM2, MLA2/LSM2, and OC3L cards only), the DS3 Thresholds tab page (MLAT3/LSMT3 and DS3L cards only), or the DSL Thresholds and DSL Frame Thresholds tab pages (MLAT1/LSMT1 cards only).

These tabs are all used to provision the various error thresholds for the cards' ports, and are summarized in the following table.

Table 5-4: Threshold Tabs for the MLA/LSM Ports

Card Types	Threshold Provisioning Tab Pages
MLA/LSM2 MLA2/LSM2 OC3L	OC3 Thresholds
MLAT1/LSMT1 (both IMUX and DS1 ports)	DSL Thresholds DSL Frame Thresholds
MLAT3/LSMT3 DS3L	DS3 Thresholds

MLA/LSM Port OC3 Thresholds Tab Page

If you are working with either the MLA/LSM or MLA2/LSM2 cards, click the OC3 Thresholds tab to display the following tab page.

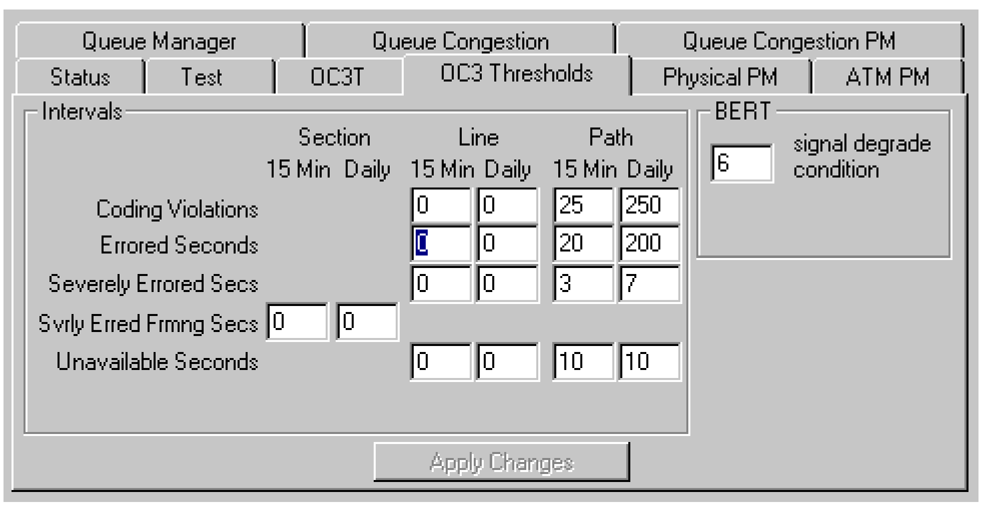


Figure 5-11: OC3 Thresholds Tab (MLA/LSM2 and MLA2/LSM2 Port)

The **Intervals** group allows you to specify thresholds for a number of parameters, for Section, Line, and Path (as appropriate for each parameter) for both 15-minute and Daily intervals.

- **Code Violation** is the count of CP-bit parity errors occurring in the accumulation period.

- **Errored Seconds** is the count of seconds containing one or more CP-bit parity errors, one or more SEF defects, or one or more AIS defects.
- **Severely Errored Secs** is the count of seconds containing more than 44 CP-bit parity errors, one or more SEF defects, or one or more AIS defects.
- **Svrly Erred Frmng Secs** is the count of seconds containing one or more SEF defects or one or more AIS defects.
- **Unavailable Seconds** is the count of one second intervals during which the OC3 path is unavailable

  Note: If SDH is selected in the **Facility Type** group on the OC3T tab, the **Interval** titles on this tab change as follows: Section changes to RS (Regenerator Section), Line changes to MS (Multiplex Section), and Path changes to HP (High Order Path).

The **BERT** (Bit Error Rate Threshold) group allows you to set the signal degrade condition.

For provisioning parameter tables, see the volume titled Provisioning.

After making changes to any of the thresholds, the **Apply Changes** button becomes enabled. Click this button to apply the changes to the MIB.

MLAT3/LSMT3 Port DS3 Thresholds Tab Page

If you are working with the MLAT3/LSMT3 cards, click the DS3 Thresholds tab to display the following tab page.

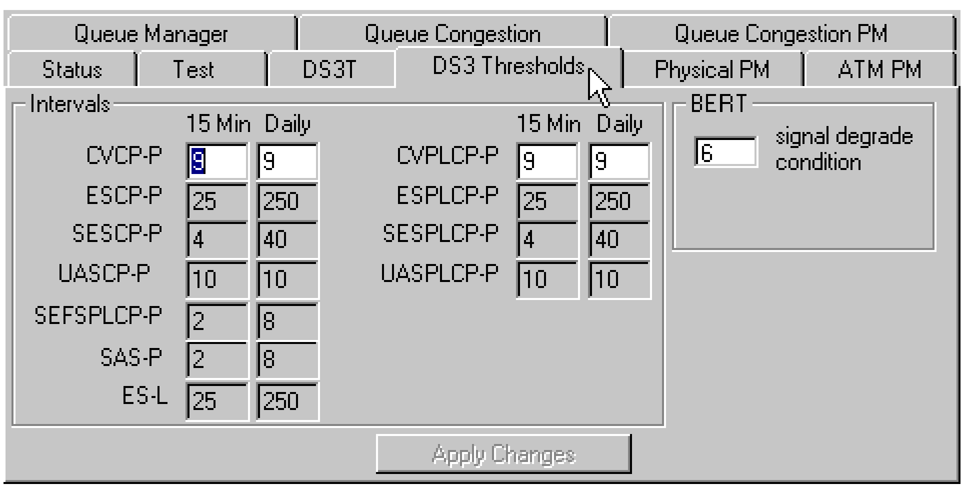


Figure 5-12: DS3 Thresholds tab (MLAT3/LSMT3 Port)

The **Intervals** group allows you to specify thresholds for two parameters, for both 15-minute and Daily intervals. Valid values are 6 through 9 (10^{-x} BER).

- **CVCP-P.** Code Violation-Path is the count of CP-bit parity errors occurring in the accumulation period.

- **CVPLCP-P.** Code Violation-PLCP-Path is the count of BIP-8 code errors in the accumulation period.

The **BERT** (Bit Error Rate Threshold) group allows you to set the signal degrade condition. Valid values are 6 through 9 (10^{-x} BER).

For provisioning parameter tables, see the volume titled Provisioning.

After making changes to any of the thresholds, the **Apply Changes** button becomes enabled. Click this button to apply the changes to the MIB.

MLAT1/LSMT1 Port DSL Thresholds Tab Page

If you are working with the MLAT1/LSMT1 cards, click the DSL Thresholds tab to display the following tab page.

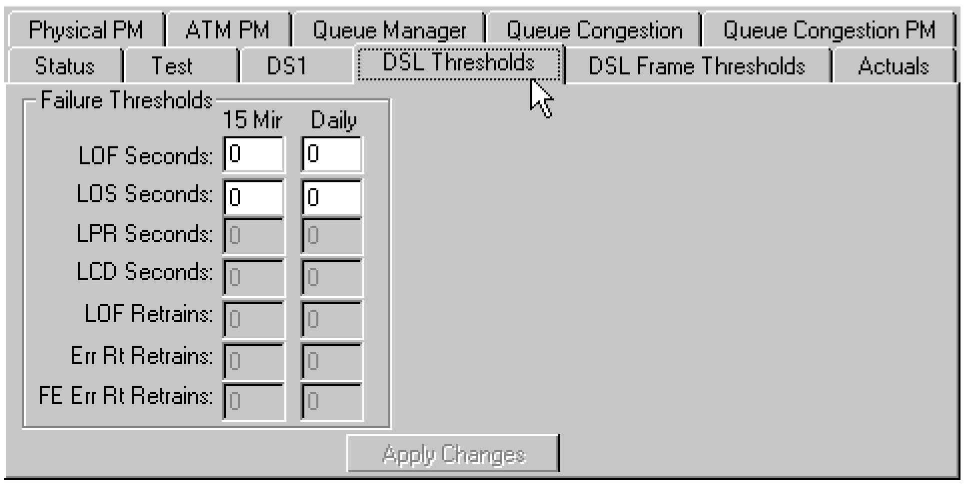


Figure 5-13: DSL Thresholds tab (MLAT1/LSMT1 Ports)

The **Failure Thresholds** group allows you to specify thresholds for a number of parameters, for both 15-minute and Daily intervals.

For tables of provisioning thresholds, see the volume titled Provisioning.

After making changes to any of the thresholds, the **Apply Changes** button becomes enabled. Click this button to apply the changes to the MIB.

MLAT1/LSMT1 Port DSL Frame Thresholds Tab Page

If you are working with the MLAT1/LSMT1 cards, click the DSL Frame Thresholds tab to display the following tab page.

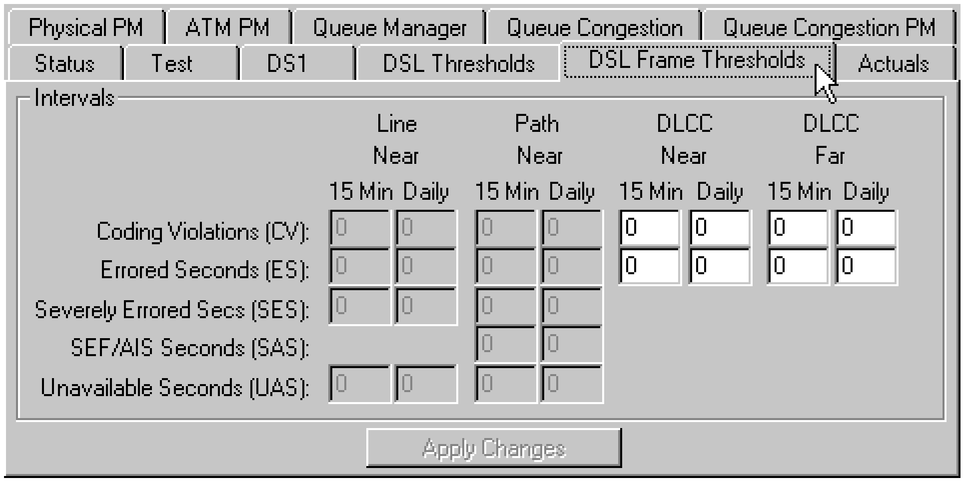


Figure 5-14: DSL Frame Thresholds tab (MLAT1/LSMT1 Ports)

The **Intervals** group allows you to specify thresholds for a number of parameters, for near-end Line and Path, for both 15-minute and Daily intervals.

> **Note:** The example shown is for the IMUX port; for the DS-1 port interface, **all** the fields are enabled (not grayed out).

For tables of provisioning thresholds, see the volume titled Provisioning.

After making changes to any of the thresholds, the **Apply Changes** button becomes enabled. Click this button to apply the changes to the MIB.

MLAT1/LSMT1 Port Actuals Tab Page

If you are working with the MLAT1/LSMT1 cards, click the Actuals tab to display the following tab page.

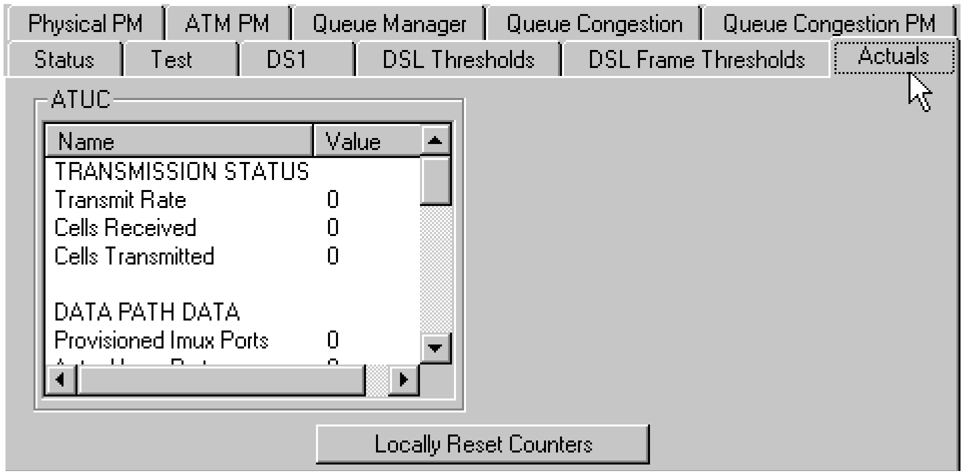


Figure 5-15: Actuals Tab (MLAT1/LSMT1 Ports)

The MLAT1/LSMT1 Port Actuals tab page displays ATUC connectivity data. This information is read-only.

The scrollable list includes the following actuals for the ATUC (for the IMUX port):

Transmission Status

- Transmit Rate.
- Cells Received.
- Cells Transmitted.

Data Path Data

- Provisioned IMUX Ports.
- Actual IMUX Ports.

Error Data

- LOF (Loss of Frame) Failures.
- LOS (Loss of Signal) Failures.
- LOF (Loss of Frame) Seconds.
- LOS Seconds.
- Errored Seconds.
- Coding Violations.
- FE (Far End) Errored Seconds.
- FE Coding Violations.
- HEC (Header Error Control) Errors.

Time Data

- Elapsed Time (current 15 minute).
- Elapsed Time (current 24 hours).
- Elapsed Time (previous day).

The scrollable list includes the following actuals for the ATUC (for the DS1 ports):

Transmission Status

- Transmit Rate.

Error Data

- LOF Failures.
- LOS Failures.
- LCD (Loss of Cell Delineation) Failures.
- LOF Seconds.
- LOS Seconds.
- LCD Seconds.
- CV-L (Code Violation-Line).
- ES-L (Errored Second-Line).
- SES-L (Severely Errored Second-Line).
- UAS-L (Unavailable Seconds-Line).
- CV-P (Code Violation-Path).
- ES-P (Errored Second-Path).
- SES-P (Severely Errored Second-Path).
- SAS-P (SEF/AIS Second-Path).
- UAS-P (Unavailable Seconds-Path).
- Errored Seconds.
- Coding Violations.
- FE Errored Seconds.
- FE Coding Violations.
- HEC Errors.

Time Data

- Elapsed Time (current 15 minute), (current 24 hours), (previous day).

Click the **Locally Reset Counters** button to reset all values to 0 (zero) for the current view, as shown in the example. After being reset, the values will begin incrementing again based on data accumulated from the point at which the counters were reset. Resetting the counters only affects the current view. Data continues to accumulate “behind the scenes,” and if the current view is closed and another view is opened, the new view displays values based on the entire reporting period.

MLA/LSM Port Physical PM Tab Page

For any of the four types of MLA/LSM cards, click the Physical PM tab to display the following tab page.

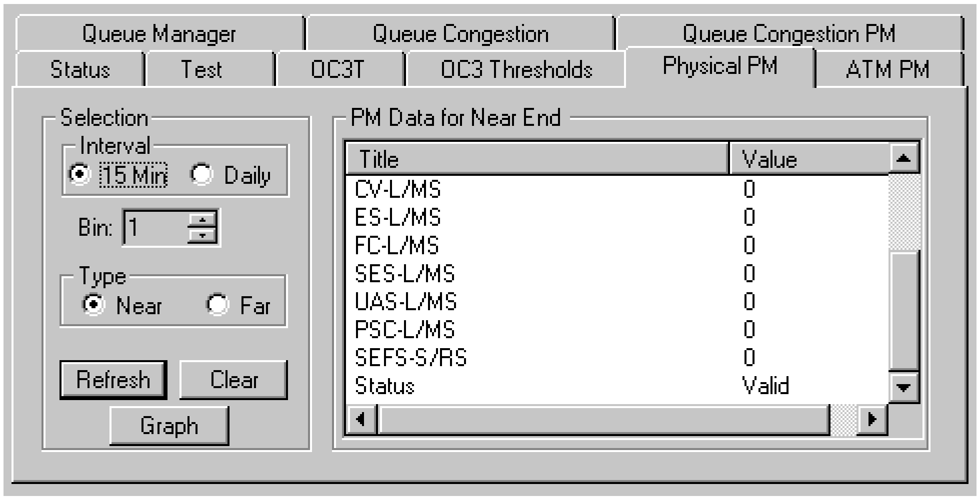


Figure 5-16: MLA/LSM Port Physical PM Tab

The **Physical PM** (Performance Monitoring) tab page provides information on performance monitoring.

The **Interval** group allows you to specify either 15-minute or Daily intervals.

You can track up to 12 bins of performance data in 15-minute intervals. Bin number 1 contains data for the current 15-minute interval. Bin number 2 contains data for the previous 15-minute interval and so on. In the **Bin** spin box, set the Bin value (1 to 12).

You can track 2 bins of data in daily intervals. Bin number 1 contains data for the current day. Bin number 2 contains data for the previous day. In the **Bin** spin box, set the Bin value (1 or 2).

The **Type** group allows you to specify whether to monitor near-end or far-end data.

The **PM Data for . . .** group displays the names and values for the parameters listed. The title of this group changes to reflect the option selected in the **Type** group. This list includes different parameters for the different types of cards, as described in the following lists.

The MLA and LSM cards display values for the following PM parameters:

- CV-P/HP (Code Violation-Path/High-Order Path).
- ES-P/HP (Errored Second-Path/High-Order Path).
- FC-P/HP (Feedback Control-Path/High-Order Path).
- SES-P/HP (Severely Errored Seconds-Path/High-Order Path).
- UAS-P/HP (Unavailable Seconds-Path/High-Order Path).
- CV-L/MS (Code Violation-Line/Multiplex Section).

- ES-L/MS (Errored Seconds-Line/Multiplex Section).
- FC-L/MS (Feedback Control-Path/Multiplex Section).
- SES-L/MS (Severely Errored Seconds-Line/Multiplex Section).
- UAS-L/MS (Unavailable Seconds-Line/Multiplex Section).
- Status.

The MLA2, LSM2, and OC3L cards display the same set of PM parameters, and also include the following:

- PSC-L/MS (Line/Multiplex Section)
- SEFS-S/RS (Severely Errored Framing Seconds-Section/Regenerator Section)

The MLAT3, LSMT3, and DS3L cards display the following set of parameters:

- Code Violation-Path (CV-P).
- Errored Second-Path (ES-P).
- Severely Errored Second-Path (SES-P).
- SEF/AIS Second-Path (SAS-P).
- Unavailable Seconds-Path (UASCP-P).
- Code Violation PLCP-Path (CVPLCP-P).
- Errored Second PLCP-Path (ESPLCP-P).
- Severely Errored Second PLCP-Path (SESPLCP-P).
- Severely Errored Framing Second PLCP-Path (SEFSPLCP-P).
- Unavailable Second PLCP-Path (UASPLCP-P).
- Errored Second-Line (ES-L).
- Status.

The MLAT1 and LSMT1 cards’ IMUX ports display values for the following PM parameters:

- LOF Seconds.
- LOS Seconds.
- Errored Seconds.
- Code Violations.
- Elapsed Time (current 15 minute).
- Elapsed Time (current 24 hours).
- Elapsed Time (previous day).
- Status.

The MLAT1 and LSMT1 cards’ DS-1 ports display the same set of PM parameters as the IMUX port, and also include the following:

- LCD Seconds.
- CV-L.
- ES-L.
- SES-L.

- UAS-L.
- CV-P.
- ES-P.
- SES-P.
- SAS-P.
- UAS-P.
- Errored Seconds.
- Code Violations.

The data will **not** automatically refresh; you must click the **Refresh** command button to refresh the data manually. Click the **Clear** command button to clear all the performance data for this port. Click the **Graph** button to display the data in graphical format.

The **Status** in the **Data** list box will always be either Valid or Invalid. A value of Invalid indicates that the data has not been accumulated for the full time of a given interval because a bin has been reset; invalid data should not be used in resolving performance issues.

MLA/LSM Port ATM PM Tab Page

Click the ATM PM tab to display the following tab page.

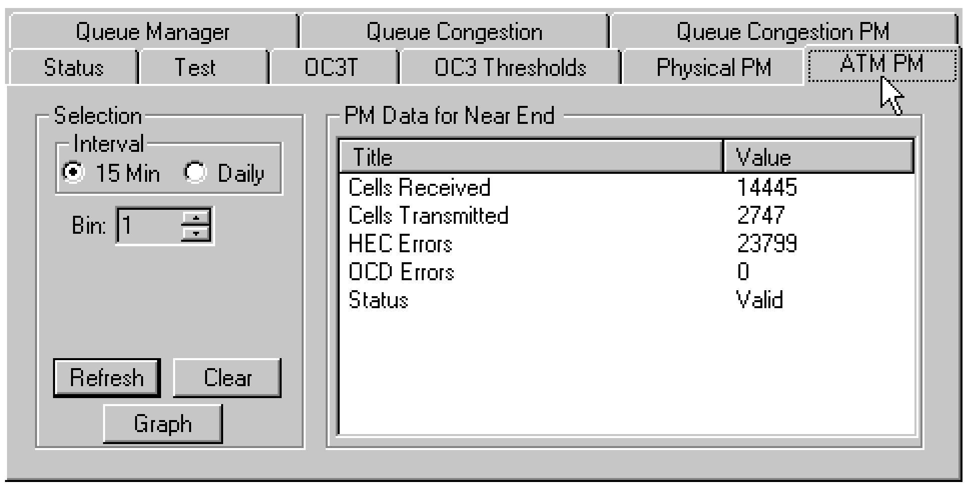


Figure 5-17: MLA/LSM Port ATM PM Tab

The **ATM PM** (Performance Monitoring) tab provides information on Cells received and transmitted, and dropped due to HEC and OCD, and the status.

The **Interval** group allows you to specify either 15-minute or Daily intervals.

You can track up to 12 bins of performance data in 15-minute intervals. Bin number 1 contains data for the current 15-minute interval. Bin number 2 contains data for the previous 15-minute interval and so on. In the **Bin** spin box, set the Bin value (1 to 12).

You can track 2 bins of data in daily intervals. Bin number 1 contains data for the current day. Bin number 2 contains data for the previous day. In the **Bin** spin box, set the Bin value (1 or 2).

The data will **not** automatically refresh; you must click the **Refresh** command button to refresh the data manually. Click the **Clear** command button to clear all the performance data for this port. Click the **Graph** button to display the data in graphical format.

The **Status** in the **Data** list box will always be either Valid or Invalid. A value of Invalid indicates that the data has not been accumulated for the full time of a given interval because the bin has been reset, or because at some time during the interval the port was in an LOS or LOF condition. Invalid data should not be used to resolve performance issues.

Graph Window

Click the Graph button on the ATM PM tab to display the following window.

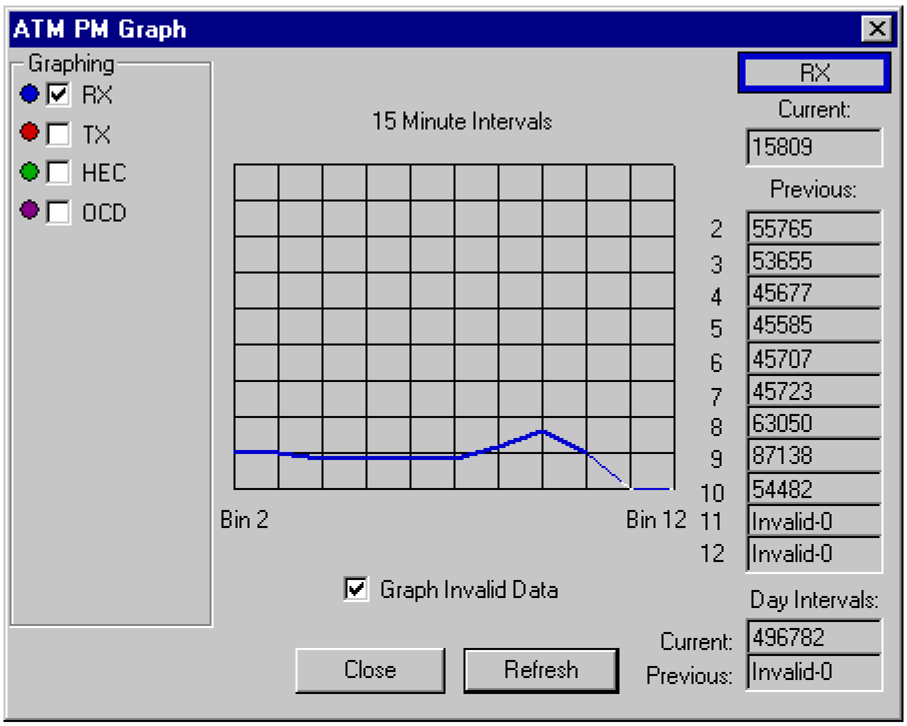


Figure 5-18: Graph Window, ATM PM (MLA/LSM Port)

The ATM PM Graph window is accessible from a number of tabs, and displays different options as appropriate for the tab from which it was accessed. The **Graphing group** box includes a list of parameters that vary depending on the window from which the Graph window was accessed. Click the check box next to each parameter to select/deselect it for display in the grid.

The Graph window's grid displays line graphs of the specified parameters. The grid can display any combination of the available parameters—each parameter displays in a different color to make it easier to view the information. The grid is divided into 15-minute intervals, and labelled by bin number.

The **Graph Invalid Data** check box displays below the grid if data for any of the intervals in the selected bin is invalid. Invalid data displays as a dashed line; valid data displays as a solid line. If you do not want to view invalid data, click the check box to deselect it.

The following numeric data is displayed on the right side of the Graph window:

- Current data for the current 15-minute interval and current day.
- Historic data for the eleven previous 15-minute bins and for the previous day.

Click the **Close** button to close the window, or the **Refresh** button to refresh the display.

MLA Port Queue Manager Tab Page

Click the Queue Manager tab to display the following tab page.

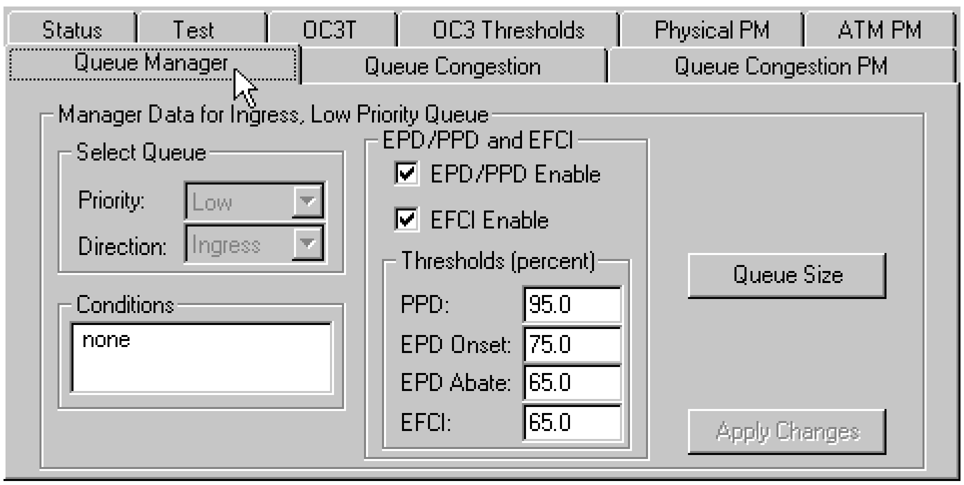


Figure 5-19: MLA Port Queue Manager Tab

The **Queue Manager** tab allows you to specify which of the QoSV4 buffers to view. The **Select Queue** group box is used to provision the QoSV4 buffers. You can specify which queue to view by **Priority** (Low, Medium, or High) and **Direction** (Ingress or Egress).

As different options are selected in these fields, the **Manager Data for . . .** title above the group changes to reflect the current selections.

The following table shows which *Queue Management* parameters are provisionable on each card ("n/p" means "not provisionable").

Table 5-5: Queue Management Parameters Provisionable by Cards

Card Type		Direction	
	Priority	**Ingress**	**Egress**
Line Cards	**YES**	N/A	n/p (preset to Egress)
LSMT1 (IMUX port)	**YES**	n/p (preset to Ingress)	N/A
LSMT3	**YES**	n/p (preset to Ingress)	N/A
MLA	n/p (preset to 1–low)	n/p (preset to Ingress)	N/A
MLA2	**YES**	**YES**	**YES**
MLAT1 (IMUX port)	**YES**	**YES**	**YES**
MLAT3	**YES**	**YES**	**YES**
Broadband tributary cards	**YES**	**YES**	**YES**
Trunk cards, LSM2	n/p	n/p	n/p

Note: The **Priority** and **Direction** fields are not enabled for the MLA card since this card has only one queue by default. The one queue does not support QoSV4.

The **Conditions** box lists any conditions pertaining to the buffers.

The **EPD/PPD and EFCI** group box includes check boxes that allow provisioning of the EPD/PPD (Early Packet Discard/Partial Packet Discard) and EFCI (Explicit Forward Congestion Indicator) features:

- **EPD/PPD Enable.** Enable/disable EPD and PPD for the port. EPD adds a measure of intelligence to the handling of PDUs which helps to reduce the number of partial packets that are transmitted. Rather than discarding PDUs that have been partially transmitted, EPD transmits only intact PDUs, based on the thresholds set on this tab. This option should be enabled (the default) if the queue will be carrying connections supporting ATM Adaption Layer (AAL) Type 5; otherwise it should be disabled.
  EPD can also be provisioned at the connection level. If a queue will be carrying a com-

bination of AAL5 and other protocols, EPD/PPD should be enabled at the port level, and enabled for the individual connections that will be carrying AAL5 traffic exclusively, and disabled for those connections not carrying AAL5 data.

- **EFCI Enable.** Enable/disable EFCI for the port.

Thresholds can be specified for each of these parameters, including:

- **PPD.** Specifies the threshold above which partial packets (Protocol Data Units, or PDUs) will be discarded. The default is 95.0 (95%).
- **EPD Onset.** Specifies the threshold above which PDUs will be discarded. The default is 75.0 (75%). A PDU that is being transmitted when this threshold is reached will be transmitted in its entirety, and any subsequent PDUs will be discarded.
- **EPD Abate.** Specifies the threshold below which PDUs will be transmitted. The default is 65.0 (65%).
- **EFCI.** Specifies the threshold above which EFCI will be applied to PDUs. The default is 65.0 (65%).

Click the **Queue Size** command button to display a dialog box where the queue size can be viewed and changed. The number displayed in the **Queue Size** box reflects the current provisioning for the queue selected in the **Priority** list on the Queue Manager tab.

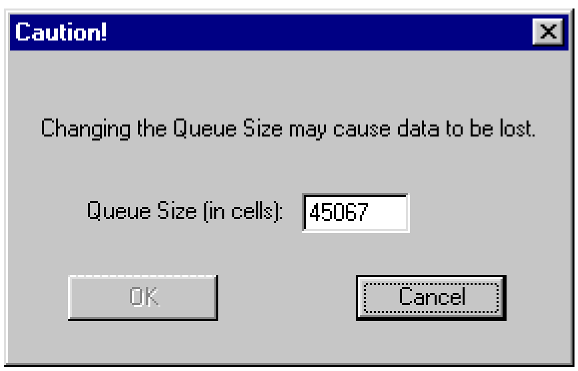


Figure 5-20: Low Priority Queue Default Size

Note: This is a data affecting action. Changing the queue size is **not** recommended. You can click the **OK** button to proceed with the action or the **Cancel** button to cancel any changes to the **Queue Size** field.

The total buffering available for all three queues of an MLA2, MLAT1 (IMUX port), MLAT3, LSMT1 (IMUX port), LSMT3, DS3L or OC3L card is 64511 cells, so the total size of all three queues should not exceed 64511. The default allocations are as follows:

- Low priority = 45067 cells.
- Medium priority = 19316 cells.

- High priority = 128 cells.

  Note: Although the MLA card does not support priority queue provisioning, the **Queue Size** box does display the number of cells in the one fixed-size queue (2048). This value is modifiable.

Since the default sizes for the three queues use the entire available buffering, increasing the size of one queue requires that you decrease the size of another by at least the same number of cells to make the required buffering available; you should decrease the size of the other queue first, otherwise a provisioning error will occur. If the total size of all three queues exceeds the maximum available buffering, the condition will display in the **Conditions** list on the Queue Manager tab.

After changing the provisioning for a port, click the **Apply Changes** command button to save the provisioning information to the MIB.

MLA Port Queue Congestion Tab Page

Click the Queue Congestion tab to display the following tab page.

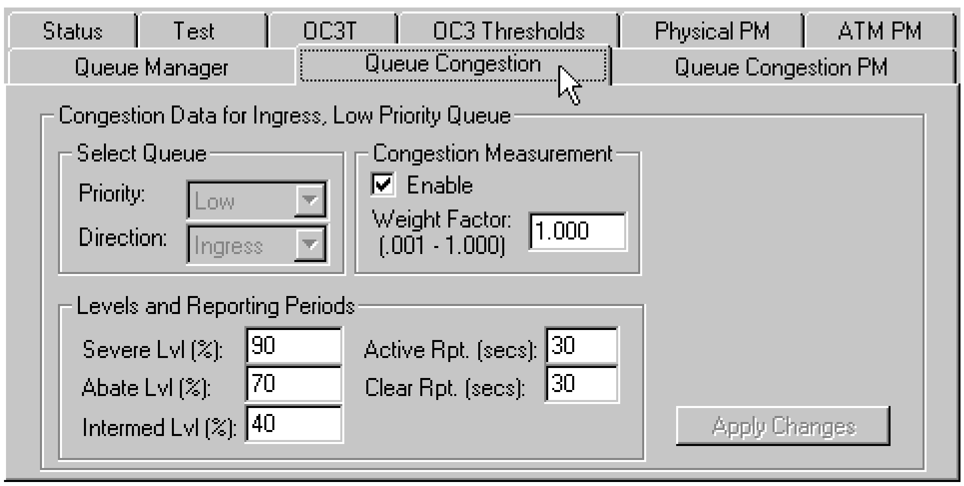


Figure 5-21: MLA Port Queue Congestion Tab

The Queue Congestion tab enables monitoring of the queues. The **Select Queue** group box is used to select the queue to monitor, by **Priority** of the queue (Low, Medium, or High) and the **Direction** (Ingress or Egress).

As different options are selected in these fields, the **Congestion Data for . . .** title above the group changes to reflect the current selections.

Note: The **Priority** and **Direction** fields are enabled only for the MLA2/LSM2, MLAT1/LSMT1, and MLAT3/LSMT3 cards.

The **Congestion Measurement** group box includes a check box to enable/disable congestion measurement. A **Weight Factor** between .001 and 1.000 can be specified (the default is .300). The weight factor is used to smooth data samples. A value of 1 means that no weighting is applied to the current sample to calculate the measure of congestion.

The **Levels and Reporting Periods** group box enables provisioning of thresholds for the following parameters:

- **Severe level.** Level at which an alarm will be reported if the level stays above the specified **Abate level** for the specified number of **Active report** seconds. The default is 90%.
- **Abate level.** Level below which an alarm will clear if the level stays below the specified **Abate level** for the specified number of **Clear report** seconds. The default is 70%.
- **Intermediate level.** Level at which a threshold report will be generated. Only one report will be generated per five-minute interval. The default is 40%.
- **Active report.** Time in seconds (default of 30) before an alarm is reported if:
  - The level exceeds the specified **Severe level**, and
  - Stays above the specified **Abate level** for the specified number of **Active report** seconds.
- **Clear report.** Time in seconds before an alarm clears if the level stays below the specified **Abate level**. The default is 30 seconds.

After changing the provisioning for a port, click the **Apply Changes** command button to save the provisioning information to the MIB.

MLA Port Queue Congestion PM Tab Page

Click the Queue Congestion tab to display the following tab page.

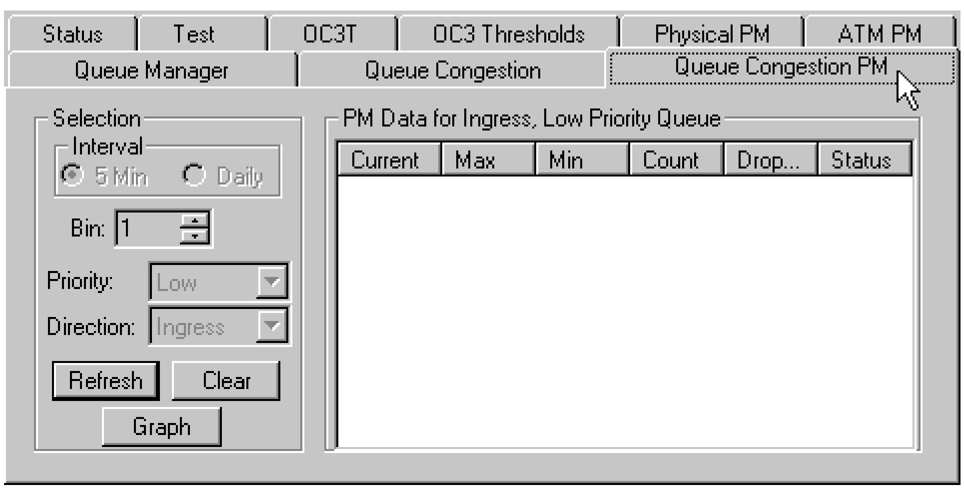


Figure 5-22: MLA Port Queue Congestion PM Tab

The **Queue Congestion PM** (Performance Monitoring) tab provides information on ingress and egress data congestion for each of the three queues (Low, Medium, and High).

The **Interval** group is a static (non-configurable) 5-minute value.

You can view up to 12 five-minute bins of performance data. The data in the Bin number 1 contains data for the current interval. Bin number 2 contains data for the previous interval and so on.

Use the **Priority** and **Direction** fields to specify the queue for which you want to view data.

As different options are selected in these fields, the **PM Data for . . .** title above the group changes to reflect the current selections.

Note: The **Priority** and **Direction** fields are not enabled on the MLA card.

In the **Bin** spin box, set the Bin value (1 to 12). The bin will contain the maximum and minimum smoothed values that occurred in that five-minute period.

The data will **not** automatically refresh; you must click the **Refresh** command button to refresh the data manually. Click the **Clear** command button to clear all the performance data for this port. Click the **Graph** button to display the data in graphical format.

The **PM Data for . . .** box displays the following items of data for bin 1:

- Current value for the period.
- Maximum value for the period.
- Minimum value for the period.
- Count value for the period.
- Drop... value for the period.
- Status of the queue.

For bins 2 through 12, only the following items of data display:

- Minimum and maximum values for the period.
- Status of the queue.

The advantage of displaying the current bin is that by selecting the **Refresh** button, both new and old data can be displayed so that the values can be compared.

Click any of the column headings and drag to resize them.

Broadband Tributary Port Connections

Unlike the *Connections tab* available on line card ports, access to current and the ability to create new connections for broadband tributary card ports is through the Tools menu.

Select **Show Connections** Tools menu item to display the (system-wide) **Connections** dialog box.

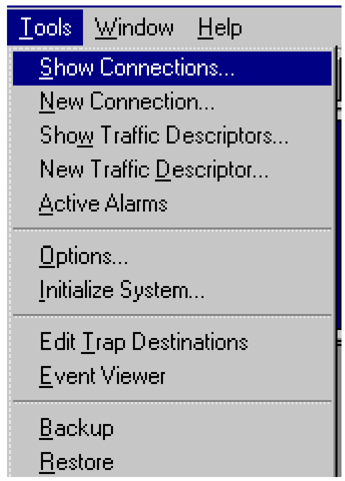


Figure 5-23: Show Connections Tools Menu Item

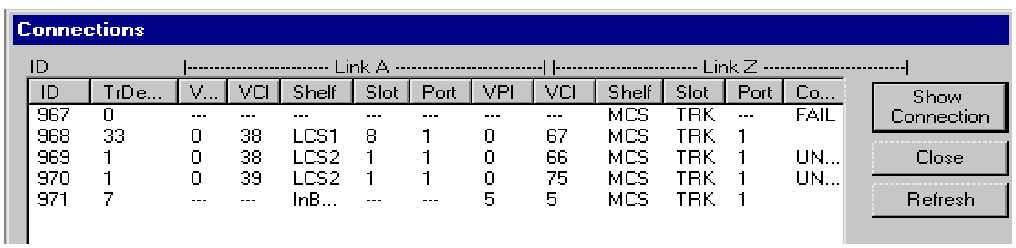


Figure 5-24: Connections Dialog Box (System-Wide)

The Connections dialog box lists all current connections by ID, shows the priority assigned to each connection, and shows the VPI/VCI addresses for the Link A and Link Z sides of the connection. Any conditions are also listed. Select any connection ID and click the **Show Connection** button to display connection details.

Select **New Connection...** Tools menu item to display the **New Connection** dialog box.

> **Note:** Flexibility is built in for a future release to to support connections bypassing the trunk interface. However, Release 6.0 currently supports only connections flowing through the trunk interface at the “Link Z” side of a connection.

For connection details, see Chapter 9—“Connection Dialog Boxes,” page 6-145.

SECTION 6 LINE CARD SHELF AND CARDS

Contents

List of Figures

List of Tables

Chapter 1
Line Card Shelf (LCS)

Introduction

The LCS contains the line cards that communicate with the ATM network. A D50 system can include up to twelve LCSs. Each LCS can contain up to 24 line cards and a Line Card Shelf Multiplexer (LSM) card, which provides communication with the Master Control Shelf (MCS). An LCS may contain any of the three types of LSM cards (LSM2, LSMT1, LSMT3), depending on the type of signal. The LSM cards (and their associated MLA cards) are described in the MLA and LSM Cards and Ports chapter.

> **Note:** A D50 Remote Access Module (D50 RAM) shelf provides four slots, but otherwise looks the same as a standard LCS.

> **Note:** An additional LSM card, literally named LSM, exists for non-QoS legacy purposes and in support of CAP2 cards used in a D50 system. For details, see Release 4.0 or earlier System documentation.

Select any LCS on the View menu (LCS1 through LCS12) to display the LCS object.

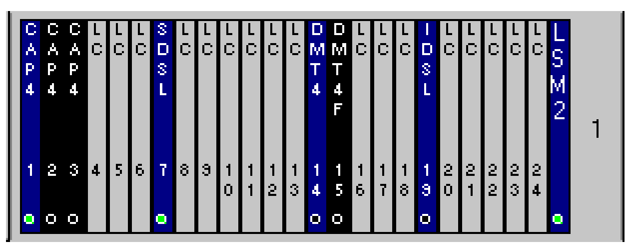


Figure 6-1: LCS Object (sample configuration)

An LCS can contain the following cards (see specific chapter for card details):

- CAP4.
- DMT4.
- DMT4F.
- DMT8.
- SDSL(8).
- SDSL8+
- IDSL.
- LSM2, LSMT1, or LSMT3.

Card Replacement Procedures

Card replacement may be necessary at some point in time in your system. If so, please read the following relevant reference(s) in the volume titled Maintenance and Testing:

- Section 2—*Card Replacement*, Chapter 1—"Replace Identical Cards," page 2-1, OR
- Section 2—*Card Replacement*, Chapter 2—"Replace an Existing Card with Different Card Type," page 2-5, OR
- Section 2—*Card Replacement*, Chapter 3—"Correct an Attribute Mismatch Condition," page 2-15.

An *Attribute Mismatch* condition occurs when the system recognizes one of the following discrepancies:

- A card is inserted into a slot that is provisioned for a different card type.
- A card software revision is more recent than that of the active MCP card (i.e., a DMT4F card with Release 6.0 software is inserted into a system with the MCP running Release 5.1 software).

The *Attribute Mismatch* condition appears in the Conditions box on the Card Status tab.

LCS Interface

Click an LCS object in the multiplexer (rack) equipment locator group to display the following tabs:

- Status.
- Configuration.
- Environmental Alarms.

LCS Status Tab Page

The Status tab page displays initially.

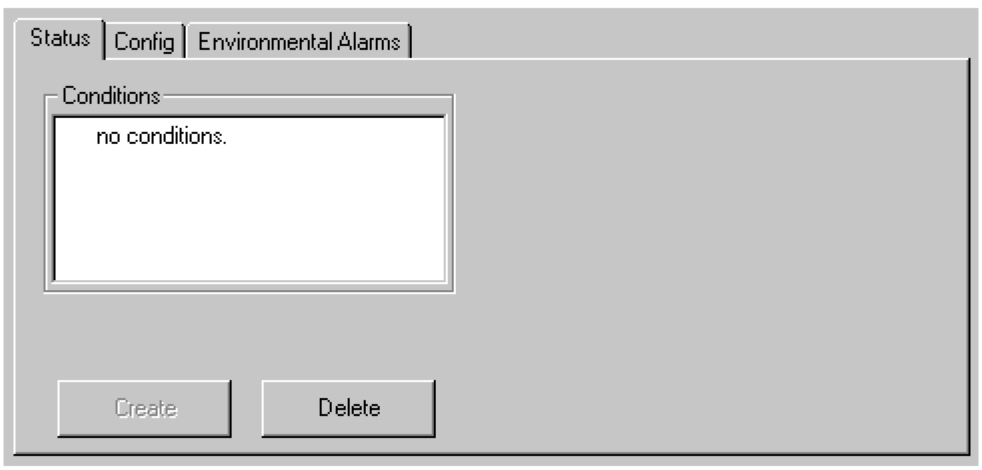


Figure 6-2: LCS Status Tab

The **Conditions** list box displays a summary of equipment and port conditions for the LCS. Data in the **Conditions** list box is refreshed periodically by the system. The data can also be updated by clicking the Refresh icon on the toolbar.

The **Create** button is only enabled if you have clicked on an unprovisioned LCS in the rack. Click this button to create an LCS.

The **Delete** command button is only enabled if you have clicked on a provisioned card. Click this button and a warning message displays indicating the card is about to be deleted from the system. You can either click the **OK** button to proceed with deleting the card, or the **Cancel** button to cancel the action. You can only delete a card if all the connections have first been deleted.

LCS Configuration Tab Page

Click the Config tab to display the following tab page.

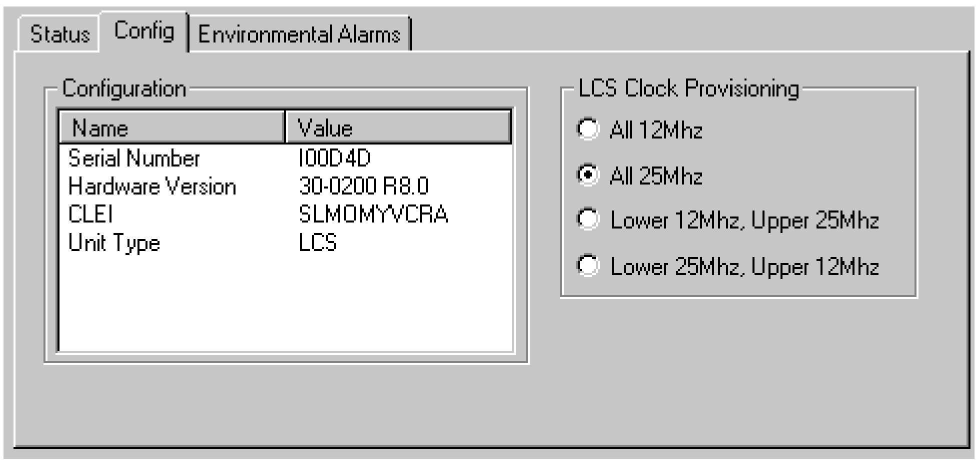


Figure 6-3: LCS Configuration Tab

The **Configuration** box lists the Serial Number, Hardware Version, CLEI, Name, and Unit Type for the card.

The **LCS Clock Provisioning** group allows you to specify the rate for the line cards in the selected shelf. The options are:

- **All 25MHz.** The default and only relevant selection.

  Note: All other remaining *LCS Clock Provisioning* options exist for legacy purposes only in support of CAP2 cards used in a D50 system. For further details, see Release 4.0 or earlier Speedlink System documentation.

  Note: The *LCS Clock Provisioning* parameter does not exist for D50 RAM shelves.

LCS Environmental Alarms Tab Page

Click the Environmental Alarms tab to display the following tab page.

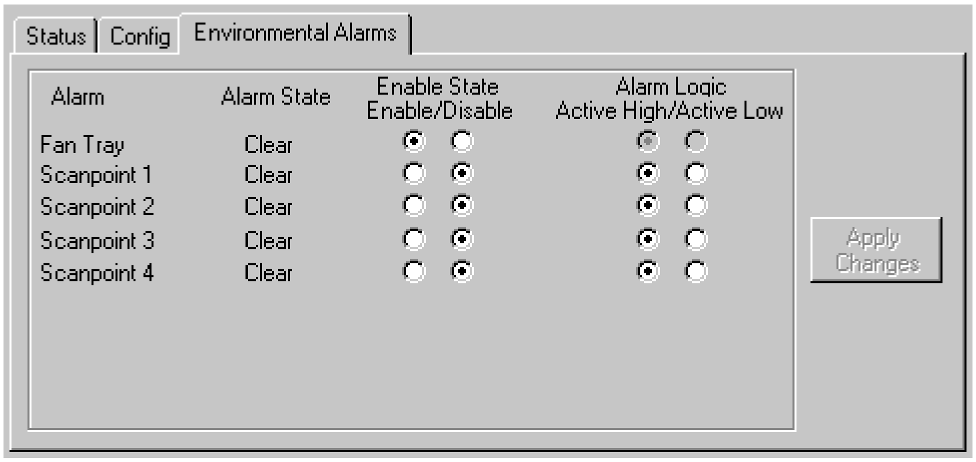


Figure 6-4: LCS Environmental Alarms Tab

The Environmental Alarms tab lists a number of system components for which alarms can be enabled. The **Alarm State** column displays the current state of each component. For Scanpoints 1 through 4, you can set **Alarm Logic** to Active High or Active Low.

After making any changes to the options, the **Apply Changes** button becomes active. Click this button and a warning message displays asking if you want to make changes to the system configuration. Click the **OK** button to save the changes to the MIB, or the **Cancel** button to cancel the action.

Line Card Ports

To enable data transport using any of the line cards, a connection must be set up between the trunk interface VPI/VCI and the line card port on which data will be sent and received. The line cards have varying numbers of ports:

- Four ports: CAP4, DMT4, and DMT4F.
- Eight ports: DMT8, SDSL(8), SDSL8+ and IDSL.

Note: While the card’s physical labels include the numeric port designation, the user interface does not include these designations in all cases.

Each of the ports on a line card is provisioned separately. To provision a port, first click the port indicator on the card.

Note: In order to provision a port, the associated line card must be displayed in the LCS equipment locator group. Since provisioning is associated with the **slot**, not the line card, the line card does not have to be physically present in the slot to view and change the provisioning information.

Click the port indicator on a line card to display a bar that contains the individual ports.

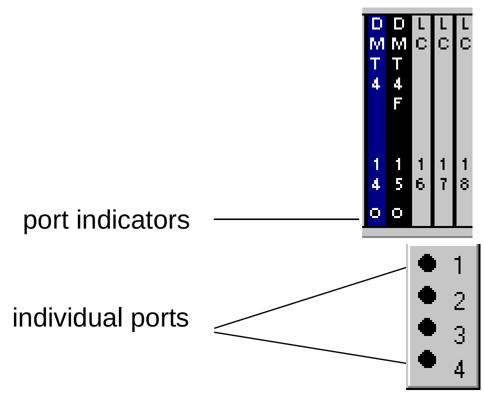


Figure 6-5: Port Indicator and Individual Ports

The color of each individual port indicates its status. For details see, Section 2—*Craft Terminal User Interface*, Chapter 2—“Menus, Toolbars, and Object Views.” Click any port to view and work with provisioning information for the port.

Information for the selected port is displayed as a port object view, with different categories of information presented on separate tab pages. The number of tab pages—and the provisioning information included on them—depends on which line card is being viewed. For details on the individual tab pages, see the chapters on individual cards.

Introduction

The CAP4 card provides RADSL (Rate Adaptive Asymmetric DSL) service using CAP (Carrierless Amplitude Phase) modulation. The CAP4 card provides four ports.

The CAP4 card uses FDD (Frequency Division Duplex) multiplexing to transmit data in the 35 KHz to 1.3 MHz frequency spectrum for up to four lines. Separate channels are assigned for upstream (ATUR to ATUC) and downstream (ATUC to ATUR) data transmission. The upstream rates range from 35 KHz up to 191 KHz, and the downstream rate range from 240 KHz to 1.3 MHz.

CAP4 Card Interface

Click a CAP4 card in an LCS equipment locator group to display the following tabs:

- Status.
- Configuration.
- Versions.

CAP4 Card Status Tab Page

The Status tab page displays initially.

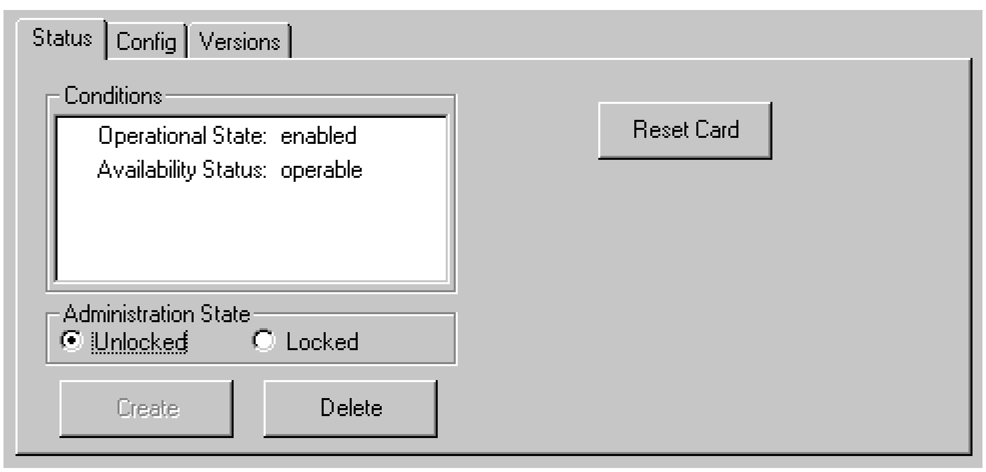


Figure 6-6: CAP4 Card Status Tab

The **Conditions** list box displays conditions associated with the selected card. Data in the **Conditions** list box is refreshed by the system at user-specified intervals; the interval can be set to 0, which means that the data will **not** automatically refresh. You can specify the polling interval by selecting Options on the Tools menu. The data can also be updated by clicking the Refresh icon on the toolbar.

The **Administration State** group allows you to control whether or not the card is available for service. **Unlocked** makes the card available if there are no other conditions blocking its use. **Locked** makes the card unavailable for service; cards should be locked when being configured, when making hardware upgrades, or when testing.

> **Note:** If a card is locked, any alarms for that card will **not** display in the Active Alarms list; however, the alarm conditions will display in the **Conditions** box on the card's Status tab. If an alarm condition exists and the unlocked option is selected, an alarm will then be displayed in the Active Alarms list. For descriptions of alarm conditions, see the volume titled Maintenance and Testing.

The **Create** button is only enabled if you have clicked on an unprovisioned slot. Click this button to display a list of line cards you can create. Select CAP4 from the list.

The **Delete** command button is only enabled if you have clicked on a provisioned card. Click this button and a warning message displays indicating the card is about to be deleted from the system. You can either click the **OK** button to proceed, or the **Cancel** button to cancel the operation.

> **Note:** You must delete all of a card's connections before you can delete the card. For details, see Chapter 9—"Connection Dialog Boxes," page 6-145.

Click the **Reset Card** button to physically reset the card. Click this button and a warning message displays asking if you are sure you want to reset the card. You can click the **OK** button to proceed or the **Cancel** button to cancel the operation.

CAP4 Card Configuration Tab Page

Click the Config tab to display the following tab page.

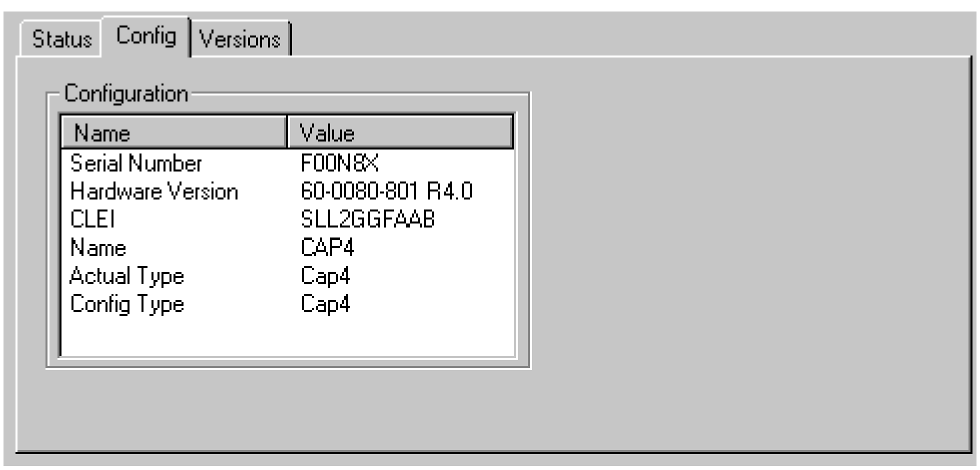


Figure 6-7: CAP4 Card Configuration Tab

The **Configuration** list box shows the Serial Number, Hardware Version, CLEI code, Name, and the Actual and Configured card Type.

CAP4 Card Versions Tab Page

Click the Versions tab to display the following tab page.

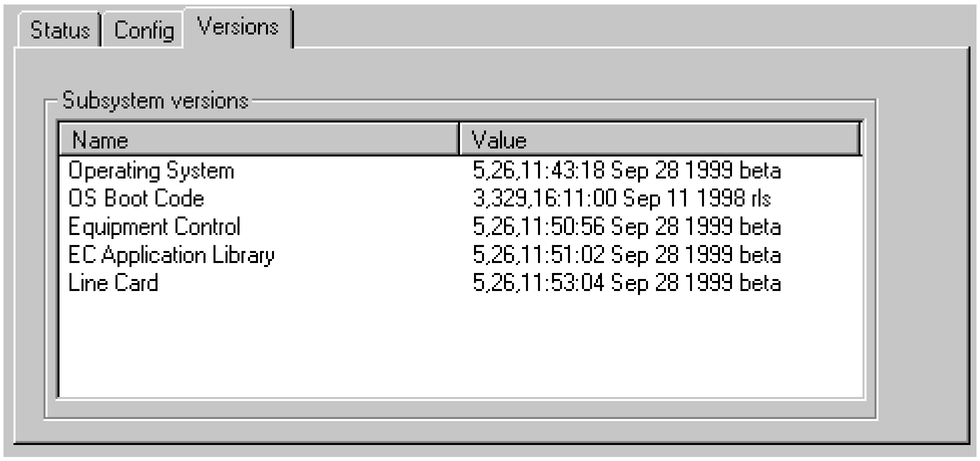


Figure 6-8: CAP4 Card Versions Tab

The **Subsystem Versions** group lists the subsystems, their version numbers, and the dates when they were created.

CAP4 Port Interface

Click the port indicator on a CAP4 card to display the four ports. Click any of the ports to display the CAP4 port object view for that port.

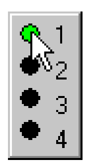


Figure 6-9: Individual Ports

The CAP4 port object view contains the following tabs:

- Status.
- Test.
- Rates.
- DSL Thresholds.
- Advanced.
- Actuals.
- Physical PM.

- ATM PM.
- Queue Manager.
- Queue Congestion.
- Queue Congestion PM.
- Connection.

CAP4 Port Status Tab Page

The Status tab displays initially.

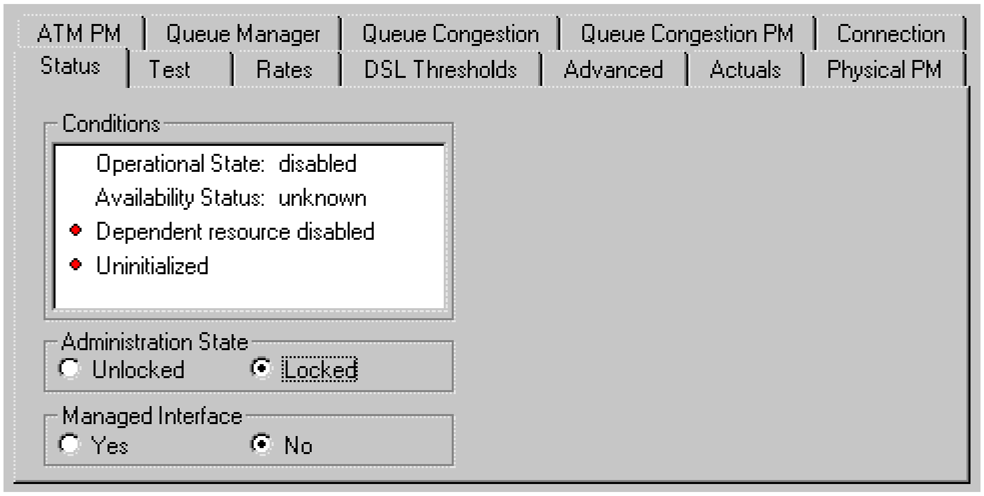


Figure 6-10: CAP4 Port Status Tab

The **Conditions** list box displays conditions associated with the selected port. Data in the **Conditions** list box is refreshed by the system at user-specified intervals; the interval can be set to 0, which means that the data will **not** automatically refresh. You can specify the polling interval by selecting Options on the Tools menu. The data can also be updated by clicking the Refresh icon on the toolbar.

The **Administration State** radio buttons control whether the object is available for service or not: **Unlocked** makes the object usable if there are no other conditions blocking use of this object. **Locked** makes the object unavailable for service. Objects should be locked when they are being configured or when performing upgrades.

> **Note:** If a port is locked, any alarms for that port will **not** display in the Active Alarms list; however, the alarm conditions will display in the **Conditions** box on the port's Status tab. If an alarm condition exists and the unlocked option is selected, an alarm will then be displayed in the Active Alarms list. For descriptions of alarm conditions, see the volume titled Maintenance and Testing.

The **Managed Interface** buttons control whether the port is being actively managed. If the managed interface option is enabled, conditions on the port (for example, an LOF

condition) are reported as alarms in the alarm list. If this option is not enabled (the default), conditions on the port will not be reported.

The managed interface option interacts with one of the options in the Options dialog box, which is available by selecting Options on the Tools menu. In the **Line Card Port Color** group of the Options dialog box, one of the options is **If Managed Interface is set to no, show all options as yellow instead of red**. If this option is enabled, and the managed interface option is disabled, a port for which a condition is reported will display yellow instead of red.

CAP4 Port Test Tab Page

Click the Test tab to display the following tab page.

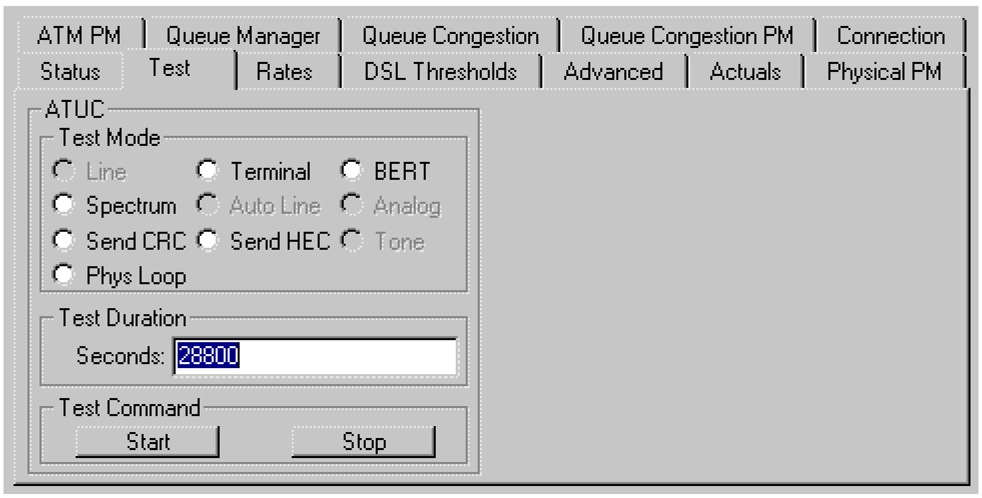


Figure 6-11: CAP4 Port Test Tab

The Test tab enables loopback testing for the port.

The **ATUC Test Mode** group allow you to select the type of testing to perform:

- **Terminal.** Test the line to the subscriber’s modem—no data out of the system.
- **BERT.** Bit Error Rate Test, indicates how many bits are incorrectly transmitted in a given bit stream.
- **Spectrum.** The DSL puts out the same signal (the same frequency spectral composition) that it would if it was linked with a CPE DSL unit—this does not require any CPE on the line.
- **Send CRC.** Test the line by forcing a single Cyclic Redundancy Check (CRC) error on the line towards the CPE.
- **Send HEC.** Test the line by forcing a single HEC error on the line towards the CPE.

- **Phys Loop.** Performs as though active, but without sending data.

  Note: The disabled options do not apply to this port type.

  Important! All diagnostic tests interrupt data flow through the system. Do not perform on a D50 that is providing service. Only use diagnostic tests during commissioning procedures or in a lab environment to isolate trouble in the system.

Test Duration sets the interval in seconds that the system should wait before stopping the loopback test. The Test Duration default is 28800 seconds. The **Test Command** buttons **Start** and **Stop** testing.

For more information on Diagnostic Test Modes, see the volume titled Maintenance and Testing.

CAP4 Port Rates Tab Page

Click the Rates tab to display the following tab page.

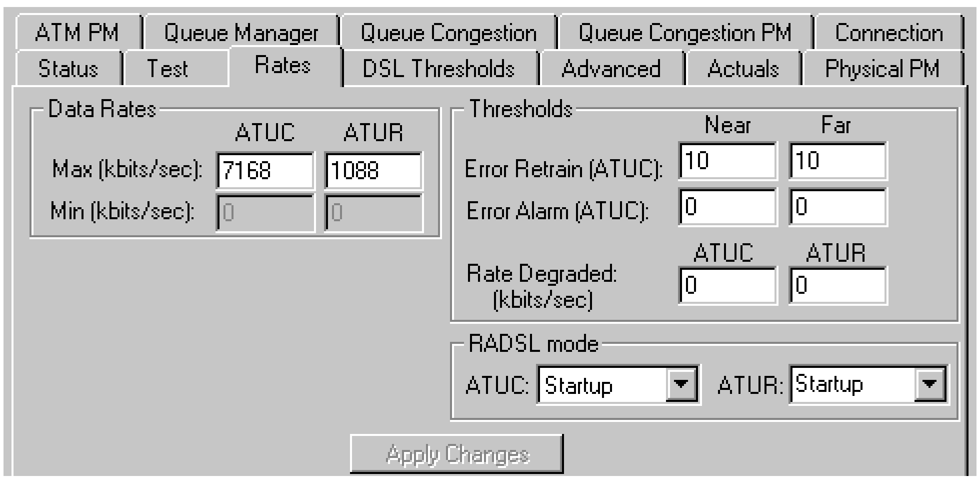


Figure 6-12: CAP4 Port Rates Tab

The Rates tab page allows you to view and set ATUC/ATUR parameters for data rates, modes, and thresholds for the CAP4 card.

The **Data Rates** group allows you to set the maximum data rates.

The **Thresholds** group allows you to view and set the **Error Alarm** and **Error Retrain** thresholds for the near and far-end ATUC, and **Rate Degraded** thresholds.

The **RADSL Mode** group allows you to select the Rate Adaptive DSL (RADSL) mode. The options are **None** and **Startup**.

- **None.** Fixed bit rate. An error message is generated if the line/connection cannot support the data rate entered.

- **Startup.** Do rate adaptation during training. There is only training at startup. If there is a loss of signal (LOS) after startup, the system does not retrain and an error message is generated.

For more information on Data Rates, Thresholds, and RADSL mode, see the volume titled Provisioning.

If you make changes to the parameters, click the **Apply Changes** button to update the system using the new parameters.

CAP4 Port DSL Thresholds Tab Page

Click the DSL Thresholds tab to display the following tab page.

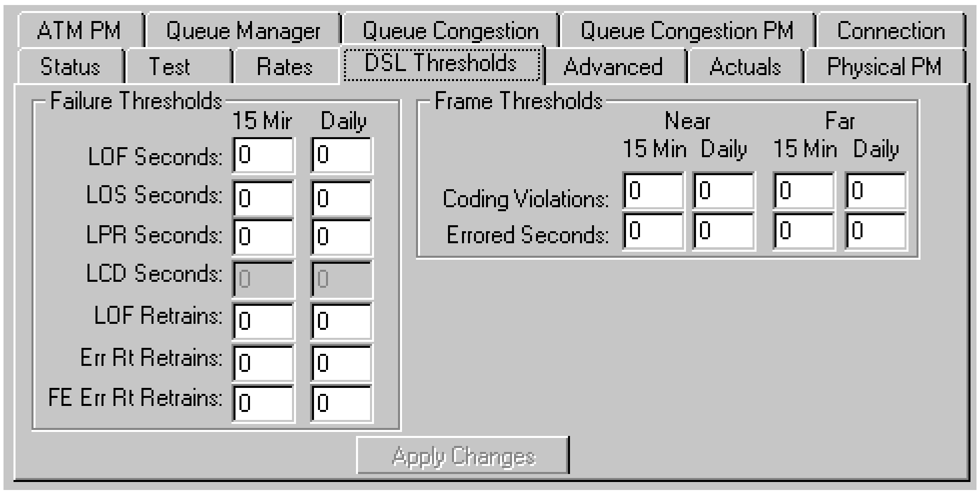


Figure 6-13: CAP4 Port DSL Thresholds Tab

The **Failure Thresholds** group allows you to specify thresholds for a number of parameters, for both 15 minute and daily intervals. The default is 0 for all values.

The **Frame Thresholds** group allows you to specify thresholds for Coding Violations and Errored Seconds for the near and far-end ATUC, for both 15-minute and daily intervals. The default is 0 for all values.

For tables of provisioning thresholds, see the volume titled Provisioning.

After making changes to any of the thresholds, the **Apply Changes** button becomes enabled. Click this button to apply the changes to the MIB.

CAP4 Port Advanced Tab Page

Click the Advanced tab to display the following tab page.

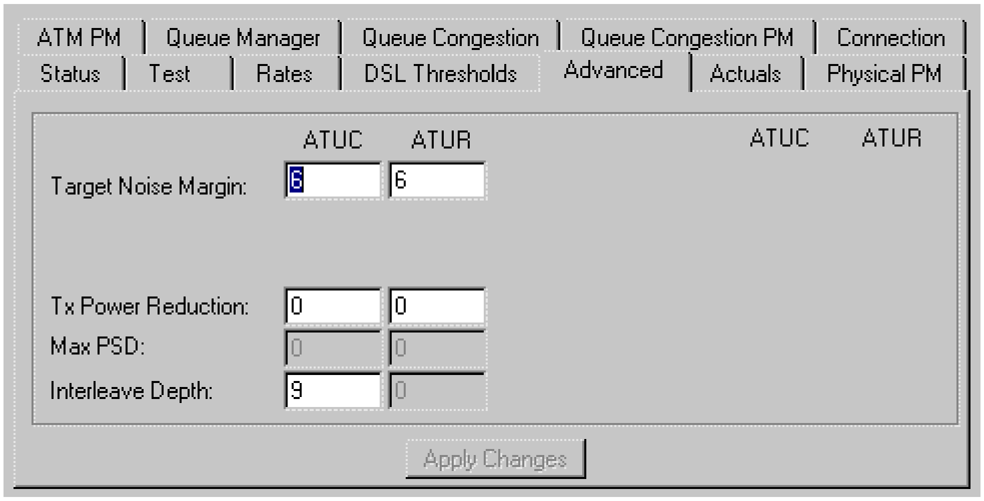


Figure 6-14: CAP4 Port Advanced Tab

The CAP4 port Advanced tab page allows you to view and set the following provisioning information for the CAP4 port:

- **Target Noise Margin** for the ATUC and ATUR. The default is 6 dB.
- **Tx Power Reduction** parameter limits the maximum power of a channel’s transmit signal. It instructs the port to limit the full transmit power level by the *Tx Power Reduction* amount (ATUC and ATUR default is 0).
- **Interleave Depth** for the ATUC only. The default is 9 bytes.

The **Max PSD** parameters are not enabled for this card.

For information on provisioning the settings on this tab, see the volume titled Provisioning.

CAP4 Port Actuals Tab Page

Click the Actuals tab to display the following tab page.

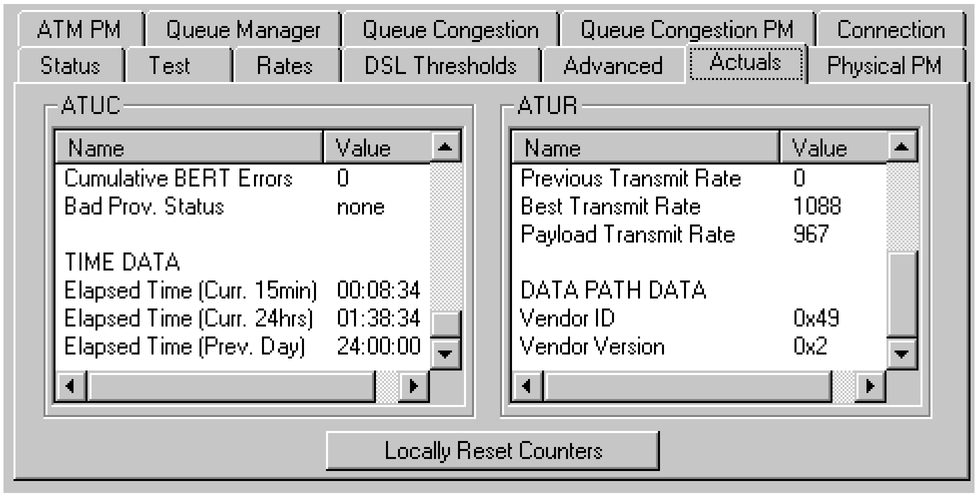


Figure 6-15: CAP4 Port Actuals Tab

The scrollable list includes the following CAP4 actuals for the ATUC:

Table 6-1: CAP4 ATUC Actuals

TRANSMISSION STATUS	DATA PATH DATA	ERROR DATA	TIME DATA
▪ Signal/Noise Ratio ▪ Noise Margin ▪ Transmit Power ▪ Receiver Gain ▪ Startup ASQ ▪ Transmit Rate ▪ Previous Transmit Rate ▪ Best Transmit Rate ▪ Payload Transmit Rate ▪ Received Blocks ▪ Transmitted Blocks ▪ Cells Received ▪ Cells Transmitted	▪ Interleave Depth ▪ Baud Rate ▪ Vendor ID ▪ Vendor Version	▪ LOF Failures ▪ LOS Failures ▪ LPR Failures ▪ LOF Seconds ▪ LOS Seconds ▪ LPR Seconds ▪ Errored Seconds ▪ Coding Violations ▪ FE Errored Seconds ▪ FE Coding Violations ▪ HEC Errors ▪ Error Retrains ▪ FE Error Retrains ▪ LOF Retrains ▪ Training Starts ▪ Cumulative BERT Errors ▪ Bad Prov. Status	▪ Elapsed Time (Curr. 15min) ▪ Elapsed TIme (Curr. 24hrs) ▪ Elapsed Time (Prev. Day)

The scrollable list includes the following CAP4 actuals for the ATUR:

Table 6-2: CAP4 ATUR Actuals

TRANSMISSION STATUS	DATA PATH DATA
■ Noise Margin ■ Loop attenuation ■ Transmit Power ■ Receiver Gain ■ Startup ASQ ■ Transmit Rate ■ Previous Transmit Rate ■ Best Transmit Rate ■ Payload Transmit Rate	■ Vendor ID ■ Vendor Version

Click the **Locally Reset Counters** button to reset all values to 0 (zero) for the current view, as shown in the example. After being reset, the values will begin incrementing again based on data accumulated from the point at which the counters were reset. Resetting the counters only affects the current view. Data continues to accumulate “behind the scenes,” and if another view is opened, the new view displays values based on the entire reporting period.

CAP4 Port Physical PM Tab Page

Click the Physical PM tab to display the following tab page.

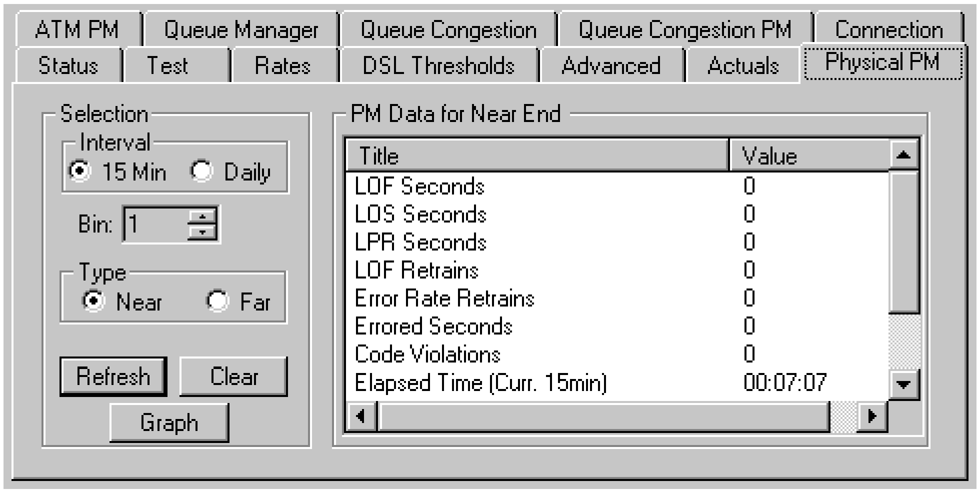


Figure 6-16: CAP4 Port Physical PM Tab

The **Physical PM** (Performance Monitoring) tab page provides information on performance monitoring.

The **Intervals** group allows you to specify either 15-minute or Daily intervals.

You can track up to 12 bins of performance data in 15-minute intervals. Bin number 1 always contains the data for the current 15-minute interval. Bin number 2 contains the data for the previous 15-minute interval and so on. In the **Bin** spin box, set the Bin value (1 to 12).

You can track 2 bins of data in daily intervals. Bin number 1 contains the data for the current day. Bin number 2 contains the data for the previous daily interval. In the **Bin** spin box, set the Bin value (1 or 2).

The **Type** group allows you to specify whether to monitor near-end or far-end data.

The **PM Data for . . .** group displays the names and values for the parameters listed. The title of this group changes to reflect the option selected in the **Type** group. This list includes values for the following parameters:

Table 6-3: Near and Far-End PM Parameters

Near-End	Far-End
■ LOF Seconds ■ LOS Seconds ■ LPR Seconds ■ LCD Seconds ■ LOF Retrains ■ Error Rate Retrains ■ Errored Seconds ■ Code Violations ■ Elapsed Time (current 15 minute) ■ Elapsed Time (current 24 hours) ■ Elapsed Time (previous day) ■ Status	■ Errored Seconds ■ Code Violations ■ Error Rate Retrains ■ Elapsed Time (current 15 minutes) ■ Elapsed Time (current 24 hours) ■ Elapsed Time (previous day) ■ Status

The data will **not** automatically refresh; you must click the **Refresh** button to refresh the data manually. Click the **Clear** button to clear all the performance data for this port. Click the **Graph** button to display the data in graphical format.

The **Status** in the **Data** list box will always be either Valid or Invalid. A value of Invalid indicates that the data has not been accumulated for the full time of a given interval because a bin has been reset; invalid data should not be used in resolving performance issues.

CAP4 Port ATM PM Tab Page

Click the ATM PM tab to display the following tab page.

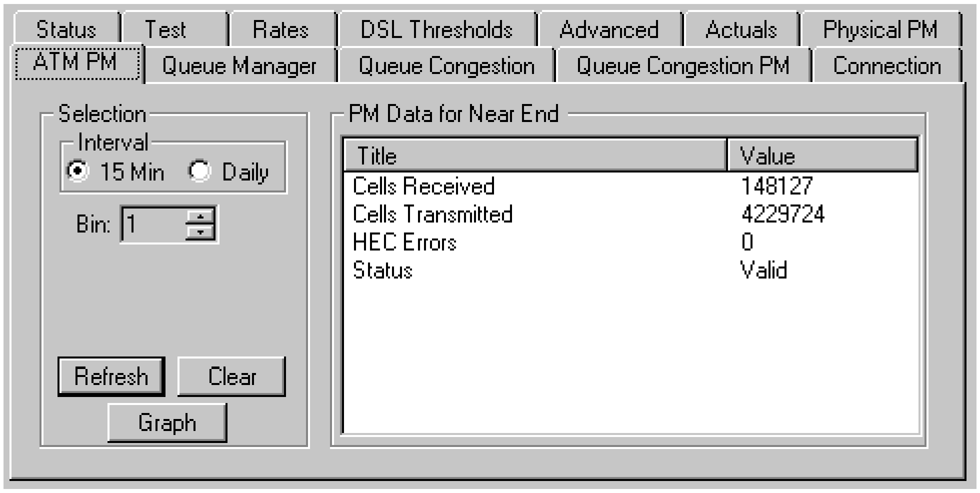


Figure 6-17: CAP4 Port ATM PM Tab

The **ATM PM** (Performance Monitoring) tab page provides information on Cells received, transmitted, HEC errors, and the status.

The **Interval** group allows you to specify either 15-minute or daily intervals.

You can track up to 12 bins of performance data in 15-minute intervals. Bin number 1 always contains the data for the current 15-minute interval. Bin number 2 contains the data for the previous 15-minute interval and so on. In the **Bin** spin box, set the Bin value (1 to 12).

You can track 2 bins of data in daily intervals. Bin number 1 contains the data for the current day. Bin number 2 contains the data for the previous day. In the **Bin** spin box, set the Bin value (1 or 2).

The data will **not** automatically refresh; you must click the **Refresh** button to refresh the data manually. Click the **Clear** button to clear all the performance data for this port. Click the **Graph** button to display the data in graphical format.

The **Status** in the **Data** list box will always be either Valid or Invalid. A value of Invalid indicates that the data has not been accumulated for the full time of a given interval because the bin has been reset, or because at some time during the interval the port was in an LOS or LOF condition. Invalid data should not be used to resolve performance issues.

The Graph window displays when you click the **Graph** button from a number of different tab pages. The options included on the Graph window vary slightly depending on the set of data that is being graphed. As an example, the ATM PM Graph window is shown below.

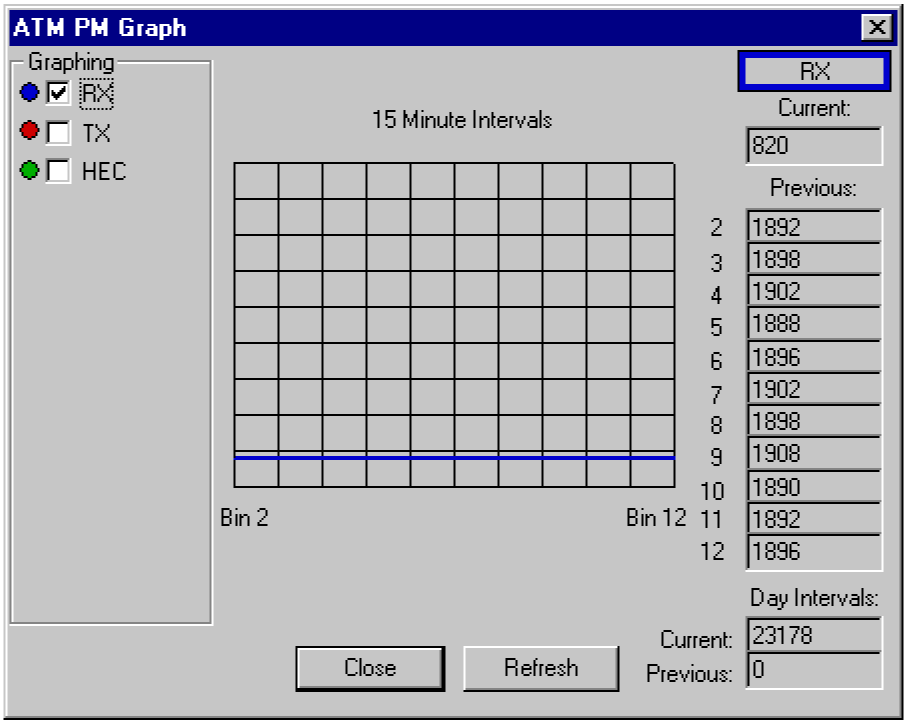


Figure 6-18: Graph Window, ATM PM

The information included in the Graph window is described in the following sections.

Graphing group. This group includes a list of parameters that vary depending on the window from which the Graph window was accessed.

The Graph window includes a grid where the line graphs are displayed. The grid can display any combination of the available parameters—each parameter displays in a different color to make it easier to view the information. The grid is divided into 15-minute intervals, and labelled by bin number.

The following numeric data is displayed on the right side of the Graph window:

- Current data for the current 15-minute interval and current day.
- Historic data for the eleven previous 15-minute bins and for the previous day.

Click the **Close** command button to close the window, or the **Refresh** command button to refresh the display.

CAP4 Port Queue Manager Tab Page

Click the Queue Manager tab to display the following tab page.

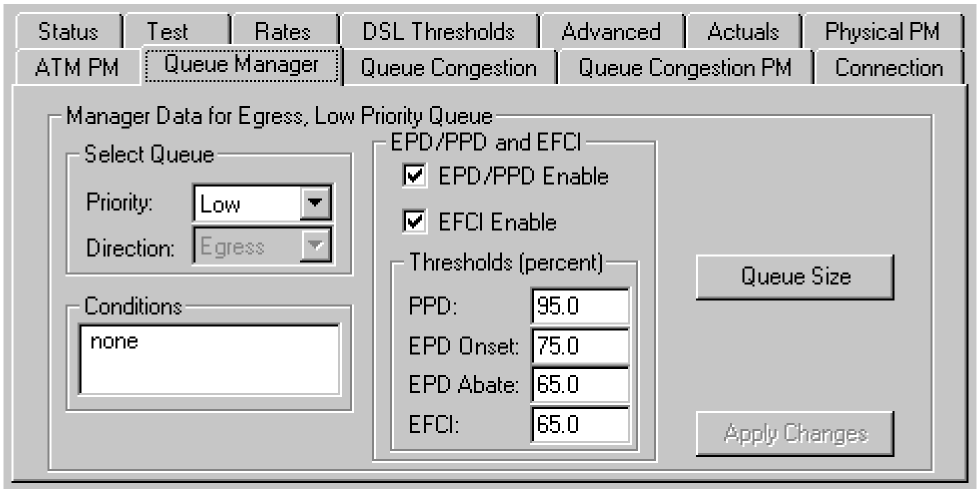


Figure 6-19: CAP4 Port Queue Manager Tab

The **Queue Manager** tab enables provisioning of the Quality of Service (QoSV4) buffers. The **Select Queue** group box is used to specify which queue to view by **Priority** (Low, Medium, or High). *Low Priority* is the default. The **Direction** field is static (non-configurable); *Egress* is the only valid value for this card.

As different options are selected in these fields, the **Manager Data for . . .** title above the group changes to reflect the current selections.

The **Conditions** box lists any conditions pertaining to the buffers.

The **EPD/PPD and EFCI** group box includes check boxes that allow provisioning of the EPD/PPD (Early Packet Discard/Partial Packet Discard) and EFCI (Explicit Forward Congestion Indicator) features:

- **EPD/PPD Enable.** This check box is used to enable EPD and PPD for the port. Enable this option (the default) if the queue will be carrying connections supporting ATM Adaption Layer (AAL) Type 5; otherwise, disable. EPD can also be provisioned at the connection level. If a queue will be carrying a combination of AAL5 and other protocols, EPD/PPD should be enabled at the port level, and enabled for the individual connections that will be carrying AAL5 traffic exclusively, and disabled for those connections not carrying AAL5 data.
- **EFCI Enable.** This check box is used to enable/disable EFCI for the port.

Thresholds can be specified for each of these parameters, including:

- **PPD.** Specifies the threshold above which partial packets will be discarded. The default is 95.0 (95 %).
- **EPD Onset.** Specifies the threshold above which packets will be discarded. The default is 75.0 (75%).

- **EPD Abate.** Specifies the threshold below which packets will be transmitted. The default is 65.0 (65 %).
- **EFCI.** Specifies the threshold above which EFCI will be applied to packets. The default is 65.0 (65 %).

Click the **Queue Size** command button to display a dialog box where the queue size can be viewed and changed. The example shows the default size for the low-priority queue.

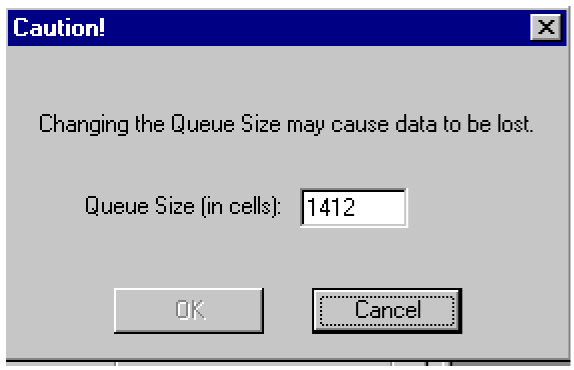


Figure 6-20: Queue Size Caution

Note: This is a data affecting action. Changing the queue size is **not** recommended. You can click the **OK** button to proceed with the action or the **Cancel** button to cancel any changes to the **Queue Size** field.

The total buffering available for all three queues is 2048 cells, so the total size of all three queues should not exceed 2048. The default allocations are as follows:

- Low priority = 1412 cells.
- Medium priority = 604 cells.
- High priority = 32 cells.

Since the default sizes for the three queues use the entire available buffering, increasing the size of one queue requires that you decrease the size of another by at least the same number of cells to make the required buffering available; you should decrease the size of the other queue first, otherwise a provisioning error will occur. If the total size of all three queues exceeds the maximum available buffering, the condition will display in the **Conditions** list on the Queue Manager tab.

After changing the provisioning for a port, click the **Apply Changes** command button to save the provisioning information to the MIB.

CAP4 Port Queue Congestion Tab Page

Click the Queue Congestion tab to display the following tab page.

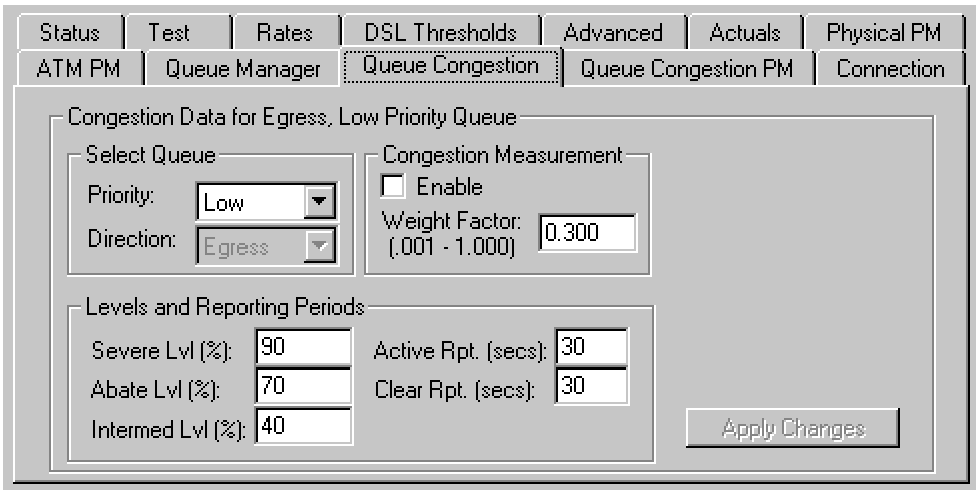


Figure 6-21: CAP4 Port Queue Congestion Tab

The Queue Congestion tab enables monitoring of the queues. The **Select Queue** group box is used to specify which queue to view by **Priority** (Low, Medium, or High). *Low Priority* is the default. The **Direction** field is static (non-configurable); *Egress* is the only valid value for this card.

As different options are selected in these fields, the **Congestion Data for . . .** title above the group changes to reflect the current selections.

The **Congestion Measurement** group box includes a check box to enable (unchecked by default) congestion measurement. A **Weight Factor** between .001 and 1.000 can be specified (the default is .300). The weight factor is used to smooth data samples. A value of 1 means that no weighting is applied to the current sample to calculate the measure of congestion.

The **Levels and Reporting Periods** group box enables provisioning of thresholds for the following parameters:

- **Severe level.** Level at which an alarm will be reported if the level stays above the specified **Abate level** for the specified number of **Active report** seconds. The default is 90%.
- **Abate level.** Level below which an alarm will clear if the level stays below the specified **Abate level** for the specified number of **Clear report** seconds. The default is 70%.
- **Intermediate level.** Level at which a threshold report will be generated. Only one report will be generated per five-minute interval. The default is 40%.
- **Active report.** Time in seconds (default of 30) before an alarm is reported if:
  - The level exceeds the specified **Severe level**, and

– Stays above the specified **Abate level** for the specified number of **Active report** seconds.

- **Clear report.** Time in seconds before an alarm clears if the level stays below the specified **Abate level**. The default is 30 seconds.

After changing the provisioning for a port, click the **Apply Changes** command button to save the provisioning information to the MIB.

CAP4 Port Queue Congestion PM Tab Page

Click the Queue Congestion PM tab to display the following tab page.

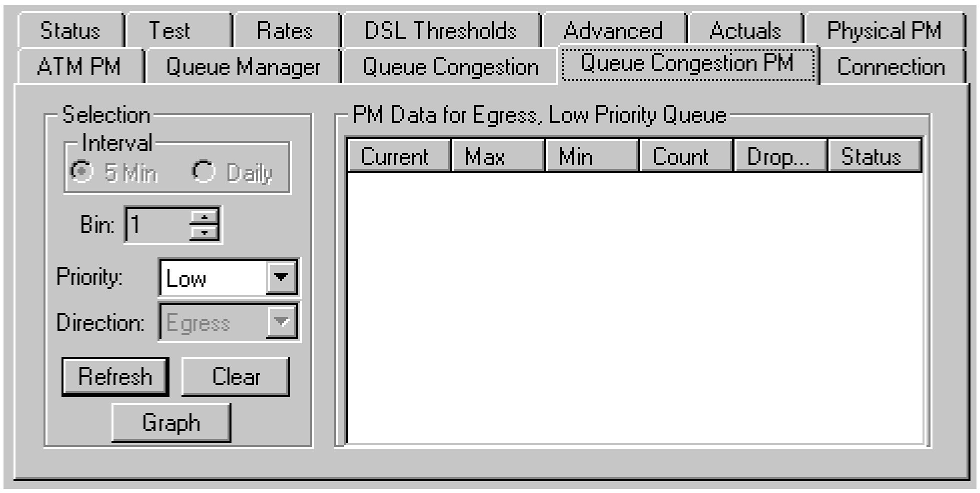


Figure 6-22: CAP4 Port Queue Congestion PM Tab

The **Queue Congestion PM** (Performance Monitoring) tab provides information on data congestion for each of the three queues (Low, Medium, and High).

The **Interval** group is a static (non-configurable) 5-minute value.

You can view up to 12 five-minute bins of performance data. The data in the Bin number 1 always contains the data for the current interval. Bin number 2 contains the data for the previous interval and so on.

Use the **Priority** field to specify the data queue you want to view. *Low Priority* is the default. The **Direction** field is static (non-configurable); *Egress* is the only valid value for this card.

As different options are selected in these fields, the **PM Data for . . .** title above the group changes to reflect the current selections.

In the **Bin** spin box, set the Bin value (1 to 12). The bin will contain the maximum and minimum smoothed values which occurred in that five-minute period.

The data will **not** automatically refresh; you must click the **Refresh** button to refresh the data manually. Click the **Clear** button to clear all the performance data for this port. Click the **Graph** button to display the data in graphical format.

The **PM Data for . . .** box displays the following items of data for bin 1:

- Current value for the period.
- Maximum value for the period.
- Minimum value for the period.
- Status of the queue.

For bins 2 through 12, only the following items of data display:

- Minimum and maximum values for the period.
- Status of the queue.

The advantage of displaying the current bin is that by selecting the **Refresh** button, both new and old data can be displayed so that the values can be compared.

Click any of the column headings and drag to resize them.

CAP4 Port Connection Tab Page

Click the Connection tab to display the following tab page.

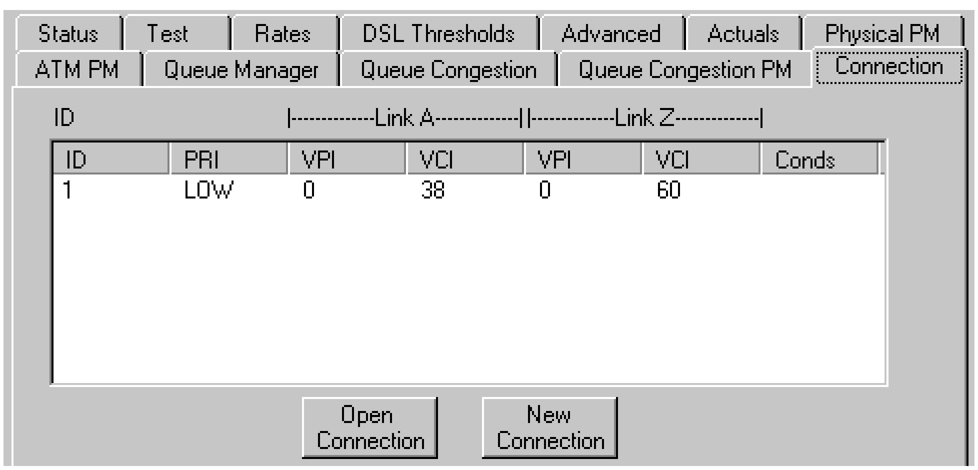


Figure 6-23: CAP4 Port Connection Tab

The Connection tab lists all connections on the port by ID, and shows the priority assigned to each connection and the VPI/VCI addresses for the Link A and Link Z sides of the connection. Any conditions are also listed.

Select any connection and click the **Open Connection** button to display connection details. Click the **New Connection** button to add a new virtual connection. For details, see Chapter 9—“Connection Dialog Boxes,” page 6-145.

Introduction

The DMT4 line card provides RADSL (Rate Adaptive Asymmetric DSL) service using the ANSI standard DMT (Discrete Multi-Tone) modulation technique. DMT uses FDD (Frequency Division Duplex) multiplexing to transmit data in the 35 KHz to 1.1 MHz frequency spectrum; it divides this spectrum into 256 discrete bands, each with 4 KHz bandwidth. Each band is independently modulated. Each DMT4 card provides four ports.

DMT4 Card Interface

Click a DMT4 card in an LCS equipment locator group to display the following set of tabs:

- Status.
- Configuration.
- Versions.

DMT4 Card Status Tab Page

The Status tab page displays initially.

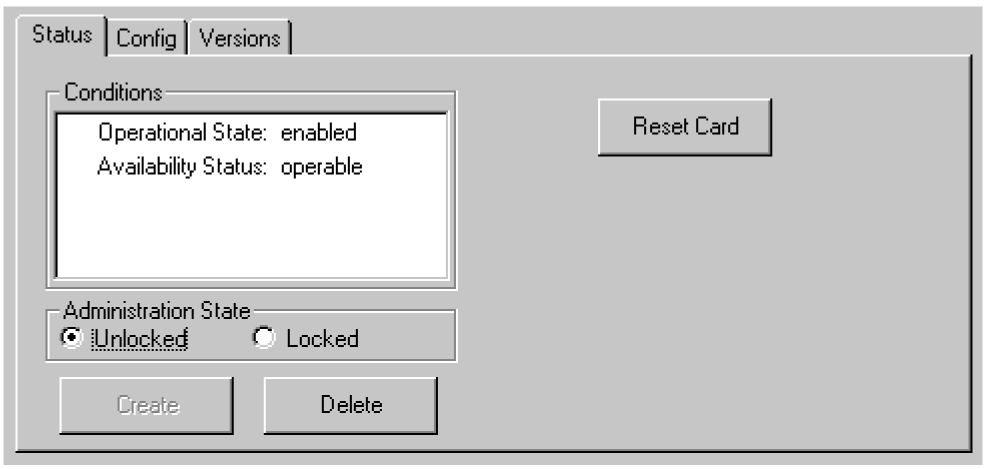


Figure 6-24: DMT4 Card Status Tab

The **Conditions** list box displays conditions associated with the selected card. Data in the **Conditions** list box is refreshed by the system at user-specified intervals; the interval can be set to 0, which means that the data will **not** automatically refresh. You can specify the polling interval by selecting Options on the Tools menu. The data can also be updated by clicking the Refresh icon on the toolbar.

The **Administration State** group allows you to control whether or not the card is available for service. **Unlocked** makes the card available if there are no other conditions blocking its use. **Locked** makes the card unavailable for service; cards should be locked when being configured, when making hardware upgrades, or when testing.

> **Note:** If a card is locked, any alarms for that card will **not** display in the Active Alarms list; however, the alarm conditions will display in the **Conditions** box on the card's Status tab. If an alarm condition exists and the unlocked option is selected, an alarm will then be displayed in the Active Alarms list. For descriptions of alarm conditions, see the volume titled Maintenance and Testing.

The **Create** button is only enabled if you have clicked on an unprovisioned slot. Click this button to display a list of line cards you can create. Select DMT4 from the list.

The **Delete** button is only enabled if you have clicked on a provisioned card. Click this button and a warning message displays indicating the card is about to be deleted from the system, and you can either click the **OK** button to proceed, or the **Cancel** button to cancel the operation.

> **Note:** You must delete all of a card's connections before you can delete the card. For details, see Chapter 9—"Connection Dialog Boxes," page 6-145.

Click the **Reset Card** button to physically reset the card. Click this button and a warning message displays asking if you are sure you want to reset the card. You can click the **OK** button to proceed or the **Cancel** button to cancel the operation.

DMT4 Card Configuration Tab Page

Click the Config tab to display the following tab page.

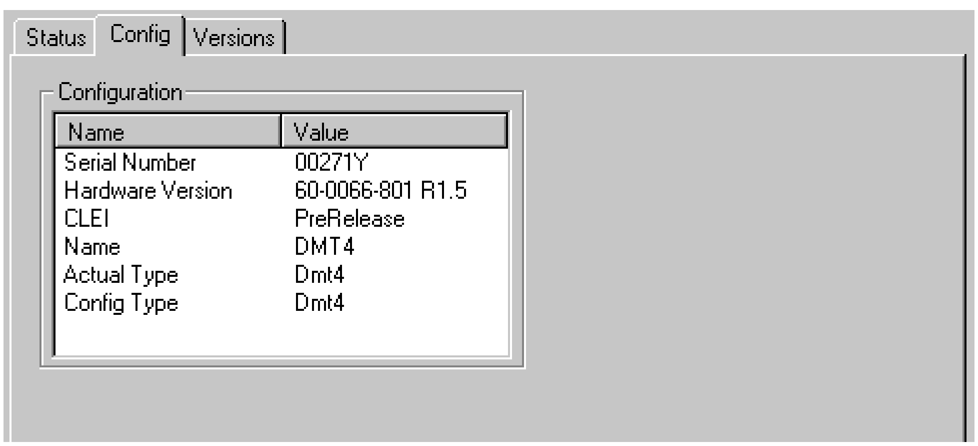


Figure 6-25: DMT4 Card Configuration Tab

The **Configuration** list box shows the Serial Number, Hardware Version, CLEI code, Name, and the Actual and Configured card Type.

DMT4 Card Versions Tab Page

Click the Versions tab to display the following tab page.

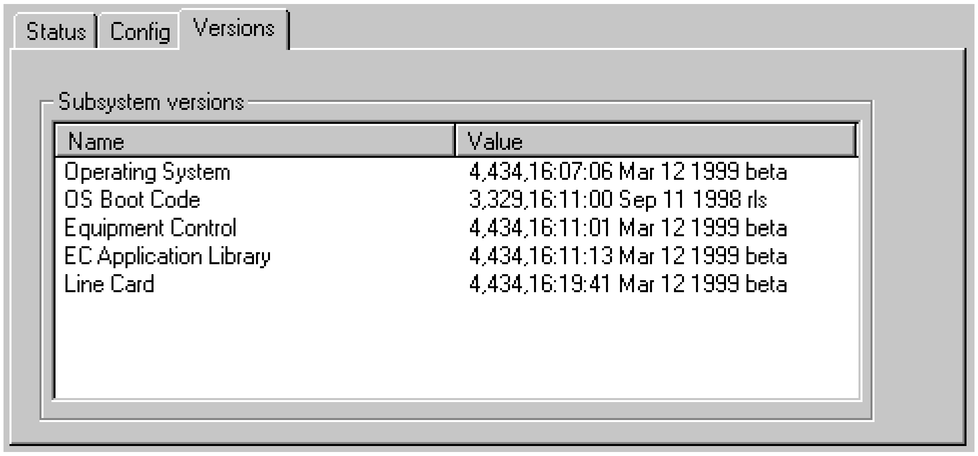


Figure 6-26: DMT4 Card Versions Tab

The **Subsystem Versions** group lists the subsystems, their version numbers, and the dates when they were created.

DMT4 Port Interface

Click the port connection on the DMT4 card to display the four ports. Click any of the four ports to display the DMT4 port object view.

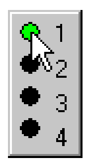


Figure 6-27: Individual Ports

The DMT4 port object view contains the following tabs:

- Status.
- Test.
- Rates.
- DSL Thresholds.
- DMT.
- Advanced.
- Actuals.
- Physical PM.
- ATM PM.

- Queue Manager.
- Queue Congestion.
- Queue Congestion PM.
- Connection.

These tabs are described in the following sections.

DMT4 Port Status Tab Page

The Status tab page displays initially.

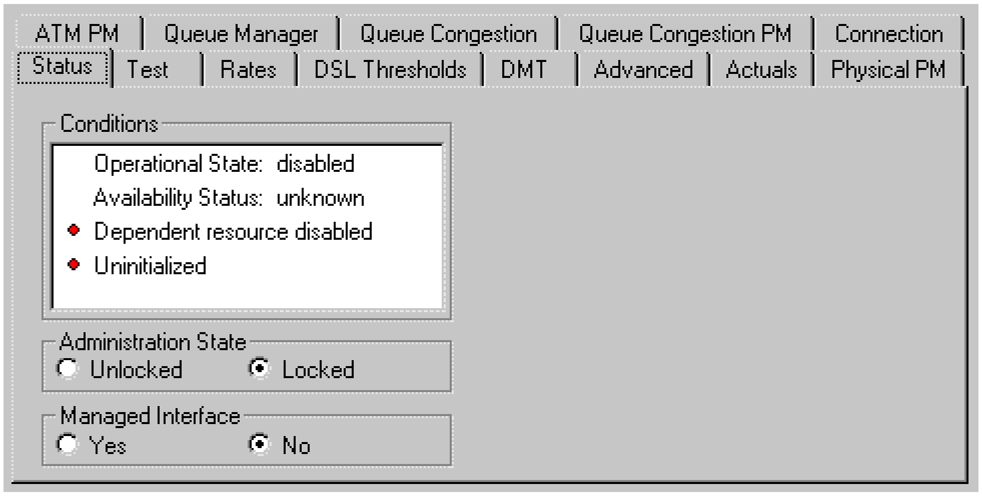


Figure 6-28: DMT4 Port Status Tab

The **Conditions** list box displays conditions associated with the selected port. Data in the **Conditions** list box is refreshed by the system at user-specified intervals; the interval can be set to 0, which means that the data will **not** automatically refresh. You can specify the polling interval by selecting Options on the Tools menu. The data can also be updated by clicking the Refresh icon on the toolbar.

The **Administration State** radio buttons control whether the object is available for service or not: **Unlocked** makes the object usable if there are no other conditions blocking use of this object. **Locked** makes the object unavailable for service. Objects should be locked when they are being configured or when performing upgrades.

> **Note:** If a port is locked, any alarms for that port will **not** display in the Active Alarms list; however, the alarm conditions will display in the **Conditions** box on the port's Status tab. If an alarm condition exists and the unlocked option is selected, an alarm will then be displayed in the Active Alarms list. For descriptions of alarm conditions, see the volume titled Maintenance and Testing.

The **Managed Interface** buttons control whether the port is being actively managed. If the managed interface option is enabled, conditions on the port (for example, an LOS

condition) are reported as alarms in the alarm list. If this option is not enabled (the default), conditions on the port will not be reported.

The managed interface option interacts with one of the options in the Tools menu Options dialog box. In the *Line Card Port Color* group of the Options dialog box, one of the options is *If Managed Interface is set to no, show all options as yellow instead of red*. If this option is enabled, and the managed interface option is disabled, a port for which a condition is reported will display yellow instead of red.

DMT4 Port Test Tab Page

Click the Test tab to display the following tab page.

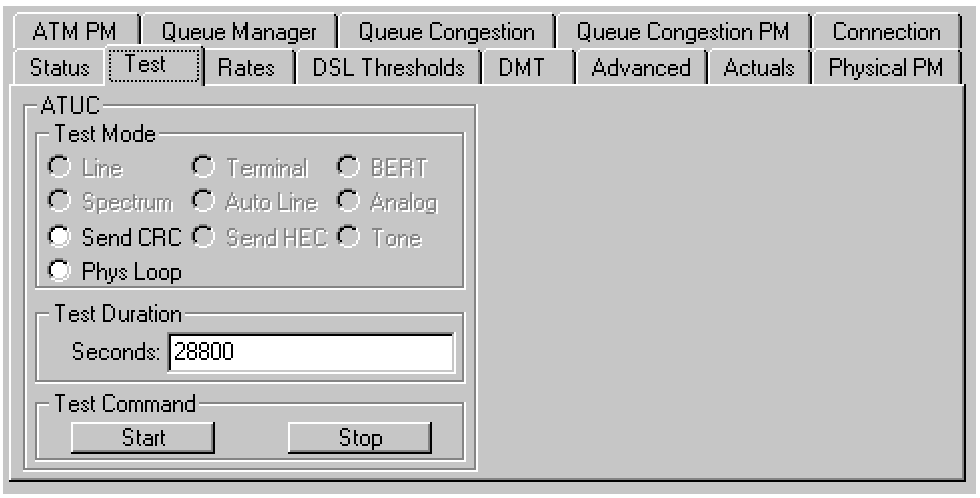


Figure 6-29: DMT4 Port Test Tab

The Test tab enables testing for the DMT4 card.

The **ATUC Test Mode** groups allow you to select the type of testing to perform:

- **Send CRC.** Test the line by forcing a single Cyclic Redundancy Check (CRC) error on the line towards the CPE.
- **Phys Loop.** Performs as though active, but without sending data.

  Note: The disabled options do not apply to this port type.

Test Duration sets the interval in seconds that the system should wait before stopping the loopback test. The *Test Duration* default for the ATUC is 28800 seconds. The **Test Command** buttons **Start** and **Stop** testing.

> **Important! All diagnostic tests interrupt data flow through the system. Do not perform on a D50 that is providing service. Only use diagnostic tests during commissioning procedures or in a lab environment to isolate trouble in the system.**

For additional information, see the volume titled Maintenance and Testing.

DMT4 Port Rates Tab Page

Click the Rates tab to display the following tab page.

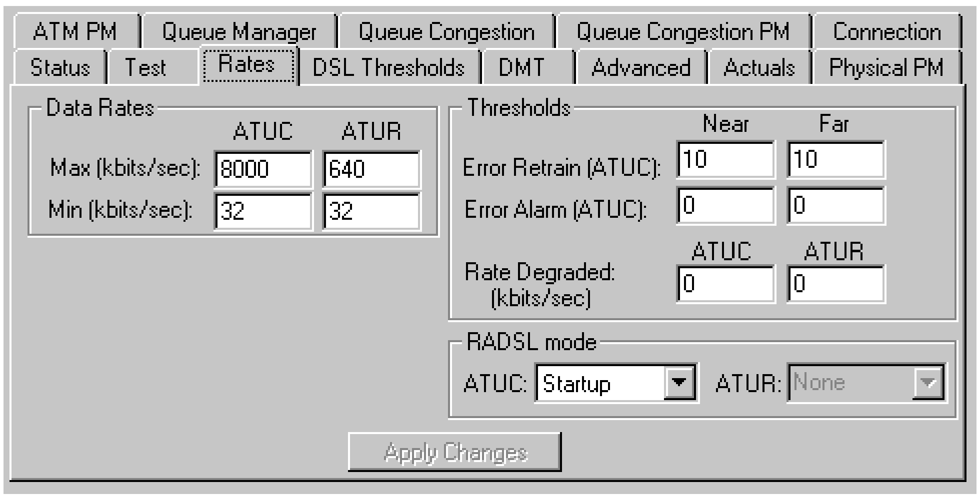


Figure 6-30: DMT4 Port Rates Tab

The Rates tab page allows you to view and set parameters for data rates, modes, and thresholds for the DMT4 card.

The **Data Rates** group allows you to set the maximum and minimum data rates for the ATUC and ATUR. The defaults are as seen in the figure above.

The **RADSL Mode** group allows you to select the Rate Adaptive DSL (RADSL) mode for the ATUC. The options are **None** and **Startup**.

- **None.** *Fixed* bit rate. An error message is generated if the line/connection cannot support the data rate entered.
- **Startup.** Do rate adaptation during training. There is only training at startup. If there is a loss of signal (LOS) after startup, the system does not retrain and an error message is generated.

The **Thresholds** group allows you to view and set near and far-end **Error Alarm** and **Error Retrain** thresholds for the ATUC, and the **Rate Degraded** thresholds for the ATUC and ATUR.

If you make changes to the parameters, click the **Apply Changes** button to update the system using the new parameters.

For more information on provisioning DMT rates, see the volume titled Provisioning.

DMT4 Port DSL Thresholds Tab Page

Click the DSL Thresholds tab to display the following tab page.

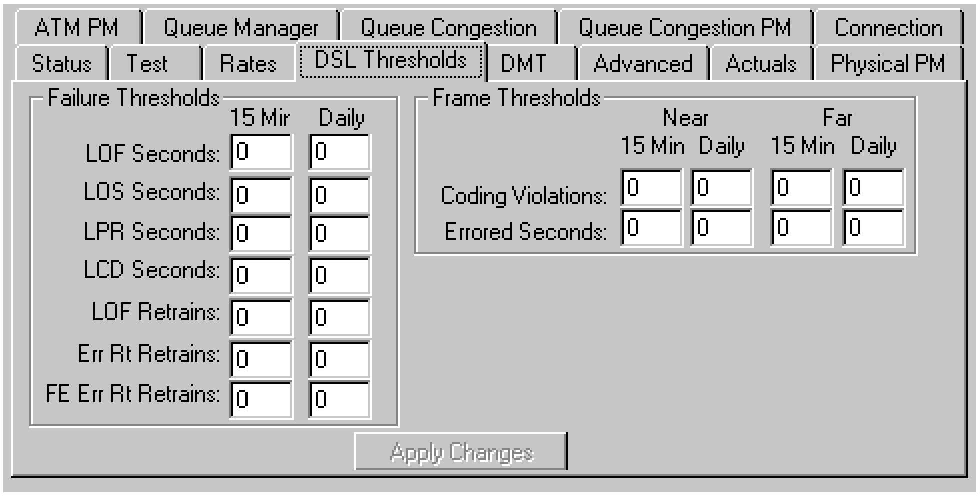


Figure 6-31: DMT4 Port DSL Thresholds Tab

The **Failure Thresholds** group allows you to specify thresholds for a number of parameters, for both 15 minute and daily intervals. The default is 0 for all values.

The **Frame Thresholds** group allows you to specify thresholds for Coding Violations and Errored Seconds for the near and far-end ATUC, for both 15-minute and daily intervals. The default is 0 for all values.

For tables of provisioning thresholds, see the volume titled Provisioning.

After making changes to any of the thresholds, the **Apply Changes** button becomes enabled. Click this button to apply the changes to the MIB.

DMT4 Port DMT Tab Page

Click the DMT tab to display the following tab page.

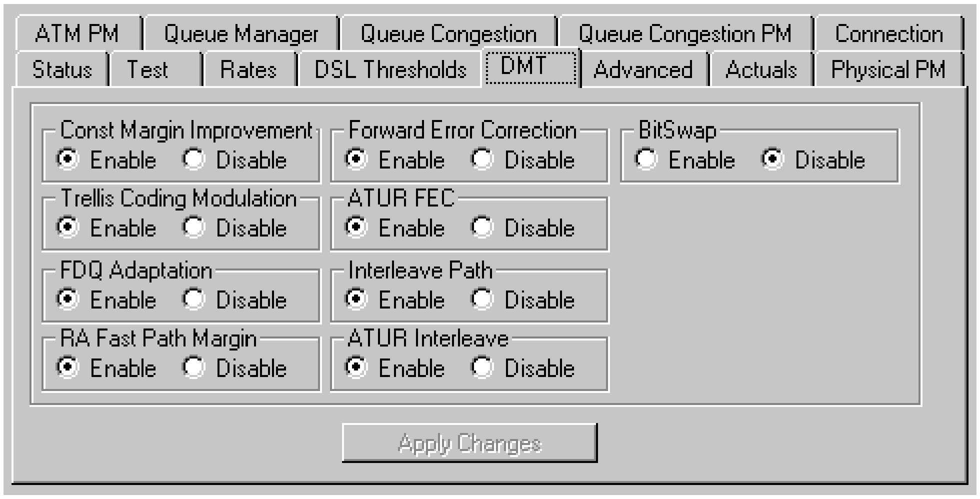


Figure 6-32: DMT4 Port DMT Tab

The DMT4 DMT tab page allows you to enable or disable a number of signal-enhancing features for the port. With the exception of *ATUR FEC* and *ATUR Interleave*, the following parameters are for ATUC.

DMT4 ports use coding gain to reduce the required margin on a line, which allows a higher data rate. The **Constant Margin Improvement** feature allows the port to determine when coding gain is less effective, and automatically reduce the data rate to provide an effective margin improvement. By default, this feature is enabled.

If this feature is disabled, the number of parity bytes is selected to provide a 6 dB coding gain, which provides a 6 dB margin improvement.

The **Trellis Coding Modulation (TCM)** is a best-fit modem modulation technique and is enabled by default.

The **FDQ Adaptation** (Frequency Domain Equalization) feature allows you to correct phase and amplitude distortion of each subchannel, so that the same symbol detection mechanism can be applied to all subchannels. By default, this feature is enabled.

The **RA** (Rate Adaptive) **Fast Path Margin** feature, enabled by default, sets the fast path margin for RA links to 6 dB, which should reduce the number of fast path errors. However, enabling this feature may cause problems with links over very long loops.

If the margin actually provisions to less than 6 dB, this (enabled) feature lowers the data rate as necessary to maintain the EOC.

The **Forward Error Correction** (FEC) feature, enabled by default, allows you to use redundant bits generated at the transmit end to detect, locate and correct transmission errors at the receive end before delivery to the data communication link. FEC avoids retransmission of information by the transmitter.

This feature should be enabled in conjunction with the **Interleave Path** option (see below) to provide a more error-free connection; however, enabling this feature does increase latency. This feature should be disabled if latency is not tolerable.

The **ATUR FEC** feature allows you to implement FEC at the ATUR as well as the ATUC. By default, this feature is enabled.

The **Interleave Path** feature, in conjunction with the **FEC** option, allows you to provide a more error-free connection; however, enabling this feature (the default) will increase latency. This feature is available only if *fixed RADSL mode* (which has both a fast path and an interleave path) is selected on the Rates tab. This feature should be disabled if latency is not tolerable. The PGA Cutback Offset should be set to 0 dB if this feature is enabled.

The **ATUR Interleave** feature implements interleaving at the ATUR as well as the ATUC. By default, this feature is enabled.

The **Bitswap** feature, disabled by default, allows you to manage bit allocation during data mode to adapt to changing line conditions, which helps maintain an acceptable level of noise margin for each bin.

Bitswapping does not dynamically change the data rate. Bit allocations are “swapped” from a bin with a degraded margin to one with a high margin. You can set the thresholds for *Margin Excess Bitswap* and *Margin Deficit Bitswap* on the *Advanced tab*; these thresholds determine the points at which the port swaps bit allocations from one bin to another.

For more information on DMT provisioning, see the volume titled Provisioning.

DMT4 Port Advanced Tab Page

Click the Advanced tab to display the following tab page.

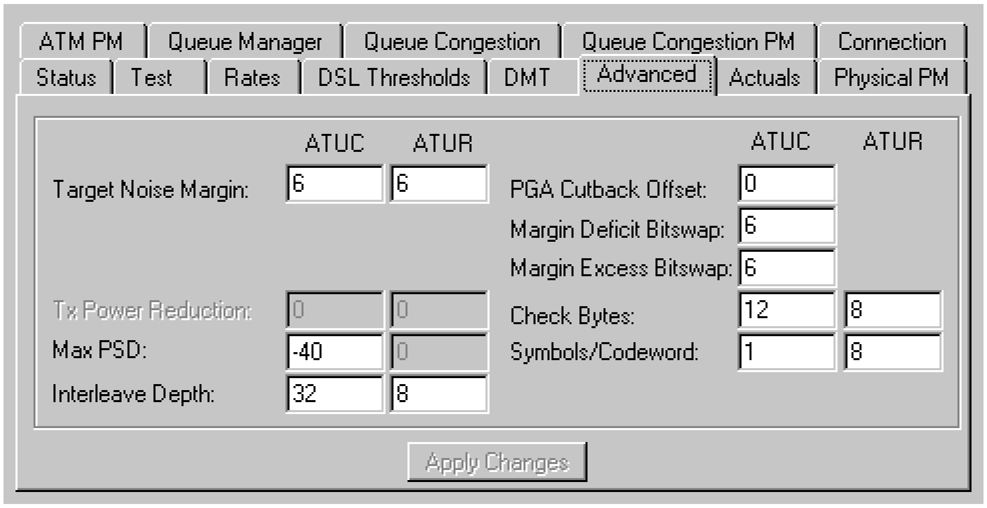


Figure 6-33: DMT4 Port Advanced Tab

The Advanced tab page allows you to specify thresholds for a number of advanced DMT options.

The **Target Noise Margin** fields allow you to specify the margin (in dB) that the port establishes during the training process. These thresholds determine the amount of noise allowed on the line for the channel to operate at 10^{-7} BER. Larger margins lower the rate, but increase the line's immunity to noise.

The port trains to the maximum data rate that a line will support at the thresholds specified in these fields when operating at 10^{-7} BER. The actual and provisioned margin should be about equal. The default is 6 dB for both ATUC and ATUR.

The **Tx** (Transmit) **Power Reduction** fields are not enabled for this card.

The **Max(imum) PSD** (Power Spectural Density) field is used to limit the transmit power on the ATUC channel, in order to prevent interference with other data services in the same cable sheath; the optimum value for this field depends on the noise tolerance of the other data services. Increasing the transmit power on the ATUC channel can also cause interference on the receive signal. The default is -40 dBm/Hz.

The **Interleave Depth** fields allow you to specify the size (in bytes) of interleave blocks for processing. Increasing the interleave depth provides a more error-free connection with increased impulse noise protection, however it also increases latency. This field is only used if the *Interleave Path* and *Forward Error Correction* features are enabled on the DMT tab. The ATUC default is 32 bytes, and the ATUR default is 8 bytes.

The **PGA** (Programmable Gain Amplifier) **Cutback Offset** field allows you to improve performance over links with bridge taps. However, if PGA cutback is lowered, the *Interleave Depth* should be set to the maximum valid value to avoid errors due to clipping.

The value entered in this field is subtracted from the nominal PGA cutback value, which is 6 dB at the ATUC and 3 dB at the ATUR. For example, if this value is set to 6 dB for the ATUC, 6 dB is removed from the nominal PGA cutback, so that the cutback will be 0 dB; this means that the PGA gain will be 6 dB higher than nominal. This field should be set to 0 dB (the default) if the *Interleave Path* feature is enabled on the DMT tab.

The **Margin Deficit Bitswap** field allows you to set the threshold below which the port will reduce bit allocations to a bin. This threshold may be set only if the **Bitswap** feature on the DMT tab is enabled. The default is 6 dB.

The **Margin Excess Bitswap** field allows you to set the threshold above which the port will increase bit allocations to a bin. This threshold may be set only if the *Bitswap* feature on the DMT tab is enabled. The default is 6 dB.

The **Check Bytes** field allows you to specify the number of Check Bytes per codeword, used with *RA Fast Path Margin* and *Interleave Path* coding (see DMT tab above). The default setting is 12 bytes for ATUC and 8 bytes for ATUR.

The **Symbols/Codeword** field allows you to specify the number of symbols used in codewords for rate adaptive links with coding. It is used to provide error protection. These fields are used in conjunction with the Check Bytes field, and only if the RA Fast Path Margin and Interleave Path features are enabled. The default setting is 1 for ATUC and 8 for ATUR.

For more information, see the volume titled Provisioning.

If you make changes to the parameters, click the **Apply Changes** button to update the system using the new parameters.

DMT4 Port Actuals Tab Page

Click the Actuals tab to display the following tab page.

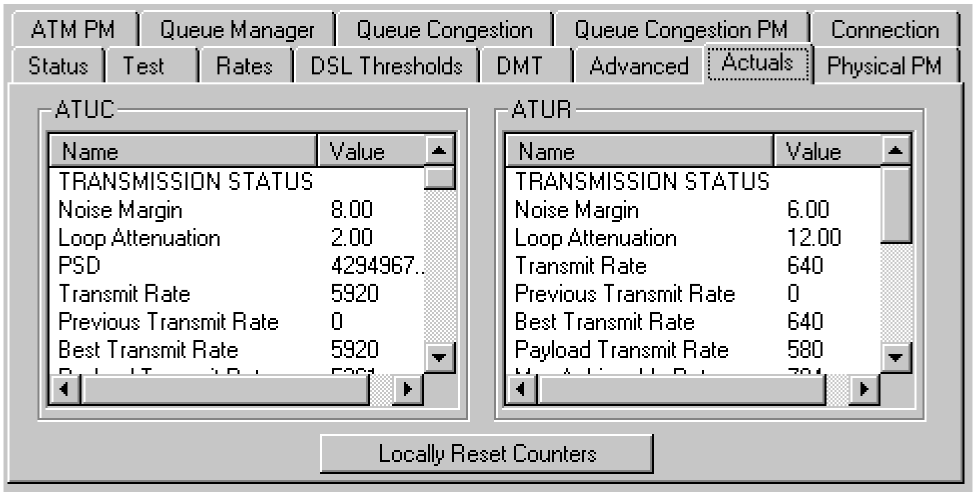


Figure 6-34: DMT4 Port Actuals Tab

The DMT4 Port Actuals tab page displays ATUC and ATUR connectivity data. This information is read-only.

The scrollable list includes the following DMT actuals for the ATUC:

Table 6-4: ATUC/ATUR Actuals

Transmission Status	Data Path Data	Error Data (ATUC only)	Time Data (ATUC only)
▪ Noise Margin ▪ Loop Attenuation ▪ PSD ▪ Transmit Rate ▪ Previous Transmit Rate ▪ Best Transmit Rate ▪ Payload Transmit Rate ▪ Max Achievable Rate ▪ Best Max Achievable Rate ▪ Received Blocks (ATUC only) ▪ Transmitted Blocks (ATUC only) ▪ Cells Received (ATUC only) ▪ Cells Transmitted (ATUC only)	▪ Codeword Size ▪ Interleave Depth ▪ Parity Bytes ▪ Vendor ID ▪ Vendor Version ▪ Serial Number (ATUR only)	▪ LOF Failures ▪ LOS Failures ▪ LPR Failures ▪ LCD Failures ▪ LOF Seconds ▪ LOS Seconds ▪ LPR Seconds ▪ LCD Seconds ▪ Errored Seconds ▪ Coding Violations ▪ FE Errored Seconds ▪ FE Coding Violations ▪ HEC Errors ▪ FE HEC Errors ▪ Error Retrains ▪ FE Error Retrains ▪ LOF Retrains ▪ Training Starts ▪ Corrected Errors ▪ Uncorrected Errors ▪ FE Corrected Errors ▪ FE Uncorrected Errors ▪ Bad Prov. Status	▪ Elapsed Time (current 15 minute) ▪ Elapsed Time (current 24 hours) ▪ Elapsed Time (previous day)

For more information on DMT actuals, see the volume titled Provisioning.

Click the **Locally Reset Counters** button to reset all values to 0 (zero) for the current view, as shown in the example. After being reset, the values will begin incrementing again based on data accumulated from the point at which the counters were reset. Resetting the counters only affects the current view. Data continues to accumulate “behind the scenes,” and if the current view is closed and another view is opened, the new view displays values based on the entire reporting period.

DMT4 Port Physical PM Tab Page

Click the Physical PM tab to display the following tab page.

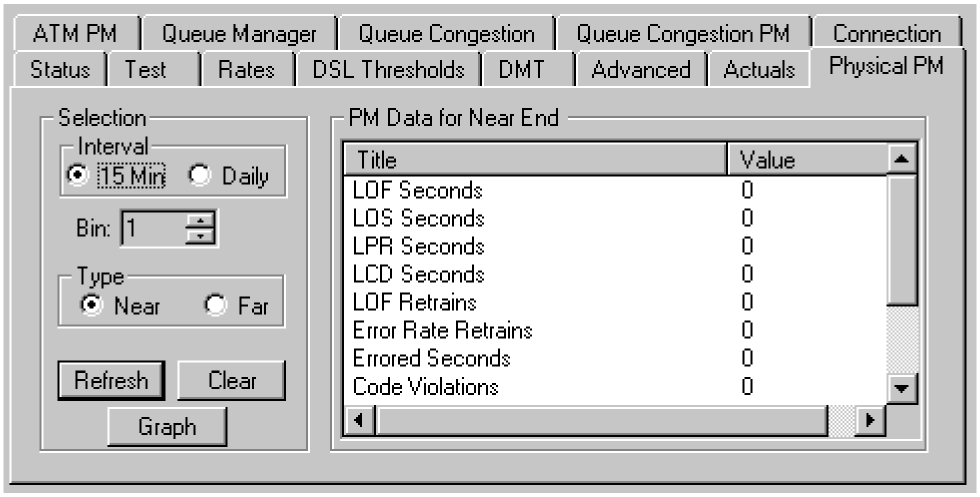


Figure 6-35: DMT4 Port Physical PM Tab

The **Physical PM** (Performance Monitoring) tab page provides near and far-end performance monitoring information.

The **Intervals** group allows you to specify either 15-minute or Daily intervals.

You can track up to 12 bins of performance data in 15-minute intervals. Bin number 1 contains data for the current 15-minute interval. Bin number 2 contains data for the previous 15-minute interval and so on. In the **Bin** spin box, set the Bin value (1 to 12).

You can track 2 bins of data in daily intervals. Bin number 1 contains data for the current day. Bin number 2 contains data for the previous day. In the **Bin** spin box, set the Bin value (1 or 2).

The **Type** group allows you to specify whether to monitor near or far-end data.

The **PM Data for . . .** group displays each parameter *Title* and *Value*. The group heading changes to reflect the option selected in the **Type** group. This list includes values for the following parameters:

Table 6-5: Near and Far-End PM Parameters

Near-End	Far-End
▪ LOF Seconds ▪ LOS Seconds ▪ LPR Seconds ▪ LCD Seconds ▪ LOF Retrains ▪ Error Rate Retrains ▪ Errored Seconds ▪ Code Violations ▪ Elapsed Time (current 15 minute) ▪ Elapsed Time (current 24 hours) ▪ Elapsed Time (previous day) ▪ Status	▪ Errored Seconds ▪ Code Violations ▪ Error Rate Retrains ▪ Elapsed Time (current 15 minutes) ▪ Elapsed Time (current 24 hours) ▪ Elapsed Time (previous day) ▪ Status

The data will **not** automatically refresh; you must click the **Refresh** button to refresh the data manually. Click the **Clear** button to clear all the performance data for this port. Click the **Graph** button to display the data in graphical format.

The **Status** in the **Data** list box will always be either Valid or Invalid. A value of Invalid indicates that the data has not been accumulated for the full time of a given interval because a bin has been reset; invalid data should not be used in resolving performance issues.

Nokia High Speed Access Products Inc. Proprietary Data

DMT4 Port ATM PM Tab Page

Click the ATM PM tab to display the following tab page.

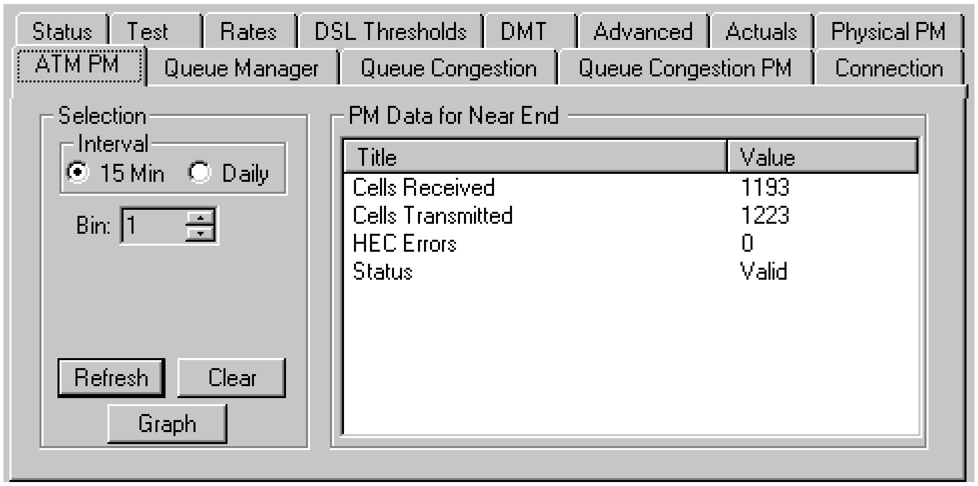


Figure 6-36: DMT4 Port ATM PM Tab

The **ATM PM** (Performance Monitoring) tab page provides information on Cells received, transmitted, HEC errors, and the status.

The **Interval** group allows you to specify either 15-minute or daily intervals.

You can track up to 12 bins of performance data in 15-minute intervals. Bin number 1 contains data for the current 15-minute interval. Bin number 2 contains data for the previous 15-minute interval and so on. In the **Bin** spin box, set the Bin value (1 to 12).

You can track 2 bins of data in daily intervals. Bin number 1 contains the data for the current day. Bin number 2 contains the data for the previous day. In the **Bin** spin box, set the Bin value (1 or 2).

The data will **not** automatically refresh; you must click the **Refresh** button to refresh the data manually. Click the **Clear** button to clear all the performance data for this port. Click the **Graph** button to display the data in graphical format.

The **Status** in the **Data** list box will always be either Valid or Invalid. A value of Invalid indicates that the data has not been accumulated for the full time of a given interval because the bin has been reset, or because at some time during the interval the port was in an LOS condition. Invalid data should not be used to resolve performance issues.

The Graph window displays when you click the **Graph** button from a number of different tab pages. The options included on the Graph window vary slightly depending on the set of data that is being graphed. As an example, the ATM PM Graph window is shown below.

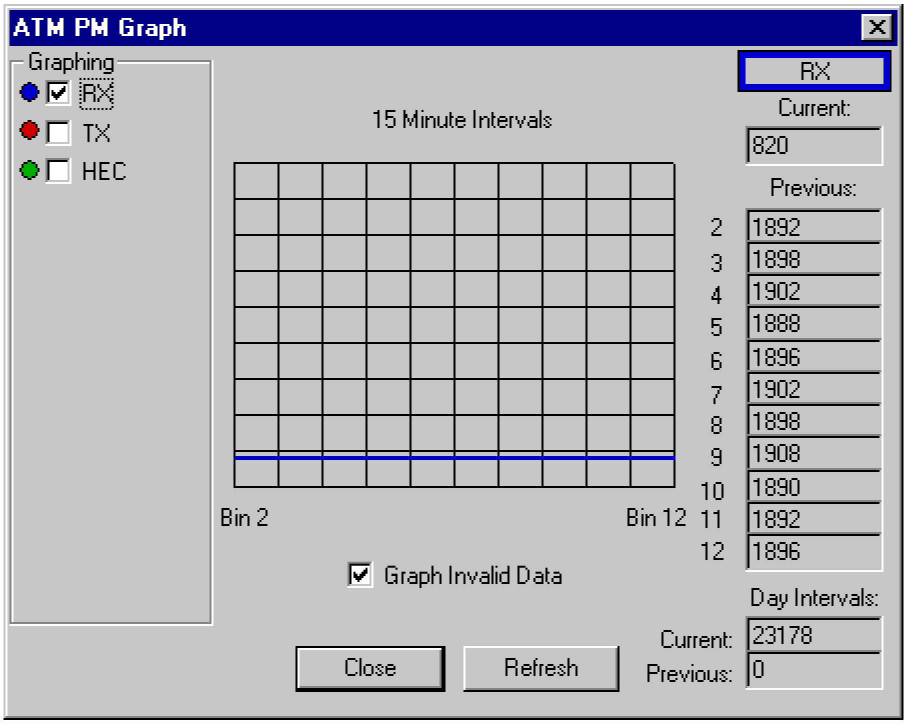


Figure 6-37: DMT4 Graph Window, ATM PM

The **Graphing** group includes a list of parameters that vary depending on the window from which the Graph window was accessed. Select the parameters you want to display by clicking the check boxes to select or deselect them.

The Graph window includes a grid where the line graphs are displayed. The grid can display any combination of the available parameters—each parameter displays in a different color to make it easier to view the information. The grid is divided into 15-minute intervals, and labelled by bin number.

The following numeric data is displayed on the right side of the Graph window:

- Current data for the current 15-minute interval and current day.
- Historic data for the eleven previous 15-minute bins and for the previous day.

Click the **Close** command button to close the window, or the **Refresh** button to refresh the display.

DMT4 Port Queue Manager Tab Page

Click the Queue Manager tab to display the following tab page.

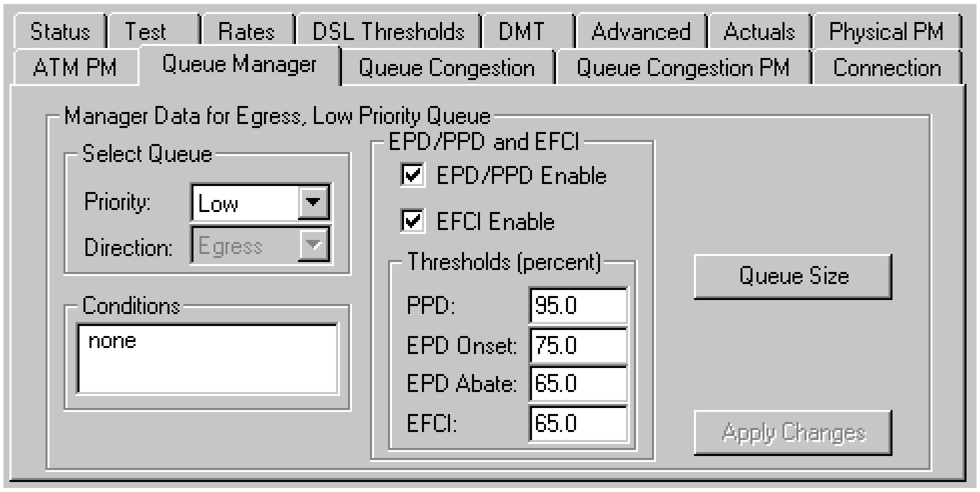


Figure 6-38: DMT4 Port Queue Manager Tab

The **Queue Manager** tab enables provisioning of the Quality of Service (QoSV4) buffers. The **Select Queue** group box is used to specify which queue to view by **Priority** (Low, Medium, or High). *Low Priority* is the default. The **Direction** field is static (non-configurable); *Egress* is the only valid value for this card.

As different options are selected in these fields, the **Manager Data for . . .** title above the group changes to reflect the current selections.

The **Conditions** box lists any conditions pertaining to the buffers.

The **EPD/PPD and EFCI** group box includes check boxes that allow provisioning of the EPD/PPD (Early Packet Discard/Partial Packet Discard) and EFCI (Explicit Forward Congestion Indicator) features:

- **EPD/PPD Enable.** This check box is used to enable EPD and PPD for the port. Enable this option (the default) if the queue will be carrying connections supporting ATM Adaption Layer (AAL) Type 5; otherwise, disable. EPD can also be provisioned at the connection level. If a queue will be carrying a combination of AAL5 and other protocols, EPD/PPD should be enabled at the port level, and enabled for the individual connections that will be carrying AAL5 traffic exclusively, and disabled for those connections not carrying AAL5 data.
- **EFCI Enable.** This check box is used to enable (the default) EFCI for the port.

Thresholds can be specified for each of these parameters, including:

- **PPD.** Specifies the threshold above which partial packets will be discarded. The default is 95.0 (95%).
- **EPD Onset.** Specifies the threshold above which packets will be discarded. The default is 75.0 (75%).

- **EPD Abate.** Specifies the threshold below which packets will be transmitted. The default is 65.0 (65%).
- **EFCI.** Specifies the threshold above which EFCI will be applied to packets. The default is 65.0 (65%).

Click the **Queue Size** command button to display a dialog box where the queue size can be viewed and changed. The number displayed in the **Queue Size** box reflects the current provisioning for the queue selected in the *Priority* list on the Queue Manager tab.

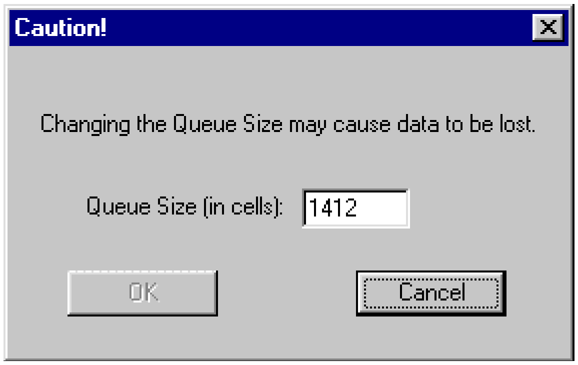


Figure 6-39: Low Priority Queue Default Size

> **Note:** This is a data affecting action. Changing the queue size is **not** recommended. You can click the **OK** button to proceed with the action or the **Cancel** button to cancel any changes to the **Queue Size** field.

The total buffering available for all three queues for one port of a DMT4 card is 2048 cells, so the total size of all three queues should not exceed 2048. The default allocations are as follows:

- Low priority = 1412 cells.
- Medium priority = 604 cells.
- High priority = 32 cells.

Since the default sizes for the three queues use the entire available buffering, increasing the size of one queue requires that you decrease the size of another by at least the same number of cells to make the required buffering available; you should decrease the size of the other queue first, otherwise a provisioning error will occur. If the total size of all three queues exceeds the maximum available buffering, the condition will display in the **Conditions** list on the Queue Manager tab.

After changing the provisioning for a port, click the **Apply Changes** command button to save the provisioning information to the MIB.

DMT4 Port Queue Congestion Tab Page

Click the Queue Congestion tab to display the following tab page.

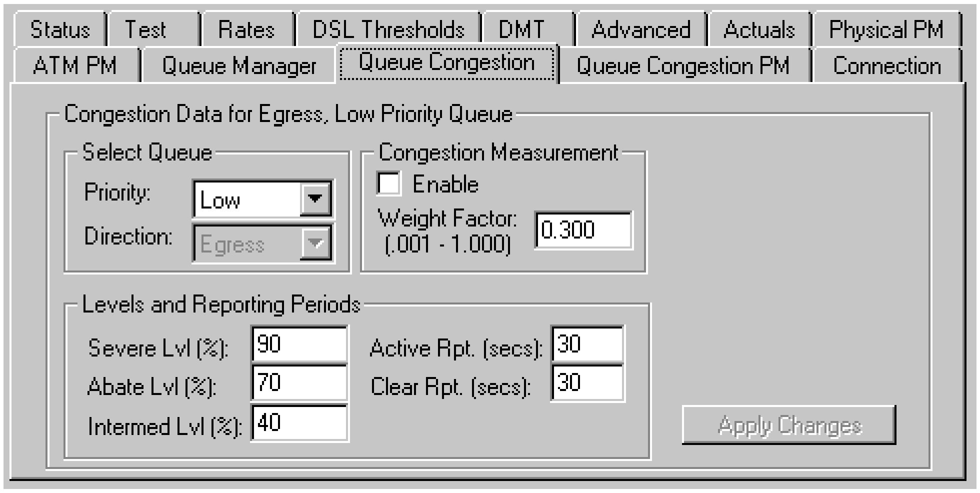


Figure 6-40: DMT4 Port Queue Congestion Tab

The Queue Congestion tab enables monitoring of the queues. The **Select Queue** group box is used to specify which queue to view by **Priority** (Low, Medium, or High). *Low Priority* is the default. The **Direction** field is static (non-configurable); *Egress* is the only valid value for this card.

As different options are selected in these fields, the **Congestion Data for . . .** title above the group changes to reflect the current selections.

The **Congestion Measurement** group box includes a check box to enable (unchecked by default) congestion measurement. A **Weight Factor** between .001 and 1.000 can be specified (the default is .300). The weight factor is used to smooth data samples. A value of 1 means that no weighting is applied to the current sample to calculate the measure of congestion.

The **Levels and Reporting Periods** group box enables provisioning of thresholds for the following parameters:

- **Severe level.** Level at which an alarm will be reported if the level stays above the specified **Abate level** for the specified number of **Active report** seconds. The default is 90%.
- **Abate level.** Level below which an alarm will clear if the level stays below the specified **Abate level** for the specified number of **Clear report** seconds. The default is 70%.
- **Intermediate level.** Level at which a threshold report will be generated. Only one report will be generated per five-minute interval. The default is 40%.
- **Active report.** Time in seconds (default of 30) before an alarm is reported if:
  - The level exceeds the specified **Severe level**, and

  - – Stays above the specified **Abate level** for the specified number of **Active report** seconds.
- **Clear report.** Time in seconds before an alarm clears if the level stays below the specified **Abate level**. The default is 30 seconds.

After changing the provisioning for a port, click the **Apply Changes** command button to save the provisioning information to the MIB.

DMT4 Port Queue Congestion PM Tab Page

Click the Queue Congestion tab to display the following tab page.

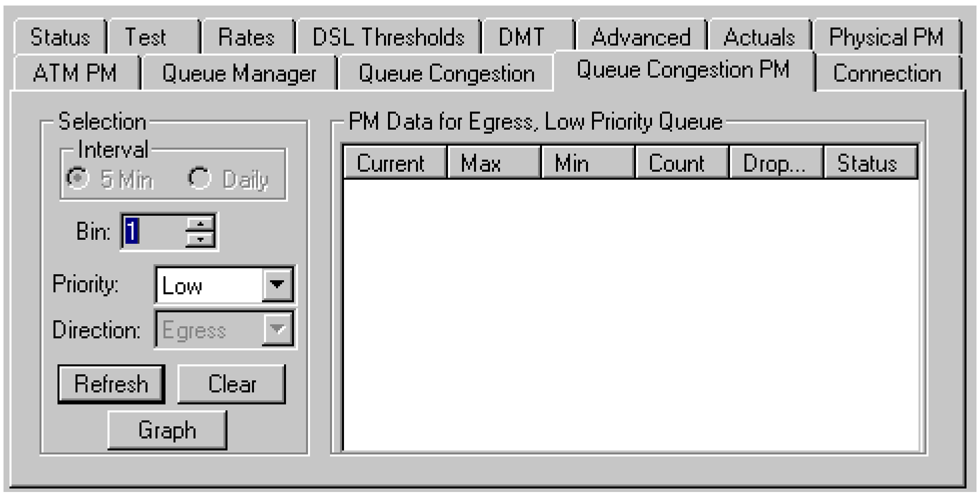


Figure 6-41: DMT4 Port Queue Congestion PM Tab

The **Queue Congestion PM** (Performance Monitoring) tab provides information on ingress and egress data congestion for each of the three queues (Low, Medium, and High).

The **Interval** group is a static (non-configurable) 5-minute value.

You can view up to 12 five-minute bins of performance data. The data in the Bin number 1 always contains the data for the current interval. Bin number 2 contains the data for the previous interval and so on.

Use the **Priority** field to specify the data queue you want to view. *Low Priority* is the default. The **Direction** field is static (non-configurable); *Egress* is the only valid value for this card.

As different options are selected in these fields, the **PM Data for . . .** title above the group changes to reflect the current selections.

In the **Bin** spin box, set the Bin value (1 to 12). The bin will contain the maximum and minimum smoothed values which occurred in that five-minute period.

The data will **not** automatically refresh; you must click the **Refresh** button to refresh the data manually. Click the **Clear** button to clear all the performance data for this port. Click the **Graph** button to display the data in graphical format.

The **PM Data for . . .** box displays the following items of data for bin 1:

- Current value for the period.
- Maximum value for the period.
- Minimum value for the period.
- Status of the queue.

For bins 2 through 12, only the following items of data display:

- Minimum and maximum values for the period.
- Status of the queue.

The advantage of displaying the current bin is that by selecting the **Refresh** button, both new and old data can be displayed so that the values can be compared.

Click any of the column headings and drag to resize them.

DMT4 Port Connection Tab Page

Click the Connection tab to display the following tab page.

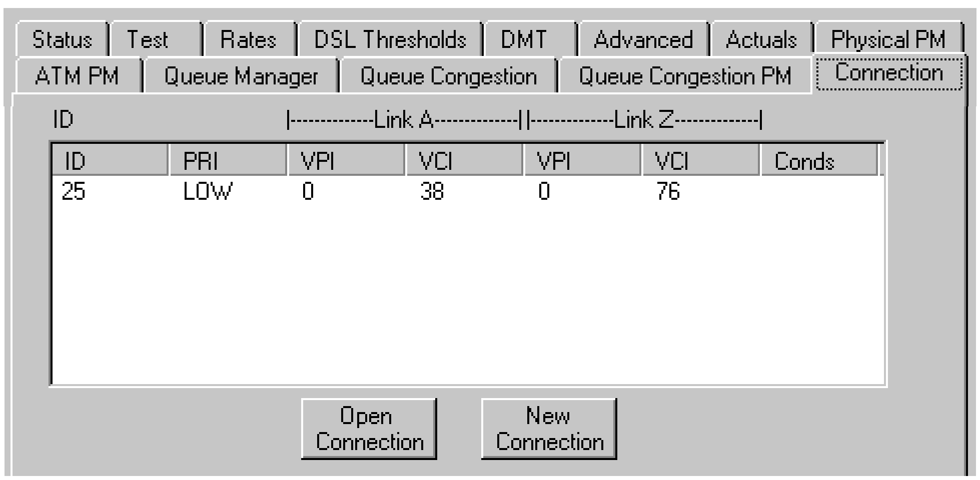


Figure 6-42: DMT4 Port Connection Tab

The Connection tab lists all connections on the port by ID, and shows the priority assigned to each connection and the VPI/VCI addresses for the Link A and Link Z sides of the connection. Any conditions are also listed.

Select any connection and click the **Open Connection** button to display connection details. Click the **New Connection** button to add a new virtual connection. For details, see Chapter 9—“Connection Dialog Boxes,” page 6-145.

Introduction

The DMT4F line card provides RADSL (Rate Adaptive Asymmetric DSL) service using the ANSI standard DMT (Discrete Multi-Tone) modulation technique. DMT uses FDD (Frequency Division Duplex) multiplexing to transmit data in the 25 KHz to 1.1 MHz frequency spectrum; it divides this spectrum into 256 discrete bands, each with 4 KHz bandwidth. Each band is independently modulated. Each DMT4F card provides four ports. The DMT4F card specifically supports both “lite” (G.lite) and “full-rate” (G.dmt) ADSL.

DMT4F Card Interface

Click a DMT4F card in an LCS equipment locator group to display the following tabs:

- Status.
- Configuration.
- Versions.

DMT4F Card Status Tab Page

The Status tab page displays initially.

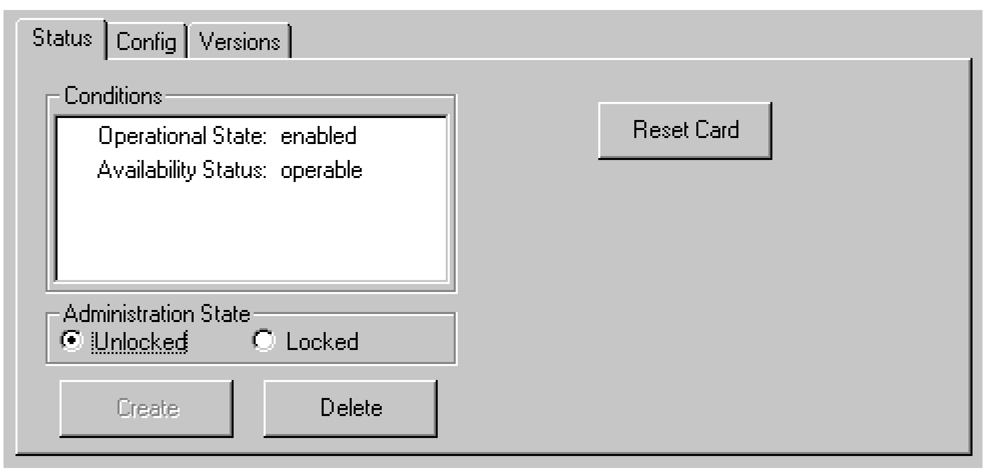


Figure 6-43: DMT4F Card Status Tab

The **Conditions** list box displays conditions associated with the selected card. Data in the **Conditions** list box is refreshed by the system at user-specified intervals; the interval can be set to 0, which means that the data will **not** automatically refresh. You can specify the

polling interval by selecting Options on the Tools menu. The data can also be updated by clicking the Refresh icon on the toolbar.

The **Administration State** group allows you to control whether or not the card is available for service. **Unlocked** makes the card available if there are no other conditions blocking its use. **Locked** makes the card unavailable for service; cards should be locked when being configured, when making hardware upgrades, or when testing.

> **Note:** If a card is locked, any alarms for that card will **not** display in the Active Alarms list; however, the alarm conditions will display in the **Conditions** box on the card's Status tab. If an alarm condition exists and the unlocked option is selected, an alarm will then be displayed in the Active Alarms list. For descriptions of alarm conditions, see the volume titled Maintenance and Testing.

The **Create** button is only enabled if you have clicked on an unprovisioned slot. Click this button to display a list of line cards you can create. Select DMT4F from the list.

The **Delete** command button is only enabled if you have clicked on a provisioned card. Click this button and a warning message displays indicating the card is about to be deleted from the system, and you can either click the **OK** button to proceed, or the **Cancel** button to cancel the operation.

> **Note:** You must delete all of a card's connections before you can delete the card. For details, see Chapter 9—"Connection Dialog Boxes," page 6-145.

Click the **Reset Card** button to physically reset the card. Click this button and a warning message displays asking if you are sure you want to reset the card. You can click the **OK** button to proceed or the **Cancel** button to cancel the operation.

DMT4F Card Configuration Tab Page

Click the Config tab to display the following tab page.

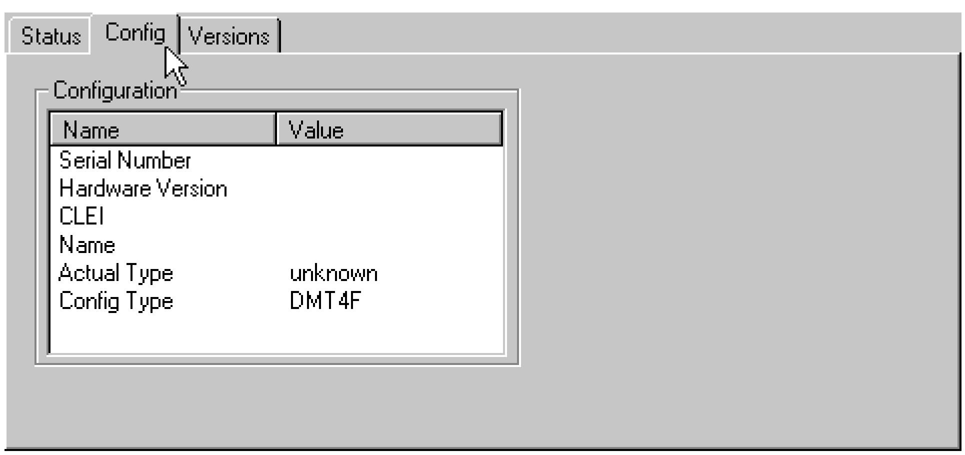


Figure 6-44: DMT4F Card Configuration Tab

The **Configuration** list box shows the Serial Number, Hardware Version, CLEI code, Name, and the Actual and Configured card Type.

DMT4F Card Versions Tab Page

Click the Versions tab to display the following tab page.

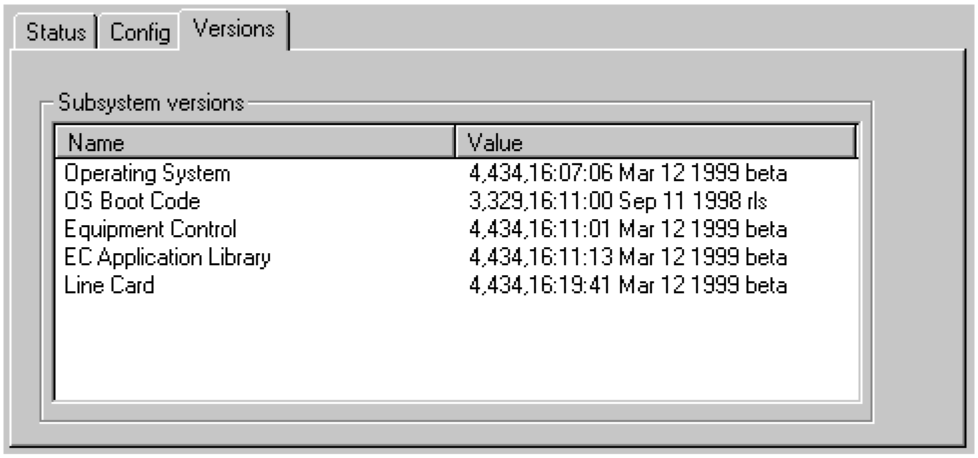


Figure 6-45: DMT4F Card Versions Tab

The **Subsystem Versions** group lists the subsystems, their version numbers, and the dates when they were created.

DMT4F Port Interface

Click the port connection on the DMT4F card to display the four ports. Click any of the four ports to display the DMT4F port object view for that port.

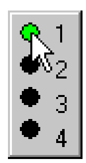


Figure 6-46: Individual Ports

The DMT4F port object view contains the following tabs:

- Status.
- Rates.
- DSL Thresholds.
- DMT.
- Advanced.
- Actuals.

- Physical PM.
- ATM PM.
- Queue Manager.
- Queue Congestion.
- Queue Congestion PM.
- Connection.

These tabs are described in the following sections.

DMT4F Port Status Tab Page

The Status tab displays initially.

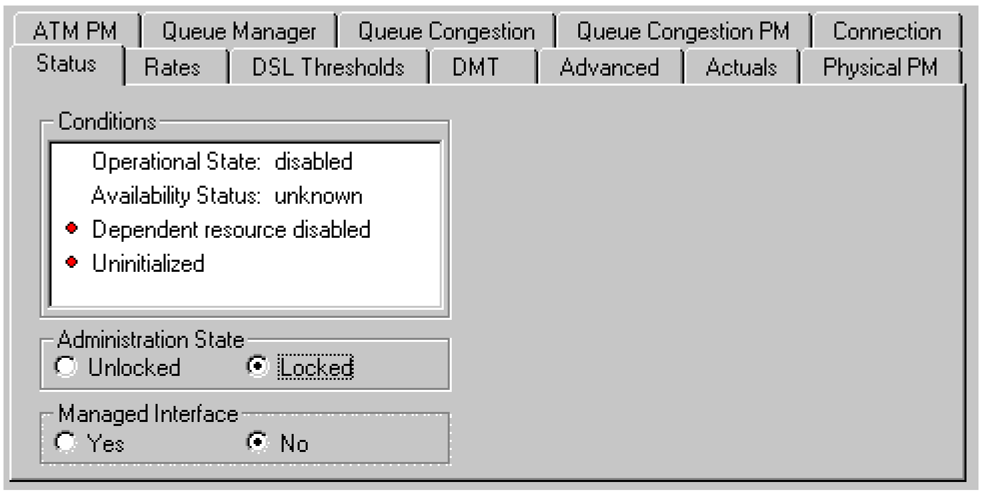


Figure 6-47: DMT4F Port Status Tab

The **Conditions** list box displays conditions associated with the selected port. Data in the **Conditions** list box is refreshed by the system at user-specified intervals; the interval can be set to 0, which means that the data will **not** automatically refresh. You can specify the polling interval by selecting Options on the Tools menu. The data can also be updated by clicking the Refresh icon on the toolbar.

The **Administration State** radio buttons control whether the object is available for service or not: **Unlocked** makes the object usable if there are no other conditions blocking use of this object. **Locked** makes the object unavailable for service. Objects should be locked when they are being configured or when performing upgrades.

> **Note:** If a port is locked, any alarms for that port will **not** display in the Active Alarms list; however, the alarm conditions will display in the **Conditions** box on the port's Status tab. If an alarm condition exists and the unlocked option is selected, an alarm will then be displayed in the Active Alarms list. For descriptions of alarm conditions, see the volume titled Maintenance and Testing.

The **Managed Interface** buttons control whether the port is being actively managed. If the managed interface option is enabled, conditions on the port (for example, an LOS condition) are reported as alarms in the alarm list. If this option is not enabled (the default), conditions on the port will not be reported.

The managed interface option interacts with one of the options in the Options dialog box, which is available by selecting Options on the Tools menu. In the **Line Card Port Color** group of the Options dialog box, one of the options is **If Managed Interface is set to no, show all options as yellow instead of red**. If this option is enabled, and the managed interface option is disabled, a port for which a condition is reported will display yellow instead of red.

DMT4F Port Rates Tab Page

Click the Rates tab to display the following tab page.

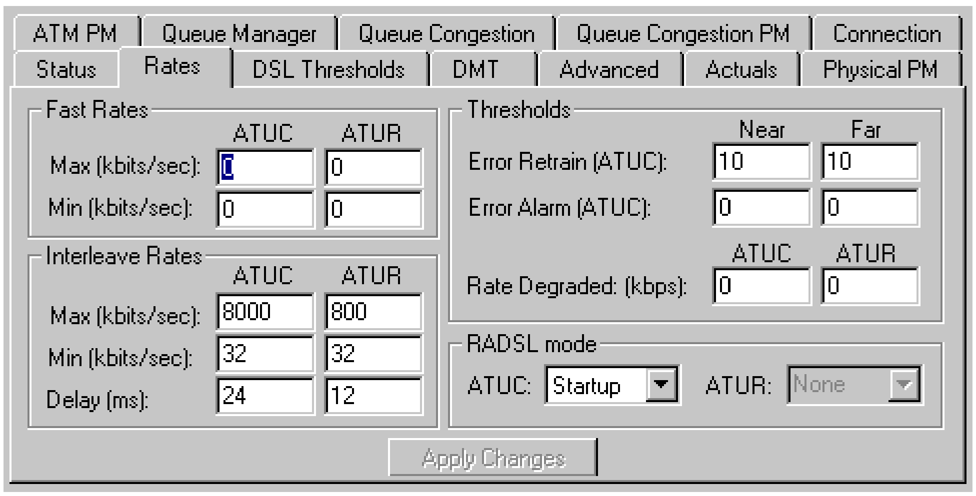


Figure 6-48: DMT4F Port Rates Tab

The Rates tab page allows you to view and set parameters for data rates, modes, and thresholds for the DMT4F card.

The **Fast Rates** group allows you to set the maximum and minimum data rates for ATUC and ATUR in Kbps. When these parameters are set to values other than 0, the *Interleaved Rates* parameters must be set to 0.

Interleave Rates for ATUC and ATUR in Kbps. The default settings for **Max**, **Min** and **Delay** *Interleave Rates* are as shown in the figure above. When these parameters are set to values other than 0, the *Fast Rates* parameters must be set to 0.

The **Thresholds** group allows you to view and set near and far-end **Error Alarm** (default of 0) and **Error Retrain** (default of 10) thresholds for ATUC, and the **Rate Degraded** (default of 0) thresholds for both ATUC and ATUR.

The **RADSL Mode** group allows you to select the Rate Adaptive DSL (RADSL) mode for the ATUC.

- **None.** Fixed bit rate. An error message is generated if the line/connection cannot support the data rate entered.
- **Startup.** Do rate adaptation during training. There is only training at startup. If there is a loss of signal (LOS) after startup, the system does not retrain and an error message is generated. *Startup* is the default *RADSL Mode* value.

If you make changes to the parameters, click the **Apply Changes** button to update the system using the new parameters.

For more information on provisioning DMT rates, see the volume titled Provisioning.

DMT4F Port DSL Thresholds Tab Page

Click the DSL Thresholds tab to display the following tab page.

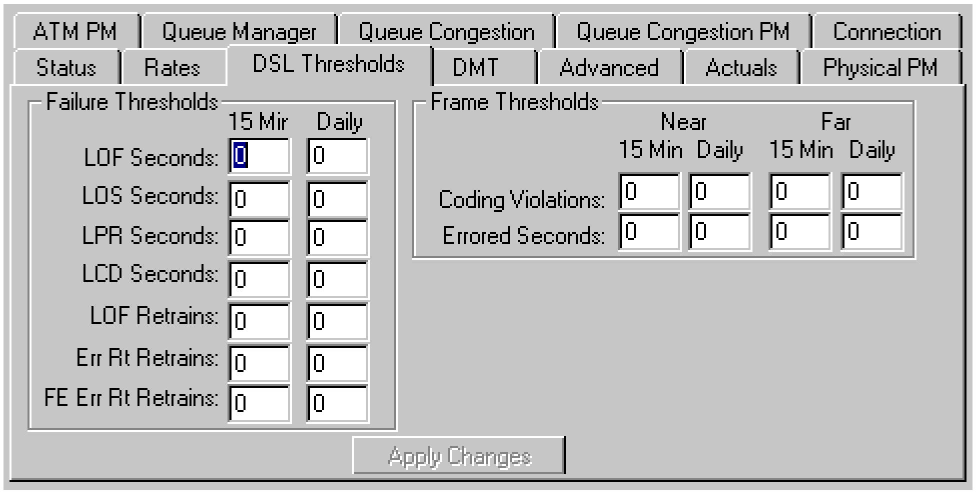


Figure 6-49: DMT4F Port DSL Thresholds Tab

The **Failure Thresholds** group allows you to specify thresholds for a number of parameters, for both 15 minute and daily intervals. The default is 0 for all values.

The **Frame Thresholds** group allows you to specify thresholds for Coding Violations and Errored Seconds for the near and far-end ATUC, for both 15-minute and daily intervals. The default is 0 for all values.

For tables of provisioning thresholds, see the volume titled Provisioning.

After making changes to any of the thresholds, the **Apply Changes** button becomes enabled. Click this button to apply the changes to the MIB.

DMT4F Port DMT Tab Page

Click the DMT tab to display the following tab page.

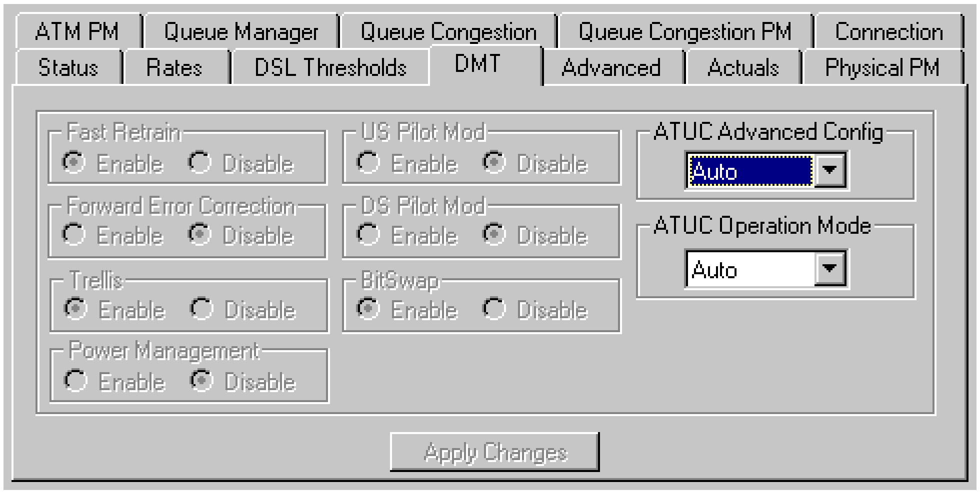


Figure 6-50: DMT4F Port DMT Tab

The DMT4F DMT tab page allows you to enable or disable a number of signal-enhancing features for the port.

ATUC Advanced Config(uration) This parameter, when set to **Auto**, sets the advanced configuration parameters for optimal performance for the selected *Operation Mode*; **Auto** is the default and recommended setting. When set to **Manual**, the advanced configuration parameters must be set manually.

The following DMT (tab) parameters for the DMT4F card are set automatically when the *ATUC Advanced Configuration* parameter is set to the default (and recommended) setting of **Auto**.

Table 6-6: DMT Parameters (Advanced Config Auto Set)

Parameters
▪ Fast Retrain (future release) ▪ Forward Error Correction ▪ Trellis ▪ Power Management ▪ US Pilot Mod (future release) ▪ DS Pilot Mod (future release) ▪ Bitswap

Forward Error Correction (FEC) for the ATUC allows you to use redundant bits generated at the transmit end to detect, locate and correct transmission errors at the receive end before delivery to the data communication link. FEC avoids retransmission of information by the transmitter.

Trellis is a best-fit modem modulation technique, Trellis Coding Modulation (TCM). *Trellis* is enabled by default for ATUC.

Bitswap allows you to manage bit allocation during data mode to adapt to changing line conditions, which helps maintain an acceptable level of noise margin for each bin.

Bitswapping does not dynamically change the data rate. Bit allocations are "swapped" from a bin with a degraded margin to one with a high margin. Bitswap is enabled by default.

ATUC Operation Mode. This parameter allows you to set the operational standard for the port. The options are **Auto** (default), **ANSI**, **G.lite**, **G.dmt**, and **G.ISDN**[1].

> **Note:** Release 6.0 supports Auto operation mode only. When Auto mode is selected, the system trains to the optimal mode: *ANSI*, *G.lite*, or *G.dmt*. Refer to the Actuals tab after training is complete to see the actual *Operation Mode* selected.

For more information on DMT provisioning, see the volume titled Provisioning.

DMT4F Port Advanced Tab Page

Click the Advanced tab to display the following tab page.

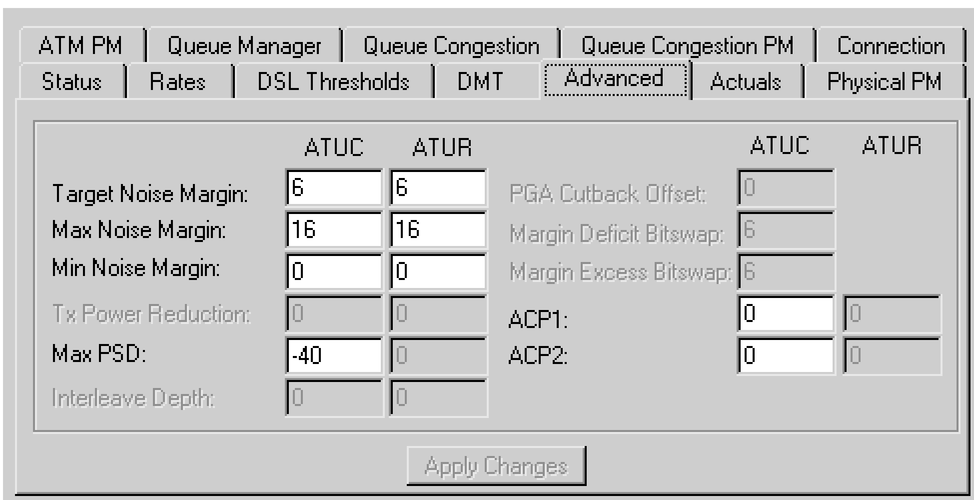


Figure 6-51: DMT4F Port Advanced Tab

[1] G.ISDN functionality is planned for a future release.

The Advanced tab page allows you to specify thresholds for a number of advanced DMT options.

The **Noise Margin** fields allow you to specify the margin (in dB) that the port establishes during the training process. These thresholds determine the amount of noise allowed on the line for the channel to operate at 10^{-7} BER. Larger margins lower the rate, but increase the line's immunity to noise.

The port trains to the maximum data rate that a line will support at the thresholds specified in these fields when operating at 10^{-7} BER. The actual and provisioned margin should be about equal. The default is 6 dB for both ATUC and ATUR.

Max Noise Margin. The maximum signal to noise ratio (SNR) margin. The default is 16 dB for both ATUC and ATUR.

Min Noise Margin. The minimum SNR margin. The default is 0 dB for both ATUC and ATUR.

The **Transmit Power Reduction** fields are not applicable for this card.

The **Max PSD** (Maximum Power Spectural Density) field is used to limit the transmit power on the ATUC channel, in order to prevent interference with other data services in the same cable sheath; the optimum value for this field depends on the noise tolerance of the other data services. Increasing the transmit power on the ATUC channel can also cause interference on the receive signal. The default is -40 dBm/Hz.

The **Interleave Depth** fields are not applicable for this card.

The **PGA Cutback Offset** field is not applicable for this card.

The **Margin Deficit Bitswap** field is not applicable for this card.

The **Margin Excess Bitswap** field is not applicable for this card.

ACPl. This parameter is reserved for future use.

ACP2. This parameter is reserved for future use.

For more information, see the volume titled Provisioning.

If you make changes to the parameters, click the **Apply Changes** button to update the system using the new parameters.

DMT4F Port Actuals Tab Page

Click the Actuals tab to display the following tab page.

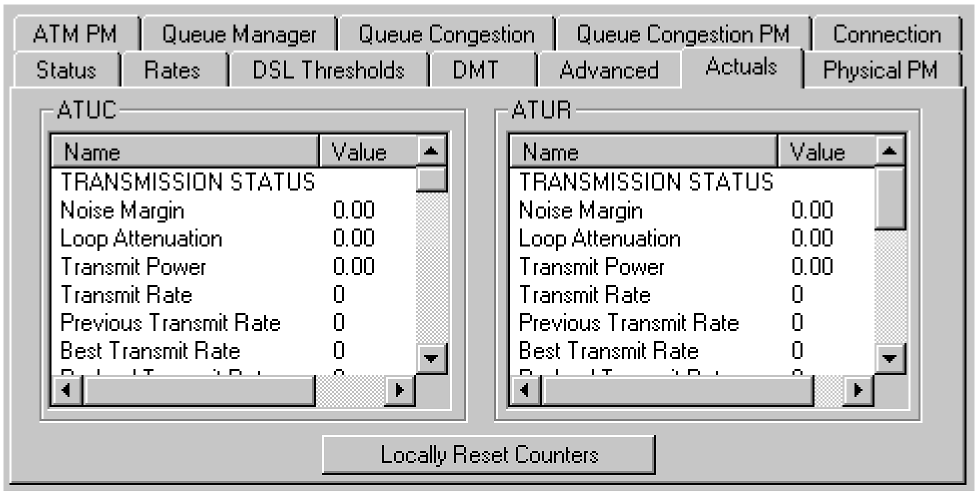


Figure 6-52: DMT4F Port Actuals Tab

The DMT4F Port Actuals tab page displays ATUC and ATUR connectivity data. This information is read-only.

The scrollable list includes the following DMT4F actuals for the ATUC and ATUR:

Table 6-7: ATUC/ATUR Actuals

Transmission Status	Data Path Data	Error Data (ATUC only)	Time Data (ATUC only)
■ Noise Margin ■ Loop Attenuation ■ PSD ■ Transmit Rate ■ Previous Transmit Rate ■ Best Transmit Rate ■ Payload Transmit Rate ■ Max Achievable Rate ■ Best Max Achievable Rate ■ Received Blocks (ATUC only) ■ Transmitted Blocks (ATUC only) ■ Cells Received (ATUC only) ■ Cells Transmitted (ATUC only) ■ Operation Mode (ATUC Only)	■ Vendor ID ■ Vendor Version ■ Serial Number (ATUR only)	■ LOF Failures ■ LOS Failures ■ LPR Failures ■ LCD Failures ■ LOF Seconds ■ LOS Seconds ■ LPR Seconds ■ LCD Seconds ■ Errored Seconds ■ Coding Violations ■ FE Errored Seconds ■ FE Coding Violations ■ HEC Errors ■ FE HEC Errors ■ Error Retrains ■ FE Error Retrains ■ LOF Retrains ■ Training Starts ■ Corrected Errors ■ FE Corrected Errors ■ Bad Prov. Status	■ Elapsed Time (current 15 minute) ■ Elapsed Time (current 24 hours) ■ Elapsed Time (previous day)

For more information on DMT actuals, see the volume titled Provisioning.

Click the **Locally Reset Counters** button to reset all values to 0 (zero) for the current view, as shown in the example. After being reset, the values will begin incrementing again based on data accumulated from the point at which the counters were reset. Resetting the counters only affects the current view. Data continues to accumulate “behind the scenes,” and if the current view is closed and another view is opened, the new view displays values based on the entire reporting period.

DMT4F Port Physical PM Tab Page

Click the Physical PM tab to display the following tab page.

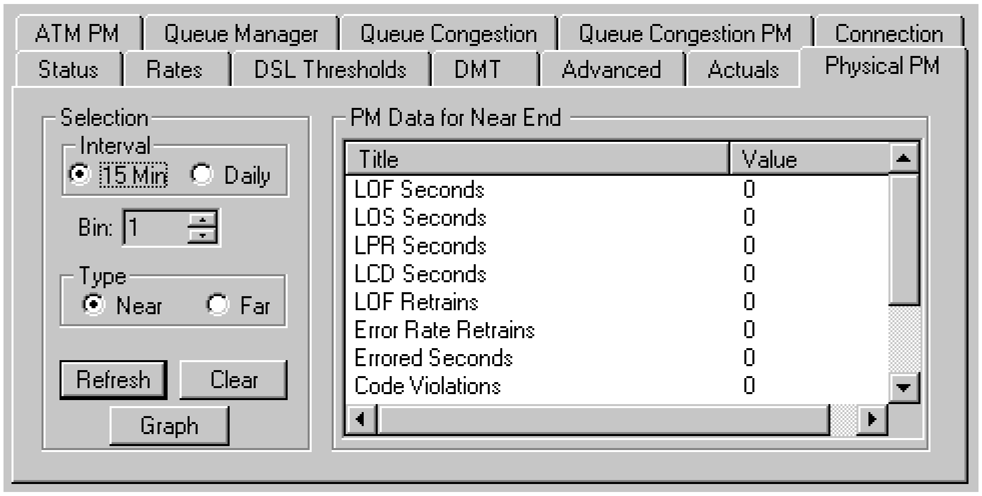


Figure 6-53: DMT4F Port Physical PM Tab

The **Physical PM** (Performance Monitoring) tab page provides near and far-end performance monitoring information.

The **Intervals** group allows you to specify either 15-minute or Daily intervals.

You can track up to 12 bins of performance data in 15-minute intervals. Bin number 1 contains data for the current 15-minute interval. Bin number 2 contains data for the previous 15-minute interval and so on. In the **Bin** spin box, set the Bin value (1 to 12).

You can track 2 bins of data in daily intervals. Bin number 1 contains data for the current day. Bin number 2 contains data for the previous day. In the **Bin** spin box, set the Bin value (1 or 2).

The **Type** group allows you to specify whether to monitor near or far-end data.

The **PM Data for . . .** group displays each parameter *Title* and *Value*. The group heading changes to reflect the option selected in the **Type** group. This list includes values for the following parameters:

Table 6-8: Near and Far-End PM Parameters

Near-End	Far-End
■ LOF Seconds ■ LOS Seconds ■ LPR Seconds ■ LCD Seconds ■ LOF Retrains ■ Error Rate Retrains ■ Errored Seconds ■ Code Violations ■ Elapsed Time (current 15 minute) ■ Elapsed Time (current 24 hours) ■ Elapsed Time (previous day) ■ Status	■ Errored Seconds ■ Code Violations ■ Error Rate Retrains ■ Elapsed Time (current 15 minutes) ■ Elapsed Time (current 24 hours) ■ Elapsed Time (previous day) ■ Status

The data will **not** automatically refresh; you must click the **Refresh** button to refresh the data manually. Click the **Clear** button to clear all the performance data for this port. Click the **Graph** button to display the data in graphical format.

The **Status** in the **Data** list box will always be either Valid or Invalid. A value of Invalid indicates that the data has not been accumulated for the full time of a given interval because a bin has been reset; invalid data should not be used in resolving performance issues.

DMT4F Port ATM PM Tab Page

Click the ATM PM tab to display the following tab page.

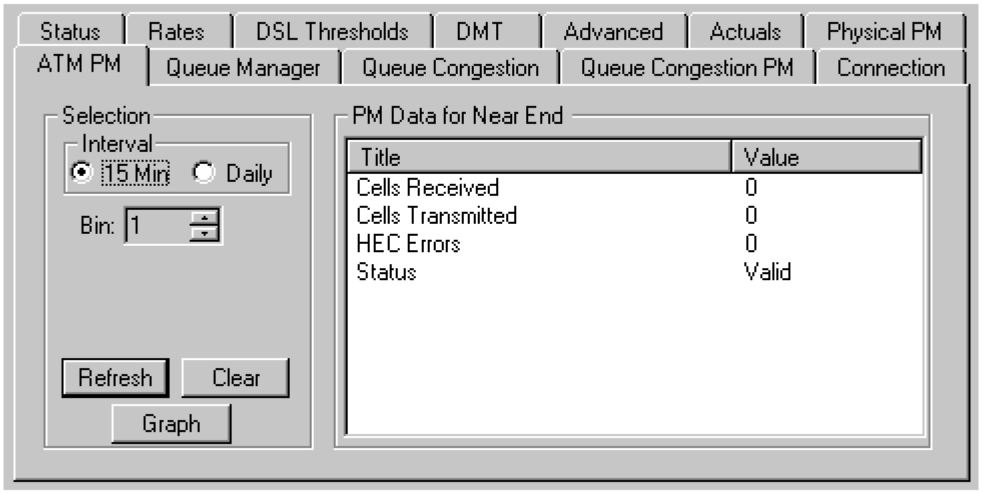


Figure 6-54: DMT4F Port ATM PM Tab

The **ATM PM** (Performance Monitoring) tab page provides information on Cells received, transmitted, HEC errors, and the status.

The **Interval** group allows you to specify either 15-minute or Daily intervals.

You can track up to 12 bins of performance data in 15-minute intervals. Bin number 1 contains data for the current 15-minute interval. Bin number 2 contains data for the previous 15-minute interval and so on. In the **Bin** spin box, set the Bin value (1 to 12).

You can track 2 bins of data in daily intervals. Bin number 1 contains the data for the current day. Bin number 2 contains the data for the previous day. In the **Bin** spin box, set the Bin value (1 or 2).

The data will **not** automatically refresh; you must click the **Refresh** button to refresh the data manually. Click the **Clear** button to clear all the performance data for this port. Click the **Graph** button to display the data in graphical format.

The **Status** in the **Data** list box will always be either Valid or Invalid. A value of Invalid indicates that the data has not been accumulated for the full time of a given interval because the bin has been reset, or because at some time during the interval the port was in an LOS condition. Invalid data should not be used to resolve performance issues.

The Graph window displays when you click the **Graph** button from a number of different tab pages. The options included on the Graph window vary slightly depending on the set of data that is being graphed. As an example, the ATM PM Graph window is shown below.

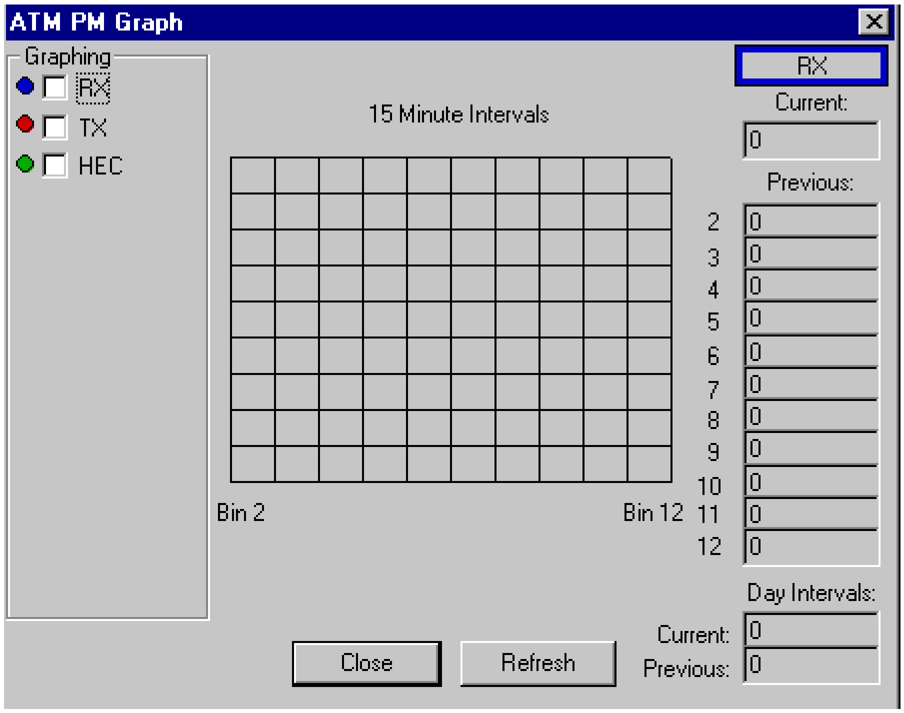


Figure 6-55: DMT4F Graph Window, ATM PM

The **Graphing** group includes a list of parameters that vary depending on the window from which the Graph window was accessed. Select the parameters you want to display by clicking the check boxes to select or deselect them.

The Graph window includes a grid where the line graphs are displayed. The grid can display any combination of the available parameters—each parameter displays in a different color to make it easier to view the information. The grid is divided into 15-minute intervals, and labelled by bin number.

The following numeric data is displayed on the right side of the Graph window:

- Current data for the current 15-minute interval and current day.
- Historic data for the eleven previous 15-minute bins and for the previous day.

Click the **Close** command button to close the window, or the **Refresh** command button to refresh the display.

DMT4F Port Queue Manager Tab Page

Click the Queue Manager tab to display the following tab page.

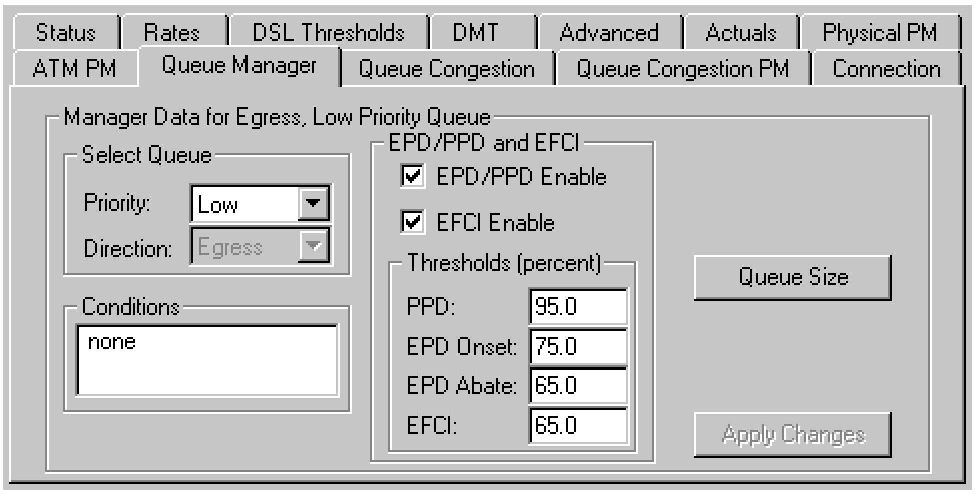


Figure 6-56: DMT4F Port Queue Manager Tab

The **Queue Manager** tab enables provisioning of the Quality of Service (QoSV4) buffers. The **Select Queue** group box is used to specify which queue to view by **Priority** (Low, Medium, or High). *Low Priority* is the default. The **Direction** field is static (non-configurable); *Egress* is the only valid value for this card.

As different options are selected in these fields, the **Manager Data for . . .** title above the group changes to reflect the current selections.

The **Conditions** box lists any conditions pertaining to the buffers.

The **EPD/PPD and EFCI** group box includes check boxes that allow provisioning of the EPD/PPD (Early Packet Discard/Partial Packet Discard) and EFCI (Explicit Forward Congestion Indicator) features:

- **EPD/PPD Enable.** This check box is used to enable EPD and PPD for the port. Enable this option (the default) if the queue will be carrying connections supporting ATM Adaption Layer (AAL) Type 5; otherwise, disable. EPD can also be provisioned at the connection level. If a queue will be carrying a combination of AAL5 and other protocols, EPD/PPD should be enabled at the port level, and enabled for the individual connections that will be carrying AAL5 traffic exclusively, and disabled for those connections not carrying AAL5 data.
- **EFCI Enable.** This check box is used to enable (the default) EFCI for the port.

Thresholds can be specified for each of these parameters, including:

- **PPD.** Specifies the threshold above which partial packets will be discarded. The default is 95.0 (95%).
- **EPD Onset.** Specifies the threshold above which packets will be discarded. The default is 75.0 (75%).

- **EPD Abate.** Specifies the threshold below which packets will be transmitted. The default is 65.0 (65%).
- **EFCI.** Specifies the threshold above which EFCI will be applied to packets. The default is 65.0 (65%).

Click the **Queue Size** command button to display a dialog box where the queue size can be viewed and changed. The number displayed in the **Queue Size** box reflects the current provisioning for the queue selected in the **Priority** list on the Queue Manager tab.

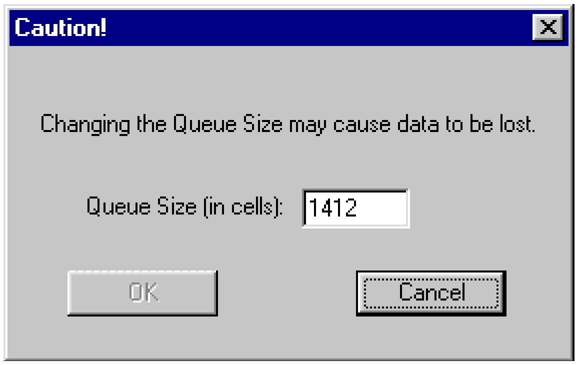


Figure 6-57: Low Priority Queue Default Size

Note: This is a data affecting action. Changing the queue size is **not** recommended. You can click the **OK** button to proceed with the action or the **Cancel** button to cancel any changes to the **Queue Size** field.

The total buffering available for all three queues for one port of a DMT4F card is 2048 cells, so the total size of all three queues should not exceed 2048. The default allocations are as follows:

- Low priority = 1412 cells
- Medium priority = 604 cells
- High priority = 32 cells

Since the default sizes for the three queues use the entire available buffering, increasing the size of one queue requires that you decrease the size of another by at least the same number of cells to make the required buffering available; you should decrease the size of the other queue first, otherwise a provisioning error will occur. If the total size of all three queues exceeds the maximum available buffering, the condition will display in the **Conditions** list on the Queue Manager tab.

After changing the provisioning for a port, click the **Apply Changes** command button to save the provisioning information to the MIB.

DMT4F Port Queue Congestion Tab Page

Click the Queue Congestion tab to display the following tab page.

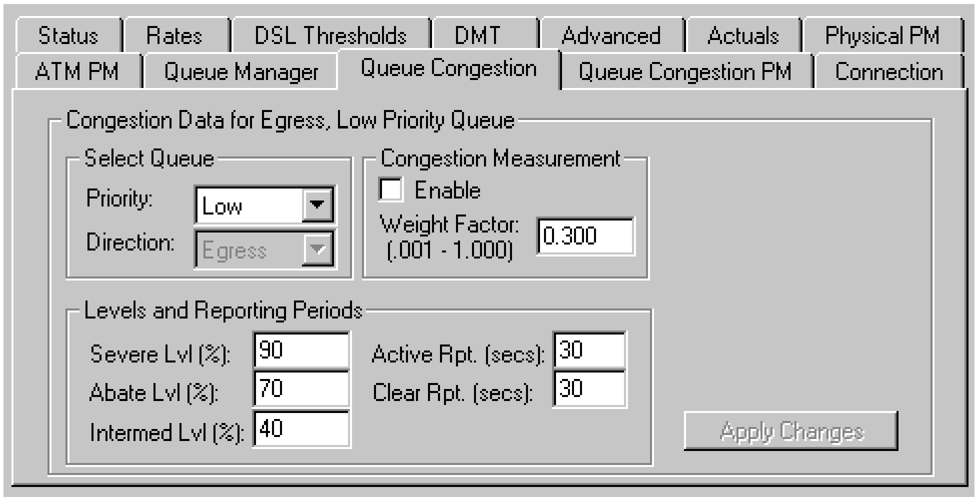


Figure 6-58: DMT4F Port Queue Congestion Tab

The Queue Congestion tab enables monitoring of the queues. The **Select Queue** group box is used to specify which queue to view by **Priority** (Low, Medium, or High). *Low Priority* is the default. The **Direction** field is static (non-configurable); *Egress* is the only valid value for this card.

As different options are selected in these fields, the **Congestion Data for . . .** title above the group changes to reflect the current selections.

The **Congestion Measurement** group box includes a check box to enable (unchecked by default) congestion measurement. A **Weight Factor** between .001 and 1.000 can be specified (the default is .300). The weight factor is used to smooth data samples. A value of 1 means that no weighting is applied to the current sample to calculate the measure of congestion.

The **Levels and Reporting Periods** group box enables provisioning of thresholds for the following parameters:

- **Severe level.** Level at which an alarm will be reported if the level stays above the specified **Abate level** for the specified number of **Active report** seconds. The default is 90%.
- **Abate level.** Level below which an alarm will clear if the level stays below the specified **Abate level** for the specified number of **Clear report** seconds. The default is 70%.
- **Intermediate level.** Level at which a threshold report will be generated. Only one report will be generated per five-minute interval. The default is 40%.
- **Active report.** Time in seconds (default of 30) before an alarm is reported if:
  – The level exceeds the specified **Severe level**, and

- Stays above the specified **Abate level** for the specified number of **Active report** seconds.

- **Clear report.** Time in seconds before an alarm clears if the level stays below the specified **Abate level**. The default is 30 seconds.

After changing the provisioning for a port, click the **Apply Changes** command button to save the provisioning information to the MIB.

DMT4F Port Queue Congestion PM Tab Page

Click the Queue Congestion tab to display the following tab page.

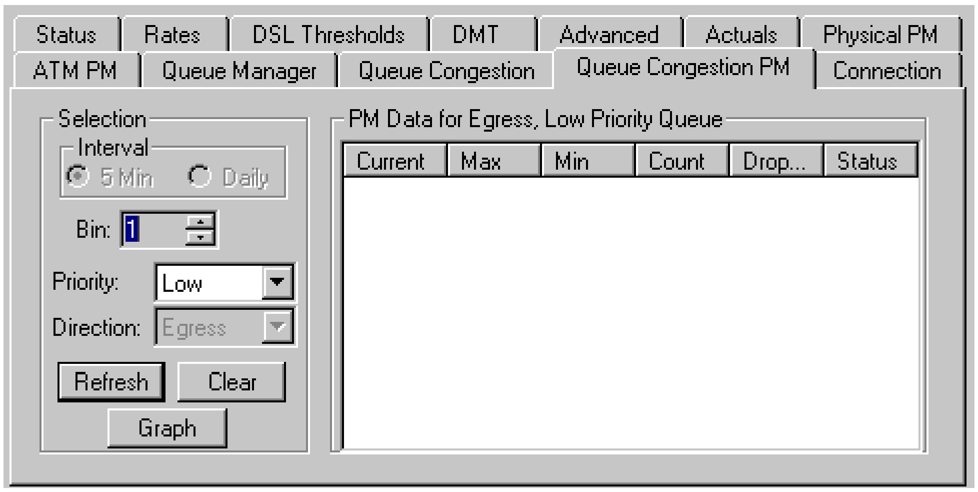


Figure 6-59: DMT4F Port Queue Congestion PM Tab

The **Queue Congestion PM** (Performance Monitoring) tab provides information on ingress and egress data congestion for each of the three queues (Low, Medium, and High).

The **Interval** group is a static (non-configurable) 5-minute value.

You can view up to 12 five-minute bins of performance data. The data in the Bin number 1 always contains the data for the current interval. Bin number 2 contains the data for the previous interval and so on.

Use the **Priority** field to specify the data queue you want to view. *Low Priority* is the default. The **Direction** field is static (non-configurable); *Egress* is the only valid value for this card.

As different options are selected in these fields, the **PM Data for . . .** title above the group changes to reflect the current selections.

In the **Bin** spin box, set the Bin value (1 to 12). The bin will contain the maximum and minimum smoothed values which occurred in that five-minute period.

The data will **not** automatically refresh; you must click the **Refresh** button to refresh the data manually. Click the **Clear** button to clear all the performance data for this port. Click the **Graph** button to display the data in graphical format.

The **PM Data for . . .** box displays the following items of data for bin 1:

- Current value for the period.
- Maximum value for the period.
- Minimum value for the period.
- Status of the queue.

For bins 2 through 12, only the following items of data display:

- Minimum and maximum values for the period.
- Status of the queue.

The advantage of displaying the current bin is that by selecting the **Refresh** button, both new and old data can be displayed so that the values can be compared.

Click any of the column headings and drag to resize them.

DMT4F Port Connection Tab Page

Click the Connection tab to display the following tab page.

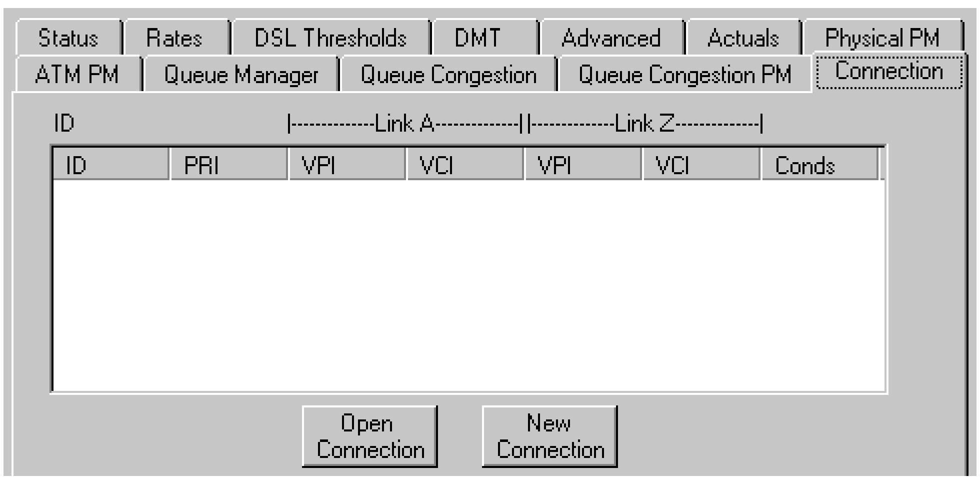


Figure 6-60: DMT4F Port Connection Tab

The Connection tab lists all connections on the port by ID, and shows the priority assigned to each connection and the VPI/VCI addresses for the Link A and Link Z sides of the connection. Any conditions are also listed.

Select any connection ID and click the **Open Connection** button to display connection details. Click the **New Connection** button to add a new virtual connection. For details, see Chapter 9—"Connection Dialog Boxes," page 6-145.

Introduction

The DMT8 line card provides RADSL (Rate Adaptive Asymmetric DSL) service using the ANSI standard DMT (Discrete Multi-Tone) modulation technique. DMT uses FDD (Frequency Division Duplex) multiplexing to transmit data in the 25 KHz to 1.1 MHz frequency spectrum; it divides this spectrum into a 256 discrete bands, each with 4 KHz bandwidth. Each band is independently modulated. Each DMT8 card provides eight ports. The DMT8 card specifically supports both “lite” (G.lite) and “full-rate” (G.dmt) ADSL.

DMT8 Card Interface

Click a DMT8 card in an LCS equipment locator group to display the following tabs:

- Status.
- Configuration.
- Versions.

DMT8 Card Status Tab Page

The Status tab page displays initially.

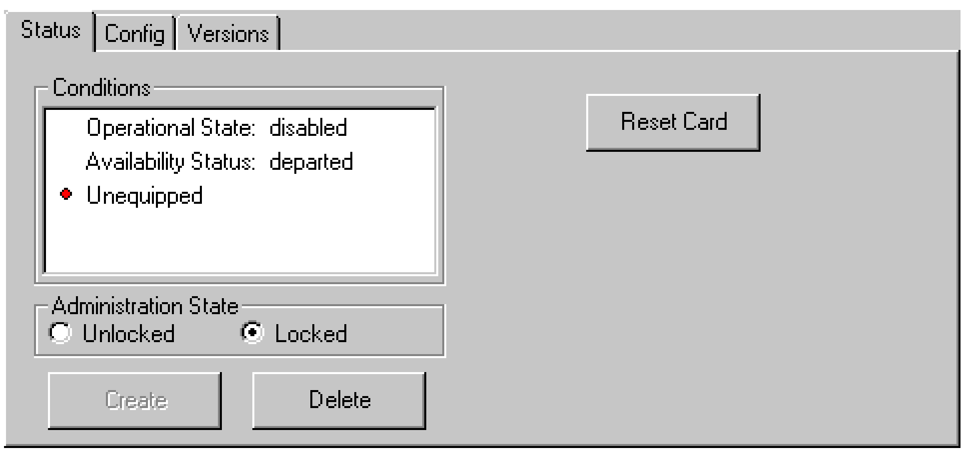


Figure 6-61: DMT8 Card Status Tab

The **Conditions** list box displays conditions associated with the selected card. Data in the **Conditions** list box is refreshed by the system at user-specified intervals; the interval can be set to 0, which means that the data will **not** automatically refresh. You can specify the polling interval by selecting Options on the Tools menu. The data can also be updated by clicking the Refresh icon on the toolbar.

Nokia High Speed Access Products Inc. Proprietary Data

The **Administration State** group allows you to control whether or not the card is available for service. **Unlocked** makes the card available if there are no other conditions blocking its use. **Locked** makes the card unavailable for service; cards should be locked when being configured, when making hardware upgrades, or when testing.

> **Note:** If a card is locked, any alarms for that card will **not** display in the Active Alarms list; however, the alarm conditions will display in the **Conditions** box on the card's Status tab. If an alarm condition exists and the unlocked option is selected, an alarm will then be displayed in the Active Alarms list. For descriptions of alarm conditions, see the volume titled Maintenance and Testing.

The **Create** button is only enabled if you have clicked on an unprovisioned slot. Click this button to display a list of line cards you can create. Select DMT8 from the list.

The **Delete** command button is only enabled if you have clicked on a provisioned card. Click this button and a warning message displays indicating the card is about to be deleted from the system, and you can either click the **OK** button to proceed, or the **Cancel** button to cancel the operation.

> **Note:** You must delete all of a card's connections before you can delete the card. For details, see Chapter 9—"Connection Dialog Boxes," page 6-145.

Click the **Reset Card** button to physically reset the card. Click this button and a warning message displays asking if you are sure you want to reset the card. You can click the **OK** button to proceed or the **Cancel** button to cancel the operation.

DMT8 Card Configuration Tab Page

Click the Config tab to display the following tab page. The **Configuration** list box shows

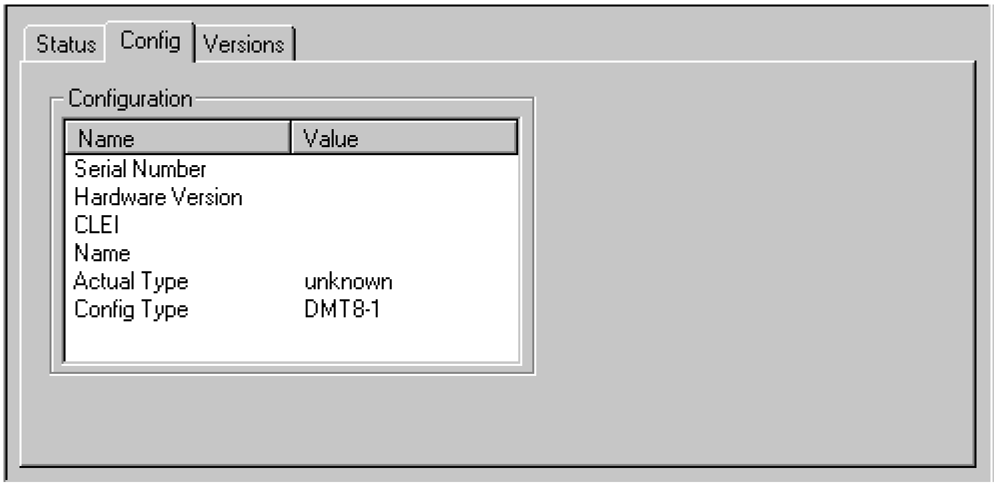


Figure 6-62: DMT8 Card Configuration Tab

the Serial Number, Hardware Version, CLEI code, Name, and the Actual and Configured card Type.

DMT8 Card Versions Tab Page

Click the Versions tab to display the following tab page.

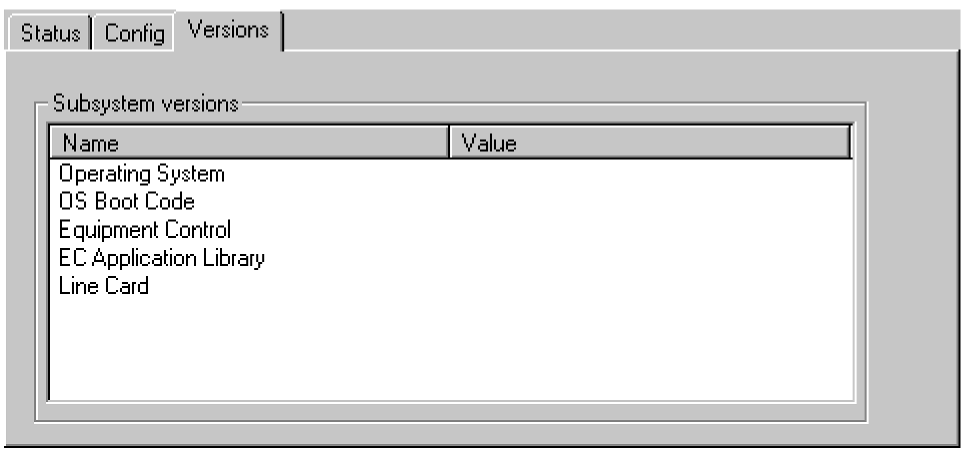


Figure 6-63: DMT8 Card Versions Tab

The **Subsystem Versions** group lists the subsystems, their version numbers, and the dates when they were created.

DMT8 Port Interface

Click the port connection on the DMT8 card to display the eight ports. Click any of the eight ports to display the DMT8 port object view for that port.

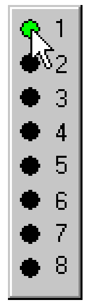


Figure 6-64: Individual Ports

The DMT8 port object view contains the following tabs:

- Status.
- Test.
- Rates.
- DSL Thresholds.
- DMT.
- Actuals.
- Physical PM.
- ATM PM.
- Queue Manager.
- Queue Congestion.
- Queue Congestion PM.
- Connection.

These tabs are described in the following sections.

DMT8 Port Status Tab Page

The Status tab displays initially.

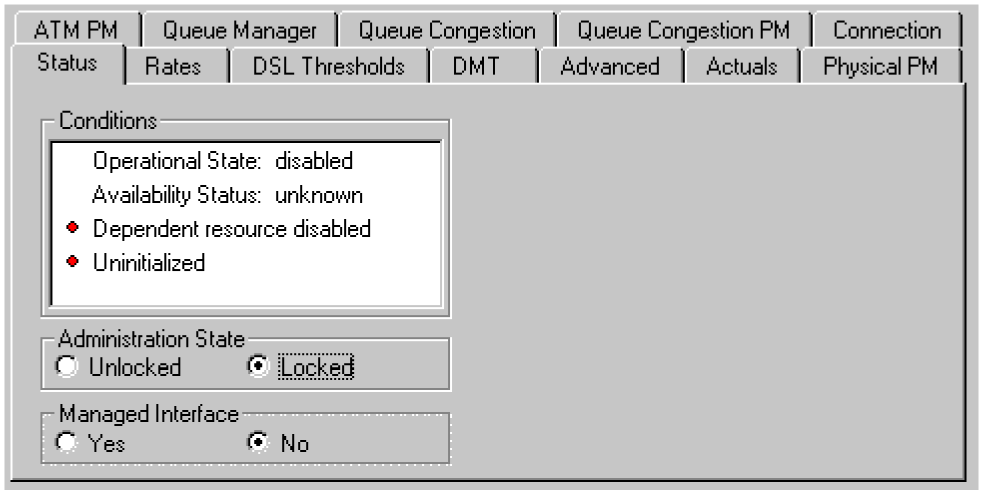


Figure 6-65: DMT8 Port Status Tab

The **Conditions** list box displays conditions associated with the selected port. Data in the **Conditions** list box is refreshed by the system at user-specified intervals; the interval can be set to 0, which means that the data will **not** automatically refresh. You can specify the polling interval by selecting Options on the Tools menu. The data can also be updated by clicking the Refresh icon on the toolbar.

The **Administration State** radio buttons control whether the object is available for service or not: **Unlocked** makes the object usable if there are no other conditions blocking use of this object. **Locked** makes the object unavailable for service. Objects should be locked when they are being configured or when performing upgrades.

> **Note:** If a port is locked, any alarms for that port will **not** display in the Active Alarms list; however, the alarm conditions will display in the **Conditions** box on the port's Status tab. If an alarm condition exists and the unlocked option is selected, an alarm will then be displayed in the Active Alarms list. For descriptions of alarm conditions, see the volume titled Maintenance and Testing.

The **Managed Interface** buttons control whether the port is being actively managed. If the managed interface option is enabled, conditions on the port (for example, an LOS condition) are reported as alarms in the alarm list. If this option is not enabled (the default), conditions on the port will not be reported.

The managed interface option interacts with one of the options in the Options dialog box, which is available by selecting Options on the Tools menu. In the **Line Card Port Color** group of the Options dialog box, one of the options is **If Managed Interface is set to no, show all options as yellow instead of red**. If this option is enabled, and the managed interface option is disabled, a port for which a condition is reported will display yellow instead of red.

DMT8 Port Test Tab Page

Click the Test tab to display the following tab page.

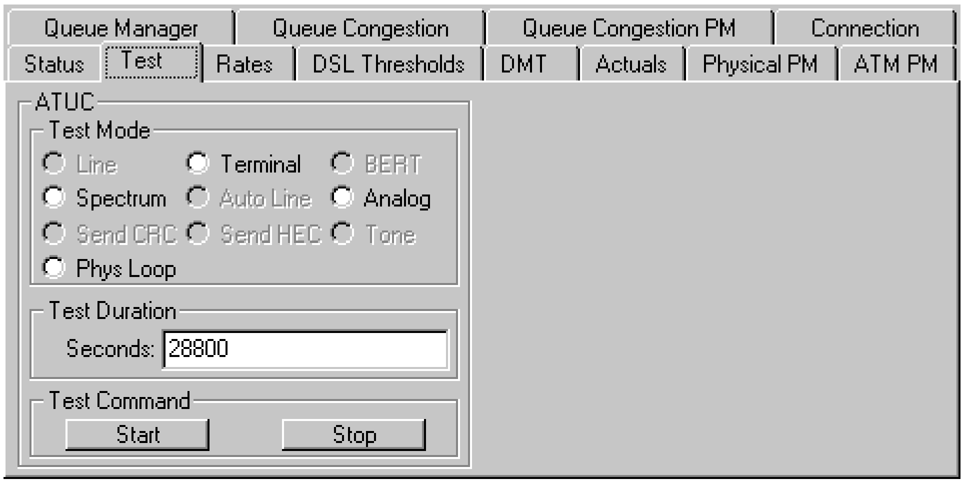


Figure 6-66: DMT8 Port Test Tab

The Test tab enables testing for the DMT8 card.

The **ATUC Test Mode** groups allow you to select the type of testing to perform:

- **Terminal.** Test the line to the subscriber's modem—no data out of the system.
- **Spectrum.** The DSL puts out the same signal (the same frequency spectral composition) that it would if it was linked with a CPE DSL unit—this does not require any CPE on the line (ATUC only).
- **Analog.** Test the line by looping a signal out through the transmit side and in through the receive side.
- **Phys Loop.** Performs as though active, but without sending data.

  Note: The disabled options do not apply to this port type.

Test Duration sets the interval in seconds that the system should wait before stopping the loopback test. The *Test Duration* default for the ATUC is 28800 seconds. The **Test Command** buttons **Start** and **Stop** testing.

Important! All diagnostic tests interrupt data flow through the system. Do not perform on a D50 that is providing service. Only use diagnostic tests during commissioning procedures or in a lab environment to isolate trouble in the system.

DMT8 Port Rates Tab Page

Click the Rates tab to display the following tab page.

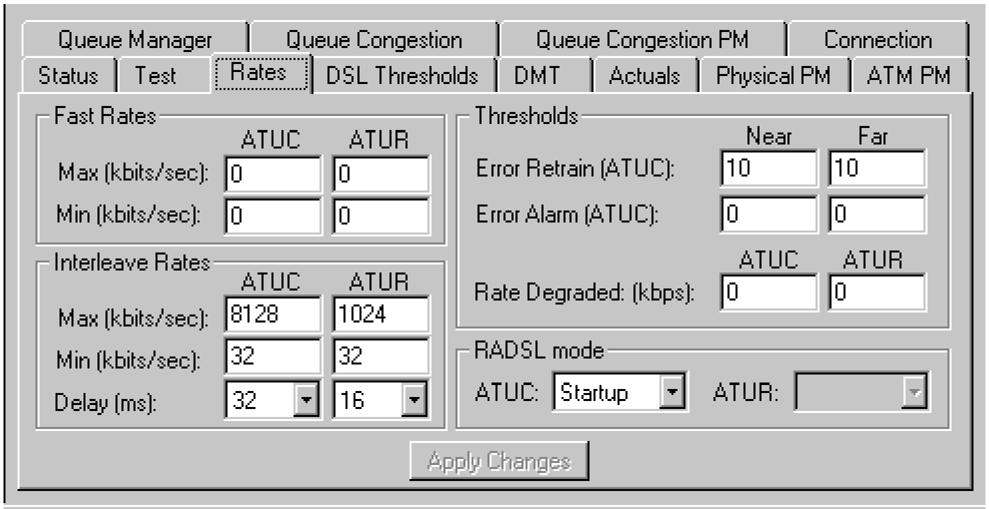


Figure 6-67: DMT8 Port Rates Tab

The Rates tab page allows you to view and set parameters for data rates, modes, and thresholds for the DMT8 card.

The **Fast Rates** group allows you to set the maximum and minimum data rates for the ATUC and ATUR in Kbps. When these parameters are set to values other than 0 (default), the *Interleave Rates* parameters must be set to 0.

Interleave Rates for ATUC and ATUR in Kbps. The default settings for **Max**, **Min** and **Delay** *Interleave Rates* are as shown in the figure above. When these parameters are set to values other than 0, the *Fast Rate* parameters must be set to 0.

The **Thresholds** group allows you to view and set near and far-end **Error Alarm** and **Error Retrain** thresholds for the ATUC, and the **Rate Degraded** thresholds for the ATUC and ATUR.

- **Error Alarm.** Set the number of near-end and/or far-end errored frames per second allowed during Data mode before the port generates an event (alarm). The default is 0.
- **Error Retrain.** set the number of near-end and/or far-end errored frames per second allowed during Data mode before the port retrains. The default is 10.
- **Rate Degraded.** Set the number of bits per second below the minimum data rate provisioned for the ATUC (downstream) and ATUR (upstream) channels before the port generates a Rate Degraded condition. The default is 0.

The **RADSL Mode** group allows you to select the Rate Adaptive DSL (RADSL) mode for the ATUC. The options are **None** and **Startup**.

- **None.** Fixed bit rate. An error message is generated if the line/connection cannot support the data rate entered.

- **Startup.** Do rate adaptation during training. There is only training at startup. If there is a loss of signal (LOS) after startup, the system does not retrain and an error message is generated.

If you make changes to the parameters, click the **Apply Changes** button to update the system using the new parameters.

For more information on provisioning DMT rates, see the volume titled Provisioning.

DMT8 Port DSL Thresholds Tab Page

Click the DSL Thresholds tab to display the following tab page.

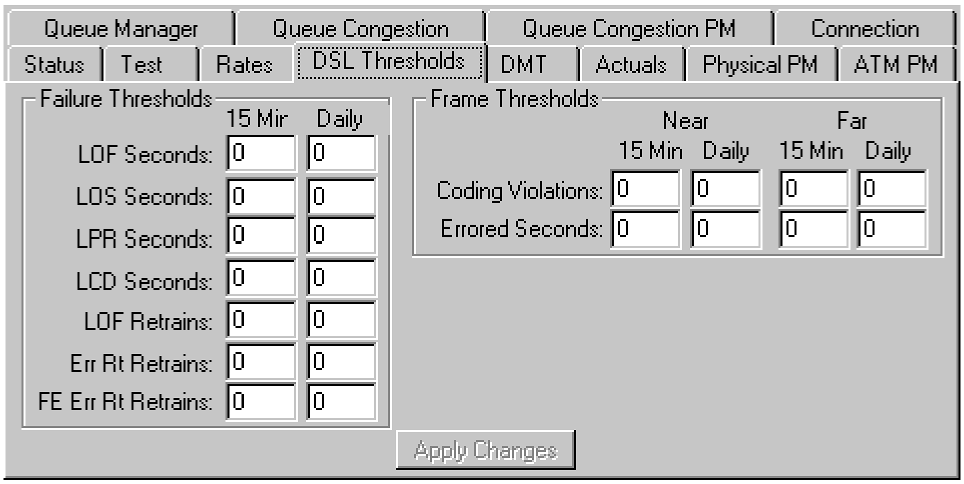


Figure 6-68: DMT8 Port DSL Thresholds Tab

The **Failure Thresholds** group allows you to specify thresholds for a number of parameters, for both 15 minute and daily intervals. The default is 0 for all values.

The **Frame Thresholds** group allows you to specify thresholds for Coding Violations and Errored Seconds for the near and far-end ATUC, for both 15-minute and daily intervals. The default is 0 for all values.

For tables of provisioning thresholds, see the volume titled Provisioning.

After making changes to any of the thresholds, the **Apply Changes** button becomes enabled. Click this button to apply the changes to the MIB.

DMT8 Port DMT Tab Page

Click the DMT tab to display the following tab page.

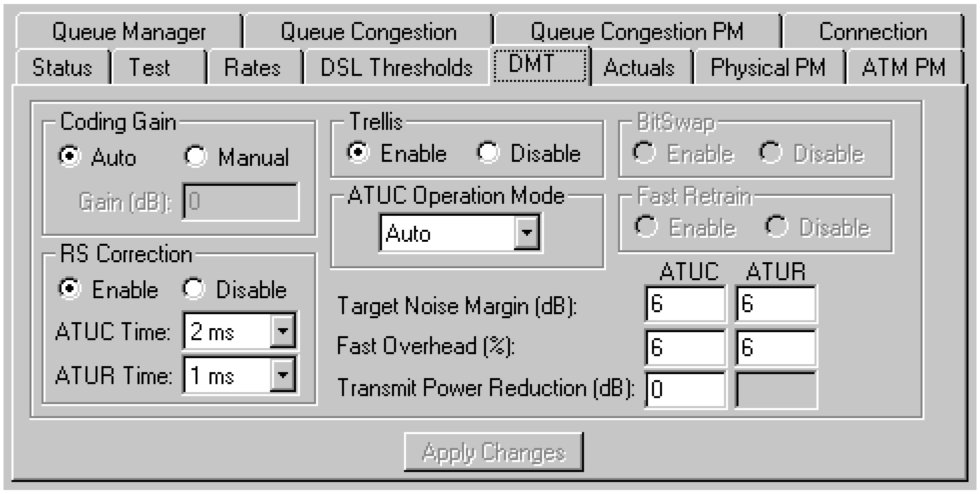


Figure 6-69: DMT8 Port DMT Tab

The DMT8 DMT tab page allows you to enable or disable a number of signal-enhancing features for the port.

Coding Gain allows you to set **Auto** or **Manual** coding gain. **Auto** (default) is typically set for automatic bit allocation. The **Manual** option provides a *Gain (dB)* value, see the next parameter.

Gain (dB) is the gain due to Trellis coding for the **Manual** Coding Gain setting. The range is 0 to 7 dB in 1 dB increments. This value is inactive for **Auto** Coding Gain.

RS Correction allows you to enable (default) or disable downstream foward error correction. *ATUC Time* default is 2 ms. *ATUR Time* default is 1 ms.

Trellis is a best-fit modem modulation technique, Trellis Coding Modulation (TCM). *Trellis* is enabled by default.

ATUC Operation Mode allows you to set the operational standard for the port. The options are **Auto** (default), **AutoANSI**, **ANSI**, **G.lite**, and **G.dmt**, **Alcatel**, **Alcatel14**, **ADI**, and **UAWG**.

> **Note:** When *Auto* mode is selected, the system trains to the mode supported by the CPE modem. Refer to the Actuals tab after training is complete to see the actual *Operation Mode* selected.

The **Target Noise Margin (dB)** fields allow you to specify the margin (in dB) that the port establishes during the training process (ATUC and ATUR default is 6). These thresholds determine the amount of noise allowed on the line for the channel to operate at 10^{-7} BER. Larger margins lower the rate, but increase the line's immunity to noise. The port trains to the maximum data rate that a line will support at the thresholds specified in these fields when operating at 10^{-7} BER. The actual and provisioned margin should be about equal.

Fast Overhead (%) indicates the percentage (ATUC and ATUR default is 6%) of payload data used for forward error correction. This parameter applies to the *Fast Rate* operation only.

Transmit Power Reduction (dB) parameter limits the maximum power of a channel's transmit signal. It instructs the port to reduce the full transmit power level by the *Transmit Power Reduction* amount. The default is 0 dB.

Bitswap is not available for this card.

Fast Retrain is not available for this card.

For more information on DMT provisioning, see the volume titled Provisioning.

DMT8 Port Actuals Tab Page

Click the Actuals tab to display the following tab page.

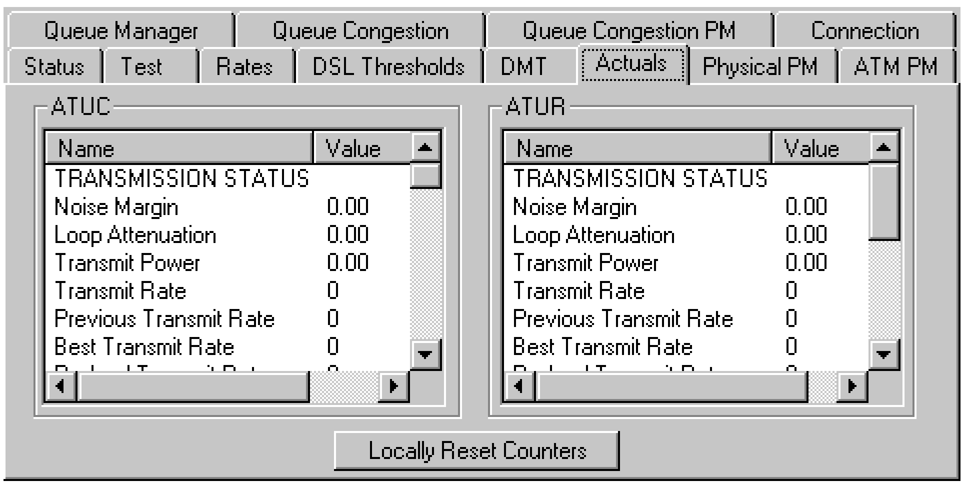


Figure 6-70: DMT8 Port Actuals Tab

The DMT8 Port Actuals tab page displays ATUC and ATUR connectivity data. This information is read-only.

The scrollable list includes the following DMT8 actuals for the ATUC and ATUR:

Table 6-9: ATUC/ATUR Actuals

Transmission Status	Data Path Data	Error Data (ATUC only)	Time Data (ATUC only)
■ Noise Margin ■ Loop Attenuation ■ Transmit Power (ATUC only) ■ Transmit Rate ■ Previous Transmit Rate ■ Best Transmit Rate ■ Payload Transmit Rate ■ Max Achievable Rate ■ Best Max Achievable Rate ■ Cells Received (ATUC only) ■ Cells Transmitted (ATUC only) ■ Operational Mode (ATUC only)	■ R (bytes/RS codeword) ■ Interleave Depth ■ Coding Gain (ATUC only) ■ S (symbols/RS codeword) ■ Vendor ID ■ Vendor Version ■ Serial Number (ATUR only)	■ LOF Failures ■ LOS Failures ■ LPR Failures ■ LCD Failures ■ LOF Seconds ■ LOS Seconds ■ LPR Seconds ■ LCD Seconds ■ Errored Seconds ■ Coding Violations ■ FE Errored Seconds ■ FE Coding Violations ■ HEC Errors ■ FE HEC Errors ■ Error Retrains ■ FE Error Retrains ■ LOF Retrains ■ Training Starts ■ Corrected Errors ■ FE Corrected Errors ■ Bad Prov. Status	■ Elapsed Time (current 15 minute) ■ Elapsed Time (current 24 hours) ■ Elapsed Time (previous day)

For more information on DMT actuals, see the volume titled Provisioning.

Click the **Locally Reset Counters** button to reset all values to 0 (zero) for the current view, as shown in the example. After being reset, the values will begin incrementing again based on data accumulated from the point at which the counters were reset. Resetting the counters only affects the current view. Data continues to accumulate “behind the scenes,” and if the current view is closed and another view is opened, the new view displays values based on the entire reporting period.

DMT8 Port Physical PM Tab Page

Click the Physical PM tab to display the following tab page.

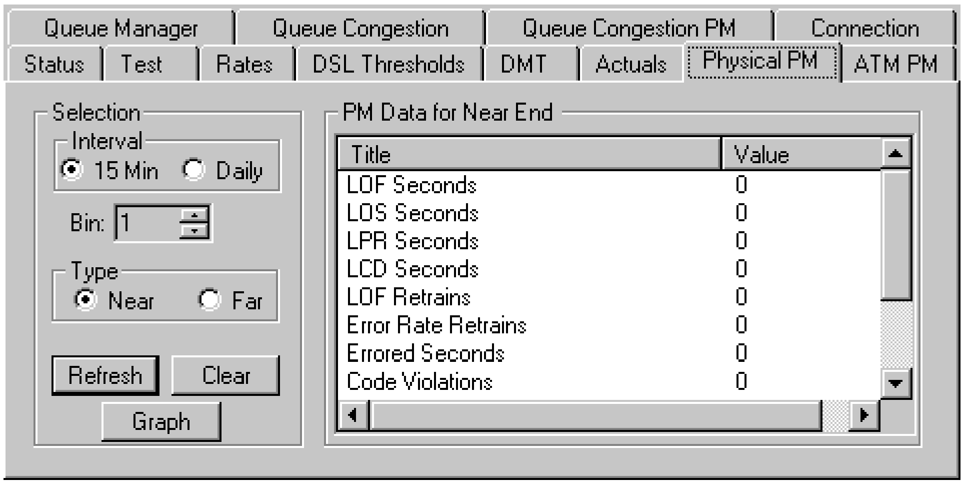


Figure 6-71: DMT8 Port Physical PM Tab

The **Physical PM** (Performance Monitoring) tab page provides near and far-end performance monitoring information.

The **Intervals** group allows you to specify either 15-minute or Daily intervals.

You can track up to 12 bins of performance data in 15-minute intervals. Bin number 1 contains data for the current 15-minute interval. Bin number 2 contains data for the previous 15-minute interval and so on. In the **Bin** spin box, set the Bin value (1 to 12).

You can track 2 bins of data in daily intervals. Bin number 1 contains data for the current day. Bin number 2 contains data for the previous day. In the **Bin** spin box, set the Bin value (1 or 2).

The **Type** group allows you to specify whether to monitor near or far-end data.

The **PM Data for . . .** group displays the names and values for the parameters listed. The title of this group changes to reflect the option selected in the **Type** group. This list includes values for the following parameters:

- LOF Seconds.
- LOS Seconds.
- LPR Seconds.
- LCD Seconds.
- LOF Retrains.
- Error Rate Retrains (both near and far-end).
- Errored Seconds (both near and far-end).
- Code Violations (both near and far-end).
- Elapsed Time (current 15 minute) (both near and far-end).

- Elapsed Time (current 24 hours) (both near and far-end).
- Elapsed Time (previous day) (both near and far-end).
- Status (both near and far-end).

The data will **not** automatically refresh; you must click the **Refresh** button to refresh the data manually. Click the **Clear** button to clear all the performance data for this port. Click the **Graph** button to display the data in graphical format.

The **Status** in the **Data** list box will always be either Valid or Invalid. A value of Invalid indicates that the data has not been accumulated for the full time of a given interval because a bin has been reset; invalid data should not be used in resolving performance issues.

DMT8 Port ATM PM Tab Page

Click the ATM PM tab to display the following tab page.

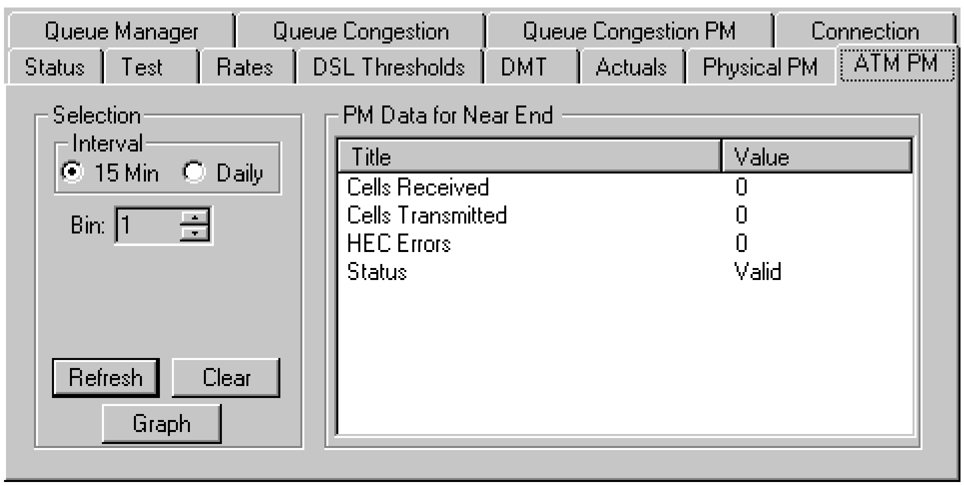


Figure 6-72: DMT8 Port ATM PM Tab

The **ATM PM** (Performance Monitoring) tab page provides information on Cells received, transmitted, HEC errors, and the status.

The **Intervals** group allows you to specify either 15-minute or Daily intervals.

You can track up to 12 bins of performance data in 15-minute intervals. Bin number 1 contains data for the current 15-minute interval. Bin number 2 contains data for the previous 15-minute interval and so on. In the **Bin** spin box, set the Bin value (1 to 12).

You can track 2 bins of data in daily intervals. Bin number 1 contains the data for the current day. Bin number 2 contains the data for the previous day. In the **Bin** spin box, set the Bin value (1 or 2).

The data will **not** automatically refresh; you must click the **Refresh** button to refresh the data manually. Click the **Clear** button to clear all the performance data for this port. Click the **Graph** button to display the data in graphical format.

The **Status** in the **Data** list box will always be either Valid or Invalid. A value of Invalid indicates that the data has not been accumulated for the full time of a given interval because the bin has been reset, or because at some time during the interval the port was in an LOS condition. Invalid data should not be used to resolve performance issues.

The Graph window displays when you click the **Graph** button from a number of different tab pages. The options included on the Graph window vary slightly depending on the set of data that is being graphed. As an example, the ATM PM Graph window is shown below.

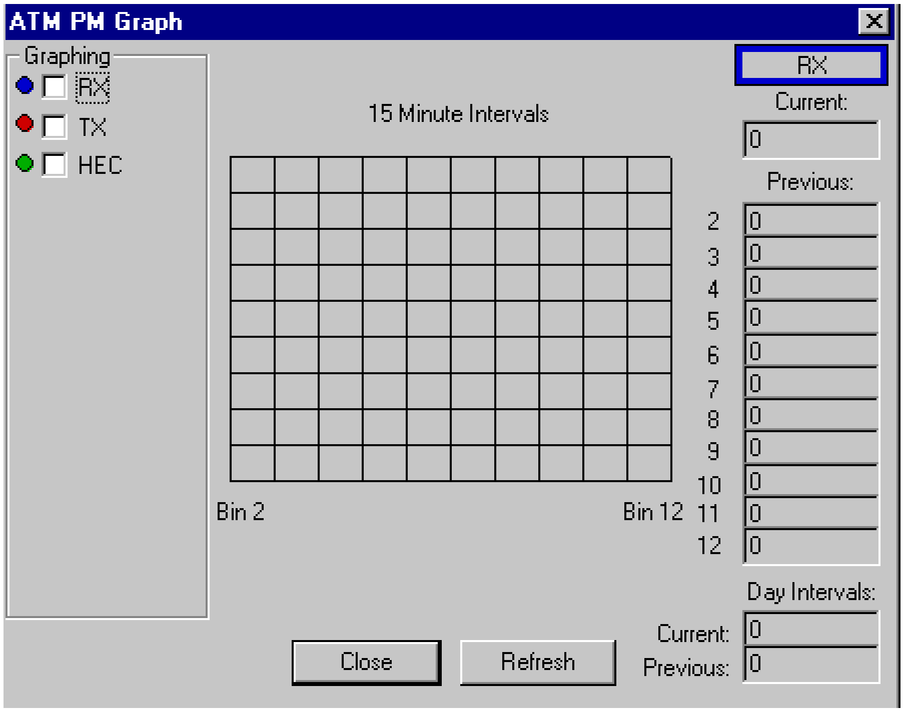


Figure 6-73: DMT8 Graph Window, ATM PM

The **Graphing** group includes a list of parameters that vary depending on the window from which the Graph window was accessed. Select the parameters you want to display by clicking the check boxes to select or deselect them.

The Graph window includes a grid where the line graphs are displayed. The grid can display any combination of the available parameters—each parameter displays in a different color to make it easier to view the information. The grid is divided into 15-minute intervals, and labelled by bin number.

The following numeric data is displayed on the right side of the Graph window:

- Current data for the current 15-minute interval and current day.
- Historic data for the eleven previous 15-minute bins and for the previous day.

Click the **Close** command button to close the window, or the **Refresh** command button to refresh the display.

DMT8 Port Queue Manager Tab Page

Click the Queue Manager tab to display the following tab page.

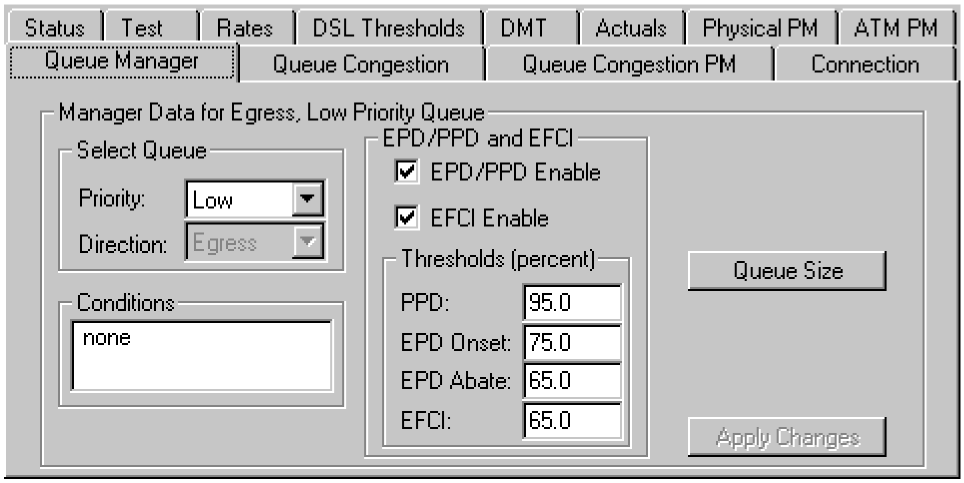


Figure 6-74: DMT8 Port Queue Manager Tab

The **Queue Manager** tab enables provisioning of the Quality of Service (QoSV4) buffers. The **Select Queue** group box is used to specify which queue to view by **Priority** (Low, Medium, or High). *Low Priority* is the default. The **Direction** field is static (non-configurable); *Egress* is the only valid value for this card.

As different options are selected in these fields, the **Manager Data for . . .** title above the group changes to reflect the current selections.

The **Conditions** box lists any conditions pertaining to the buffers.

The **EPD/PPD and EFCI** group box includes check boxes that allow provisioning of the EPD/PPD (Early Packet Discard/Partial Packet Discard) and EFCI (Explicit Forward Congestion Indicator) features:

- **EPD/PPD Enable.** This check box is used to enable EPD and PPD for the port. Enable this option (the default) if the queue will be carrying connections supporting ATM Adaption Layer (AAL) Type 5; otherwise, disable. EPD can also be provisioned at the connection level. If a queue will be carrying a combination of AAL5 and other protocols, EPD/PPD should be enabled at the port level, and enabled for the individual connections that will be carrying AAL5 traffic exclusively, and disabled for those connections not carrying AAL5 data.
- **EFCI Enable.** This check box is used to enable/disable EFCI for the port.

Thresholds can be specified for each of these parameters, including:

- **PPD.** Specifies the threshold above which partial packets will be discarded. The default is 95.0 (95%).
- **EPD Onset.** Specifies the threshold above which packets will be discarded. The default is 75.0 (75%).
- **EPD Abate.** Specifies the threshold below which packets will be transmitted. The default is 65.0 (65%).
- **EFCI.** Specifies the threshold above which EFCI will be applied to packets. The default is 65.0 (65%).

Click the **Queue Size** command button to displas a dialog box where the queue size can be viewed and changed. The number displayed in the **Queue Size** box reflects the current provisioning for the queue selected in the **Priority** list on the Queue Manager tab.

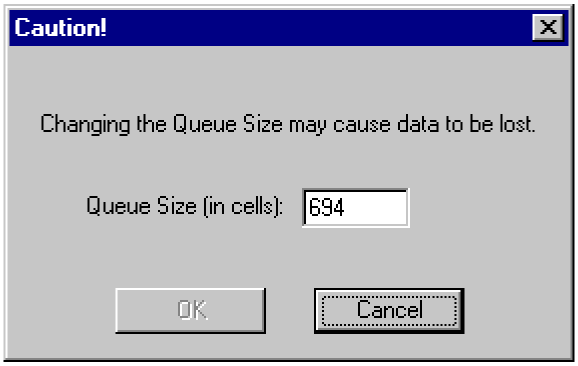


Figure 6-75: Low Priority Queue Default Size

Note: This is a data affecting action. Changing the queue size is **not** recommended. You can click the **OK** button to proceed with the action or the **Cancel** button to cancel any changes to the **Queue Size** field.

The total buffering available for all three queues for one port of a DMT8 card is 1024 cells, so the total size of all three queues should not exceed 1024. The default allocations are as follows:

- Low priority = 694 cells.
- Medium priority = 298 cells.
- High priority = 32 cells.

Since the default sizes for the three queues use the entire available buffering, increasing the size of one queue requires that you decrease the size of another by at least the same number of cells to make the required buffering available; you should decrease the size of the other queue first, otherwise a provisioning error will occur. If the total size of all three queues exceeds the maximum available buffering, the condition will display in the **Conditions** list on the Queue Manager tab.

After changing the provisioning for a port, click the **Apply Changes** command button to save the provisioning information to the MIB.

DMT8 Port Queue Congestion Tab Page

Click the Queue Congestion tab to display the following tab page.

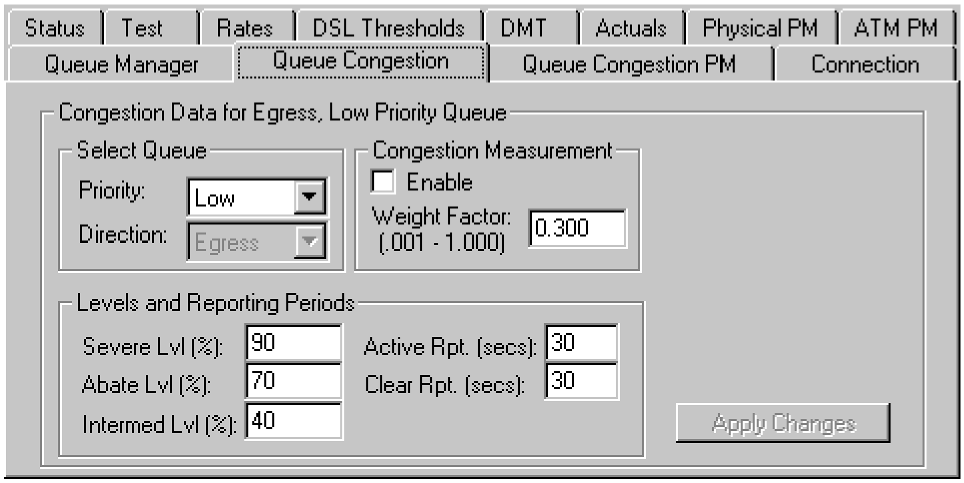


Figure 6-76: DMT8 Port Queue Congestion Tab

The Queue Congestion tab enables monitoring of the queues. The **Select Queue** group box is used to specify which queue to view by **Priority** (Low, Medium, or High). *Low Priority* is the default. The **Direction** field is static (non-configurable); *Egress* is the only valid value for this card.

As different options are selected in these fields, the **Congestion Data for . . .** title above the group changes to reflect the current selections.

The **Congestion Measurement** group box includes a check box to enable (unchecked by default) congestion measurement. A **Weight Factor** between .001 and 1.000 can be specified (the default is .300). The weight factor is used to smooth data samples. A value of 1 means that no weighting is applied to the current sample to calculate the measure of congestion.

The **Levels and Reporting Periods** group box enables provisioning of thresholds for the following parameters:

- **Severe level.** Level at which an alarm will be reported if the level stays above the specified **Abate level** for the specified number of **Active report** seconds. The default is 90%.
- **Abate level.** Level below which an alarm will clear if the level stays below the specified **Abate level** for the specified number of **Clear report** seconds. The default is 70%.
- **Intermediate level.** Level at which a threshold report will be generated. Only one report will be generated per five-minute interval. The default is 40%.

- **Active report.** Time in seconds (default of 30) before an alarm is reported if:
  - The level exceeds the specified **Severe level**, and
  - Stays above the specified **Abate level** for the specified number of **Active report** seconds.
- **Clear report.** Time in seconds before an alarm clears if the level stays below the specified **Abate level**. The default is 30 seconds.

After changing the provisioning for a port, click the **Apply Changes** command button to save the provisioning information to the MIB.

DMT8 Port Queue Congestion PM Tab Page

Click the Queue Congestion tab to display the following tab page.

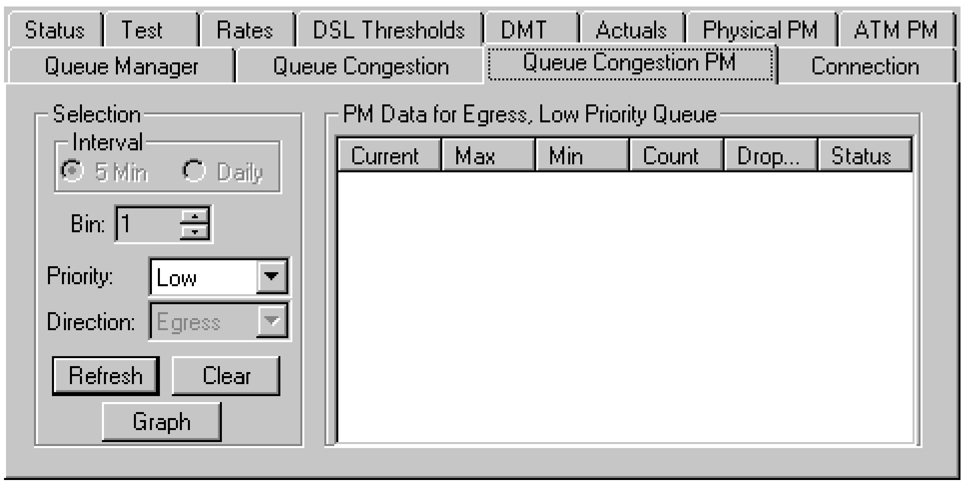


Figure 6-77: DMT8 Port Queue Congestion PM Tab

The **Queue Congestion PM** (Performance Monitoring) tab provides information on ingress and egress data congestion for each of the three queues (Low, Medium, and High).

The **Interval** group is a static (non-configurable) 5-minute value.

You can view up to 12 five-minute bins of performance data. The data in the Bin number 1 always contains the data for the current interval. Bin number 2 contains the data for the previous interval and so on.

Use the **Priority** field to specify the queue for which you want to view data. The **Direction** field is not enabled for this tab.

As different options are selected in these fields, the **PM Data for . . .** title above the group changes to reflect the current selections.

In the **Bin** spin box, set the Bin value (1 to 12). The bin will contain the maximum and minimum smoothed values which occurred in that five-minute period.

The data will **not** automatically refresh; you must click the **Refresh** button to refresh the data manually. Click the **Clear** button to clear all the performance data for this port. Click the **Graph** button to display the data in graphical format.

The **PM Data for . . .** box displays the following items of data for bin 1:

- Current value for the period.
- Maximum value for the period.
- Minimum value for the period.
- Status of the queue.

For bins 2 through 12, only the following items of data display:

- Minimum and maximum values for the period.
- Status of the queue.

The advantage of displaying the current bin is that by selecting the **Refresh** button, both new and old data can be displayed so that the values can be compared.

Click any of the column headings and drag to resize them.

DMT8 Port Connection Tab Page

Click the Connection tab to display the following tab page.

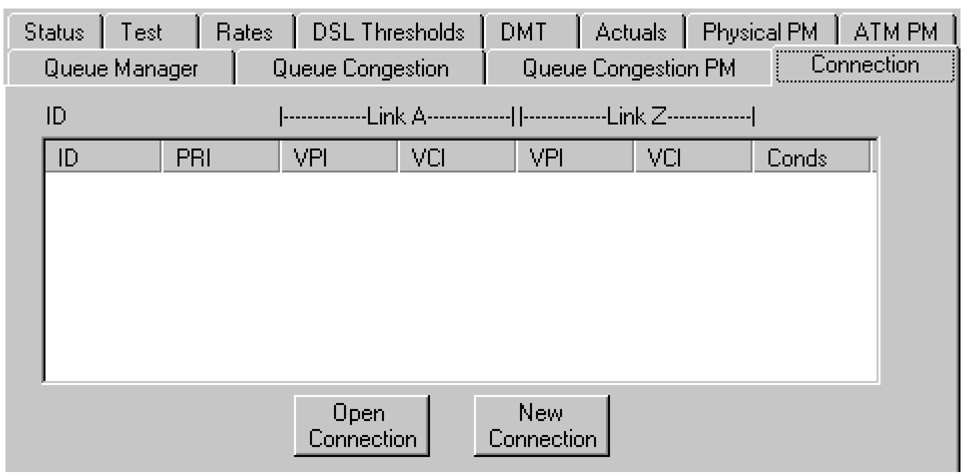


Figure 6-78: DMT8 Port Connection Tab

The Connection tab lists all connections on the port by ID, and shows the priority assigned to each connection and the VPI/VCI addresses for the Link A and Link Z sides of the connection. Any conditions are also listed.

Select any connection ID and click the **Open Connection** button to display connection details. Click the **New Connection** button to add a new virtual connection. For details, see Chapter 9—"Connection Dialog Boxes," page 6-145.

Chapter 6
SDSL Card and Ports

Introduction

The Symmetrical Digital Subscriber Line (SDSL) line card provides DSL service using the 2B1Q (2 Binary, 1 Quaternary) line encoding technique. 2B1Q is a DSL line encoding technique that uses four variations in amplitude and polarity to represent two bits. The SDSL line card uses the entire frequency spectrum for data transmission—unlike the ADSL line cards, which can carry both data and analog voice transmissions. The SDSL card supports a data rate of up to 1.536 Mbps (1536 Kbps).

The SDSL card port communicates with the customer premise equipment (CPE) over an embedded operations channel (EOC) to establish a rate for the D50 to CPE link. The EOC assists in determining the most reliable rate in the shortest time possible. After the link rate is established, the EOC allows for the exchange of information for the purpose of monitoring the link and adapting to changing line conditions as required.

Each SDSL line card provides eight ports.

The user interface naming convention for the SDSL card is SDSL. This SDSL reference is used through the remainder of this document.

SDSL Card Interface

Click an SDSL card in an LCS equipment locator group to display the following tabs:

- Status.
- Configuration.
- Versions.

SDSL Card Status Tab Page

The Status tab page displays initially.

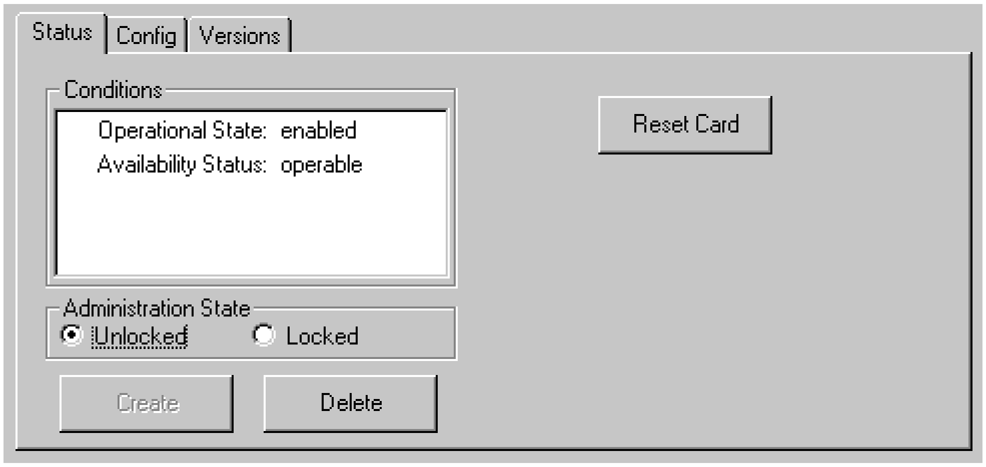


Figure 6-79: SDSL Card Status Tab

The **Conditions** list box displays conditions associated with the selected card. Data in the **Conditions** list box is refreshed by the system at user-specified intervals; the interval can be set to 0, which means that the data will **not** automatically refresh. You can specify the polling interval by selecting Options on the Tools menu. The data can also be updated by clicking the Refresh icon on the toolbar.

The **Administration State** group allows you to control whether or not the card is available for service. **Unlocked** makes the card available if there are no other conditions blocking its use. **Locked** makes the card unavailable for service; cards should be locked when being configured, when making hardware upgrades, or when testing.

> **Note:** If a card is locked, any alarms for that card will **not** display in the Active Alarms list; however, the alarm conditions will display in the **Conditions** box on the card's Status tab. If an alarm condition exists and the unlocked option is selected, an alarm will then be displayed in the Active Alarms list. For descriptions of alarm conditions, see the volume titled Maintenance and Testing.

The **Create** button is only enabled if you have clicked on an unprovisioned slot. Click this button to display a list of line cards you can create. Select SDSL from the list.

The **Delete** command button is only enabled if you have clicked on a provisioned card. Click this button and a warning message displays indicating the card is about to be deleted from the system, and you can either click the **OK** button to proceed, or the **Cancel** button to cancel the operation.

> **Note:** You must delete all of a card's connections before you can delete the card. For details, see Chapter 9—"Connection Dialog Boxes," page 6-145.

Click the **Reset Card** button to physically reset the card. Click this button and a warning message displays asking if you are sure you want to reset the card. You can click the **OK** button to proceed or the **Cancel** button to cancel the operation.

SDSL Card Configuration Tab Page

Click the Config tab to display the following tab page.

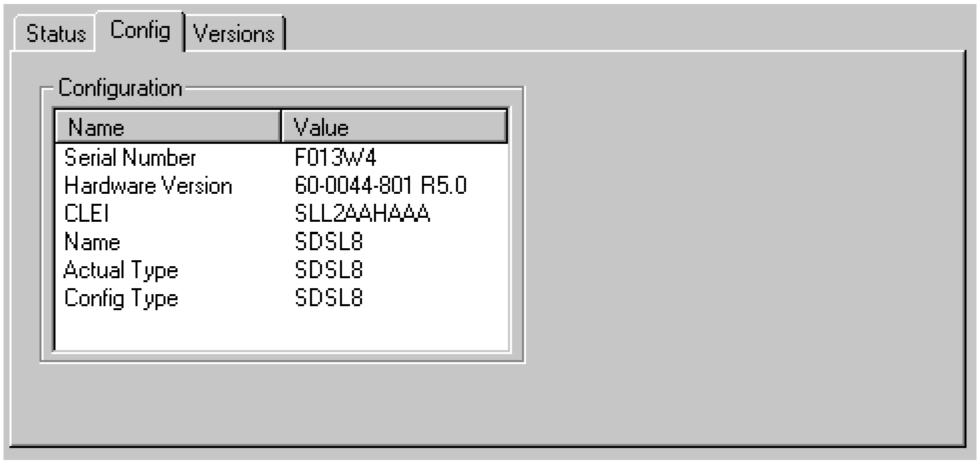


Figure 6-80: SDSL Card Configuration Tab

The **Configuration** list box shows the Serial Number, Hardware Version, CLEI code, Name, and the Actual and Configured card Type.

SDSL Card Versions Tab Page

Click the Versions tab to display the following tab page.

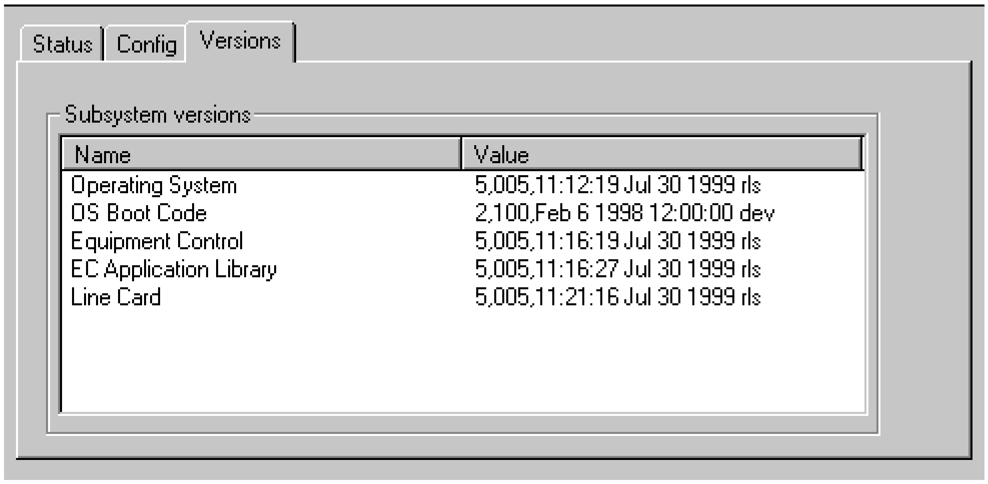


Figure 6-81: SDSL Card Versions Tab

The **Subsystem Versions** group lists the subsystems, their version numbers, and the dates when they were created.

SDSL Port Interface

Click the port connection on an SDSL card to display the eight ports. Click any of the ports to display the SDSL port object view for that port.

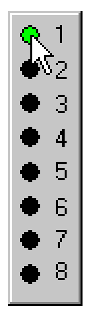


Figure 6-82: Port Interface

The SDSL port object view contains the following tabs:

- Status.
- Test.
- Rates.
- DSL Thresholds.
- Actuals.

- Physical PM.
- ATM PM.
- Queue Manager.
- Queue Congestion.
- Queue Congestion PM.
- Connection.

SDSL Port Status Tab Page

Click the Status tab to display the following tab page.

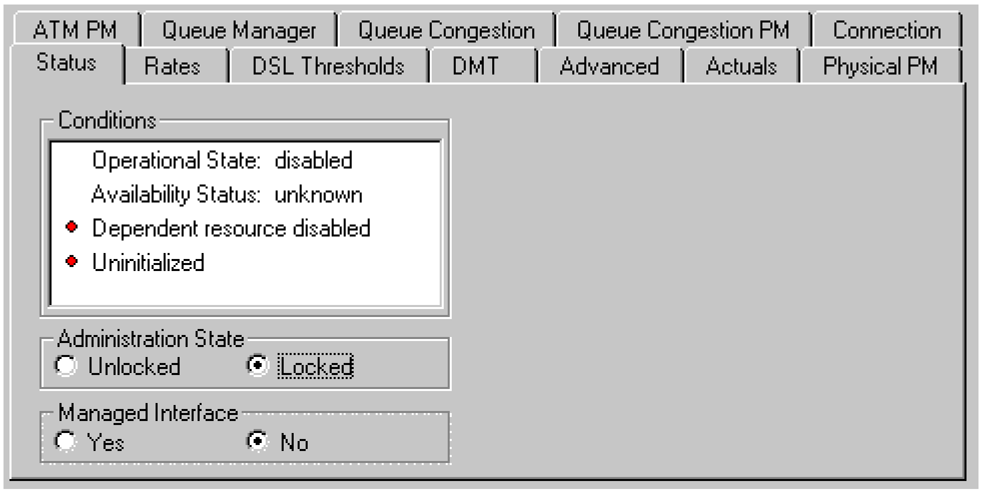


Figure 6-83: SDSL Port Status Tab

The **Conditions** list box displays conditions associated with the selected port. Data in the **Conditions** list box is refreshed by the system at user-specified intervals; the interval can be set to 0, which means that the data will **not** automatically refresh. You can specify the polling interval by selecting Options on the Tools menu. The data can also be updated by clicking the Refresh icon on the toolbar.

The **Administration State** radio buttons control whether the object is available for service or not: **Unlocked** makes the object usable if there are no other conditions blocking use of this object. **Locked** makes the object unavailable for service. Objects should be locked when they are being configured or when performing upgrades.

> **Note:** If a port is locked, any alarms for that port will **not** display in the Active Alarms list; however, the alarm conditions will display in the **Conditions** box on the port's Status tab. If an alarm condition exists and the unlocked option is selected, an alarm will then be displayed in the Active Alarms list. For descriptions of alarm conditions, see the volume titled Maintenance and Testing.

The **Managed Interface** buttons control whether the port is being actively managed. If the managed interface option is enabled, conditions on the port (for example, an LOF

condition) are reported as alarms in the alarm list. If this option is not enabled (the default), conditions on the port will not be reported.

The managed interface option interacts with one of the options in the Options dialog box, which is available by selecting Options on the Tools menu. In the **Line Card Port Color** group of the Options dialog box, one of the options is **If Managed Interface is set to no, show all options as yellow instead of red**. If this option is enabled, and the managed interface option is disabled, a port for which a condition is reported will display yellow instead of red.

SDSL Port Test Tab Page

Click the Test tab to display the following tab page.

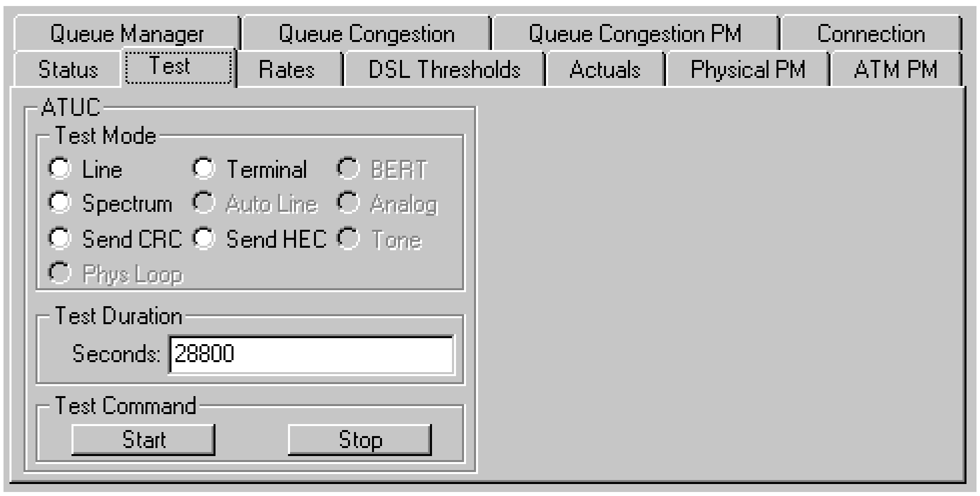


Figure 6-84: SDSL Port Test Tab

The Test tab enables loopback testing for the SDSL card.

The **(ATUC) Test Mode** groups allow you to select the type of testing to perform:

- **Line.** Test the line to the subscriber's network interface—no data into the system.
- **Terminal.** Test the line to the subscriber's modem—no data out of the system.
- **Spectrum.** The DSL puts out the same signal (the same frequency spectral composition) that it would if it was linked with a CPE DSL unit—this does not require any CPE on the line (ATUC only).
- **Send CRC Errors:** Sends CRC errors to the CPE.
- **Send HEC Errors:** Sends HEC errors to the CPE.

Note: The disabled options do not apply to this port type.

Important! All diagnostic tests interrupt data flow through the system. Do not perform on a D50 System that is providing service. Only use diagnostic tests

during commissioning procedures or in a lab environment to isolate trouble in the system.

Test Duration sets the interval in seconds that the system should wait before stopping the loopback test. The Loopback Duration default is 28800 seconds. The **Test Command** buttons **Start** and **Stop** testing.

For additional information, see the volume titled Maintenance and Testing.

SDSL Port Rates Tab Page

Click the Rates tab to display the following tab page.

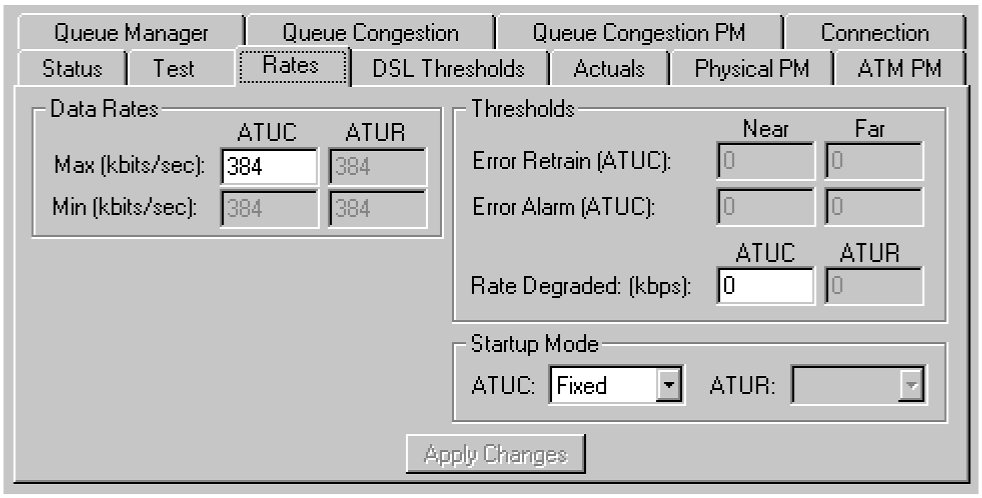


Figure 6-85: SDSL Port Rates Tab

The Rates tab page allows you to view information and provision the data rates for the port.

The **Data Rates** group allows you to specify the maximum data rate for the ATUC.

The **ATUC Startup Modes** are as follows:

- **Fixed**: Fixed rate training.
- **EOC Fast:** Embedded Operations Channel (EOC) Fast training sequence links up at a predetermined “best rate” and then attempts to link at the “faster” provisioned rate.

For information on setting the data rates, thresholds, and startup mode for this tab, see the volume titled Provisioning.

SDSL Port DSL Thresholds Tab Page

Click the DSL Thresholds tab to display the following tab page.

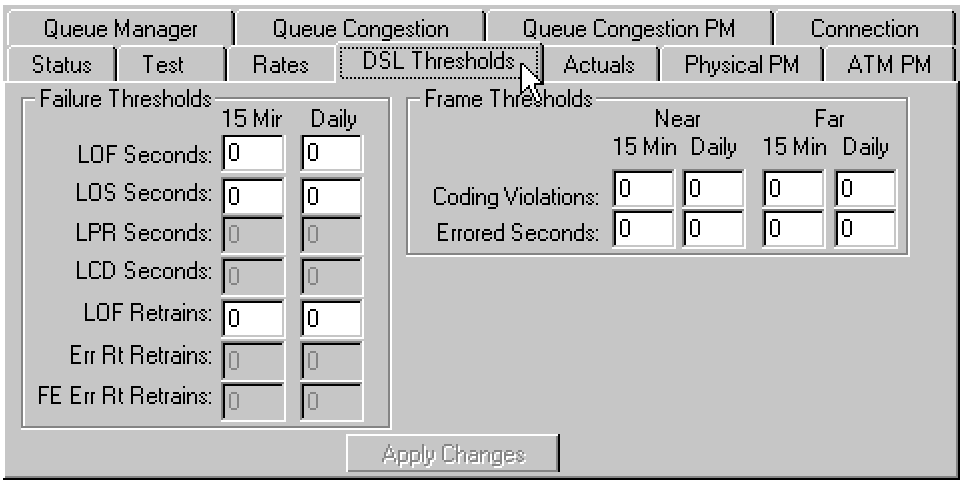


Figure 6-86: SDSL Port DSL Thresholds Tab

The **Failure Thresholds** group allows you to specify thresholds for a number of parameters, for both 15 minute and daily intervals. The default is 0 for all values.

The **Frame Thresholds** group allows you to specify thresholds for Coding Violations and Errored Seconds for the near and far-end ATUC, for both 15-minute and daily intervals. The default is 0 for all values.

For tables of provisioning thresholds, see the volume titled Provisioning.

After making changes to any of the thresholds, the **Apply Changes** button becomes enabled. Click this button to apply the changes to the MIB.

SDSL Port Actuals Tab Page

Click the Actuals tab to display the following tab page.

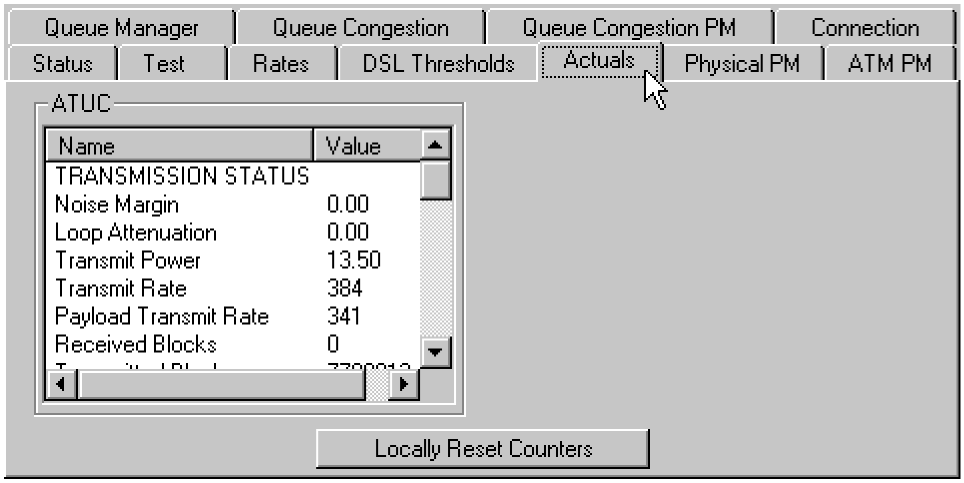


Figure 6-87: SDSL Port Actuals Tab

The SDSL Port Actuals tab page displays ATUC connectivity data. This information is read-only.

The scrollable list includes the following SDSL actuals for the ATUC:

Transmission Status

- Noise Margin.
- Loop Attenuation.
- Transmit Power.
- Transmit Rate.
- Payload Transmit Rate.
- Received Blocks.
- Transmitted Blocks.
- Cells Received.
- Cells Transmitted.

Data Path Data

- Vendor ID.

Error Data

- LOF Failures.
- LOS Failures.
- LOF Seconds.
- LOS Seconds.
- Errored Seconds.

- Coding Violations.
- FE Errored Seconds.
- FE Coding Violations.
- HEC Errors.
- LOF Retrains.
- Bad Prov. Status.

Time Data

- Elapsed Time (current 15 minute).
- Elapsed Time (current 24 hours).
- Elapsed Time (previous day).

Click the **Locally Reset Counters** button to reset all values to 0 (zero) for the current view, as shown in the example. After being reset, the values will begin incrementing again based on data accumulated from the point at which the counters were reset. Resetting the counters only affects the current view. Data continues to accumulate "behind the scenes," and if another view is opened, the new view displays values based on the entire reporting period.

SDSL Port Physical PM Tab Page

Click the Physical PM tab to display the following tab page.

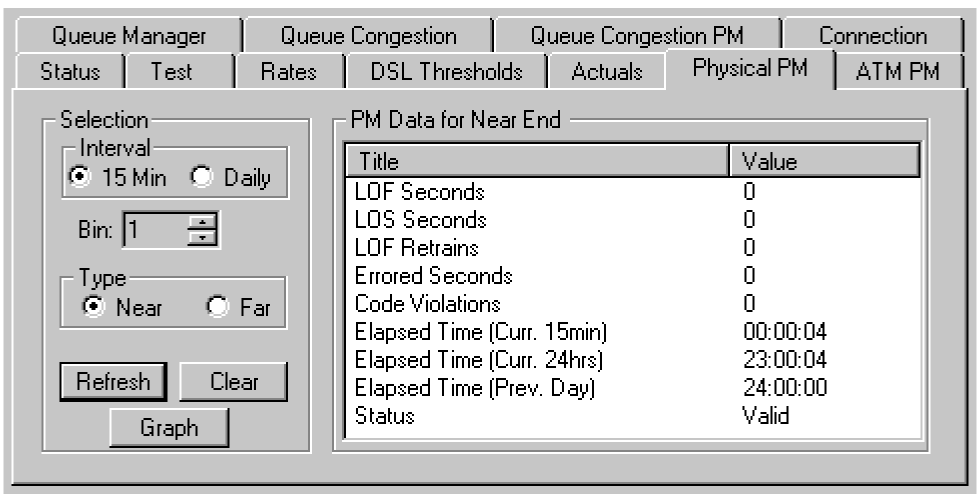


Figure 6-88: SDSL Port Physical PM Tab

The Physical PM (Performance Monitoring) tab page provides near and far-end performance monitoring information.

The **Interval** group allows you to specify either 15-minute or Daily intervals.

You can track up to 12 bins of performance data in 15-minute intervals. Bin number 1 contains data for the current 15-minute interval. Bin number 2 contains data for the previous 15-minute interval and so on. In the **Bin** spin box, set the Bin value (1 to 12).

You can track 2 bins of data in daily intervals. Bin number 1 contains data for the current day. Bin number 2 contains data for the previous daily interval. In the **Bin** spin box, set the Bin value (1 or 2).

The **Type** group allows you to specify whether to monitor near or far-end ATUC data.

The **PM Data for . . .** group displays the names and values for the parameters listed. The title of this group changes to reflect the option selected in the **Type** group. This list includes values for the following parameters:

- LOF Seconds.
- LOS Seconds.
- LOF Retrains.
- Errored Seconds.
- Code Violations.
- Elapsed Time (current 15 minute).
- Elapsed Time (current 24 hours).
- Elapsed Time (previous day).
- Status.

The data will **not** automatically refresh; you must click the **Refresh** button to refresh the data manually. Click the **Clear** button to clear all the performance data for this port. Click the **Graph** button to display the data in graphical format.

The **Status** in the **Data** list box will always be either Valid or Invalid. A value of Invalid indicates that the data has not been accumulated for the full time of a given interval because a bin has been reset; invalid data should not be used in resolving performance issues.

Nokia High Speed Access Products Inc. Proprietary Data

SDSL Port ATM PM Tab Page

Click the ATM PM tab to display the following tab page.

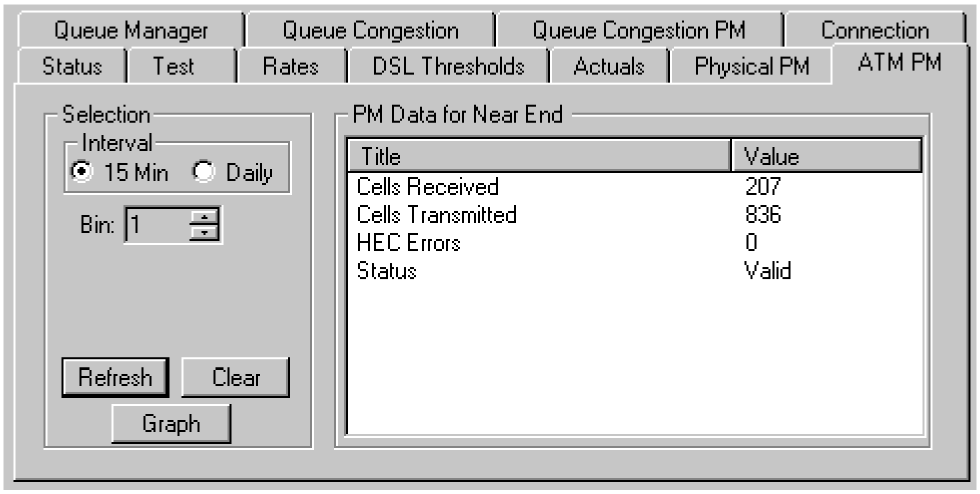


Figure 6-89: SDSL Port ATM PM Tab

The **ATM PM** (Performance Monitoring) tab page provides information on Cells received, transmitted, HEC errors, and the status.

The **Intervals** group allows you to specify either 15-minute or Daily intervals.

You can track up to 12 bins of performance data in 15-minute intervals. Bin number 1 contains data for the current 15-minute interval. Bin number 2 contains data for the previous 15-minute interval and so on. In the **Bin** spin box, set the Bin value (1 to 12).

You can track 2 bins of data in daily intervals. Bin number 1 contains data for the current day. Bin number 2 contains data for the previous day. In the **Bin** spin box, set the Bin value (1 or 2).

The data will **not** automatically refresh; you must click the **Refresh** button to refresh the data manually. Click the **Clear** button to clear all the performance data for this port. Click the **Graph** button to display the data in graphical format.

The **Status** in the **Data** list box will always be either Valid or Invalid. A value of Invalid indicates that the data has not been accumulated for the full time of a given interval because the bin has been reset, or because at some time during the interval the port was in an LOS or LOF condition. Invalid data should not be used to resolve performance issues.

The Graph window displays when you click the **Graph** button from a number of different tab pages. The options included on the Graph window vary slightly depending on the set of data that is being graphed. As an example, the ATM PM Graph window is shown below.

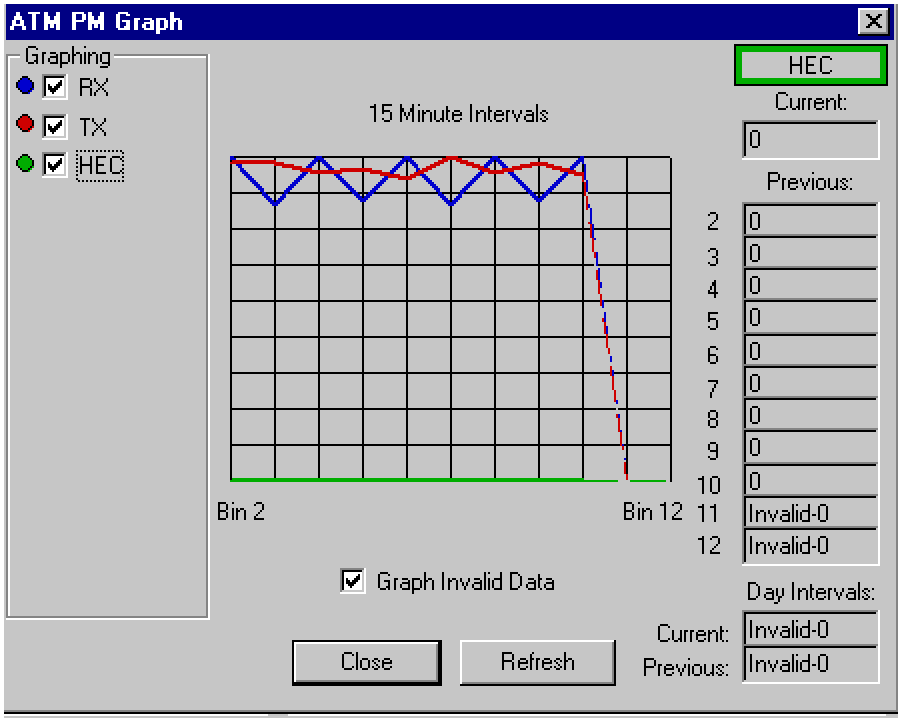


Figure 6-90: Graph Window, ATM PM

The information included in the Graph window is described in the following sections.

Graphing group. This group includes a list of parameters that vary depending on the window from which the Graph window was accessed.

The Graph window includes a grid where the line graphs are displayed. The grid can display any combination of the available parameters; each parameter displays in a different color to make it easier to view the information. The grid is divided into 15-minute intervals, and labelled by bin number.

The following numeric data is displayed on the right side of the Graph window:

- Current data for the current 15-minute interval and current day.
- Historic data for the eleven previous 15-minute bins and for the previous day.

Click the **Close** command button to close the window, or the **Refresh** command button to refresh the display.

SDSL Port Queue Manager Tab Page

Click the Queue Manager tab to display the following tab page.

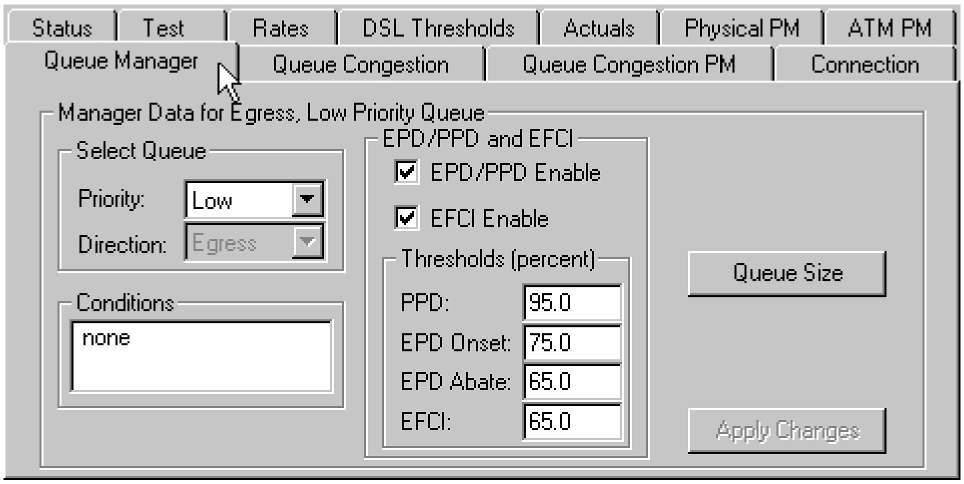


Figure 6-91: SDSL Port Queue Manager Tab

The **Queue Manager** tab enables provisioning of the Quality of Service (QoSV4) buffers. The **Select Queue** group box is used to specify which queue to view by **Priority** (Low, Medium, or High). *Low Priority* is the default. The **Direction** field is static (non-configurable); *Egress* is the only valid value for this card.

As different options are selected in these fields, the **Manager Data for . . .** title above the group changes to reflect the current selections.

The **Conditions** box lists any conditions pertaining to the buffers.

The **EPD/PPD and EFCI** group box includes check boxes that allow provisioning of the EPD/PPD (Early Packet Discard/Partial Packet Discard) and EFCI (Explicit Forward Congestion Indicator) features:

- **EPD/PPD Enable.** This check box is used to enable EPD and PPD for the port. Enable this option (the default) if the queue will be carrying connections supporting ATM Adaption Layer (AAL) Type 5; otherwise, disable. EPD can also be provisioned at the connection level. If a queue will be carrying a combination of AAL5 and other protocols, EPD/PPD should be enabled at the port level, and enabled for the individual connections that will be carrying AAL5 traffic exclusively, and disabled for those connections not carrying AAL5 data.
- **EFCI Enable.** This check box is used to enable (the default) EFCI for the port.

Thresholds can be specified for each of these parameters, including:

- **PPD.** Specifies the threshold above which partial packets will be discarded. The default is 95.0 (95%).
- **EPD Onset.** Specifies the threshold above which packets will be discarded. The default is 75.0 (75%).

- **EPD Abate.** Specifies the threshold below which packets will be transmitted. The default is 65.0 (65%).
- **EFCI.** Specifies the threshold above which EFCI will be applied to packets. The default is 65.0 (65%).

Click the **Queue Size** command button to display a dialog box where the queue size can be viewed and changed. The number displayed in the **Queue Size** box reflects the current provisioning for the queue selected in the **Priority** list on the Queue Manager tab.

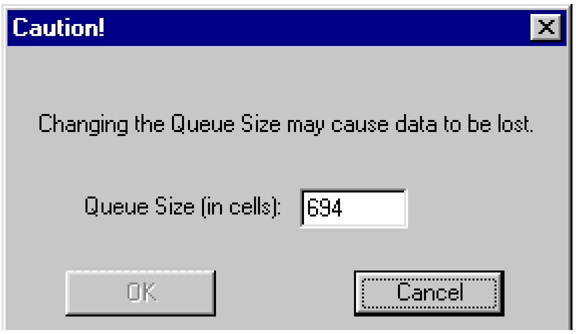


Figure 6-92: Low Priority Queue Default Size

Note: This is a data affecting action. Changing the queue size is **not** recommended. You can click the **OK** button to proceed with the action or the **Cancel** button to cancel any changes to the **Queue Size** field.

The total buffering available for all three queues for one port of a SDSL card is 1024 cells, so the total size of all three queues should not exceed 1024. The default allocations are as follows:

- Low priority = 694 cells.
- Medium priority = 298 cells.
- High priority = 32 cells.

  Since the default sizes for the three queues use the entire available buffering, increasing the size of one queue requires that you decrease the size of another by at least the same number of cells to make the required buffering available; you should decrease the size of the other queue first, otherwise a provisioning error will occur. If the total size of all three queues exceeds the maximum available buffering, the condition will display in the Conditions list on the Queue Manager tab.

After changing the provisioning for a port, click the **Apply Changes** command button to save the provisioning information to the MIB.

SDSL Port Queue Congestion Tab Page

Click the Queue Congestion tab to display the following tab page.

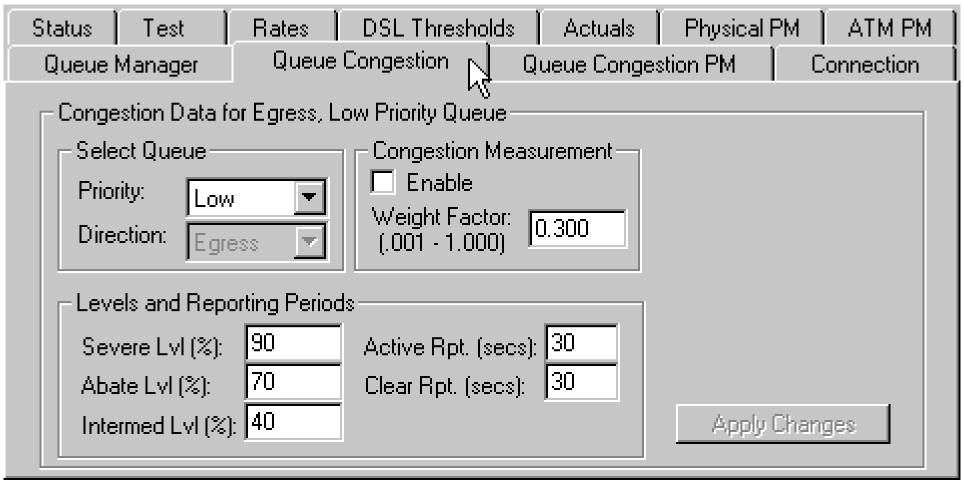


Figure 6-93: SDSL Port Queue Congestion Tab

The Queue Congestion tab enables monitoring of the queues. The **Select Queue** group box is used to specify which queue to view by **Priority** (Low, Medium, or High). *Low Priority* is the default. The **Direction** field is static (non-configurable); *Egress* is the only valid value for this card.

As different options are selected in these fields, the **Congestion Data for . . .** title above the group changes to reflect the current selections.

The **Congestion Measurement** group box includes a check box to enable (unchecked by default) congestion measurement. A **Weight Factor** between .001 and 1.000 can be specified (the default is .300). The weight factor is used to smooth data samples. A value of 1 means that no weighting is applied to the current sample to calculate the measure of congestion.

The **Levels and Reporting Periods** group box enables provisioning of thresholds for the following parameters:

- **Severe level.** Level at which an alarm will be reported if the level stays above the specified **Abate level** for the specified number of **Active report** seconds. The default is 90%.
- **Abate level.** Level below which an alarm will clear if the level stays below the specified **Abate level** for the specified number of **Clear report** seconds. The default is 70%.
- **Intermediate level.** Level at which a threshold report will be generated. Only one report will be generated per five-minute interval. The default is 40%.
- **Active report.** Time in seconds (default of 30) before an alarm is reported if:
  - The level exceeds the specified **Severe level**, and

- Stays above the specified **Abate level** for the specified number of **Active report** seconds.

- **Clear report.** Time in seconds before an alarm clears if the level stays below the specified **Abate level**. The default is 30 seconds.

After changing the provisioning for a port, click the **Apply Changes** command button to save the provisioning information to the MIB.

SDSL Port Queue Congestion PM Tab Page

Click the Queue Congestion PM tab to display the following tab page.

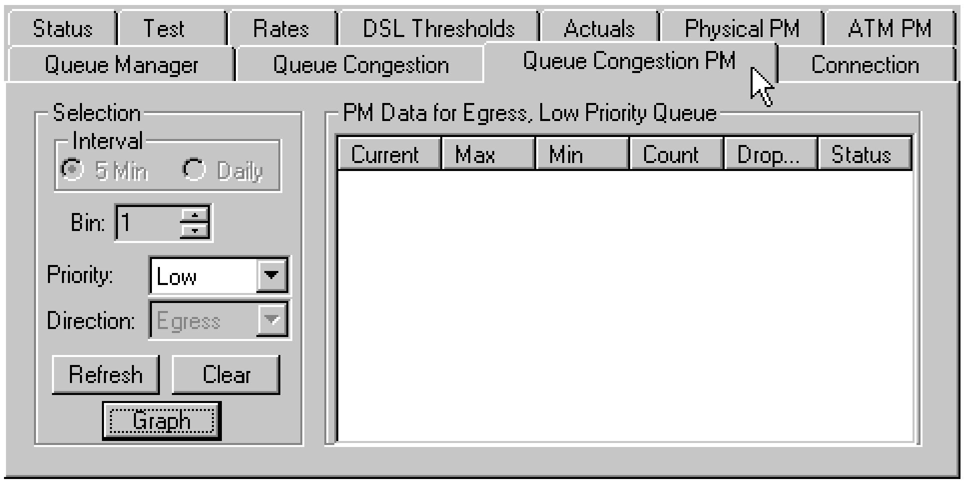


Figure 6-94: SDSL Port Queue Congestion PM Tab

The **Queue Congestion PM** (Performance Monitoring) tab provides information on data congestion for each of the three queues (Low, Medium, and High).

The **Interval** group is a static (non-configurable) 5-minute value.

You can view up to 12 five-minute bins of performance data. The data in the Bin number 1 always contains the data for the current interval. Bin number 2 contains the data for the previous interval and so on.

Use the **Priority** field to specify the queue for which you want to view data. The **Direction** field is not enabled for this tab.

As different options are selected in these fields, the **PM Data for . . .** title above the group changes to reflect the current selections.

In the **Bin** spin box, set the Bin value (1 to 12). The bin will contain the maximum and minimum smoothed values which occurred in that five-minute period.

The data will **not** automatically refresh; you must click the **Refresh** button to refresh the data manually. Click the **Clear** button to clear all the performance data for this port. Click the **Graph** button to display the data in graphical format.

The **PM Data for . . .** box displays the following items of data for bin 1:

- Current value for the period.
- Maximum value for the period.
- Minimum value for the period.
- Status of the queue.

For bins 2 through 12, only the following items of data display:

- Minimum and maximum values for the period.
- Status of the queue.

The advantage of displaying the current bin is that by selecting the **Refresh** button, both new and old data can be displayed so that the values can be compared.

Click any of the column headings and drag to resize them.

SDSL Port Connection Tab Page

Click the Connection tab to display the following tab page.

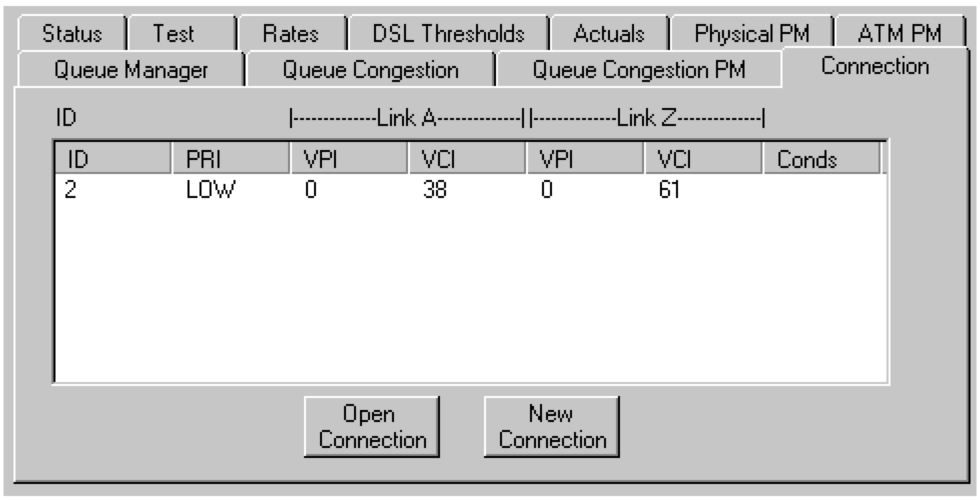


Figure 6-95: SDSL Port Connection Tab

The Connection tab lists all connections on the port by ID, and shows the priority assigned to each connection and the VPI/VCI addresses for the Link A and Link Z sides of the connection. Any conditions are also listed.

Select any connection and click the **Open Connection** button to display connection details. Click the **New Connection** button to add a new virtual connection. For details, see Chapter 9—“Connection Dialog Boxes,” page 6-145.

Chapter 7
SDSL8+ Card and Ports

Introduction

As with SDSL8 line cards, SDSL8+ line cards provides Symmetrical Digital Subscriber Line (SDSL) service using the 2B1Q (2 Binary, 1 Quaternary) line encoding technique. 2B1Q is a DSL line encoding technique that uses four variations in amplitude and polarity to represent two bits. The SDSL8+ line card uses the entire frequency spectrum for data transmission—unlike the ADSL line cards, which can carry both data and analog voice transmissions.

In addition to retaining SDSL8 line card functionality, the SDSL8+ card provides the following new feature.

> **Note:** SDSL8+ features are available only with equally compatible CPE.

Variable data rate range in 8 Kbps increments. The SDSL8+ line card allows provisioning of 273 data rates within a range of 144 to 2320 Kbps in 8 Kbps increments. The default data rate is 384 Kbps. In comparison, the SDSL8 card allows five specific data rates of 192, 384, 768, 1152, and 1536 Kbps.

> **Note:** Additional provisioning information can be located in the volume titled Provisioning, Section 4—*Appendices*, Appendix A—“Provisioning Parameters.”

SDSL8+ Card Interface

Click an SDSL8+ card in an LCS equipment locator group to display the following tabs:

- Status.
- Configuration.
- Versions.

SDSL8+ Card Status Tab Page

The Status tab page displays initially.

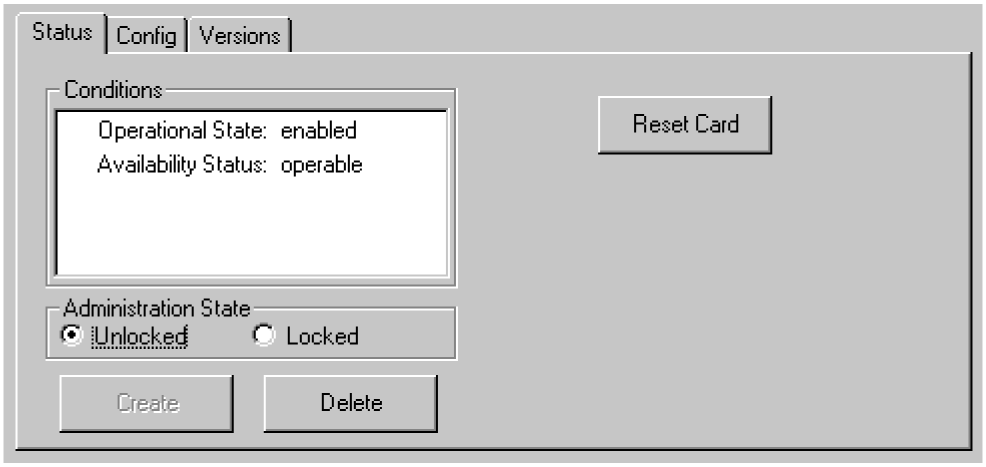


Figure 6-96: SDSL8+ Card Status Tab

The **Conditions** list box displays conditions associated with the selected card. Data in the **Conditions** list box is refreshed by the system at user-specified intervals; the interval can be set to 0, which means that the data will **not** automatically refresh. You can specify the polling interval by selecting Options on the Tools menu. The data can also be updated by clicking the Refresh icon on the toolbar.

The **Administration State** group allows you to control whether or not the card is available for service. **Unlocked** makes the card available if there are no other conditions blocking its use. **Locked** makes the card unavailable for service; cards should be locked when being configured, when making hardware upgrades, or when testing.

> **Note:** If a card is locked, any alarms for that card will **not** display in the Active Alarms list; however, the alarm conditions will display in the **Conditions** box on the card's Status tab. If an alarm condition exists and the unlocked option is selected, an alarm will then be displayed in the Active Alarms list. For descriptions of alarm conditions, see the volume titled Maintenance and Testing.

The **Create** button is only enabled if you have clicked on an unprovisioned slot. Click this button to display a list of line cards you can create. Select SDSL8+ from the list.

The **Delete** command button is only enabled if you have clicked on a provisioned card. Click this button and a warning message displays indicating the card is about to be deleted from the system, and you can either click the **OK** button to proceed, or the **Cancel** button to cancel the operation.

> **Note:** You must delete all of a card's connections before you can delete the card. For details, see Chapter 9—"Connection Dialog Boxes," page 6-145.

Click the **Reset Card** button to physically reset the card. Click this button and a warning message displays asking if you are sure you want to reset the card. You can click the **OK** button to proceed or the **Cancel** button to cancel the operation.

SDSL8+ Card Configuration Tab Page

Click the Config tab to display the following tab page.

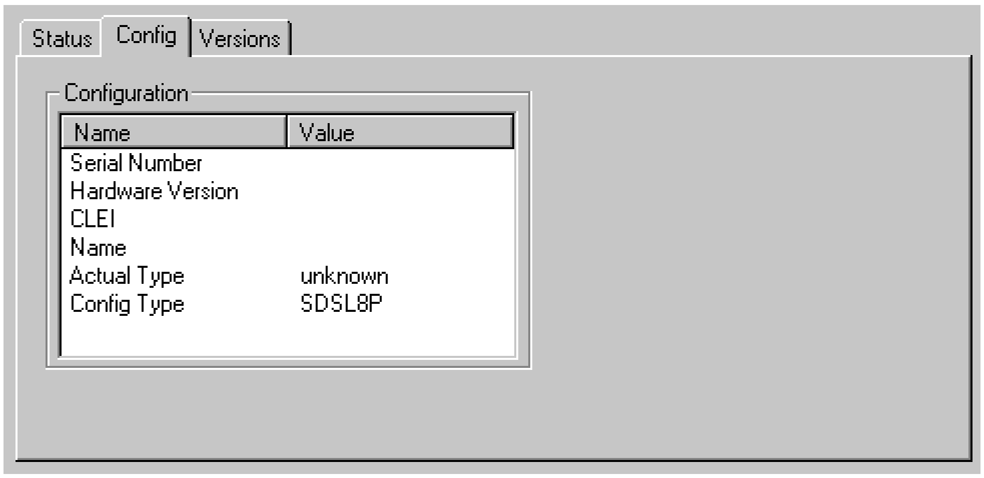


Figure 6-97: SDSL8+ Card Configuration Tab

The **Configuration** list box shows the Serial Number, Hardware Version, CLEI code, Name, and the Actual and Configured card Type.

SDSL8+ Card Versions Tab Page

Click the Versions tab to display the following tab page.

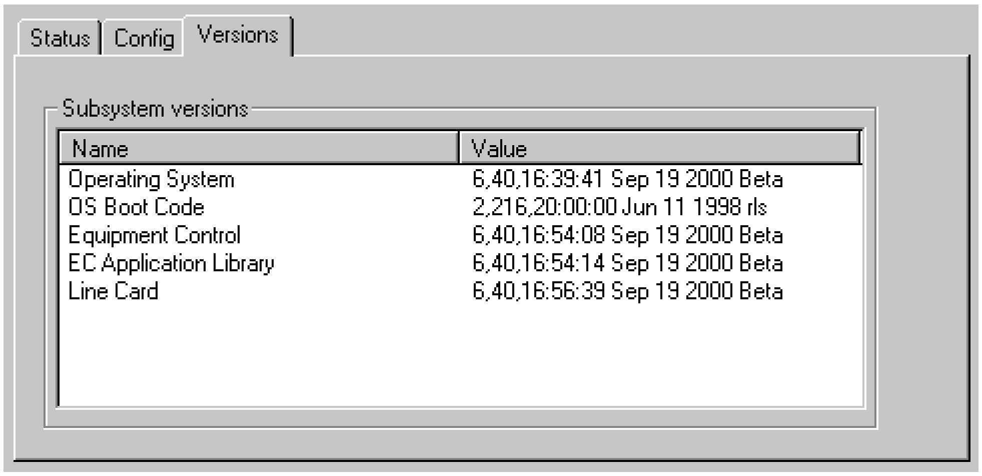


Figure 6-98: SDSL8+ Card Versions Tab

The **Subsystem Versions** group lists the subsystems, their version numbers, and the dates when they were created.

SDSL8+ Port Interface

Click the port connection on an SDSL8+ card to display the eight ports. Click any of the ports to display the SDSL8+ port object view for that port.

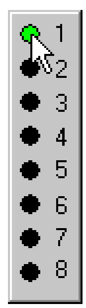


Figure 6-99: Port Interface

The SDSL8+ port object view contains the following tabs:

- Status.
- Test.
- Rates.
- DSL Thresholds.
- Actuals.

- Physical PM.
- ATM PM.
- Queue Manager.
- Queue Congestion.
- Queue Congestion PM.
- Connection.

SDSL8+ Port Status Tab Page

Click the Status tab to display the following tab page.

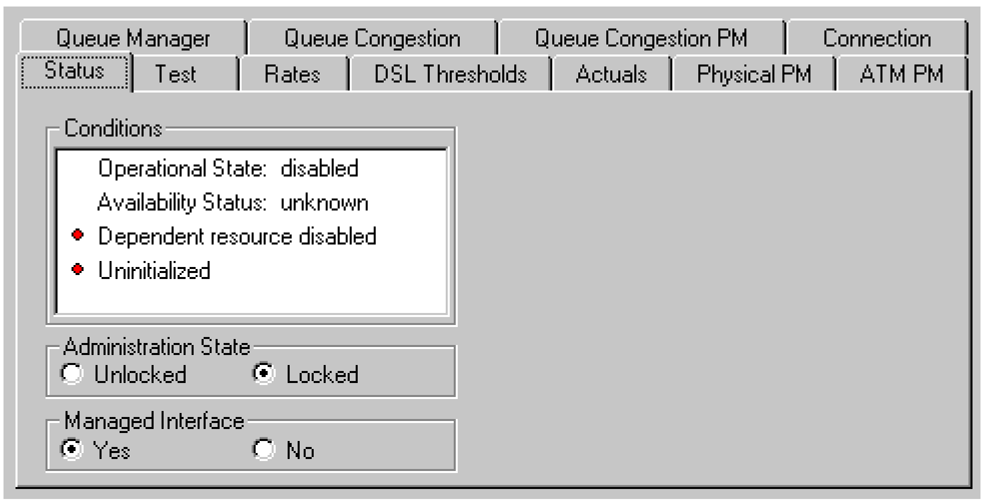


Figure 6-100: SDSL8+ Port Status Tab

The **Conditions** list box displays conditions associated with the selected port. Data in the **Conditions** list box is refreshed by the system at user-specified intervals; the interval can be set to 0, which means that the data will **not** automatically refresh. You can specify the polling interval by selecting Options on the Tools menu. The data can also be updated by clicking the Refresh icon on the toolbar.

The **Administration State** radio buttons control whether the object is available for service or not: **Unlocked** makes the object usable if there are no other conditions blocking use of this object. **Locked** makes the object unavailable for service. Objects should be locked when they are being configured or when performing upgrades.

> **Note:** If a port is locked, any alarms for that port will **not** display in the Active Alarms list; however, the alarm conditions will display in the **Conditions** box on the port's Status tab. If an alarm condition exists and the unlocked option is selected, an alarm will then be displayed in the Active Alarms list. For descriptions of alarm conditions, see the volume titled Maintenance and Testing.

The **Managed Interface** buttons control whether the port is being actively managed. If the managed interface option is enabled (the default), conditions on the port (for example, an LOF condition) are reported as alarms in the alarm list. If this option is not enabled, conditions on the port will not be reported.

The managed interface option interacts with one of the options in the Options dialog box, which is available by selecting Options on the Tools menu. In the **Line Card Port Color** group of the Options dialog box, one of the options is **If Managed Interface is set to no, show all options as yellow instead of red**. If this option is enabled, and the managed interface option is disabled, a port for which a condition is reported will display yellow instead of red.

SDSL8+ Port Test Tab Page

Click the Test tab to display the following tab page.

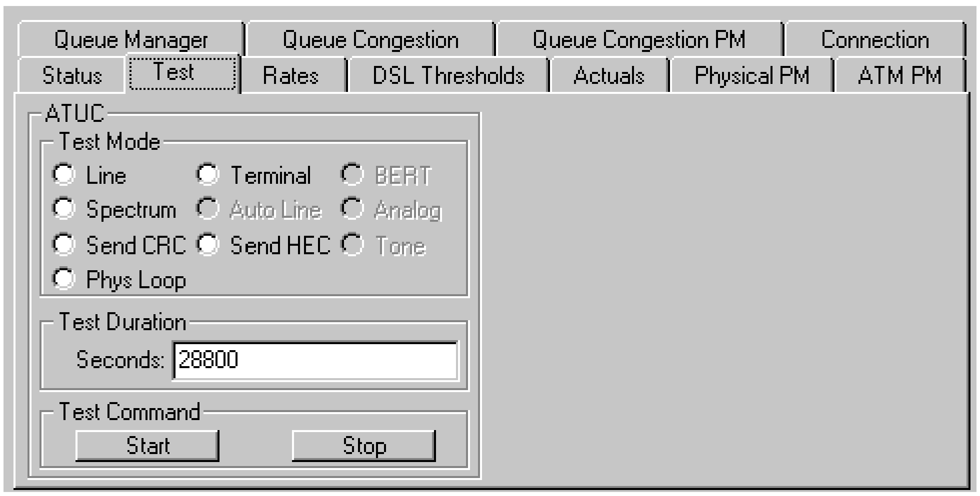


Figure 6-101: SDSL8+ Port Test Tab

The Test tab enables loopback testing for the SDSL8+ card.

The **(ATUC) Test Mode** groups allow you to select the type of testing to perform:

- **Line.** Test the line to the subscriber’s network interface—no data into the system.
- **Terminal.** Test the line to the subscriber’s modem—no data out of the system.
- **Spectrum.** The DSL puts out the same signal (the same frequency spectral composition) that it would if it was linked with a CPE DSL unit—this does not require any CPE on the line (ATUC only).
- **Send CRC Errors:** Sends CRC errors to the CPE.
- **Send HEC Errors:** Sends HEC errors to the CPE.

- **Phys Loop.** Performs as though active, but without sending data.

  Note: The disabled options do not apply to this port type.

  Important! All diagnostic tests interrupt data flow through the system. Do not perform on a D50 System that is providing service. Only use diagnostic tests during commissioning procedures or in a lab environment to isolate trouble in the system.

Test Duration sets the interval in seconds that the system should wait before stopping the loopback test. The Loopback Duration default is 28800 seconds. The **Test Command** buttons **Start** and **Stop** testing.

For additional information, see the volume titled Maintenance and Testing.

SDSL8+ Port Rates Tab Page

Click the Rates tab to display the following tab page.

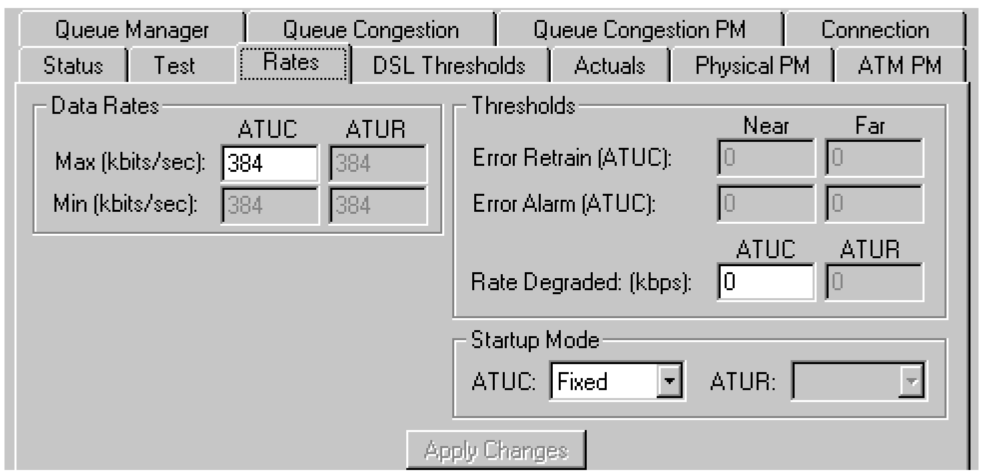


Figure 6-102: SDSL8+ Port Rates Tab

The Rates tab page allows you to view information and provision the data rates for the port.

The **Data Rates** group allows you to specify the maximum data rate for the ATUC.

The **ATUC Startup Modes** are as follows:

- **Fixed**: Fixed rate training.
- **AutoBaud:** This training mode is available with D50 Release 6.0 and above, and works only with an AutoBaud Pre-Activation Rate Negotiation capable CPE. This mode establishes a simple communication channel prior to synchronization between the SDSL8+ port and the CPE.

For information on setting the data rates, thresholds, and startup mode for this tab, see the volume titled Provisioning.

SDSL8+ Port DSL Thresholds Tab Page

Click the DSL Thresholds tab to display the following tab page.

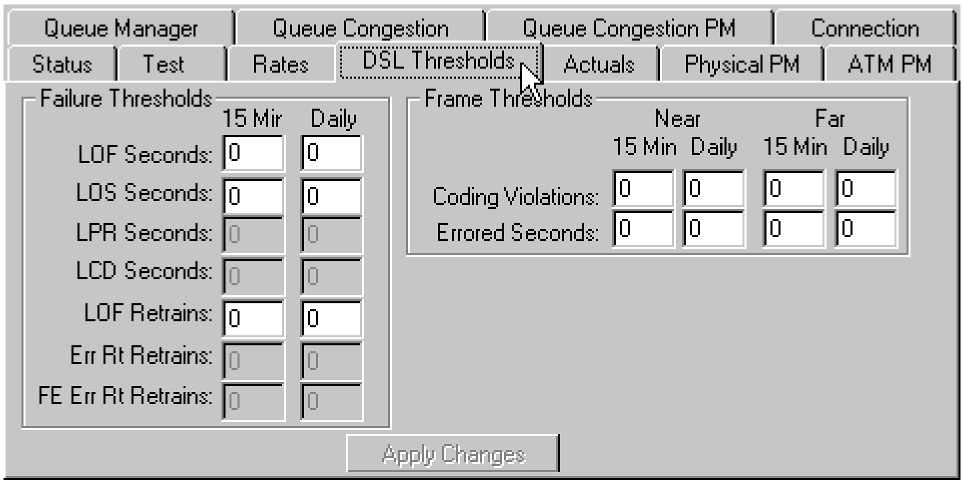


Figure 6-103: SDSL8+ Port DSL Thresholds Tab

The **Failure Thresholds** group allows you to specify thresholds for a number of parameters, for both 15 minute and daily intervals. The default is 0 for all values.

The **Frame Thresholds** group allows you to specify thresholds for Coding Violations and Errored Seconds for the near and far-end ATUC, for both 15-minute and daily intervals. The default is 0 for all values.

For tables of provisioning thresholds, see the volume titled Provisioning.

After making changes to any of the thresholds, the **Apply Changes** button becomes enabled. Click this button to apply the changes to the MIB.

SDSL8+ Port Actuals Tab Page

Click the Actuals tab to display the following tab page.

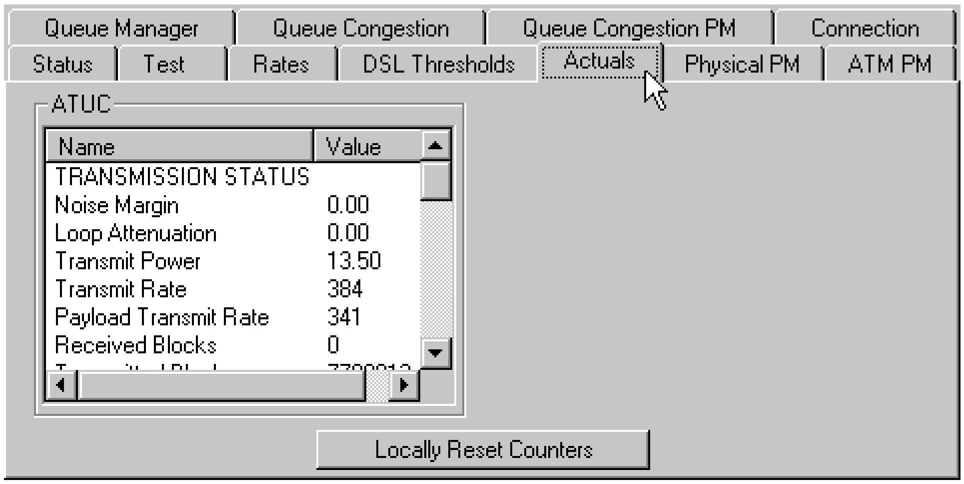


Figure 6-104: SDSL8+ Port Actuals Tab

The SDSL8+ Port Actuals tab page displays ATUC connectivity data. This information is read-only.

The scrollable list includes the following SDSL8+ actuals for the ATUC:

Transmission Status

- Noise Margin.
- Loop Attenuation.
- Transmit Power.
- Transmit Rate.
- Payload Transmit Rate.
- Received Blocks.
- Transmitted Blocks.
- Cells Received.
- Cells Transmitted.

Data Path Data

- Vendor ID.

Error Data

- LOF Failures.
- LOS Failures.
- LOF Seconds.
- LOS Seconds.
- Errored Seconds.

- Coding Violations.
- FE Errored Seconds.
- FE Coding Violations.
- HEC Errors.
- LOF Retrains.
- Bad Prov. Status.

Time Data

- Elapsed Time (current 15 minute).
- Elapsed Time (current 24 hours).
- Elapsed Time (previous day).

Click the **Locally Reset Counters** button to reset all values to 0 (zero) for the current view, as shown in the example. After being reset, the values will begin incrementing again based on data accumulated from the point at which the counters were reset. Resetting the counters only affects the current view. Data continues to accumulate "behind the scenes," and if another view is opened, the new view displays values based on the entire reporting period.

SDSL8+ Port Physical PM Tab Page

Click the Physical PM tab to display the following tab page.

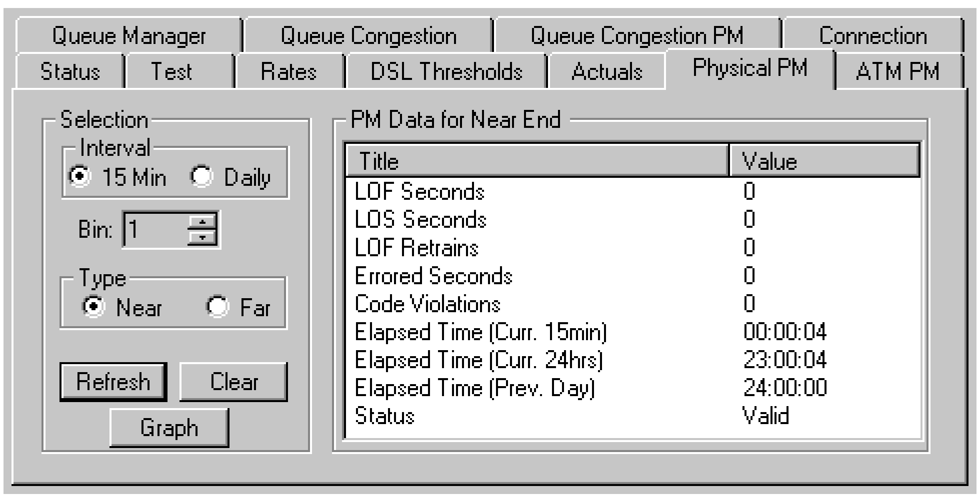


Figure 6-105: SDSL8+ Port Physical PM Tab

The Physical PM (Performance Monitoring) tab page provides near and far-end performance monitoring information.

The **Interval** group allows you to specify either 15-minute or Daily intervals.

You can track up to 12 bins of performance data in 15-minute intervals. Bin number 1 contains data for the current 15-minute interval. Bin number 2 contains data for the previous 15-minute interval and so on. In the **Bin** spin box, set the Bin value (1 to 12).

You can track 2 bins of data in daily intervals. Bin number 1 contains data for the current day. Bin number 2 contains data for the previous daily interval. In the **Bin** spin box, set the Bin value (1 or 2).

The **Type** group allows you to specify whether to monitor near or far-end ATUC data.

The **PM Data for . . .** group displays the names and values for the parameters listed. The title of this group changes to reflect the option selected in the **Type** group. This list includes values for the following parameters:

- LOF Seconds.
- LOS Seconds.
- LOF Retrains.
- Errored Seconds.
- Code Violations.
- Elapsed Time (current 15 minute).
- Elapsed Time (current 24 hours).
- Elapsed Time (previous day).
- Status.

The data will **not** automatically refresh; you must click the **Refresh** button to refresh the data manually. Click the **Clear** button to clear all the performance data for this port. Click the **Graph** button to display the data in graphical format.

The **Status** in the **Data** list box will always be either Valid or Invalid. A value of Invalid indicates that the data has not been accumulated for the full time of a given interval because a bin has been reset; invalid data should not be used in resolving performance issues.

SDSL8+ Port ATM PM Tab Page

Click the ATM PM tab to display the following tab page.

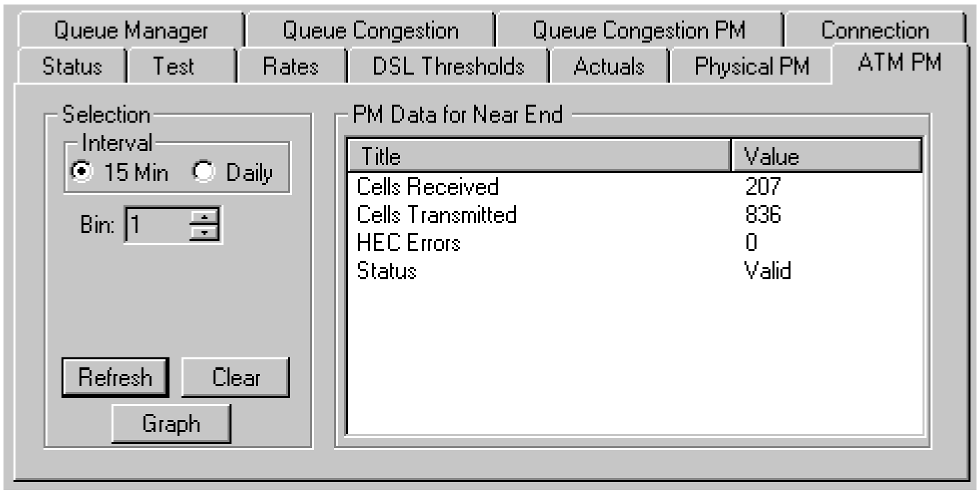


Figure 6-106: SDSL8+ Port ATM PM Tab

The **ATM PM** (Performance Monitoring) tab page provides information on Cells received, transmitted, HEC errors, and the status.

The **Intervals** group allows you to specify either 15-minute or Daily intervals.

You can track up to 12 bins of performance data in 15-minute intervals. Bin number 1 contains data for the current 15-minute interval. Bin number 2 contains data for the previous 15-minute interval and so on. In the **Bin** spin box, set the Bin value (1 to 12).

You can track 2 bins of data in daily intervals. Bin number 1 contains data for the current day. Bin number 2 contains data for the previous day. In the **Bin** spin box, set the Bin value (1 or 2).

The data will **not** automatically refresh; you must click the **Refresh** button to refresh the data manually. Click the **Clear** button to clear all the performance data for this port. Click the **Graph** button to display the data in graphical format.

The **Status** in the **Data** list box will always be either Valid or Invalid. A value of Invalid indicates that the data has not been accumulated for the full time of a given interval because the bin has been reset, or because at some time during the interval the port was in an LOS or LOF condition. Invalid data should not be used to resolve performance issues.

The Graph window displays when you click the **Graph** button from a number of different tab pages. The options included on the Graph window vary slightly depending on the set of data that is being graphed. As an example, the ATM PM Graph window is shown below.

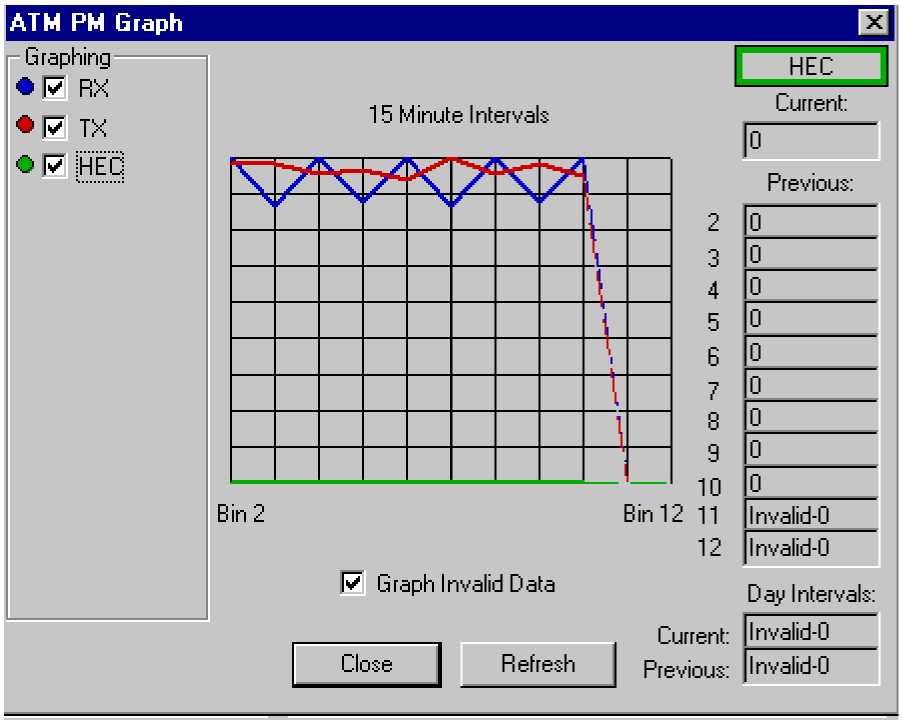


Figure 6-107: Graph Window, ATM PM

The information included in the Graph window is described in the following sections.

Graphing group. This group includes a list of parameters that vary depending on the window from which the Graph window was accessed.

The Graph window includes a grid where the line graphs are displayed. The grid can display any combination of the available parameters; each parameter displays in a different color to make it easier to view the information. The grid is divided into 15-minute intervals, and labelled by bin number.

The following numeric data is displayed on the right side of the Graph window:

- Current data for the current 15-minute interval and current day.
- Historic data for the eleven previous 15-minute bins and for the previous day.

Click the **Close** command button to close the window, or the **Refresh** command button to refresh the display.

SDSL8+ Port Queue Manager Tab Page

Click the Queue Manager tab to display the following tab page.

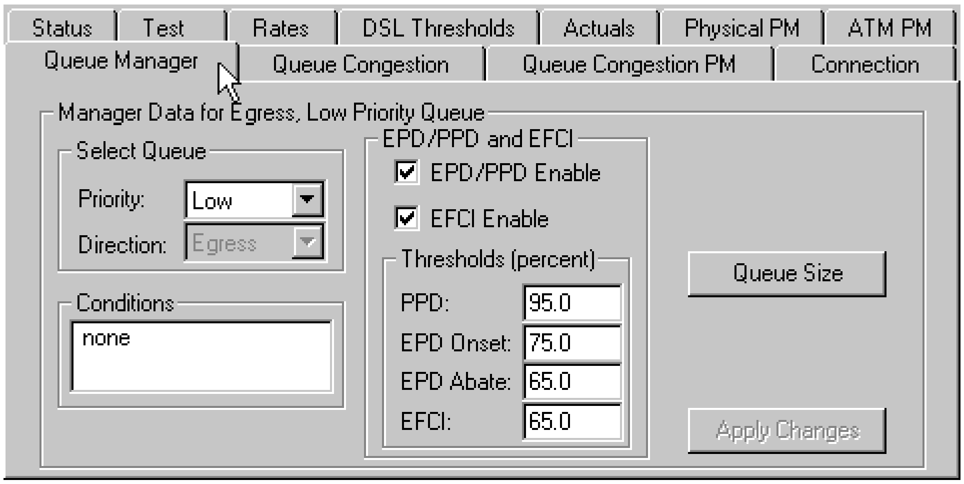


Figure 6-108: SDSL8+ Port Queue Manager Tab

The **Queue Manager** tab enables provisioning of the Quality of Service (QoSV4) buffers. The **Select Queue** group box is used to specify which queue to view by **Priority** (Low, Medium, or High). *Low Priority* is the default. The **Direction** field is static (non-configurable); *Egress* is the only valid value for this card.

As different options are selected in these fields, the **Manager Data for . . .** title above the group changes to reflect the current selections.

The **Conditions** box lists any conditions pertaining to the buffers.

The **EPD/PPD and EFCI** group box includes check boxes that allow provisioning of the EPD/PPD (Early Packet Discard/Partial Packet Discard) and EFCI (Explicit Forward Congestion Indicator) features:

- **EPD/PPD Enable.** This check box is used to enable EPD and PPD for the port. Enable this option (the default) if the queue will be carrying connections supporting ATM Adaption Layer (AAL) Type 5; otherwise, disable. EPD can also be provisioned at the connection level. If a queue will be carrying a combination of AAL5 and other protocols, EPD/PPD should be enabled at the port level, and enabled for the individual connections that will be carrying AAL5 traffic exclusively, and disabled for those connections not carrying AAL5 data.
- **EFCI Enable.** This check box is used to enable (the default) EFCI for the port.

Thresholds can be specified for each of these parameters, including:

- **PPD.** Specifies the threshold above which partial packets will be discarded. The default is 95.0 (95%).
- **EPD Onset.** Specifies the threshold above which packets will be discarded. The default is 75.0 (75%).

- **EPD Abate.** Specifies the threshold below which packets will be transmitted. The default is 65.0 (65%).
- **EFCI.** Specifies the threshold above which EFCI will be applied to packets. The default is 65.0 (65%).

Click the **Queue Size** command button to display a dialog box where the queue size can be viewed and changed. The number displayed in the **Queue Size** box reflects the current provisioning for the queue selected in the **Priority** list on the Queue Manager tab.

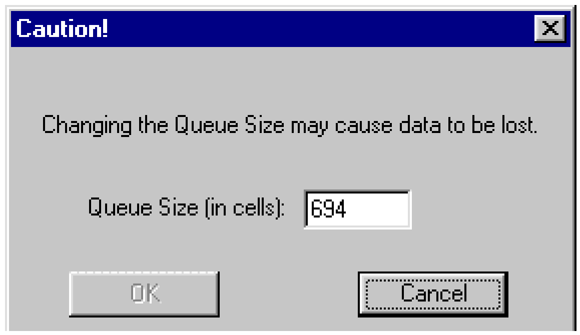


Figure 6-109: Low Priority Queue Default Size

Note: This is a data affecting action. Changing the queue size is **not** recommended. You can click the **OK** button to proceed with the action or the **Cancel** button to cancel any changes to the **Queue Size** field.

The total buffering available for all three queues for one port of a SDSL8+ card is 1024 cells, so the total size of all three queues should not exceed 1024. The default allocations are as follows:

- Low priority = 694 cells.
- Medium priority = 298 cells.
- High priority = 32 cells.

  Since the default sizes for the three queues use the entire available buffering, increasing the size of one queue requires that you decrease the size of another by at least the same number of cells to make the required buffering available; you should decrease the size of the other queue first, otherwise a provisioning error will occur. If the total size of all three queues exceeds the maximum available buffering, the condition will display in the Conditions list on the Queue Manager tab.

After changing the provisioning for a port, click the **Apply Changes** command button to save the provisioning information to the MIB.

SDSL8+ Port Queue Congestion Tab Page

Click the Queue Congestion tab to display the following tab page.

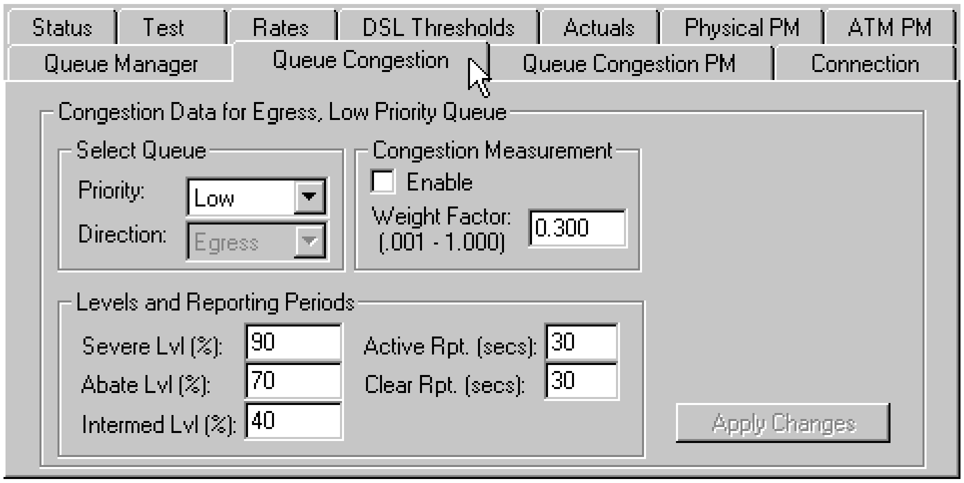


Figure 6-110: SDSL8+ Port Queue Congestion Tab

The Queue Congestion tab enables monitoring of the queues. The **Select Queue** group box is used to specify which queue to view by **Priority** (Low, Medium, or High). *Low Priority* is the default. The **Direction** field is static (non-configurable); *Egress* is the only valid value for this card.

As different options are selected in these fields, the **Congestion Data for . . .** title above the group changes to reflect the current selections.

The **Congestion Measurement** group box includes a check box to enable (unchecked by default) congestion measurement. A **Weight Factor** between .001 and 1.000 can be specified (the default is .300). The weight factor is used to smooth data samples. A value of 1 means that no weighting is applied to the current sample to calculate the measure of congestion.

The **Levels and Reporting Periods** group box enables provisioning of thresholds for the following parameters:

- **Severe level.** Level at which an alarm will be reported if the level stays above the specified **Abate level** for the specified number of **Active report** seconds. The default is 90%.
- **Abate level.** Level below which an alarm will clear if the level stays below the specified **Abate level** for the specified number of **Clear report** seconds. The default is 70%.
- **Intermediate level.** Level at which a threshold report will be generated. Only one report will be generated per five-minute interval. The default is 40%.
- **Active report.** Time in seconds (default of 30) before an alarm is reported if:
  - The level exceeds the specified **Severe level**, and

– Stays above the specified **Abate level** for the specified number of **Active report** seconds.

- **Clear report.** Time in seconds before an alarm clears if the level stays below the specified **Abate level**. The default is 30 seconds.

After changing the provisioning for a port, click the **Apply Changes** command button to save the provisioning information to the MIB.

SDSL8+ Port Queue Congestion PM Tab Page

Click the Queue Congestion PM tab to display the following tab page.

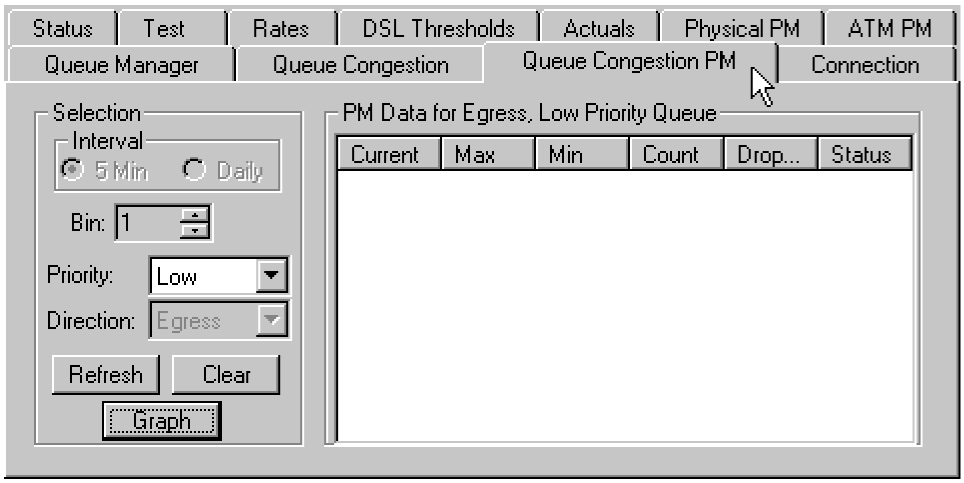


Figure 6-111: SDSL8+ Port Queue Congestion PM Tab

The **Queue Congestion PM** (Performance Monitoring) tab provides information on data congestion for each of the three queues (Low, Medium, and High).

The **Interval** group is a static (non-configurable) 5-minute value.

You can view up to 12 five-minute bins of performance data. The data in the Bin number 1 always contains the data for the current interval. Bin number 2 contains the data for the previous interval and so on.

Use the **Priority** field to specify the queue for which you want to view data. The **Direction** field is not enabled for this tab.

As different options are selected in these fields, the **PM Data for . . .** title above the group changes to reflect the current selections.

In the **Bin** spin box, set the Bin value (1 to 12). The bin will contain the maximum and minimum smoothed values which occurred in that five-minute period.

The data will **not** automatically refresh; you must click the **Refresh** button to refresh the data manually. Click the **Clear** button to clear all the performance data for this port. Click the **Graph** button to display the data in graphical format.

The **PM Data for . . .** box displays the following items of data for bin 1:

- Current value for the period.
- Maximum value for the period.
- Minimum value for the period.
- Status of the queue.

For bins 2 through 12, only the following items of data display:

- Minimum and maximum values for the period.
- Status of the queue.

The advantage of displaying the current bin is that by selecting the **Refresh** button, both new and old data can be displayed so that the values can be compared.

Click any of the column headings and drag to resize them.

SDSL8+ Port Connection Tab Page

Click the Connection tab to display the following tab page.

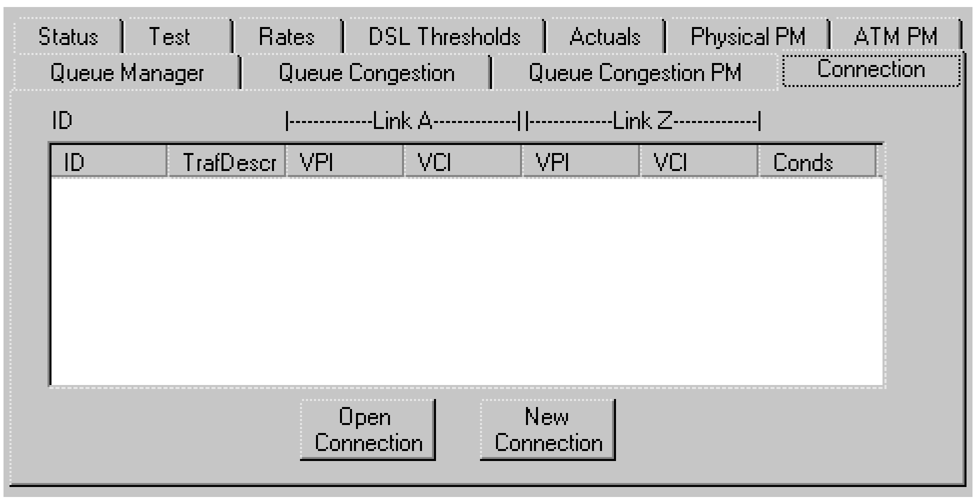


Figure 6-112: SDSL8+ Port Connection Tab

The Connection tab lists all connections on the port by ID, and shows the traffic descriptor assigned to each connection and the VPI/VCI addresses for the Link A and Link Z sides of the connection. Any conditions are also listed.

Select any connection and click the **Open Connection** button to display connection details. Click the **New Connection** button to add a new virtual connection. For details, see Chapter 9—“Connection Dialog Boxes,” page 6-145.

Chapter 8
IDSL Card and Ports

Introduction

The IDSL line card provides translation between standard frame-based protocols (Frame Relay, PPP) and the ATM broadband network.

The Segmentation and Reassembly (SAR) function is located on the IDSL line card rather than on the CPE (as with ATM-based line cards). Since the SAR function is located on the card itself, the IDSL card must implement Inter-Working Functions (IWFs) from the frame-based protocols on the line, translating them to ATM on the backbone.

In the ingress direction, the IDSL card operates on incoming frames using one of the IWF options; the modified frames are then *segmented* and sent as ATM cells across the backplane.

In the egress direction, the ATM cells are *reassembled* into a Protocol Data Unit (PDU), again operated on using the selected IWF, then sent to the CPE.

The PDUs transported through the ATM network are transmitted out the line card line interface over High-Level Data Link Control (HDLC), carried on a transceiver-specific physical layer. The IDSL line card uses standard ISDN transceivers supporting the 2B1Q line encoding.

IDSL Card Interface

Click an IDSL card in an LCS equipment locator group to display the following tabs:

- Status.
- Configuration.
- Versions.

IDSL Card Status Tab Page

The Status tab page displays initially.

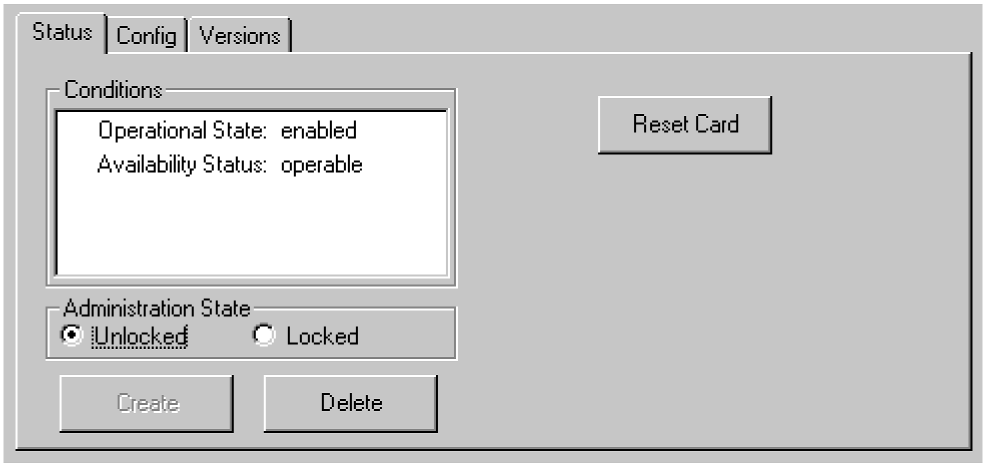


Figure 6-113: IDSL Card Status Tab

The **Conditions** list box displays conditions associated with the selected card. Data in the **Conditions** list box is refreshed by the system at user-specified intervals; the interval can be set to 0, which means that the data will **not** automatically refresh. You can specify the polling interval by selecting Options on the Tools menu. The data can also be updated by clicking the Refresh icon on the toolbar.

The **Administration State** group allows you to control whether or not the card is available for service. **Unlocked** makes the card available if there are no other conditions blocking its use. **Locked** makes the card unavailable for service; cards should be locked when being configured, when making hardware upgrades, or when testing.

> **Note:** If a card is locked, any alarms for that card will **not** display in the Active Alarms list; however, the alarm conditions will display in the **Conditions** box on the card's Status tab. If an alarm condition exists and the unlocked option is selected, an alarm will then be displayed in the Active Alarms list. For descriptions of alarm conditions, see the volume titled Maintenance and Testing.

The **Create** button is only enabled if you have clicked on an unprovisioned slot. Click this button to display a list of line cards you can create. Select IDSL from the list.

The **Delete** command button is only enabled if you have clicked on a provisioned card. Click this button and a warning message displays indicating the card is about to be deleted from the system, and you can either click the **OK** button to proceed, or the **Cancel** button to cancel the operation.

> **Note:** You must delete all of a card's connections before you can delete the card. For details, see Chapter 9—"Connection Dialog Boxes," page 6-145.

Click the **Reset Card** button to physically reset the card. Click this button and a warning message displays asking if you are sure you want to reset the card. You can click the **OK** button to proceed or the **Cancel** button to cancel the operation.

IDSL Card Configuration Tab Page

Click the Config tab to display the following tab page.

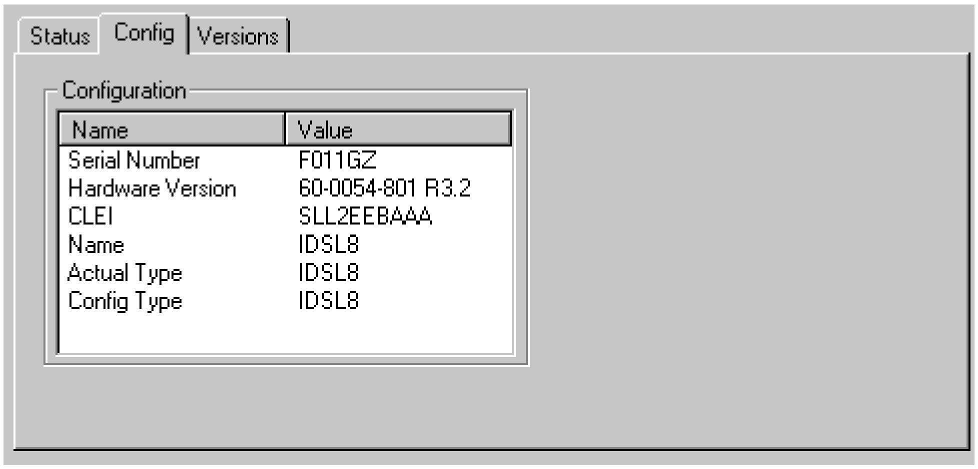


Figure 6-114: IDSL Card Configuration Tab

The **Configuration** list box shows the Serial Number, Hardware Version, CLEI code, Name, and the Actual and Configured card Type.

IDSL Card Versions Tab Page

Click the Versions tab to display the following tab page.

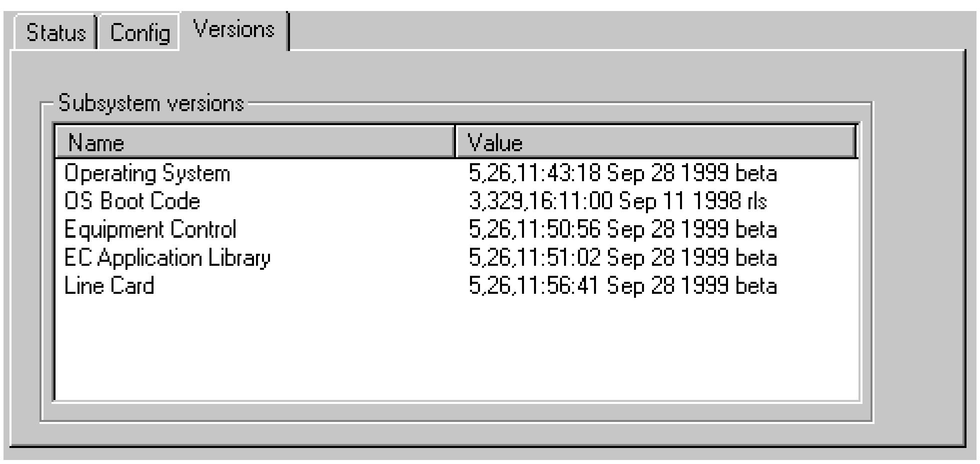


Figure 6-115: IDSL Card Versions Tab

The **Subsystem Versions** group lists the subsystems, their version numbers, and the dates when they were created.

IDSL Port Interface

Click the port connection on an IDSL card to display the eight ports. Click any of the ports to display the IDSL port object view for that port.

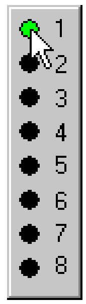


Figure 6-116: Individual Ports

The IDSL port object view contains the following tabs:

- Status.
- IDSL.
- DSL Thresholds.
- Channels.
- Actuals.
- Physical PM.
- ATM PM.
- Queue Manager.
- Queue Congestion.
- Queue Congestion PM.
- Connection.

IDSL Port Status Tab Page

The Status tab displays initially.

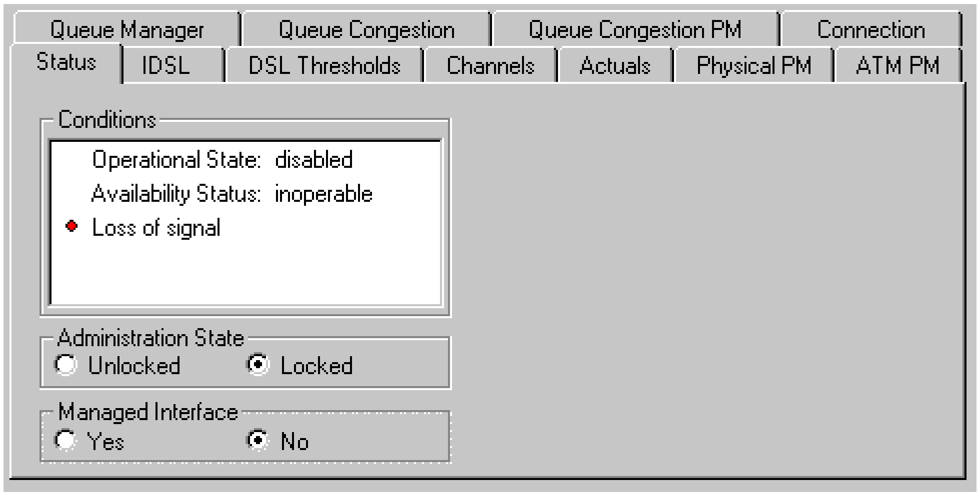


Figure 6-117: IDSL Port Status Tab

The **Conditions** list box displays conditions associated with the selected port. Data in the **Conditions** list box is refreshed by the system at user-specified intervals; the interval can be set to 0, which means that the data will **not** automatically refresh. You can specify the polling interval by selecting Options on the Tools menu. The data can also be updated by clicking the Refresh icon on the toolbar.

The **Administration State** radio buttons control whether the object is available for service or not: **Unlocked** makes the object usable if there are no other conditions blocking use of this object. **Locked** makes the object unavailable for service, and prevents alarms from being reported.

> **Note:** If a port is locked, any alarms for that port will **not** display in the Active Alarms list; however, the alarm conditions will display in the **Conditions** box on the port's Status tab. If an alarm condition exists and the unlocked option is selected, an alarm will then be displayed in the Active Alarms list. For descriptions of alarm conditions, see the volume titled Maintenance and Testing.

The **Managed Interface** buttons control whether the port is being actively managed. If the managed interface option is enabled, conditions on the port (for example, an LOF condition) are reported as alarms in the alarm list. If this option is not enabled (the default), conditions on the port will not be reported.

The managed interface option interacts with one of the options in the Options dialog box, which is available by selecting Options from the Tools menu. In the **Line Card Port Color** group of the Options dialog box, one of the options is **If Managed Interface is set to no, show all options as yellow instead of red**. If this option is enabled, and the managed interface option is disabled, a port for which a condition is reported will display yellow instead of red.

IDSL Port IDSL Tab Page

Click the IDSL tab to display the following tab page.

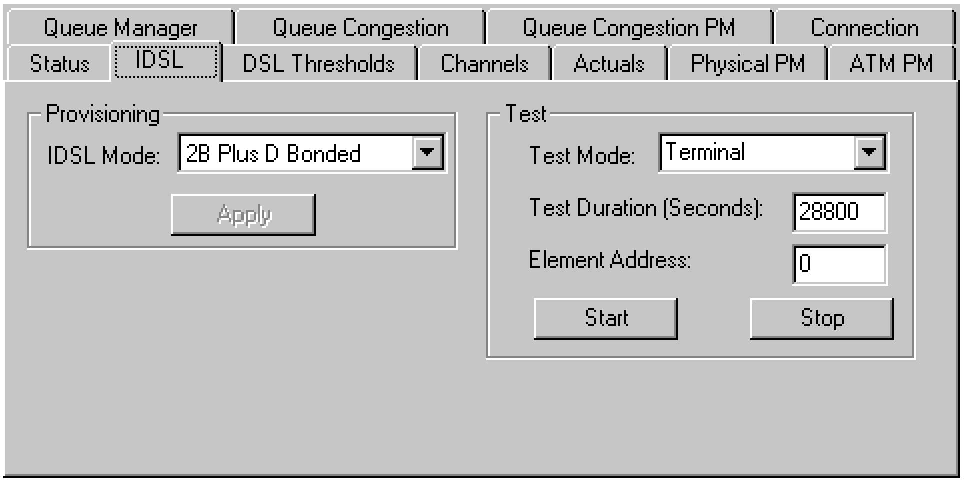


Figure 6-118: IDSL Port IDSL Tab

The **IDSL** tab supports IDSL Mode **Provisioning** and **Test** for the IDSL card.

The **IDSL Mode** allows you to select a mode for the ISDN port; the mode selected determines the data rate for the port. The mode option used depends on the mapping option specified on the IDSL port object view **Channels** tab, as follows:

- **2B Plus D Bonded**. 144 Kbps. Used with mapping option **B1**. This is the default.
- **2B Bonded**. 128 Kbps. Used with mapping option **B1**.
- **2B Independent**. 2 B channels, 64 Kbps each. Use with mapping options **B1** or **B2**.
- **ISDN Compatible.** 2B channels, 64 Kbps each. D channel, 16 Kbps. Use with mapping options B1, B2, or D.

For more information on the mapping options, see **IDSL Port Channels Tab Page**, page 6-132.

The **(ATUC) Test Mode** groups allow you to select the type of testing to perform:

- **Line.** Test the line to the subscriber's network interface—no data into the system.
- **Terminal.** Test the line to the subscriber's modem—no data out of the system. This is the default.
- **Analog.** Test the line by looping a signal out through the transmit side and in through the receive side.
- **Send CRC.** Test the line by forcing a single Cyclic Redundancy Check (CRC) error on the line towards the CPE.

- **Tone.** Test the line by causing the Link ID tone to be transmitted on the specified port, to allow remote test access to identify a given port.
- **BERT B1, BERT B2, BERT 2B, BERT 2B+D.** Perform a Bit Error Rate Test (BERT) on the loopback channel. Test result actuals can be seen by selecting the *Actuals* tab.
- **Count Repeater.** A count of how many repeaters are between the D50 and the CPE. There are 0-7 intermediate elements possible for ISDN.

Important! All diagnostic tests interrupt data flow through the system. Do not perform on a D50 System that is providing service. Only use diagnostic tests during commissioning procedures or in a lab environment to isolate trouble in the system.

Element Address: The D50 can address up to 6 intermediate equipment units between itself and the CPE, such as ISDN repeaters and Digital Loop Carriers (DLCs). *Element Addresses* 1 through 6 represent the intermediate elements, and "0" (the default) represents the CPE.

Note: If the D50 receives an *Element Address* greater than 6, it is read as "0" (the CPE).

Test Duration sets the interval in seconds that the system should wait before stopping the loopback test. The Loopback Duration default is 28800 seconds. The **Test command** buttons **Start** and **Stop** testing.

For additional information, see the volume titled Maintenance and Testing.

IDSL Port DSL Thresholds Tab Page

Click the DSL Thresholds tab to display the following tab page.

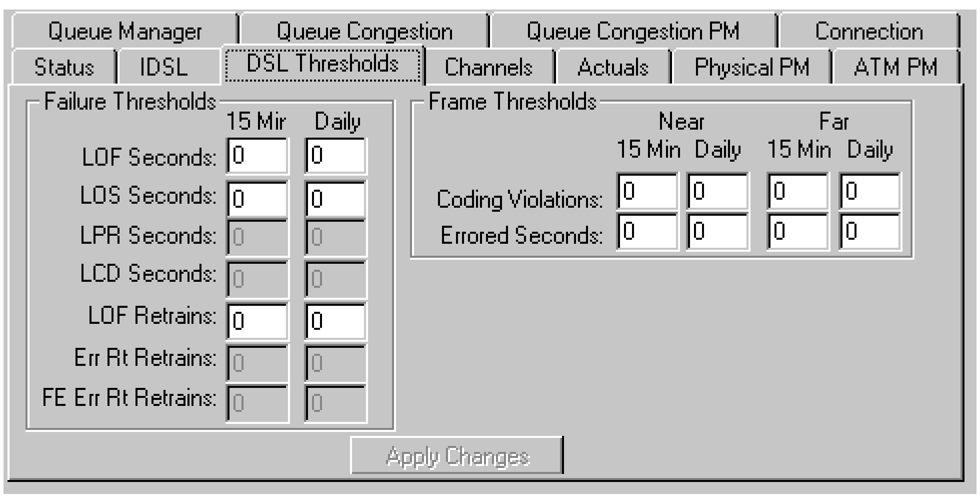


Figure 6-119: IDSL Port DSL Thresholds Tab

The **Failure Thresholds** group allows you to specify thresholds for several parameters, for both 15 minute and daily intervals. The default is 0 for all values.

The **Frame Thresholds** group allows you to specify thresholds for Coding Violations and Errored Seconds for the near and far-end ATUC, for both 15-minute and daily intervals.The default is 0 for all values.

For tables of provisioning thresholds, see the volume titled Provisioning.

After making changes to any of the thresholds, the **Apply Changes** button becomes enabled. Click this button to apply the changes to the MIB.

IDSL Port Channels Tab Page

Click the Channels tab to display the following tab page.

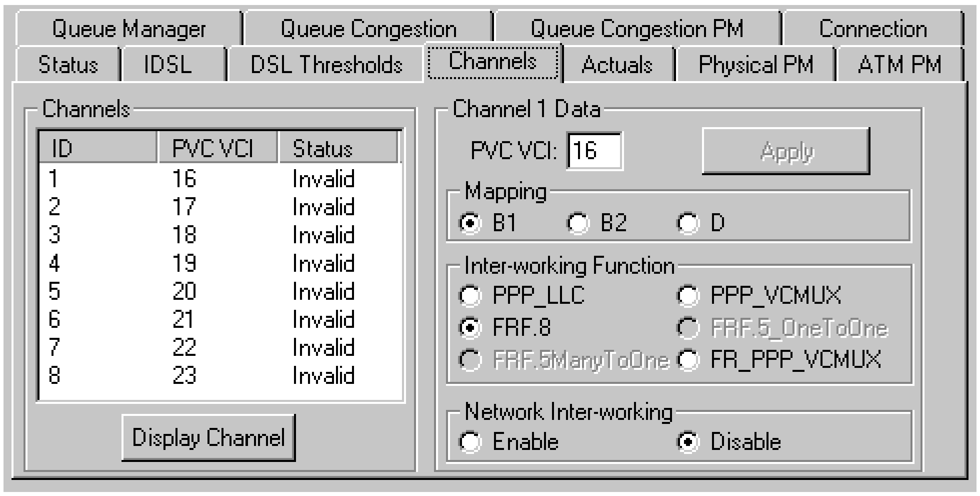


Figure 6-120: IDSL Port Channels Tab

The **Channels** tab page allows you to provision individual Permanent Virtual Channels (PVCs). To display and work with detail information for a specific PVC, click the ID, then click the **Display Channel** command button. You can also display detail information when you double-click the ID. The title of the **Channel <number> Data** area changes to reflect the ID number for the selected channel. The following information can be viewed and worked with for the selected channel:

PVC VCI. This box displays a list of PVC VCIs (PVC Virtual Channel Identifier), along with the ID number and status (valid or invalid) for each. Valid values are 16 through 1023. The trunk side VCI must make the frame relay DLCI for the connection to be valid.

Mapping. This group allows you to select a mapping option for the PVC. The mapping option selected depends on the IDSL mode specified on the IDSL port object view **IDSL** tab, as follows:

- **B1**. Used for any of the four IDSL modes; **2B + D Bonded**, **2B Bonded**, **2B Independent**, or **ISDN Compatible**. This is the default.
- **B2**. Used for IDSL mode **2B Independent** or **ISDN Compatible**.

- **D**. Used for IDSL mode **ISDN Compatible**.

For details see **IDSL Port IDSL Tab Page**, page 6-130.

Inter-networking Function (IWF). This group allows you to select an IWF option for the PVC. Each IDSL PVC must be configured to support one of the following types of protocols:

- **PPP_LLC.** PPP (Point-to-Point Protocol) over HDLC (High-Level Data Link Control), LLC (Logical Link Control) encapsulated. For this protocol, there is no frame relay DLCI on the IDSL port, so only one connection is supported with a default mapping.
- **PPP_VCMux.** PPP over HDLC, VC (Virtual Channel) multiplexed only. For this protocol, there is no frame relay DLCI on the IDSL port, so only one connection is supported with a default mapping.
- **FRF.8.** Frame Relay translated over HDLC, includes PPP over Frame Relay, LLC encapsulated. Translated protocols are supported for FRF.8 only. This is the default.
- **FR_PPP_VCMUX.** PPP over Frame Relay, without LLC encapsulation, VC multiplexed.

For *Frame Relay* IWF options, the trunk VPI/VCI is mapped to a specified Frame Relay DLCI on the IDSL port. Multiple connections can be supported by mapping trunk VPI/VCIs to a line card Data Link Connection Identifier (DLCI). The IDSL card can support a maximum of eight frame relay connections per port, and each card can support a maximum of twenty-four connections over all eight ports.

The **Apply** command button becomes active if any of the provisioning parameters are changed.

> **Note:** Clicking this button **immediately** applies the changes to the system. To return the parameters to their original values, close the dialog box without clicking the Apply button. The port status should be set to **Locked** before applying changes to the system.

IDSL Port Actuals Tab Page

Click the Actuals tab to display the following tab page.

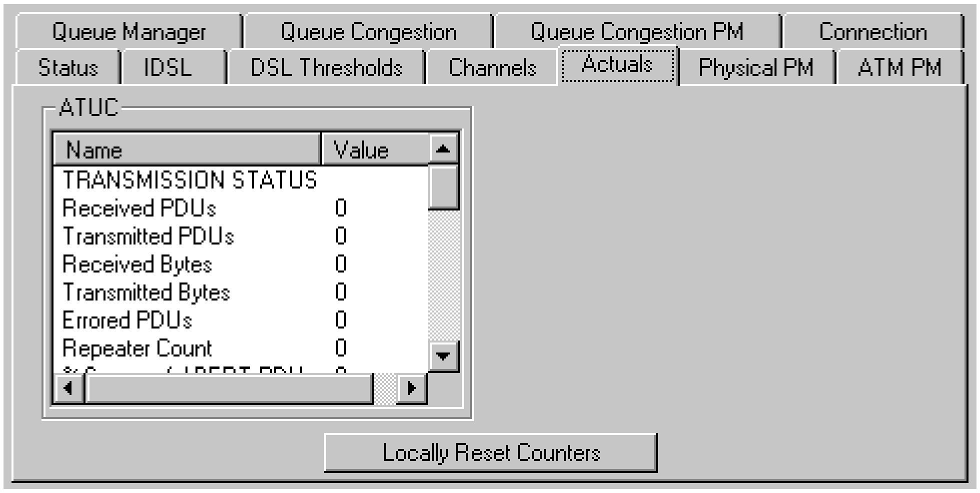


Figure 6-121: IDSL Port Actuals Tab

The IDSL Port Actuals tab page displays ATUC connectivity data. This information is read-only.

The scrollable list includes the following IDSL actuals for the ATUC:

Table 6-10: IDSL ATUC Actuals

TRANSMISSION STATUS	ERROR DATA	TIME DATA
■ Received PDUs (Protocol Data Units) ■ Transmitted PDUs ■ Received Bytes ■ Transmitted Bytes ■ Errored PDUs ■ Repeater Count ■ % Successful BERT PDUs ■ BERT Result	■ LOF Failures ■ LOS Failures ■ LOF Seconds ■ LOS Seconds ■ Errored Seconds ■ Coding Violations ■ FE Errored Seconds ■ FE Coding Violations ■ LOF Retrains ■ Bad Prov. Status	■ Elapsed Time (Curr. 15 min) ■ Elapsed Time (Curr. 24 hrs) ■ Elapsed Time (Prev. Day)

Click the **Locally Reset Counters** button to reset all values to 0 (zero) for the current view, as shown in the example. After being reset, the values will begin incrementing again based on data accumulated from the point at which the counters were reset. Resetting the counters only affects the current view. Data continues to accumulate “behind the scenes,” and if another view is opened, the new view displays values based on the entire reporting period.

IDSL Port Physical PM Tab Page

Click the Physical PM tab to display the following tab page.

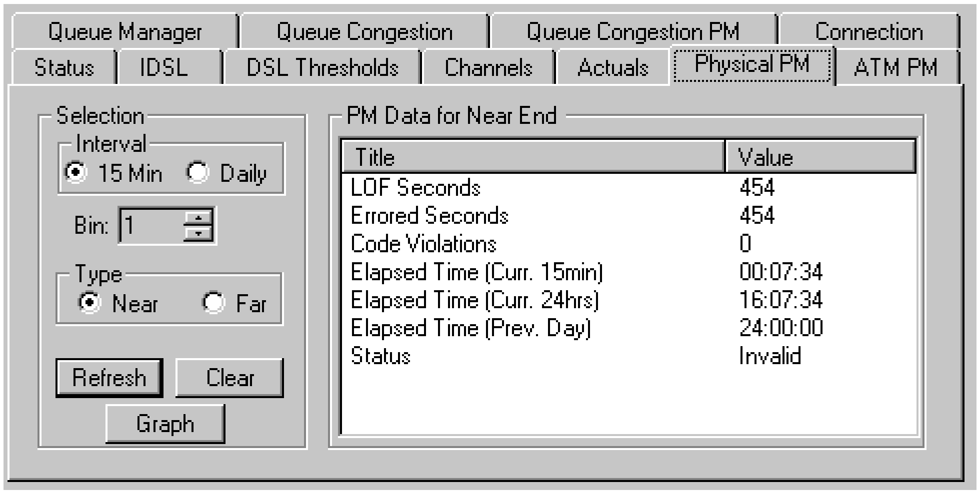


Figure 6-122: IDSL Port Physical PM Tab

The Physical PM (Performance Monitoring) tab page provides near and far-end performance monitoring information.

The **Interval** group allows you to specify either 15-minute or Daily intervals.

You can track up to 12 bins of performance data in 15-minute intervals. Bin number 1 contains data for the current 15-minute interval. Bin number 2 contains data for the previous 15-minute interval and so on. In the **Bin** spin box, set the Bin value (1 to 12).

You can track 2 bins of data in daily intervals. Bin number 1 contains data for the current day. Bin number 2 contains data for the previous daily interval. In the **Bin** spin box, set the Bin value (1 or 2).

The **Type** group allows you to specify whether to monitor near or far-end ATUC data.

The **PM Data for . . .** group displays the names and values for the parameters listed. The title of this group changes to reflect the option selected in the **Type** group. This list includes values for the following parameters:

- LOF Seconds.
- LOS Seconds.
- Errored Seconds.

- Code Violations.
- Elapsed Time (current 15 minute).
- Elapsed Time (current 24 hours).
- Elapsed Time (previous day).
- Status.
- The data will **not** automatically refresh; you must click the **Refresh** button to refresh the data manually. Click the **Clear** button to clear all the performance data for this port. Click the **Graph** button to display the data in graphical format.

The **Status** in the **Data** list box will always be either Valid or Invalid. A value of Invalid indicates that the data has not been accumulated for the full time of a given interval because a bin has been reset; invalid data should not be used in resolving performance issues.

IDSL Port ATM PM Tab Page

Click the ATM PM tab to display the following tab page.

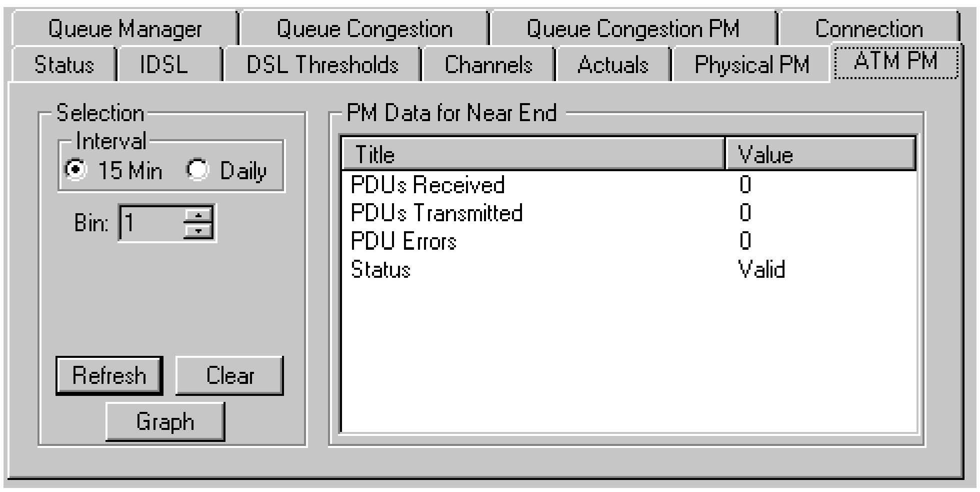


Figure 6-123: IDSL Port ATM PM Tab

The **ATM PM** (Performance Monitoring) tab page provides information on PDUs (Protocol Data Units) received, PDUs transmitted, PDU Errors, and the status.

The **Intervals** group allows you to specify either 15-minute or Daily intervals.

You can track up to 12 bins of performance data in 15-minute intervals. Bin number 1 contains data for the current 15-minute interval. Bin number 2 contains data for the previous 15-minute interval and so on. In the **Bin** spin box, set the Bin value (1 to 12).

You can track 2 bins of data in daily intervals. Bin number 1 contains data for the current day. Bin number 2 contains data for the previous day. In the **Bin** spin box, set the Bin value (1 or 2).

The data will **not** automatically refresh; you must click the **Refresh** button to refresh the data manually. Click the **Clear** button to clear all the performance data for this port. Click the **Graph** button to display the data in graphical format.

The **Status** in the **Data** list box will always be either Valid or Invalid. A value of Invalid indicates that the data has not been accumulated for the full time of a given interval because the bin has been reset, or because at some time during the interval the port was in an LOS or LOF condition. Invalid data should not be used to resolve performance issues.

The Graph window displays when you click the **Graph** button from a number of different tab pages. The options included on the Graph window vary slightly depending on the set of data that is being graphed. As an example, the ATM PM Graph window is shown below.

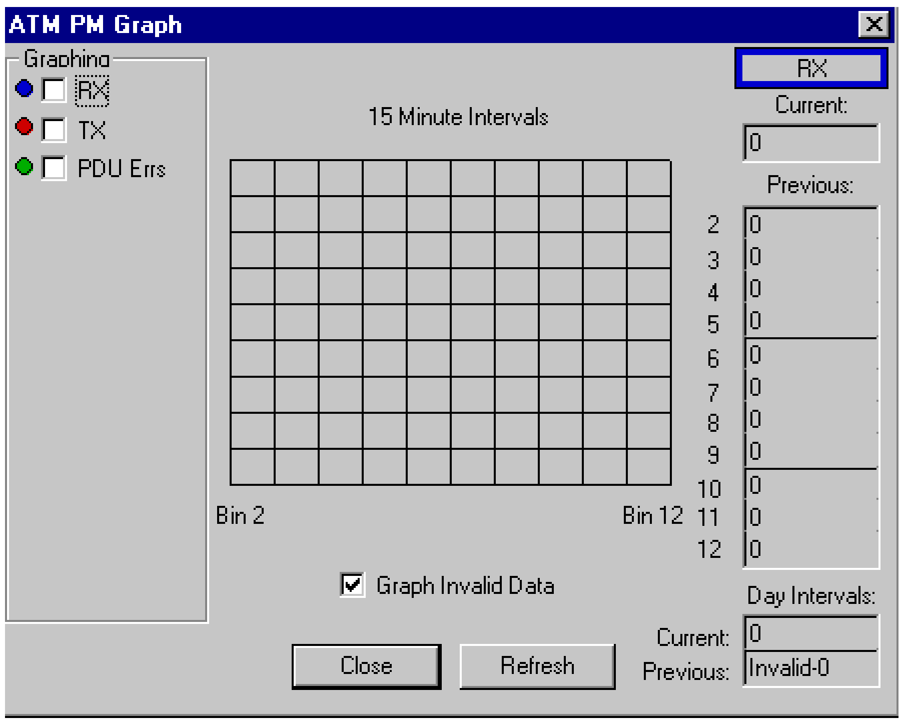


Figure 6-124: Graph Window, ATM PM

The information included in the Graph window is described in the following sections.

Graphing. This group includes a list of parameters that vary depending on the window from which the Graph window was accessed.

The Graph window includes a grid where the line graphs are displayed. The grid can display any combination of the available parameters—each parameter displays in a different color to make it easier to view the information. The grid is divided into 15-minute intervals, and labelled by bin number.

The following numeric data is displayed on the right side of the Graph window:

- Current data for the current 15-minute interval and current day.
- Historic data for the eleven previous 15-minute bins and for the previous day.

Click the **Close** command button to close the window, or the **Refresh** command button to refresh the display.

IDSL Port Queue Manager Tab Page

Click the Queue Manager tab to display the following tab page.

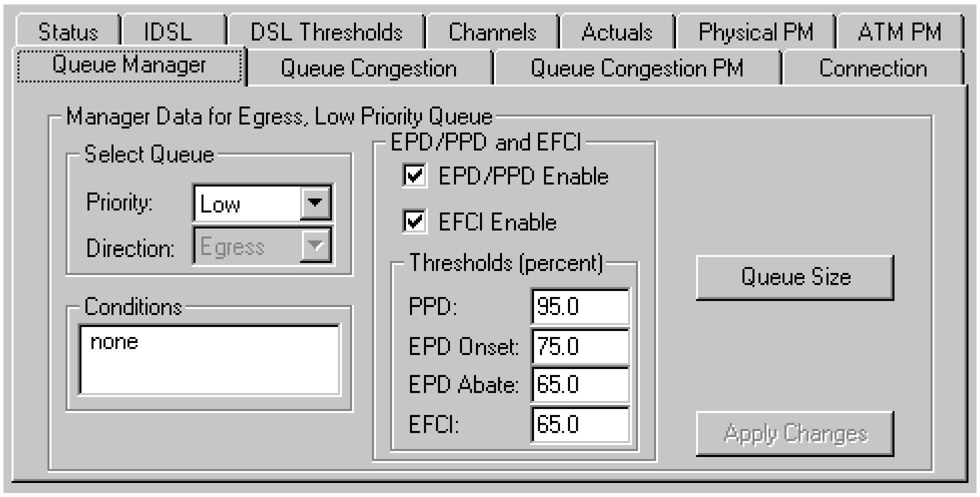


Figure 6-125: IDSL Port Queue Manager Tab

The **Queue Manager** tab enables provisioning of the Quality of Service (QoSV4) buffers. The **Select Queue** group box is used to specify which queue to view by **Priority** (Low, Medium, or High). *Low Priority* is the default. The **Direction** field is static (non-configurable); *Egress* is the only valid value for this card.

As different options are selected in these fields, the **Manager Data for . . .** title above the group changes to reflect the current selections.

The **Conditions** box lists any conditions pertaining to the buffers.

The **EPD/PPD and EFCI** group box includes check boxes that allow provisioning of the EPD/PPD (Early Packet Discard/Partial Packet Discard) and EFCI (Explicit Forward Congestion Indicator) features:

- **EPD/PPD Enable.** This check box is used to enable EPD and PPD for the port. Enable this option (the default) if the queue will be carrying connections supporting ATM Adaption Layer (AAL) Type 5; otherwise, disable. EPD can also be provisioned at the connection level. If a queue will be carrying a combination of AAL5 and other protocols, EPD/PPD should be enabled at the port level, and enabled for the individual connections that will be carrying AAL5 traffic exclusively, and disabled for those connections not carrying AAL5 data.

- **EFCI Enable.** This check box is used to enable (the default) EFCI for the port.

Thresholds can be specified for each of these parameters, including:

- **PPD.** Specifies the threshold above which partial packets will be discarded. The default is 95.0 (95%).
- **EPD Onset.** Specifies the threshold above which packets will be discarded. The default is 75.0 (75%).
- **EPD Abate.** Specifies the threshold below which packets will be transmitted. The default is 65.0 (65%).
- **EFCI.** Specifies the threshold above which EFCI will be applied to packets. The default is 65.0 (65%).

Click the **Queue Size** command button to display a dialog box where the queue size can be viewed and changed. The number displayed in the **Queue Size** box reflects the current provisioning for the queue selected in the **Priority** list on the Queue Manager tab.

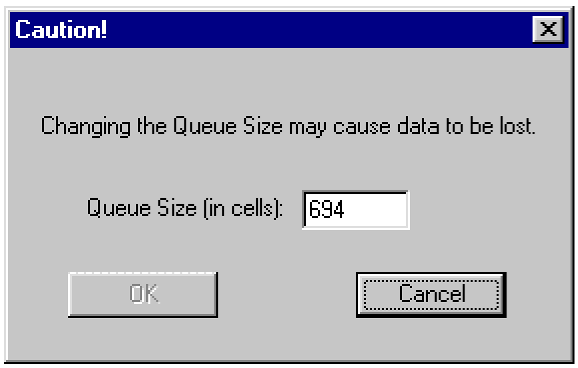


Figure 6-126: Low Priority Queue Default Size

Note: This is a data affecting action. Changing the queue size is **not** recommended. You can click the **OK** button to proceed with the action or the **Cancel** button to cancel any changes to the **Queue Size** field.

The total buffering available for all three queues for one port of an IDSL card is 1024 cells, so the total size of all three queues should not exceed 1024. The default allocations are as follows:

- Low priority = 694 cells.
- Medium priority = 298 cells.
- High priority = 32 cells.

Since the default sizes for the three queues use the entire available buffering, increasing the size of one queue requires that you decrease the size of another by at least the same number of cells to make the required buffering available; you should decrease the size of the other queue first, otherwise a provisioning error will occur. If the total size of all three queues exceeds the maximum available buffering, the condition will display in the **Conditions** list on the Queue Manager tab.

After changing the provisioning for a port, click the **Apply Changes** command button to save the provisioning information to the MIB.

IDSL Port Queue Congestion Tab Page

Click the Queue Congestion tab to display the following tab page.

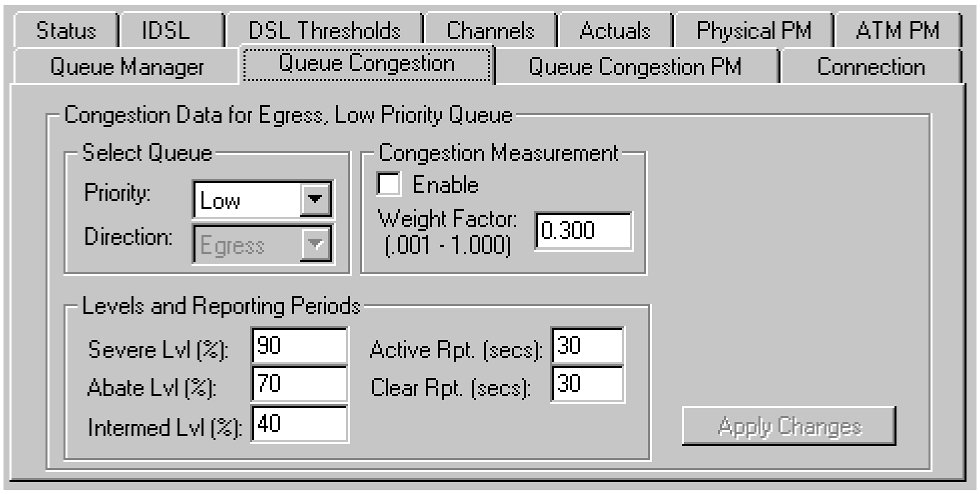


Figure 6-127: IDSL Port Queue Congestion Tab

The Queue Congestion tab enables monitoring of the queues. The **Select Queue** group box is used to specify which queue to view by **Priority** (Low, Medium, or High). *Low Priority* is the default. The **Direction** field is static (non-configurable); *Egress* is the only valid value for this card.

As different options are selected in these fields, the **Congestion Data for . . .** title above the group changes to reflect the current selections.

The **Congestion Measurement** group box includes a check box to enable (unchecked by default) congestion measurement. A **Weight Factor** between .001 and 1.000 can be specified (the default is .300). The weight factor is used to smooth data samples. A value of 1 means that no weighting is applied to the current sample to calculate the measure of congestion.

The **Levels and Reporting Periods** group box enables provisioning of thresholds for the following parameters:

- **Severe level.** Level at which an alarm will be reported if the level stays above the specified **Abate level** for the specified number of **Active report** seconds. The default is 90%.
- **Abate level.** Level below which an alarm will clear if the level stays below the specified **Abate level** for the specified number of **Clear report** seconds. The default is 70%.

- **Intermediate level.** Level at which a threshold report will be generated. Only one report will be generated per five-minute interval. The default is 40%.
- **Active report.** Time in seconds (default of 30) before an alarm is reported if:
  - The level exceeds the specified **Severe level**, and
  - Stays above the specified **Abate level** for the specified number of **Active report** seconds.
- **Clear report.** Time in seconds before an alarm clears if the level stays below the specified **Abate level**. The default is 30 seconds.

After changing the provisioning for a port, click the **Apply Changes** command button to save the provisioning information to the MIB.

IDSL Port Queue Congestion PM Tab Page

Click the Queue Congestion PM tab to display the following tab page.

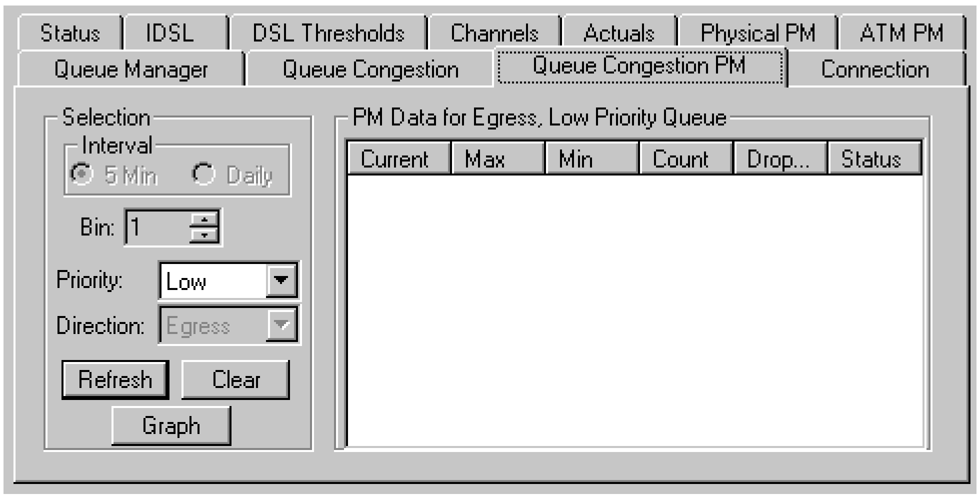


Figure 6-128: DSL Port Queue Congestion PM Tab

The **Queue Congestion PM** (Performance Monitoring) tab provides information on data congestion for each of the three queues (Low, Medium, and High).

The **Interval** group is a static (non-configurable) 5-minute value.

You can view up to 12 five-minute bins of performance data. The data in the Bin number 1 always contains the data for the current interval. Bin number 2 contains the data for the previous interval and so on.

Use the **Priority** field to specify the queue for which you want to view data. The **Direction** field is not enabled for this tab.

As different options are selected in these fields, the **PM Data for . . .** title above the group changes to reflect the current selections.

In the **Bin** spin box, set the Bin value (1 to 12). The bin will contain the maximum and minimum smoothed values which occurred in that five-minute period.

The data will **not** automatically refresh; you must click the **Refresh** button to refresh the data manually. Click the **Clear** button to clear all the performance data for this port. Click the **Graph** button to display the data in graphical format.

The **PM Data for . . .** box displays the following items of data for bin 1:

- Current value for the period.
- Maximum value for the period.
- Minimum value for the period.
- Status of the queue.

For bins 2 through 12, only the following items of data display:

- Minimum and maximum values for the period.
- Status of the queue.

The advantage of displaying the current bin is that by selecting the **Refresh** button, both new and old data can be displayed so that the values can be compared.

Click any of the column headings and drag to resize them.

IDSL Port Connection Tab Page

Click the Connection tab to display the following tab page.

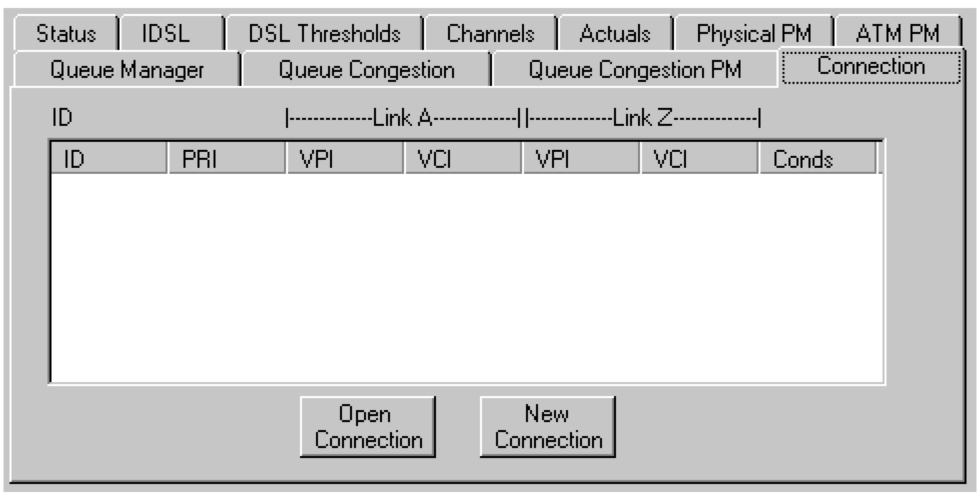


Figure 6-129: IDSL Port Connection Tab

The Connection tab lists all connections on the port by ID, and shows the priority assigned to each connection and the VPI/VCI addresses for the Link A and Link Z sides of the connection. Any conditions are also listed.

Select any connection and click the **Open Connection** button to display connection details. Click the **New Connection** button to add a new virtual connection. For details, see Chapter 9—"Connection Dialog Boxes," page 6-145.

Chapter 9
Connection Dialog Boxes

Introduction

To enable data transport using any of the line cards or broadband tributary cards[1], a connection must be set up between the trunk interface and the line card port or broadband tributary card port on which data will be sent and received. The Connection dialog boxes are used to view and work with connections. The descriptions in this chapter assume that you are viewing either: the *Connection tab* for a line card's port interface, which includes a list of connections for that port; the *system-wide Connections dialog*, which includes a list of all the connections in the system; or the *New Connection dialog*, which includes configuration information to create a new virtual connection.

Current Connections Interface

To display information about a current connection, click on the connection ID in the list box, then click the **Open Connection** button (on the *Connection tab* for line cards) or the **Show Connection** button (on the system-wide *Connections dialog*) to display the Connection dialog box (you can also double-click on the connection ID with the left mouse button to display this dialog box). This dialog box includes the following tab pages:

- Status.
- Connection.

[1] Flexibility is built in for a future release to support connections bypassing the trunk interface. However, Release 6.0 currently supports only connections flowing through the trunk interface at the "Link Z" side of a connection.

Status Tab Page The Status tab displays initially.

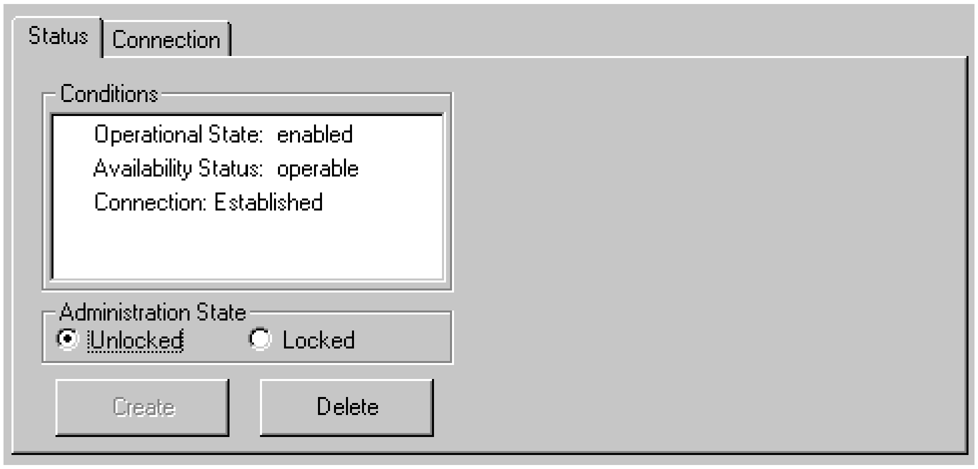


Figure 6-130: Open Connection Status Tab

The **Conditions** list box displays conditions associated with the selected object. Data in the **Conditions** list box is refreshed periodically by the system. The data can also be updated by clicking the Refresh icon on the toolbar.

The **Administration State** group allows you to control whether or not the connection is available for service. **Unlocked** makes the connection available if there are no other conditions blocking its use. **Locked** makes the connection unavailable for service; connections should be locked when being configured, when making hardware upgrades, or when testing.

Note: If a connection is locked, any alarms for that connection will **not** display in the Active Alarms list; however, the alarm conditions will display in the **Conditions** box on the connection's Status tab. If an alarm condition exists and the unlocked option is selected, an alarm will then be displayed in the Active Alarms list. For descriptions of alarm conditions, see the volume titled Maintenance and Testing.

The **Create** button is not applicable and "grayed-out."

Click the **Delete** command button and a warning message displays indicating that the connection is about to be deleted from the system. You can either click the **OK** button to proceed, or the **Cancel** button to cancel the operation.

Note: You must delete all of a card's connections and lock the port and the card before you can delete the card.

Connection Tab Page

Click the Connection tab to display the following tab page.

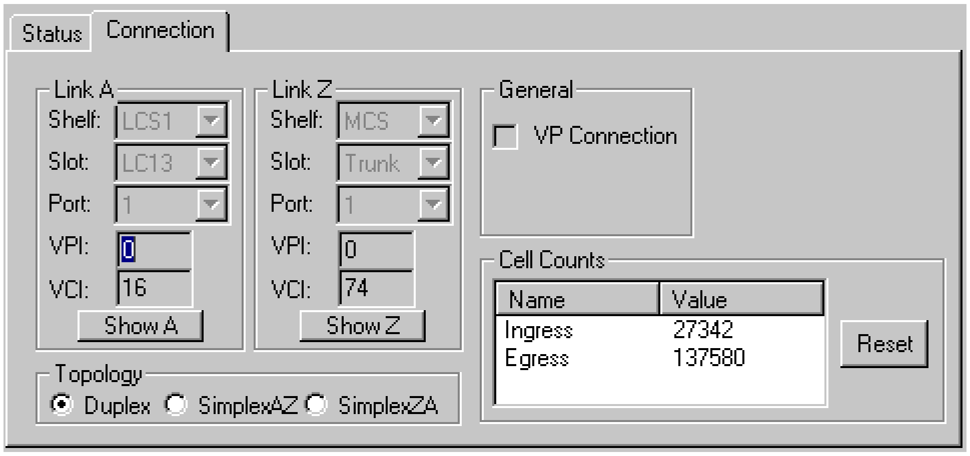


Figure 6-131: Open Connection Connection Tab

The **Link A** and **Link Z** groups display address information for the selected connection.

The **Topology** radio buttons specify the direction in which the PVC sends data:

- **Duplex.** Transmits data both directions through this port.
- **Simplex AZ.** Transmits data up from the port only.
- **Simplex ZA.** Transmits data down to the port only.

The **Cell Counts** box displays the ingress and egress cell counts for the connection. Click the **Reset** button to set the count back to 0.

Click the **Show A** or **Show Z** command buttons to display the tab pages for the A or Z side of the connection.

Show A and Show Z Tab Pages

The Show A/Show Z interface includes the following tab pages:

- Status.
- Link Config.
- OAM Config.

Show A/Z Status Tab Page

The Status tab displays initially.

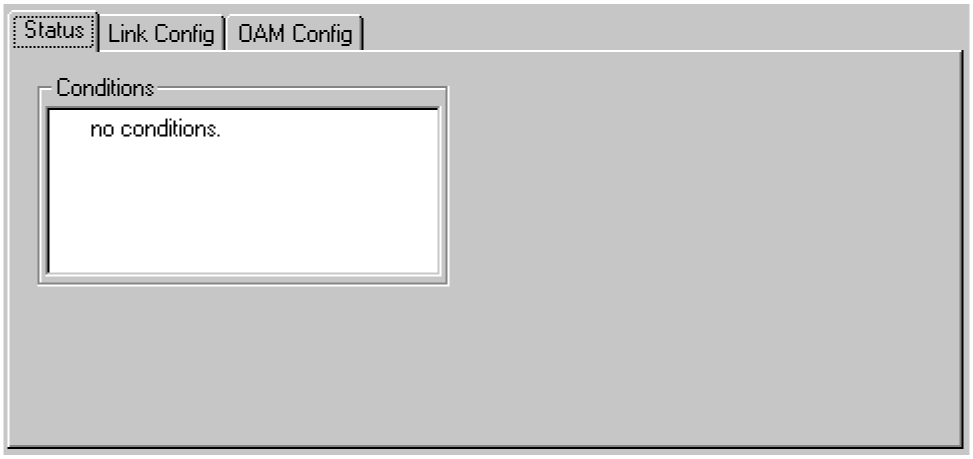


Figure 6-132: Show A/Z Status Tab

The **Conditions** list box displays conditions associated with the connection. Data in the **Conditions** list box is refreshed periodically by the system. The data can also be updated by clicking the Refresh icon on the toolbar.

Show A/Z Link Configuration Tab Page

Click the Link Config tab to display the following tab page.

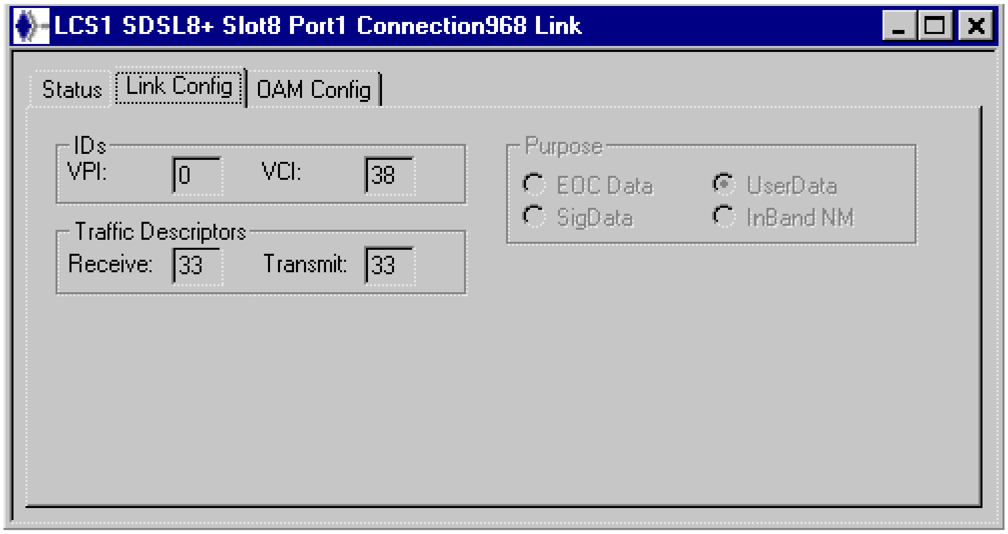


Figure 6-133: Show A/Z Link Configuration Tab

The **IDs** group displays the VPI and VCI addresses for the selected connection.

Traffic Descriptors. The traffic descriptors indicate a specific set of connectivity characteristics based on standard traffic management contracts.

- **Receive:** Specifies traffic characteristics (traffic management parameters and service category) for the virtual connection.
- **Transmit:** Specifies traffic characteristics (traffic management parameters and service category) for the virtual connection.

Show A/Z OAM Configuration Tab Page

Click the OAM Config tab to display the following tab page.

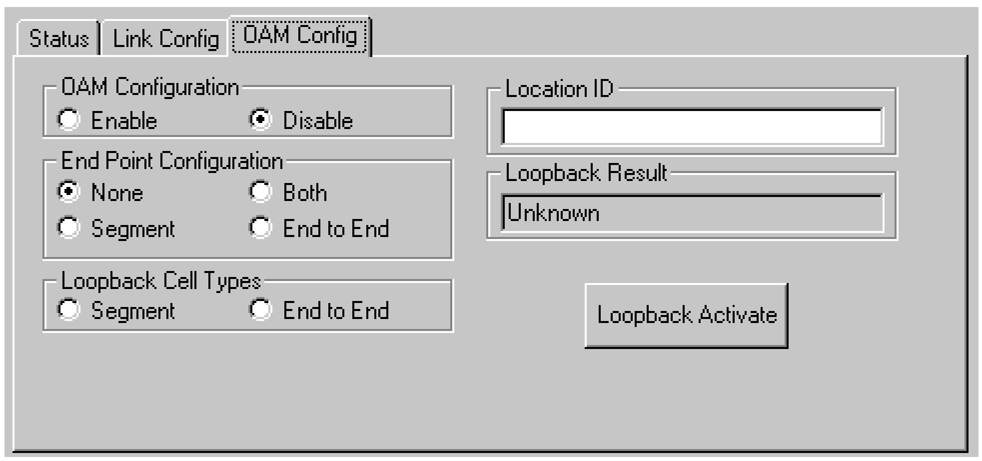


Figure 6-134: Show A/Z OAM Configuration Tab

The **OAM Configuration** group allows you to specify whether Operations And Maintenance (OAM) ATM cells are sent on the PVC connection.

The **End Point Configuration** group allows you to specify the type of processing this virtual link applies to ATM loopback cells.

- **None.** Performs no ATM loopback cell processing.
- **Segment.** Functions as a segment-type loopback cell node. Segment loopback cells loop back to the other end of the ATM connection.
- **End to End.** Functions as an end-to-end-type loopback cell node. End-to-end loopback cells loop back to the other end of the ATM connection.
- **Both.** Functions as both a **Segment** and **End-to-End** loopback cell node. Both types of loopback cells loop back to the other end of the ATM connection.

The **Loopback Cell Types** group allows you to specify the type of ATM loopback cell that will be looped back to the other end of the connection.

The **Location ID** field allows you to specify a 16-byte character string indicating where the OAM loopback cell should go. You normally identify a destination ID if the loopback point is not a segment or an end-to-end endpoint.

The **Loopback Result** box is a read-only list box that shows the results of the ATM loopback test.

- **Unknown.** Loopback result is not known.
- **Timeout.** Loopback cells were dispatched, but did not return within the timeout interval.
- **Error.** Unknown loopback failure detected.
- **Succeeded.** Loopback cell successfully returned.
- **Invalid**. Invalid destination specified for the loopback cell, or the loopback cell could not reach its intended destination.
- **Already Active.** Loopback is already active, cannot start another one until current loopback completes.
- **Resources.** No more loopbacks available on this multiplexer.
- **No OAM.** OAM cell traffic not enabled for this connection.
- **Non-Default.** This link is an intermediate point, and you are attempting to use a default NEID value for the loopback.

Click the **Loopback Activate** button to activate diagnostic testing for the connection.

New Connection Dialog Box

Click the **New Connection** button (on the *Connection tab* for line card ports) or select the **New Connection...** Tools menu item (for system-wide access) to display the **New Connection** dialog box.

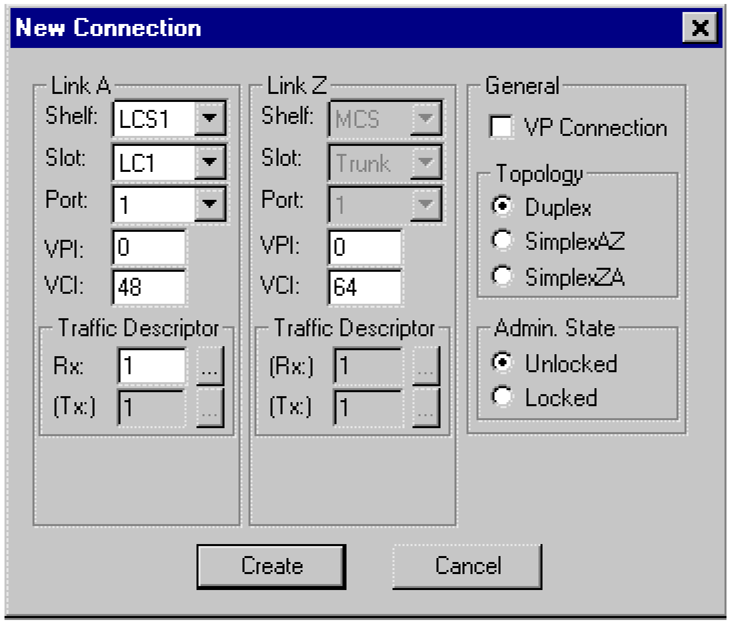


Figure 6-135: New Connection Dialog Box

Link A is the line card side of a PVC; **Link Z** is the trunk side of a PVC. The **VPI/VCI** fields at the bottom of both **Link A** and **Link Z**'s group boxes specify the ATM circuit address for each end of the connection. The VPI (Virtual Path Identifier) identifies the route to be used by the ATM cell. A virtual path may include multiple virtual channels. The VCI (Virtual Circuit Identifier) identifies the specific virtual channel to which the cell belongs. The VPI and VCI are translated at each ATM switch and are unique only for a given physical link. This information is read-only.

The **Shelf**, **Slot**, and **Port** fields specify the address where the line card side of the PVC terminates. For a PVC that connects a line card and a trunk, these fields are only meaningful for **Link A**. This information is read-only.

Traffic Descriptor: Select from a list of traffic descriptors. For details on traffic descriptors, see Section 3—*D50 Multiplexer*, Chapter 1—“Network Element,” page 3-5.

The following rules apply to traffic descriptors:

- A traffic descriptor must exist before creating connections.
- Traffic descriptors cannot be deleted unless all the associated connections are delete.
- Traffic descriptors cannot be modified once created.

- An existing connection can be moved from one traffic descriptor to another by first deleting the connection, and then re-creating the connection and associate it with the desired traffic descriptor.

Select **VP Connection** to set up a Virtual Path (VP) without setting up individual Virtual Circuits within the VP. For example, if you have multiple PCs connected to a single ADSL router at the remote end CPE, use the VP Connection option to configure the same parameters for all nodes attached to the router.

The **Topology** radio buttons specify the direction in which the PVC sends data:

- **Duplex.** Transmits data both directions through this port.
- **Simplex AZ.** Transmits data up from the port only.
- **Simplex ZA.** Transmits data down to the port only.

The **Administration State** radio buttons specify whether the connection is available for service. **Unlocked** makes the connection usable if there are no other conditions blocking its use. **Locked** makes the connection unavailable for service. The administration state should be set to **Locked** when configuring or deleting a connection.

SECTION 7 APPENDICES

Contents

List of Tables

Appendix A
Craft Terminal Troubleshooting Tips

Craft Terminal Troubleshooting Tips

Follow the Recommended Actions listed below to correct error conditions or problems for installing and running Craft Terminal:

Table 7-1: Craft Terminal Troubleshooting Tips

#	IF THE CONDITION IS THIS...	THEN DO THIS...
1	**“MgmtApi.dll not found”** error dialog appears immediately on starting the Craft Terminal application.	In Windows NT®, turn on SNMP services in Network Services.
2	**“The ordinal <6467> could not be located in dynamic library MFC42.DLL”** error dialog appears on starting the Craft Terminal application.	Reinstall latest Windows NT service pack.
3	“Remote Access Services are not turned on....”	In Windows NT, turn on RAS services in Network Services.

Table 7-1: Craft Terminal Troubleshooting Tips (continued)

#	IF THE CONDITION IS THIS...	THEN DO THIS...
4	**“Error connecting to D50”** in error window of Craft Terminal.	■ Check all port settings (baud rate, stop bits, etc.) against installation details. See the volume titled Craft Terminal. ■ Check modem settings against installation details. See the volume titled Craft Terminal. ■ Check that cable is properly attached to serial port connector, and/or try another cable. ■ Reboot NMP by pulling/resetting NMP. ■ Test serial port with oscilloscope. Contact the manufacturer if problem continues. ■ Reinstall latest Windows NT service pack.
5	**“Connected”** then **“Timeout”** messages appear in the error window of Craft Terminal (and no data is shown).	■ Reinstall latest Windows NT service packs. ■ Reboot NMP by pulling/resetting the NMP.
6	“An earlier version of this application is required to communicate with this system.”	■ Craft Terminal Release 6.0 does not manage D50 systems running previous system release software 4.0 or less. A lower version of Craft Terminal can be loaded onto the same platform as Release 6.0, but into a different directory. ■ Craft Terminal cannot find the D50 system. Check the IP address, network connections, etc.

Appendix B
Glossary and Acronyms

10BaseT. A 10 Mbps Ethernet network that uses unshielded twisted pair cable in a star topology with a central hub.

2B1Q (Two Binary, One Quaternary). A line encoding technique used in ISDN BRI and IDSL. It is a four-level PAM (Pulse Amplitude Modulation) technique, which maps two bits of data into one quaternary symbol, with each symbol comprising one of four variations in amplitude and polarity over a circuit.

AAL (ATM Adaptation Layer). ATM Adaptation Layer is located above ATM and converts non-ATM bit streams into ATM cells. The AAL protocol supports higher-layer service requirements.

ADSL (Asymmetric Digital Subscriber Line). Asymmetrical data signals for Internet access that share twisted pairs with POTS and that use modern signal modulation techniques to accomplish the data communications task. The downstream rates are much faster than the upstream rates.

AIS (Alarm Indication Signal). A downstream signal in a digital network that replaces the normal traffic signal when a maintenance alarm indication has been activated (indicating an upstream failure detection – error or alarm on the network). It is used in the OSI network management model.

Alarm. A signal used to indicate that an abnormality, a fault, or a failure has been detected. Alarms may be distinguished by type and by the severity of the event that caused the alarm.

ANSI (American National Institute). Founded in 1918, ANSI is a U.S. voluntary standards setting board.

API (Application Programming Interface). Software that an application program uses to request and carry out lower-level services performed by an operating system.

ASCII (American Standard Code for Information Interchange). A computer coding method for converting alphanumeric and punctuation characters and control codes into digital (binary) form.

ASQ (Average Signal Quality). Startup ASQ is the measured quality of the signal received over the local loop during the training process of a D50 CAP port. ASQ is measured in decibels. ASQ is affected by the transmit power of the transmitted signal, noise, plus the length and quality of the local loop.

Attenuation. Attenuation is the loss of signal strength over distance. Attenuation is measured in decibels.

ATM (Asynchronous Transfer Mode). A multiplexed information transfer and switching process (cell-switched technology) in which data is organized into fixed length (53 octet) cells and transmitted according to each application’s requirement. ATM is generally deployed in enterprise networks, which often connect LANs over wide areas that require large amounts of data to be transported over great distances.

ATUC (ADSL Transmission Unit – Central Office). Special electronics located in the Central Office to support a high rate of data transmission over UTP copper wires. This is the "downstream" direction. Works in conjunction with ATUR (see below).

ATUR (ADSL Transmission Unit – Remote). Special electronics located at the customer’s premises to support a high rate of data transmission over UTP copper wires. This is the "upstream" direction. Works in conjunction with ATUC (see above).

AutoBaud. A set of drivers available on SDSL devices to promote inter-operability.

Auxiliary Common Systems Interface Panel (CSIP). Each Auxiliary CSIP connects and distributes Central Office power to up to four Line Card Shelves (LCSs). Auxiliary CSIPs are required for D50 Systems with over five LCSs.

AWG (American Wire Gauge). A standard classification for measuring non-ferrous conductors such as copper wire.

Backbone. The part of a network that carries the heaviest traffic. It is one basis for the design of an overall network service. For example, the D50 operates on an ATM backbone.

Bandwidth. The capacity of a communications channel. For digital communications, bandwidth is usually measured in bits per second.

BER (Bit Error Rate). A measurement of transmission quality expressed as a ratio (ratio of error bits to the total number of bits transmitted – erroneous bits per million). The BER indicates how many bits are incorrectly transmitted in a given bit stream. The BER depends on the type and length of transmission.

BNC (Bayonett Neill Concelman). A bayonet-locking cabling interconnection standard, used in thin coaxial cable Ethernet applications.

BPS (Bits Per Second). A measurement of transmission speed – number of bits transmitted each second.

Bridge. A communications device used to interconnect networks or network nodes with a common set of higher level protocols.

Broadband. A communications method in which multiple channels are formed by dividing the transmission medium on a shared communications path. Generally describes communications above 1.5 Mbps.

Burst. A short flow of packets, often followed by idle periods where there is no transmission activity.

CAC (Connection Admission Control). Procedures carried out by an ATM network at connection set-up to determine whether a requested virtual connection can be supported or should be rejected.

CAM (Complimentary Analysis Module). A Nokia Broadband Systems product. A card that is used to provide the pathway to perform continuity testing from the LCS to the MDF when using a Low Pass Filter Shelf (LPFS). Plugs into the LPFS backplane in the same manner as a Low Pass Filter card. Works with the PAM (Pair Analysis Module) card.

CAP. 1) Competitive Access Provider: an alternative competitive local exchange carrier. 2) Carrierless Amplitude and Phase modulation: a bandwidth-efficient transmission technology that has excellent loop reach in the presence of bridge-taps, cross-talk and other interferences.

CBR (Constant or Continuous Bit Rate). An ATM service category that supports a constant or guaranteed rate to transport services such as video or voice as well as circuit emulation requiring rigorous timing control and performance parameters.

CCA (Congestion Control and Avoidance). A resource and traffic management mechanism to correct, avoid and/or prevent excessive situations such as buffer overflow or insufficient bandwidth that can cause the network to collapse.

CDV (Cell Delay Variance). A component of Cell Transfer Delay, induced by buffering and scheduling.

CDVT (Cell Delay Variance Tolerance). Specifies the acceptable tolerance to cell-by-cell variations of the CDV (jitter).

CE. Products sold into the European Economic Community since January 1996 are required to carry the CE Mark. The CE Mark represents that the product meets all Electromagnetic Compatibility Directives.

Cell. The smallest data component in an ATM stream. The ATM Cell has a 5-byte header and contains 48 bytes of payload.

CEV (Controlled Environment Vault). An environmentally conditioned room for housing optical and electronic equipment.

Channel. A point-to-point link in a communications system.

Circuit. A transmission path for sending and receiving data and/or voice between two points in a telecommunications system.

Circuit Emulation. A virtual circuit service offered to end users where the characteristics of an actual, digital bit-stream line (for example, video traffic) are emulated.

CLEC (Competitive Local Exchange Carrier). These carriers compete with the local exchange service to provide telephone service to customers who may choose voice and/or data services. Additionally, a CLEC may lease existing lines or provide their own local loop.

CLEI (Common Language Equipment Identifier) Codes. Assigned to all telecommunications equipment that may be installed in a RBOC facility (or other facilities if required). The codes are assigned by Bellcore (now SAIC).

Client/Server Model. In the client-server model, the *server* program offers a service reachable over the network (or within a stand-alone system). A server receives a request, performs the service, and returns the result to the requester. The *client* program sends a request to the server and waits for a response.

CLP (Cell Loss Priority). A 1-bit field in the ATM cell header that corresponds to the loss priority of a cell. Lower priority (CLP=1) cells can be discarded under a congestion situation.

CLR (Cell Loss Ratio). A QoS parameter that gives the ratio of the lost cells to the total number of transmitted cells on a given VCC in cells per second.

CMIP (Common Management Information Protocol). An OSI network management/service interface protocol created and standardized by ISO. Based on the basic data storage concept in which management information is collected and stored for subsequent retrieval by a management application. Provides for the transmission of event notifications and the transmission of operations directed toward managed objects.

CNM (Customer Network Management). A feature of ATM, Frame Relay and SMDS (Switched Multimegabit Data Service) which allows customers to directly view and manage their public data service (communications networks) in the same way they view and manage their local area networks.

CO (Central Office). Houses the Local Exchange switch that terminates individual local telephone subscriber lines for switching and connection to the public network (locally and long distance).

Coding Violation (CV). A violation detected in the coding of a signal.

Common Systems Interface Panel (CSIP) Alarm Board. All D50/D50e alarm connections are made at the CSIP Alarm Board; Central Office visual, audible, remote Bay Alarm and remote input alarms. The Alarm Board has LEDs to display D50/D50e alarm status.

Common Systems Interface Panel (CSIP) Power and Distribution Board. The CSIP Power and Distribution Board is located in the Master Control Shelf (MCS). Central Office power is terminated at the CSIP and is distributed to the MCS and up to four Line Card Shelves (LCSs).

CORBA (Common Object Resource Broker Architecture). An Object Request Broker (ORB) standard developed by the Object Management Group (OMG). It is an object-oriented technology which provides a scalable, open platform for both service provider and large enterprise network environments.

COT (Central Office Terminal or Termination). The termination of a local loop facility. Located at the Central Office facility. See Digital Loop Carrier for further information about how this is used.

CPE (Customer Premises Equipment). Refers to telephone and related equipment located on the customer's premises (office or home).

Craft Terminal (DiamondCraft®). Craft Terminal, previously known as DiamondCraft, is the D50's stand-alone craft interface application. It communicates directly with a D50 through a serial port connection using Point-to Point Protocol (PPP) or an Ethernet connection.

CRC (Cyclical Redundancy Checking). A data error-detecting mathematical process designed to ensure that errors don't occur undetected in a block of data. Systems using CRC will request that data be retransmitted if errors are detected.

Crossconnect. A connection between two or more elements of a telecommunications system.

CTD (Cell Transfer Delay). A QoS parameter that measures the maximum or worst-case time for a cell to be transferred from its source to its destination over a virtual connection. It is the sum of buffering, propagation, processing and queuing delays.

Data Rate. The rate at which a channel carries data – measured in bits per second.

D50 Multiplexer. The D50 Multiplexer is classified as a Digital Subscriber Line Access Multiplexer (DSLAM). The D50 Multiplexer uses Digital Subscriber Line (DSL) and Asynchronous Transfer Mode (ATM) technologies to deliver high speed data rates over the existing copper network.

D50 RAM (Remote Access Module). The D50 RAM is a small, versatile DSL remote line card shelf supporting up to three 8-port D50 line cards, one Line Control Shelf Multiplexer card, and three low pass filter cards, for up to 24 lines. It is equivalent to a small LCS.

dB (Decibel). The decibel is a unit used to measure the power of sound or voltage. It is expressed as the ratio of two values. In telephony, the decibel (a logarithmic measurement) is used as a measure of relative power between circuits or transmission level points. As a reference: a change in level of 1 dB is barely perceptible under ideal conditions; however, increases or reductions of 3 dB result in doubling or halving, respectively, the power in a circuit. The corresponding figure for doubling or halving voltage is 6 dB.

DLC (Digital Loop Carrier). Network transmission equipment used to provide a pair gain function. DLC equipment is deployed in situations in which the cost of the equipment is more than offset by the savings in copper distribution accomplished by eliminating need for as many copper pairs. Digital loop carrier systems consist of two parts—a Central Office Terminal (COT) and a Remote Terminal. The COT provides the multiplexing/demultiplexing function of individual voice signals to the composite multiplexed signal at the interface between the switching equipment and the DLC. The Remote Terminal provides the multiplexing/demultiplexing function at the interface between the individual subscriber pairs and the DLC equipment.

DMT (Discrete Multi-Tone). Modulation technique which uses Frequency Division Duplex multiplexing to transmit data in the 35 kHz to 1.1 MHz frequency spectrum. It divides the frequency range into 256 discrete bands, each with 4 kHz bandwidth. Each band is independently modulated.

Downstream. The communications path going from the CO or DSLAM to the client/end user.

DS1 (Digital Signal Level One). 1.544 Mbps digital signal.

DS3 (Digital Signal Level Three). 44.736 Mbps digital signal – equivalent of 28 T-1 channels (also referred to as T-3).

DS3L. A DS3 rate broadband tributary card that provides a standard ATM UNI/NNI interface that supports provisionable VPI/VCI mappings to the D50 trunk card, allowing ATM cells to be aggregated from standard ATM network equipment.

DSL (Digital Subscriber Line). The generic name for a family of digital services provided by the local telephone companies to their local subscribers. The high speeds of transmission (up to 8 Mbps) are accomplished over the existing twisted pair copper wires.

DSLAM (Digital Subscriber Line Access Multiplexer). An ATM access mux/concentrator that grooms traffic from multiple low rate lines into a high rate trunk (DS1, DS3, OC3, OC12).

Leaky Bucket Algorithm. Officially called the Generic Cell Rate Algorithm. A method of explaining by means of a hole in a bucket, how an ATM switch measures the PCR and SCR conformance of each CBR and VBR connection.

EFCI (Explicit Forward Congestion Indication). A field in the ATM cell header indicating congestion or impending congestion. When EFCI is set, it indicates that a network element is either in a congested state or there is a potential congested state problem. The ATM end-system receiving cells with EFCI set can use this indication to adaptively decrease the cell rate of the connection to avoid congestion.

Egress. Outgoing direction to a network or network device, as opposed to the ingress direction.

Element Manager. Element Manager is an ITU-T M.3100 standards based Telecommunications Management Network (TMN) Element Management System (EMS) that provides fault, configuration, performance, and security management functions for one or more D50 multiplexers. It is an adjunct software product with a distributed client/server architecture.

EMI (Electromagnetic Interference). Unwanted electrical noise from an external source that can interfere with transmissions over copper cables.

EML (Element Management Layer). A layer representing the management and monitoring of components, at their lowest level, in a telecommunications network. In short, an abstraction of the functions provided by systems that manage each network element on an individual basis.

EMS (Element Management Systems). Software used to manage and monitor components of a telecommunication system at the lower levels of the Telecommunications Management Network.

EOC (Embedded Operations Channel). A control and signaling channel used for operations, administration and maintenance of the transmission line.

EPD (Early Packet Discard). A congestion control technique that selectively drops all but the last ATM cell in a Classical IP over ATM packet.

Error Rate. The ratio of incorrect elements sent to the total number of elements transmitted.

ES (Errored Seconds). The number of seconds in which at least one coding violation was detected.

ESD (Electrostatic Discharge). Transfer of an electrostatic charge on a surface through a conductive path to ground.

ETSI (European Telecommunications Standards Institute). ETSI is the European counterpart to ANSI, the American National Standards Institute. ETSI was founded in 1988.

Fault. Performance degradation that impacts the ability of the network element from properly performing.

FEBE (Far End Block Error). FEBE is used to monitor bit error performance of a communication link. An indication returned to the source that the far-end receiver has detected one or more errors in its received signal from the source.

FEC (Forward Error Correction). A transmission method in which extra bits or characters transmitted with the payload so that transmission errors can be corrected on the receiving end without forcing a retransmission.

FM (Fault Management). A data collection and reporting mechanism for component fault analysis.

Frame. In Time Division Multiplexing (TDM), a frame is one complete cycle of events. The frame consists of a fixed-size block of bits, which contains one (or more) time slots for each channel, plus synchronization and other overhead bits.

GFC (Generic Flow Control). A four bit field in the ATM header which can be used to provide local functions (e.g. flow control). The GFC is used to ensure that all nodes obtain access to the transmission medium. It can also be used to prioritize transmissions by data type.

GUI (Graphical User Interface). Generic name for the computer interface that presents graphics (icons) and characters. The GUI permits users to directly manipulate graphical objects displayed on the monitor.

HEC (Header Error Control). An 8-bit field (the last byte) of the ATM-cell header, whose purpose is to allow a receiver to detect, and possibly correct, transmission errors in the cell header. It is used for checking integrity only.

HDLC (High Level Data Link Control). An ITU-TSS link layer protocol standard for point-to-point and multi-point communications. HDLC includes functions for link establishment, sequencing, flow control and error recovery.

HDSL (High bit rate Digital Subscriber Line). HDSL provides a T1 on two copper wire pairs (without the loop engineering and repeaters required for a standard T1 system).

HTML (Hyper Text Markup Language). HTML is the software programming language used to create World Wide Web pages.

IAD (Integrated Access Device). An integrated-access device that can multiplex voice and data on one line.

IDF (Intermediate Distribution Frame). A metal rack designed to connect cables and located in an equipment room or closet. Consists of bits and pieces that provide the connection between inter-building cabling and the intra-building cabling (i.e. between the Main Distribution Frame (MDF) and individual phone wiring).

IDSL (ISDN Digital Subscriber Line). Delivers speeds up to 128/144 Kbps on copper loops as long as 18,000 feet. Dedicated service for data communications applications only. 2B1Q interface. In most cases, users can use their existing ISDN CPE equipment.

IEEE (Institute of Electrical and Electronics Engineers). An international engineering organization that defines standards related to networking and other areas.

IETF (Internet Engineering Task Force). One of two technical engineering bodies of the Internet Architecture Board. The IETF is responsible for solving short-term engineering needs and standards of the Internet.

ILEC (Incumbent Local Exchange Carrier). The local carrier that is (typically) the primary carrier for local calls in a given area. ILECs are telephone companies that were part of the Bell System.

In-Band. Using the same circuit to transport both the information (e.g., data or voice) along with the signaling information.

Ingress. Incoming direction to a network or network device, as opposed to the egress (or exit).

Interleave. A process or technique that reduces the number of undetected error bursts and improves burst error performance. Interleave mode provides the most robust service and more reliable service under long reach conditions for DSL service that supports the Interleave process.

Inverse Multiplexer (IMUX). A device that combines multiple links (usually T1s or E1s) a single shared digital channel. Circuits can be added and dropped without losing ATM cells.

IP (Internet Protocol). A component of the TCP/IP protocol suite. IP operates at Layer 3 of the OSI Reference model.

ISDN (Integrated Services Digital Network). ISDN is a digital telecommunications standard for transmitting digital voice, data and video on the same transmission facility.

ISDN has two basic access interfaces; BRI (Basic Rate Interface) and PRI (Primary Rate Interface). Both interfaces provide circuit-switched access to public networks. BRI provides a throughput of 144 Kbps and PRI has a throughput of up to 2 Mbps.

ISO (International Standards Organization). The International Standards Organization is an international organization founded in 1946 to facilitate the development of international data communication standards.

ISP (Internet Service Provider). A vendor who provides access to the Internet and the World Wide Web.

ISU (Integrated Services Unit). A digital device that consists of a CSU (Channel Service Unit) and DSU (Digital Service Unit).

ITU (International Telecommunications Union). An organization established by the United Nations. The ITU sets telecommunications standards and allocates frequencies to various uses worldwide.

IWF (Interworking Function). A function used on an interface between networks which use dissimilar technologies.

IXC (Interexchange Carrier). Long distance carrier such as AT&T, MCI WorldCom, Sprint, and some smaller carriers.

Java. A programming language developed by Sun Microsystems® for platform independent, object-oriented application development.

JDBC (Java DataBase Connectivity). A Java based driver which provides a database independent interface between a Java application or applet and the database. It provides a Java API on one side and an SQL interface on the other.

JDK (Java Developer's Kit). A (platform specific) development environment for creating Java based applications and applets.

Kbps (Kilo Bits Per Second). A measurement of transmission speed – one thousand bits transmitted each second.

kHz (Kilohertz). A unit of frequency equal to one thousand (1,000) cycles per second (Hz).

LAN (Local Area Network). A privately owned and administered network for data communications, usually within a building or campus environment, used to connect computers and peripheral devices. Communication is typically accomplished by broadcasting on a connectionless basis over a shared medium.

Latency. The amount of time between the moment a device generates a request for data and the instant at which the requested channel is available for transmission.

Line Card. A line card serves as the interface between a line and a communications device.

Line Card Shelf (LCS). The D50 System is made up of one Master Control Shelf and up to twelve Line Card Shelves. Each LCS has 24 mounting slots for line cards, one slot for a Line Card Shelf Multiplexer (LSM) card, and one slot for an optional LSM card for Remote Line Card Shelf protection group application.

Line Card Shelf Multiplexer (LSM) card. The LSM card communicates with the Master Line Card Adapter (MLA) card. The LSM multiplexes and demultiplexes ATM cell streams for up to 24 line cards in a Line Card Shelf.

Link A. The virtual connection path between the D50 and the CPE (or line card) side of the network.

Link Z. The virtual connection path between the D50 and the ATM side of the network.

LISP (Local Internet Service Provider). See ISP (Internet Service Provider).

Local Loop. The twisted pair cable connecting the subscriber to the Central Office.

LOF (Loss of Frame). A condition that can occur in digital transmissions when the receiving equipment loses frame alignment data (used to determine channel assignments and channel boundaries).

LOS (Loss of Signal). An alarm sent by the receiving end to indicate that the transmission signal has been lost.

Loopback. Type of diagnostic test in which the transmitted signal is returned to the sending device after passing through a data communications link or network. The returned signal is then evaluated (either by a technician or diagnostic equipment) to get some sense of the condition of the line. Typically used in troubleshooting a data circuit or network.

Low Pass Filter Shelf (LPFS or LPFS8). Data plus voice frequency signals are received from the customer at the Low Pass Filter Shelf. The LPF card “splits” the low frequency voice signal from the high frequency ADSL signal. The voice signal is sent onto the voice switch unimpeded; while data signal is received by the line card.

Mbps (Mega Bits Per Second). A measurement of transmission speed – one million bits transmitted each second.

MBS (Maximum Burst Size). An ATM traffic parameter that specifies the maximum number of cells in a burst that can be transmitted at the peak rate assuming that, at the beginning of the burst, the receiving buffers are empty.

MDF (Main Distribution Frame). A wiring arrangement which connects the telephone/data lines coming from outside on one side and the internal lines on the other.

Master Control Processor (MCP) card. The MCP card is the central control and communications path for the D50; it stores program and provisioning database information. The D50 has two MCP cards in a 1:1 protection group.

Master Control Shelf (MCS). The MCS contains the central control and communication functions for the D50 System and serves as the ATM network interface.

Master Line Card Adapter (MLA) card. Each MLA card provides the broadband interface to one Line Card Shelf. There are up to twelve MLA cards in a Master Control

Shelf providing the broadband interface for up to twelve Line Card Shelves and up to 288 line cards.

MDU (Multiple Dwelling Unit). Refers to high-rise apartment buildings or sometimes office buildings. Newer MDUs are often being built with fiber optic cables and other equipment (such as DSLAMs) installed so the occupants have easy access to high-speed data services.

MHz (Megahertz). A unit of frequency equal to one million (1,000,000) cycles per second (Hz).

MIB (Management Information Base). The MIB contains all the provisioning information for the D50 Multiplexer. (The MIB contains data available to a network management program. The network manager queries the MIB.)

MTBF (Mean Time Between Failure). Reliability metric for electronic equipment that represents the average amount of time (expected or predicted) between breakdowns.

Multi-mode Fiber. Fiber whose core diameter is larger than single mode fiber, which allows many modes of light to propagate down the multiple fiber optic paths. Each of these paths has a slightly different length, depending upon how often the light bounces off the reflective boundary of the core region. Multi-mode fiber is used for short-distance data links.

Multiplexer. Equipment that aggregates two or more channels onto a single transmission channel.

MUX. Abbreviation for Multiplexer.

NE (Network Elements). Processor controlled entities of the telecommunications network that primarily provide switching and transport network functions and contain network operations functions.

NEBS (Network Equipment Building System). NEBS is the Network Equipment Building System specification authored by Bellcore. NEBS compliance is required by many carrier customers; the D50 System shipping today is already NEBS-compliant.

Network Management Processor (NMP) card. The NMP card controls the D50's network management interfaces and provides the protocol support for communication for D50 Element Manager and D50 Craft Terminal.

NIC (Network Interface Card). An electronic circuitry board that usually fits into an expansion slot of a PC whose purpose is to connect to a Local Area Network. A NIC is designed to comply with both a specific LAN Medium Access Control procedure (CSMA/CD for Ethernet) and a specific physical medium (e.g. twisted pair wire, coax, or multi-mode fiber). Associated with the NIC is a unique address called the MAC address. It works with the network software and computer operating system to transmit and receive messages on the network.

NID (Network Interface Device). The Nokia Broadband Systems' NID ADSL Splitter divides the ADSL and POTS signals and works in conjunction with the router at the subscriber end. The splitter installs on the outside of a home or building, and is enclosed in a weatherproof wall mount enclosure. It features primary lighting and AC power fault protection, and is a passive device, requiring no power or management from the Central Office or subscriber.

NISP (National Internet Service Provider). See ISP (Internet Service Provider).

NNI (Network Node Interface). An Asynchronous Transfer Mode (ATM) interface between two public network pieces of equipment (contrast that to UNI, which stands for User Network Interface).

Node. Connection point in a network.

Noise. Unwanted electronic signals or disturbance that degrades line performance.

OAM (Operations And Maintenance). A group of network management functions that provide network fault indication, performance information, and data diagnosis functions.

OC-1 (Optical Carrier Level-1). A SONET line rate of 51.840 Mbps. Direct electrical-to-optical mapping of the STS signal with frame synchronous scrambling.

OC-3 (Optical Carrier Level-3). A SONET line rate of 155.520 Mbps. 3 x OC-1. Direct electrical-to-optical mapping of the STS signal with frame synchronous scrambling.

OC3L. A OC3 rate broadband tributary card that provides a standard ATM UNI/NNI interface that supports provisionable VPI/VCI mappings to the D50 trunk card, allowing ATM cells to be aggregated from standard ATM network equipment.

OC-12. SONET channel of 622.08 Mbps.

ODF (Optical Distribution Frame). Connection and distribution point for fiber optic cables. It is similar, in function, to an MDF for copper wires.

Optical Cross-Connect Panel. A cross-connect unit used for circuit administration and built from modular cabinets. It provides for the connection of individual optical fibers with optical fiber patch cords.

Oracle8®. An Object Relational Database Management System developed by Oracle.

ORB (Object Request Broker). An object-oriented system consisting of middleware which manages message traffic between application software and computer/software platforms.

OSI (Open System Interconnection Reference Model). An internationally accepted set of standards for communication between various systems manufactured by different vendors. The OSI Reference Model is a seven-layer model developed by the ISO (International Standardization Organization) to describe how to connect any combination of devices to communicate.

OSS (Operations Support System). A management operations center system which supports the daily operation of a telecommunications network.

Packet. A block or group of data organized in such a way as to be treated as a single unit within a communication network. It consists of the data (payload) and its control information.

PAM (Pair Analysis Module) card. A Nokia Broadband Systems' product. The PAM card plugs into the LCS backplane just like a line card and is used to test continuity of cable pair wiring from the LCS to the MDF. The PAM card is powered by AA batteries or -48V Central Office battery. The D50 does not have to be powered up to use the PAM card.

Payload. The data being transmitted, less its control and error-correction information.

PCI (Peripheral Component Interconnect). Bus of an Intel PC. PCI transfers data between the PC's main microprocessor and peripherals at up to 132 Mbps.

PCR (Peak Cell Rate). Specifies an upper bound on the rate at which traffic can be submitted to an ATM connection. Enforcement of this bound allows the network to allocate sufficient resources to ensure that the network performance objectives can be achieved.

PDF (Portable Document Format). File format of documents that can be viewed with Adobe Acrobat® Reader. PDF files are widely used to view files on the Internet.

PDU (Protocol Data Unit). In data communication protocols, a unit of data created by a given protocol layer at one place and logically transferred to the same layer at another place called a peer. This is the OSI terminology for "packet."

PLCP (Physical Layer Convergence Protocol). The part of the physical layer that adapts the transmission facility to handle DQDB (Distributed Queue Dual Bus) functions as defined in IEEE 802.6-1990.

PM (Performance Management). A data collection and reporting mechanism for Quality of Service analysis.

PNNI (Private Network-to-Network Interface). PNNI is a standard of the ATM Forum that provides a multilevel hierarchical routing model for scalability in large and complex networks using ATM switches from multiple vendors.

POP (Point-of-Presence). The physical place within a LATA (Local Access and Transport Area; the long distance carrier's local office) where the IEC (Inter-Exchange Carrier) provides services to the LEC (Local Exchange Carrier), and perhaps directly to end-users.

POTS (Plain Old Telephone Service). A term used to describe analog, voice-only basic telephone service. All POTS lines work on loop start signaling.

PPP (Point-to-Point Protocol). A layer 2 protocol (relative to the OSI reference model) that allows a computer to use TCP/IP with a standard telephone line and a high-speed modem.

Profile. A set of pre-defined configuration variables which can be applied to one or more objects (of the same type) during the provisioning process. The use of profiles decreases configuration time and increases accuracy.

PSD (Power Spectral Density). PSD is the total power in the specified bandwidth divided by the specified bandwidth. PSD is measured in watts per hertz.

PSTN (Public Switched Telephone Network). Refers to the worldwide telephone system accessible to anyone with a telephone.

PTT (Post Telephone & Telegraph administration). The PTTs, usually controlled by their governments, provide telephone and telecommunications services in most countries outside of the USA.

PVC (Permanent Virtual Circuit). A permanent association between two DTEs (Data Terminal Equipment) established by configuration (established administratively via a service order process). A PVC uses a fixed logical channel to maintain a connection between the DTEs. After a PVC is defined, it requires no setup operation before data is sent and no disconnect operation after. The concept of a PVC is included in Networks supporting X.25, Frame Relay and ATM.

QoS (Quality of Service). In ATM networks, a set of parameters for describing a transmission. These parameters include values such as allowable cell loss ratio. The parameters apply to virtual channel connections and virtual path connections.

RADSL (Rate Adaptive Digital Subscriber Line). Transmission technology that supports both asymmetric and symmetric applications on a single twisted pair telephone line. Transmission rates are dynamically adjusted as the performance of the loop varies during a session.

Reed-Solomon. A coding technique used to handle Forward Error Correction (FEC).

RBOC (Regional Bell Operating Company). These are the major local service providers in the USA today. In 1984 ATT was broken up into 7 RBOCs. Today, because of mergers, there are 4 RBOCs: BellSouth, Bell Atlantic, SBC Communications, and US WEST (recently merged with Qwest Communications).

Redundancy. This refers to various designs that provide a backup system (or part of a system) in case of a failure. As an example, the D50 has redundant power input terminals so that if one power source fails the backup source can continue to provide power to the system.

Remote Line Card Shelf (RLCS). An RLCS allows customers served over long loops — beyond 5.5 kilometers from the Central Office — access to DSL service. The RLCS is located remotely from the Central Office in an outside cabinet and connected to the Central Office Master Control Shelf via fiber optic, coax or copper cable extensions.

Remote Low Pass Filter (RLPF). The RLPF is a remote passive low pass filter “splitter” device. It splits the high frequency ADSL data signal from the voice signal at the customer end just like the Low Pass Filter card in the Central Office. There are two types of RLPF – a retrofit RLPF available in a standard Network Interface Device housing and a stand-alone RLPF.

RFC (Request for Comments). In the Internet community, a series of documents that contain protocol and model descriptions, experimental results, and reviews. All Internet standard protocols are written up as RFCs.

SCR (Sustainable Cell Rate). An ATM traffic parameter in cells per second that characterizes a bursty source and specifies a maximum average rate at which cells can be sent over a given ATM virtual connection.

SDH (Synchronous Digital Hierarchy). SDH is a high-speed, fiber-optic system, which provides an interface and mechanism for optical transmission of digital information. At the interface, signals are converted from electrical to optical form (and back to electrical form at the destination). SDH is an ETSI standard and is used in most of the world outside North America, where SONET is used. Transmission rates range from 155.520 Mbps to 9.953 Gbps.

SDSL (Symmetric Digital Subscriber Line). Also referred to as Single-Line Digital Subscriber Line, SDSL supports symmetrical T1 transmissions. It uses a single copper-pair wire and has a maximum operating range of 10,000 feet. It is capable of accommodating applications that require identical downstream and upstream speeds, such as video conferencing.

Serial Port. A hardware input/output port in which only one pin is available for data transmission in a given direction – bits are transmitted in sequence (one bit at a time). The wiring for a port is associated with a particular physical interface (i.e., RS-232). A serial port is most commonly used for a modem or a mouse.

Service Provider. A service provider is an organization or individual that provides telephone access to a network or to another service, such as the Internet.

Single Mode Fiber. Single mode fiber only provides one path for light pulses to travel through the fiber optic cable. There is very little loss of light pulses transmitted on single mode fiber. Therefore single mode fiber can be used for much longer distances than multi-mode fiber.

SNMP (Simple Network Management Protocol). The network management protocol used within TCP/IP-based internets. Defines the protocol for managers (clients) to communicate with agents (servers). The agent interfaces directly with the networking layers on the monitored network device to obtain the network management information. An agent is installed on every network device that will be managed or monitored. A client is an application program that is installed at the network operations center. It communicates with the SNMP agents to collect information in the form of MIB variables. SNMP is a request/reply protocol that uses the operations of Set or Get on data items in an agent's MIB.

SNR (Signal-to-Noise Ratio). In transmission, SNR is the ratio between the signal and noise levels at a given point, usually at the receiving end of the transmission. The SNR value is generally expressed in decibels (dB). The SNR can be used to determine how long a cable segment can be before the signal loss is unacceptably high. The SNR also helps determine whether a particular type of cable is appropriate for the intended use.

SONET (Synchronous Optical NETwork). SONET is a high-speed, fiber-optic system, which provides an interface and mechanism for optical transmission of digital information. At the interface, signals are converted from electrical to optical form (and back to electrical form at the destination). SONET is an ANSI standard. Transmission rates range from 51.84 Mbps to 13.22 Gbps.

Splitter. A device used in DSL to split the incoming bit stream into voice and data.

SVC (Switched Virtual Circuit). A virtual connection set up on demand via a signal protocol connection, established for a specific communications session and then terminated after the session is over. This is in contrast to a permanent virtual circuit (PVC), which is a connection that is always established.

Tagging. The marking of a non-conforming cell that can be later discarded along its route through the ATM network if severe congestion conditions are experienced or the cell is still in violation of the traffic contract.

T1. DS1 rate electrical signal (two pair). T1 is suited for voice, data and image transmissions. T1 has a bandwidth of 1.544 Mbps, which comes from two dozen 64 Kbps channels, together with one 8 Kbps framing channel.

TCM (Trellis Coding Modulation). A method of forward error correction in which each signal element is assigned a value based on phase and amplitude to help the receiving modem determine if the element is received in error. Allows the user to meet performance margin requirements for long loops, or increase the transmission throughput under a specified performance margin; provides increased gain against background and crosstalk noise.

TCP/IP (Transmission Control Protocol / Internet Protocol). TCP/IP is a common suite of several networking protocols developed for use on the Internet.

Telnet. Telnet is the terminal-remote host protocol developed for ARPAnet in 1974. On the Internet, it is a service program that allows you to connect to other computers at another site permitting you to interact with applications as if by a local terminal.

Threshold. Level or value of a particular signal where an event or alarm will be generated.

Trap. A method used to isolate an abnormal condition or operation.

TMN (Telecommunications Management Network). Reference model for telecommunications network management.

Transmission rates. The speed at which data is transmitted, measured in bits per second (bps).

Table 7-2: Transmission Rates

DS level	E level	OC level	STM equivalents	Line bit rate
DS-0				64 Kbps
DS-1 (T-1)				1.544 Mbps
	E-1			2.048 Mbps
DS-2				6.312 Mbps
	E-2			8.448 Mbps
	E-3			34.368 Mbps
DS-3 (T-3)				44.736 Mbps
		OC-1		51.84 Mbps
		OC-3	STM-1	155.52 Mbps
		OC-9		466.56 Mbps
		OC-12	STM-4	622.08 Mbps
		OC-18		933.12 Mbps
		OC-24	STM-8	1.244 Gbps
		OC-36	STM-12	1.866 Gbps
		OC-48	STM-16	2.488 Gbps
		OC-96		4.976 Gbps
		OC-192		9.953 Gbps

- **DS.** Digital Signal hierarchy: standard signals used in the U.S. telecommunications industry.
- **E.** Standard signals used in the European telecommunications industry.
- **OC.** Optical Carrier; a SONET optical signal.
- **STM.** Synchronous Transport Module; depends on information occurring in regular and fixed patterns with respect to a reference such as a frame pattern.

Trunk. A communication circuit or link that interconnects two entities, usually switching systems.

Trunk Card. An interface card used to connect a D50/D50e multiplexer to the ATM backbone facility.

Twisted Pair. The term used to describe common copper telephone wire. The two wires are called Tip and Ring. Also called Unshielded Twisted Pair (UTP).

UBR (Unspecified Bit Rate). In ATM networks, a UBR connection transmits at variable rates. With UBR, specific bandwidth allocation is not guaranteed.

UNI (User Network Interface). In ATM networks, one of three levels of interface. A UNI specification which defines Layer 1 and Layer 2 protocols required for CPE and carrier equipment to interoperate. UNI specifications provide physical media and line rate implementation options.

UNIX. A multi-task, multi-user operating system developed by Ken Thompson of AT&T Bell Labs. UNIX is a registered trademark of Santa Cruz Operations.

UPC. The traffic control entity that monitors and enforces a virtual circuit's conformance with the source's traffic contract and parameters.

Upstream. Description of the communications path coming from the client/end user to the CO or DSLAM.

USB (Universal Serial Bus). The Universal Serial Bus is used in newer PCs. The bus is 12 Mbps and designed to be "plug and play." It supports multiple PC peripherals, including Nokia D50 compatible CPE with USB.

VBR (Variable Bit Rate). In ATM networks, a VBR connection transmits in bursts, at variable speeds.

VCI (Virtual Channel Identifier). An identifier (value) in an ATM cell that identifies the data of one Virtual Channel connection from the data of another connection.

VDSL (Very-high-speed Digital Subscriber Line). VDSL provides DSL service at a data rate in excess of 10 Mbps (up to 52 Mbps). VDSL has a maximum operating range from 1,000 feet to 4,500 feet on 24-gauge wire.

VF. Voice Frequency – In telephony, the usable voice-frequency band ranges from approximately 300 Hz to 3400 Hz. Also, the bandwidth allocated for a single voice-frequency transmission channel is usually 4 kHz.

VoDSL (Voice over Digital Subscriber Line). An end-to-end voice transport technique integrating voice and data over DSL using special gateways that are designed to connect packetized voice traffic to Class 5 circuit switches.

VoIP (Voice over Internet Protocol). A technique for transmitting voice information in digital form in packets rather than the circuit-switch protocol of the public switched telephone network.

VPI (Virtual Path Identifier). An identifier (value) in an ATM cell that identifies the data of one Virtual Path connection from the data of another connection.

WAN (Wide Area Network). A WAN is a network of computers and related communications equipment whose elements may be in dispersed sites with distances great enough to require common carrier provided communication lines.

xDSL (all forms of Digital Subscriber Lines). The “x” represents the various types of digital subscriber lines: ADSL, RADSL, SDSL, HDSL, or VDSL.

INDEX

E

L

M

N