
# STS16-20 User's Guide

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# Contents

Chapter 1

# Introduction

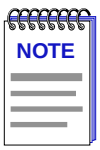
*How to use the STS16-20 User's Guide; related manuals; software conventions; getting help*

Welcome to ***NetSight Element Manager STS16-20 User's Guide***. We have designed this guide to serve as a reference for using NetSight Element Manager to monitor and manage the family of SmartSTACK Token Ring STS16-20 switches. The STS16-20 is a high performance, intelligent 20-port Token Ring switch that provides switching intelligence to network backbones, workgroups, and desktop connections.

The STS16-20 complies to IEEE 802.5 and supports 802.1D bridging. The STS16-20 provides half or full duplex connections, auto-configuration, enhanced bridging capabilities, port-based VLANs, and four groups of RMON.

The STS16-20 devices include the STS16-20D, STS16-20R, STS16-20RM, and STS16-20FRM. These devices are functionally identical, except for the configuration of ports.

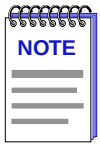
- The STS16-20D has 20 built-in RJ-45 ports —16 workstation ports and 4 network ports.
- The STS16-20R has 20 built-in RJ-45 ports; a RI/RO-like connection is available on all ports.
- The STS16-20RM has 20 built-in RJ-45 ports and supports two slots for optional SmartSTACK Interface Modules (SSIMs). A RI/RO-like connection is available on ports 19 and 20 and when a fiber expansion module is installed.
- The STS16-20FRM has 20 built-in fiber VF-45 ports and supports two slots for optional SmartSTACK Interface Modules (SSIMs). A RI/RO-like connection is available on all ports.




*For the STS16-20D, ports 1 through 16 are workstation ports, which support a single MAC address per port; ports 17 through 20 are network ports, which provide full network connectivity without a limitation on the number of MAC addresses that can be learned per port. Refer to your hardware documentation for more information.*

The STS16-20RM and STS16-20FRM provide two slots for optional expansion SmartSTACK Interface Modules (SSIMs). Several types of SSIMs are available which provide either standard 4/16 Mbps Token Ring connectivity, or high speed connectivity via 155 Mbps ATM, 100 Mbps High-Speed Token Ring, and 100 Mbps Fast Ethernet, as described below:

- The Token Ring SSIMs (T5-04 and T8-04) provide 4 additional 4/16 Mbps ports of Token Ring connectivity via twisted-pair with RJ-45-type connectors or multimode fiber with ST-type connectors.
- The ATM SSIMs (A2-01 and A8-01) provide 1 port of 155 Mbps high-speed connectivity to an ATM backbone via twisted pair with RJ-45-type connectors or multimode fiber with duplex SC-type connectors.
- The HSTR SSIMs (R2-02 and R8-02) provide 2 ports of 100 Mbps High-Speed Token Ring connectivity via twisted pair with RJ-45-type connectors or multimode fiber and VF-45-type connectors. The HSTR SSIMs integrate Token Ring networks with High-Speed Token Ring servers or backbones.
- The Fast Ethernet SSIM (H2-02) is a translational switch that provides 2 ports of 10/100 Mbps Fast Ethernet connectivity via twisted pair with RJ-45-type connectors. The Fast Ethernet SSIM integrates Token Ring and Ethernet networks.




*Depending on the type of SSIMs installed in the STS16-20FRM and STS16-20RM, the management options available will vary. If you have an ATM SSIM (A2-01 and A8-01) installed, the ATM Connections option will be available from the Device menu.*

# Using the STS16-20 User's Guide

Each chapter in this guide describes one major functionality or a collection of several smaller functionalities of the STS16-20, which are accessed directly from the device icon. Additional management information about tools and features common to many devices can also be found in the ***NetSight Element Manager User's Guide***, the ***NetSight Element Manager Tools Guide***, and the ***Remote Administration Tools User's Guide***.

Because the SmartSTACK Token Ring switches —STS16-20RM, STS16-20FRM, STS16-20D, and STS16-20R— share much of their functionality, the devices will be jointly referred to as the STS16-20 throughout this guide. The options available and the information displayed in some of the windows may differ slightly, depending on the type of STS16-20 device being managed.

The following is a description of the chapters contained in this guide. While we provide as much background information as we can, we do assume that you are familiar with Token Ring networks and general network management concepts.

- Chapter 1, **Introduction**, provides a list of related documentation, describes certain software conventions, and shows you how to contact Global Technical Assistance Center.
- Chapter 2, **Using the STS16-20 Chassis View**, describes the visual display of the Chassis View and explains how to use the mouse to access management applications. Also described in this chapter are device and port level monitoring functions.
- Chapter 3, **Configuring ATM Connections**, describes how to configure Permanent Virtual Circuits (PVCs). The ATM Connections option will only be available if you have an ATM SSIM installed in your device.

In addition to providing its own management capabilities, NetSight Element Manager enables you to access the SmartStack Manager for Windows 95/NT. The SmartStack Manager is a configuration and device management application that provides network managers with device configuration, performance monitoring, and troubleshooting capabilities. For more information about the SmartStack Manager, see the ***SmartStack Manager - Installation and User's Guide.***

# Related Manuals

The ***STS16-20 User's Guide*** is only part of a complete document set designed to provide comprehensive information about the features available to you through NetSight Element Manager. Use the following documents to supplement the procedures and other technical information provided in this manual:

***NetSight Element Manager User's Guide***

***NetSight Element Manager Tools Guide***

***NetSight Element Manager Remote Administration Tools User's Guide***

***NetSight Element Manager Remote Monitoring (RMON) User's Guide***

***NetSight Element Manager Alarm and Event Handling User's Guide***

***Network Troubleshooting Guide***

For more information about the capabilities of the STS16-20, consult the appropriate hardware documentation.

For more information on the features of the SmartSTACK Manager, refer to ***SmartSTACK Manager - Installation and User's Guide.***

# Conventions

NetSight Element Manager's device user interface contains a number of elements which are common to most windows and which operate the same regardless of the window in which they appear. A brief description of some of the most common elements appears below.

## Common Window Fields

Similar descriptive information is displayed in the fields at the top of most device-specific windows in NetSight Element Manager, as shown in Figure 1-1.

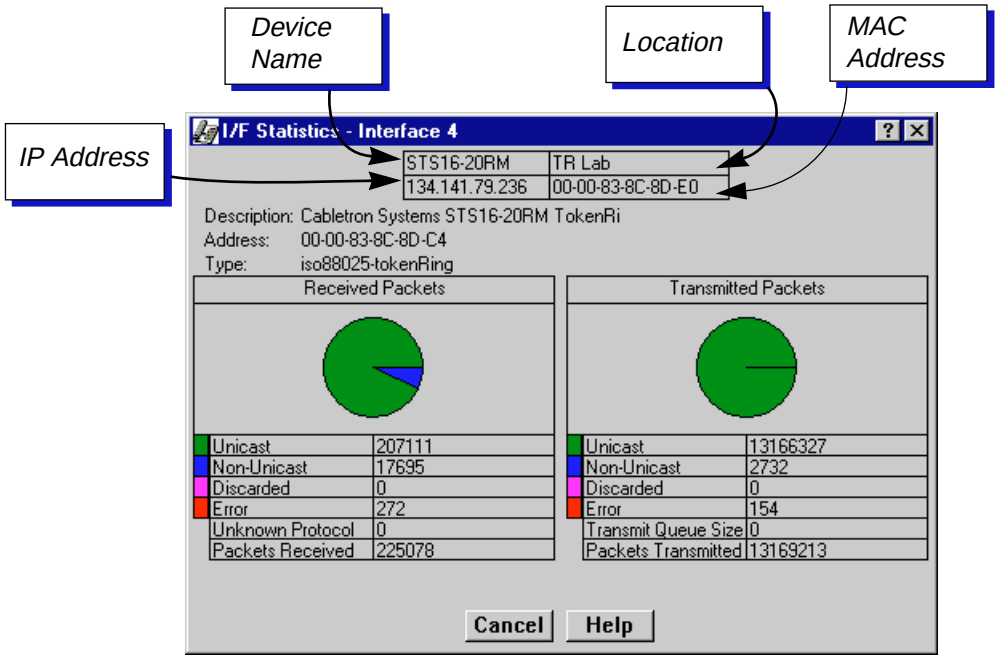



Figure 1-1. Common Window Fields

### Device Name

Displays the user-defined name of the device. The device name is entered and can be changed via the System Group window; see **Viewing System Group Information** in Chapter 2, or the ***Generic SNMP User's Guide*** for details.

### IP Address

Displays the device's IP (Internet Protocol) address. This is the IP address used to define the device icon. IP addresses are assigned via Local Management; they cannot be changed via NetSight Element Manager.

### Location

Displays the user-defined location of the device. The location is entered and can be changed via the System Group window; see **Viewing System Group Information**, in Chapter 2, or the ***Generic SNMP User's Guide*** for details.

### MAC Address

Displays the manufacturer-set MAC address that is associated with the IP address used to define the device icon when it is added to NetSight Element Manager. This address is factory-set and cannot be altered.

**Uptime**
Displays the amount of time that the STS16-20 has been running since the last start-up, displayed in an *X* day(s) hh:mm:ss format.

## Using Window Buttons

The **Cancel** button that appears at the bottom of most windows allows you to exit a window and terminate any unsaved changes you have made. You may also have to use this button to close a window after you have made any necessary changes and set them by clicking on the **OK**, **Set**, or **Apply** button.

An **OK**, **Set**, or **Apply** button appears in windows that have configurable values; it allows you to confirm and set changes you have made to those values. In some windows, you may have to use this button to confirm each individual set; in other windows, you can set several values at once and confirm the sets with one click on the button.

The **Help** button brings up a Help text box with information specific to the current window; see **Getting Help**, page 1-6, for details.

The command buttons, for example **Bridge,** display a menu listing the windows available for that selection.

Any menu topic followed by ... (three dots) — for example **Statistics...** — launches a window associated with that selection.

## Using the Mouse

This document assumes that you are using a Windows-compatible mouse with two buttons; if you are using a three button mouse, you should ignore the operation of the middle button when following procedures in this document. Procedures within NetSight Element Manager document set refer to these buttons as follows.

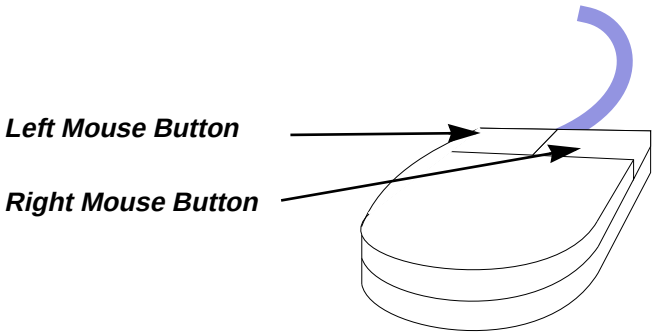



Figure 1-2. Mouse Buttons

For many mouse operations, this document assumes that the left (primary) mouse button is to be used, and references to activating a menu or button will not include instructions about which mouse button to use.

However, in instances in which right (secondary) mouse button functionality is available, instructions will explicitly refer to **right** mouse button usage. Also, in situations where you may be switching between mouse buttons in the same area or window, instructions will also explicitly refer to both **left** and **right** mouse buttons.

Instructions to perform a mouse operation include the following terms:

- **Pointing** means to position the mouse cursor over an area without pressing either mouse button.
- **Clicking** means to position the mouse pointer over the indicated target, then press and release the appropriate mouse button. This is most commonly used to select or activate objects, such as menus or buttons.
- **Double-clicking** means to position the mouse pointer over the indicated target, then press and release the mouse button two times in rapid succession. This is commonly used to activate an object's default operation, such as opening a window from an icon. Note that there is a distinction made between "click twice" and "double-click," since "click twice" implies a slower motion.
- **Pressing** means to position the mouse pointer over the indicated target, then press and hold the mouse button until the described action is completed. It is often a pre-cursor to Drag operations.
- **Dragging** means to move the mouse pointer across the screen while holding the mouse button down. It is often used for drag-and-drop operations to copy information from one window of the screen into another, and to highlight editable text.

# Getting Help

This section describes different methods of getting help for questions or concerns you may have while using NetSight Element Manager.

## Using On-Line Help

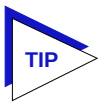
You can use the **Help** button in the STS16-20 windows to obtain information specific to the device. When you click on a **Help** button, a window will appear which contains context-sensitive on-screen documentation that will assist you in the use of the window and its associated command and menu options. Note that if the **Help** button is grayed out, on-line help has not yet been implemented for the associated window.

From the Help menu accessed from the Chassis View window menu bar, you can launch on-line help specific to the Chassis View window, as well as bring up the Chassis Manager window for reference.


*All of the on-line help windows use the standard Microsoft Windows help facility. If you are unfamiliar with this feature of Windows, you can select* ***Help*** *from the Windows* ***Start*** *menu, or* ***Help —> How to Use Help*** *from the primary NetSight Element Manager window, or consult your Microsoft Windows product* **User's Guide**.

## Accessing On-line Documentation

The complete suite of documents available for NetSight Element Manager can be accessed via a menu option from the primary window menu bar: **Help —> Online Documents.** If you chose to install the documentation when you installed NetSight Element Manager, selecting this option will launch Adobe's Acrobat Reader and a menu file which provides links to all other available documents.




*If you have not yet installed the documentation, the* **Online Documents** *option will not be able to access the menu file. In order to activate this option, you must run the* setup.exe *again to install the documentation component. See your* **Installation Guide** *for details.*

## Getting Help from the Global Technical Assistance Center

If you need technical support related to NetSight Element Manager, contact the Global Technical Assistance Center via one of the following methods:

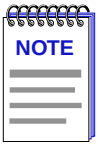
| | |
|---|---|
| By phone: | (603) 332-9400<br>*24 hours a day, 365 days a year* |
| By fax: | (603) 337-3075 |
| By mail: | Enterasys Networks<br>Technical Support<br>35 Industrial Way<br>Rochester, NH 03867 |
| By e-mail: | support@enterasys.com |
| FTP: | ftp.ctron.com (134.141.197.25) |
| *Login*<br>*Password* | `anonymous`<br>`your email address` |
| By BBS: | (603) 335-3358 |
| Modem Setting | 8N1: 8 data bits, 1 stop bit, No parity |

Send your questions, comments, and suggestions regarding NetSight documentation to NetSight Technical Communications via the following e-mail address:

Netsight_docs@enterasys.com

To locate product specific information, refer to the Enterasys Web site at the following address:

http://www.enterasys.com




*For the highest firmware versions successfully tested with NetSight Element Manager 2.2.1, refer to the **Readme** file available from the NetSight Element Manager program group. If you have an earlier version of firmware and experience problems, contact the Global Technical Assistance Center.*

Chapter 2

# Using the STS16-20 Chassis View

*Navigating through the Chassis View; viewing Chassis information; using source address functions*

The STS16-20 Chassis View window is the main screen that immediately informs you of the current condition of individual ports on your switch via a color-coded graphical display. The Chassis View window serves as a single point of access to all applications and windows which are discussed in the following sections and chapters.

To access the STS16-20 Chassis View window:

1. In any map, list, or tree view, double-click on the device icon of the STS16-20 you wish to manage.


Figure 2-1. SmartSTACK Icon

***or***

1. In any map, list, or tree view, click the left mouse button once to select the STS16-20 you wish to manage.
2. Select **Manage—>Node** from the main NetSight Element Manager window menu bar, or select the Manage Node  toolbar button.

***or***

1. In any map, list, or tree view, click the right mouse button once to select the STS16-20 you wish to manage.
2. On the resulting menu, click **Manage**.

# Viewing Chassis Information

The Chassis View window (Figure 2-2) provides a graphical representation of the STS16-20, including a color-coded port status display which immediately informs you of the current configuration and status of the device and its ports. You can access the menus that lead to more detailed device- and port- level windows by clicking in the designated areas of the graphical display, or by using the menu bar at the top of the Chassis View window.

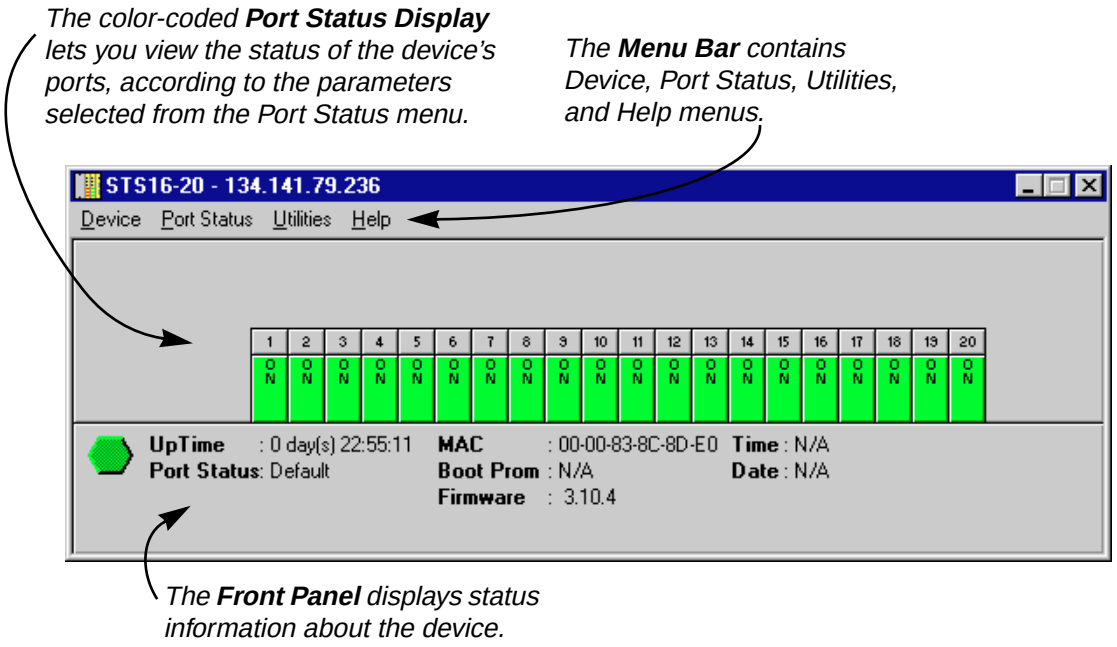



Figure 2-2. The STS16-20 Chassis View Window

TIP

*When you move the mouse cursor over a management "hot spot" the cursor icon will change into a hand symbol to indicate that clicking in the current location will bring up a management option.*

## Viewing Front Panel Information

The Front Panel section provides the following device information:

**Connection Status**

This color-coded icon indicates the current state of communication between NetSight Element Manager and the STS16-20:

- **Green** indicates a valid connection; the STS16-20 is responding to device polls.

- **Magenta** indicates a temporary stand-by mode, while the STS16-20 responds to a physical change in the switch.
- **Blue** indicates an unknown contact status; polling has not yet been established with the STS16-20.
- **Red** indicates that the STS16-20 is not responding to device polls (the device is off line, or device polling has failed across the network).

### Up Time
The amount of time that the STS16-20 has been running without interruption since the last start-up, displayed in an *X* day(s) hh:mm:ss format.

### Port Status
Indicates the Port Status display selection currently in effect; see **Selecting a Port Status Display**, page 2-6, for details. The default port status display is **Admin**; if you have not changed the port status selection since launching the Chassis View, this field will display **Default.**

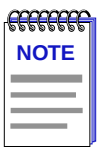
### MAC
The physical layer address assigned to the interface associated with the IP Address used to define the device icon when it was added to NetSight Element manager. MAC addresses are hard-coded into the device, and are not configurable.

### Boot Prom
The revision of BOOT PROM installed in the STS16-20.

### Firmware
The revision of device firmware installed in the switch's flash memory.

### Time
The current time set in the internal clock of the STS16-20, displayed in a 24-hour hh:mm:ss format.

### Date
The current date set in the internal clock of the STS16-20, displayed in a mm/dd/yyyy format.




*For some firmware versions, the **Time**, **Date**, and **Boot Prom** fields will display as N/A (not available).*

### IP Address
The IP (Internet Protocol) address assigned to the device will appear in the title bar of the Chassis View.

## Menu Structure

By clicking on various areas of the STS16-20 Chassis View, you can access menus with device and port level options, as well as utility applications which apply to the device. Figure 2-3 displays the menu structure for the STS16-20, and indicates how to use the mouse to access the various menus.

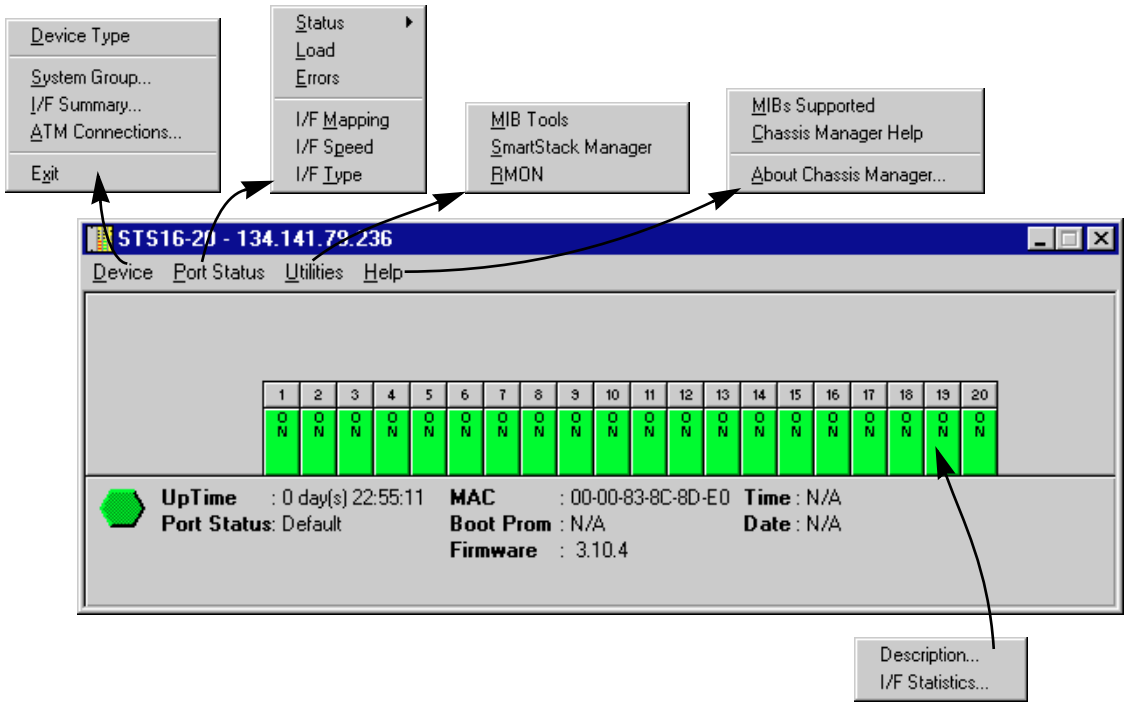



Figure 2-3. Sample Chassis View Menu Structure (STS16-20RM with an ATM SSIM)


*Depending on the type of SSIM(s) installed in the STS16-20FRM and STS16-20RM, the options available will vary. If you have an ATM SSIM (A2-01 and A8-01) installed, the ATM Connections option will be available from the Device menu. For this release, additional management support is not provided for the Token Ring SSIMs (T5-04 and T8-04), the HSTR SSIMs (R2-02 and R8-02), and the Fast Ethernet SSIM (H2-02).*

### The Device Menu

From the Device menu of the Chassis View menu bar, you can access the following selections:

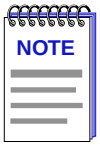
- **Device Type** displays a hardware description of the device; see **Viewing the Device Type**, page 2-9, for details.

- **System Group** allows you to manage the STS16-20 by providing direct access via SNMP to MIB II variables. Refer to the ***Generic SNMP User's Guide*** for more information on SNMP, or see **Viewing System Group Information**, page 2-10, to edit the name, contact, and location fields.
- **I/F Summary** displays statistics for the traffic processed by each network interface on the device, including a detailed transmit and receive traffic breakdown; see **Viewing I/F Summary Information**, page 2-12, for details.
- **ATM Connections** lets you configure Permanent Virtual Circuits (PVCs) on the device. The ATM Connections option will only appear if you have an ATM SSIM (A2-01 or A8-01) installed in the STS16-20RM or STS16-20FRM; see Chapter 3, **Configuring ATM Connections**, for details.
- **Exit** closes the STS16-20 Chassis View window.

### The Port Status Menu

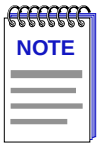
The Port Status menu allows you to select the status information that will be shown in the Chassis View's port status display.

- **Status** allows you to select one of two status types: **Admin**, or **Operator**.
- **Load** displays the portion of network load processed per polling interval by each interface as a percentage of the theoretical maximum load (4 or 16 Mbps).




*For this release, the **Load** port status option will display three dashes and maintain the color code of the most recently selected option for any unlinked ports (i.e. ports for which the **Operator** status is OFF).*

- **Errors** displays the number of errors detected per polling interval by each interface as a percentage of the total number of valid packets processed by the interface.
- **I/F Mapping** displays the interface value associated with each port on the STS16-20.
- **I/F Speed** displays the speed (4 or 16 Mbps) of the network segment attached to each port.




*For this release, the **I/F Speed** port status option will display a zero and maintain the color code of the most recently selected option for any unlinked ports (i.e. ports for which the **Operator** status is OFF).*

- **I/F Type** displays the interface type of each port: **TR** for Token Ring.

### The Utilities Menu

From the Utilities menu, you can select the following options:

- **MIB Tools** provides direct access to the device's Management Information Bases (MIBs); refer to the ***Tools Guide*** for more information.
- **SmartStack Manager** launches the Windows 95/NT SmartStack Manager, which provides device configuration, performance monitoring, and troubleshooting options. This selection will appear only if the SmartStack Manager is installed on your NetSight workstation; refer to the ***SmartStack Manager - Installation and User's Guide*** for more information.
- **RMON** allows you to distribute network monitoring functions through your network to smart devices; refer to the ***Remote Monitoring (RMON) User's Guide*** for more information.

The **MIB Tools** and **RMON** selections are also available from the **Tools** menu at the top of the primary NetSight Element Manager window.

### The Help Menu

The Help menu has the following three selections:

- **MIBs Supported** opens the Chassis Manager window which displays the MIBs, RFCs, and MIB Components contained on the device; see **Displaying MIBs and MIB Components**, page 2-9, for details.
- **Chassis Manager Help** opens a help window with information specifically related to using the Chassis Manager and Chassis View windows.
- **About Chassis Manager** opens a version window for the Chassis Manager application in use.

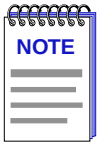
### The Port Menus

The Port menu offers the following selections:

- **Description** displays a hardware description of the selected port; see **Viewing the Interface Description**, page 2-10, for details.
- **I/F Statistics** displays transmit and receive packets for the selected port; see **Viewing Interface Detail Statistics**, page 2-15, for details.

## Selecting a Port Status Display

The port status display graphically depicts all interfaces supported by the STS16-20. When you open the Chassis View, each port on the STS16-20 will display its **Admin** status (see page 2-7). To change the port status display, select one of the options on the Port Status menu, as described in the following section.




*The Port Status options allow you to display status information for the 20 built-in Token Ring ports. The Port Status options do not display status information for any SSIMs installed in the STS16-20RM and STS16-20FRM.*

To change the port status display:

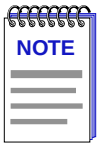
1. Click on **Port Status** in the Chassis View menu bar to access the Port Status menu.
2. Click to select the status information you want to display; the appropriate status information will be shown in the port status display.

The port status options available as follows:

### Status

Displays bridge status information for each port, as determined by the selected submenu option:

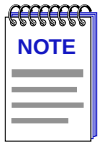
- **Admin** displays each bridge port's administrative status:
  - **ON** (Green) — The port has been enabled by management and has a valid link.
  - **OFF** (Red) — The port has not been enabled or it has been disabled through a management action.
  - **N/A** (Blue) — The administrative status is not available.
- **Operator** displays each bridge port's actual operational state:
  - **ON** (Green) — The port is currently forwarding packets.
  - **OFF** (Red) — The port is not currently forwarding packets.
  - **N/A** (Blue) — The operator status is not available.




*The **Admin** status provides the state requested by management; the **Operator** status provides the actual state of the port. Depending on the circumstances, the **Operator** status may or may not match the **Admin** status currently requested by management. For example, ports which are administratively ON but not yet connected would display an **Operator** status of OFF, since no packets are being forwarded.*

### Load

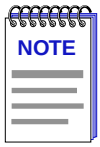
Displays the percentage of network load processed by each port during the last polling interval. This percentage reflects the network load generated per polling interval by devices connected to the port compared to the theoretical maximum load (4 or 16 Mbps) of the network.




*For this release, the **Load** port status option will display three dashes and maintain the color code of the most recently selected Port Status option for any unlinked ports (i.e. ports for which the **Operator** status is OFF).*

### Errors

Displays the percentage of the total number of valid packets processed by each port during the last polling interval that were error packets. This percentage reflects the number of errors generated during the last polling interval by devices connected to that port compared to the total number of valid packets processed by the port.



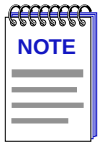

*The polling interval is set via the **Tools —> Options** window from the primary window menu bar. Refer to the* **NetSight Element Manager User's Guide** *for more information on setting device polling intervals.*

### I/F Mapping

Displays the index value associated with each port on the STS16-20.

### I/F Speed

Displays the speed (4 or 16 Mbps) of the network segment connected to each port.




*For this release, the **I/F Speed** port status option will display a zero and maintain the color code of the most recently selected Port Status option for any unlinked ports (i.e. ports for which the **Operator** status is OFF).*

### I/F Type

Displays the interface type of each port on the STS16-20: **TR** for Token Ring.

## Port Status Display Color Codes

The port status display options incorporate color coding schemes. For the **Admin**, and **Operator** display options the color coding scheme is described above.

For all other port status display selections — **Load**, **Errors**, **I/F Mapping**, **I/F Speed**, and **I/F Type** — color codes will reflect the most recently selected option which incorporates its own color coding scheme.

## Displaying MIBs and MIB Components

Like most networking devices, the STS16-20 draws its functionality from a collection of proprietary MIBs, and IETF RFCs. The MIB data is organized into a series of "components," which is a logical grouping of MIB data with each group controlling a defined set of objects. There is no one-to-one correspondence between MIBs and MIB components. A single MIB component might contain objects from several different proprietary MIBs and RFCs.

The Chassis Manager window (Figure 2-4) is a read-only window that displays the MIBs and the MIB components — and, therefore, the functionality — supported by the currently monitored device.

To open the Chassis Manager window:

1. Click on **Help** in the Chassis View menu bar to access the Help menu.
2. Click on **MIBs Supported**. The Chassis Manager window, Figure 2-4, will appear.

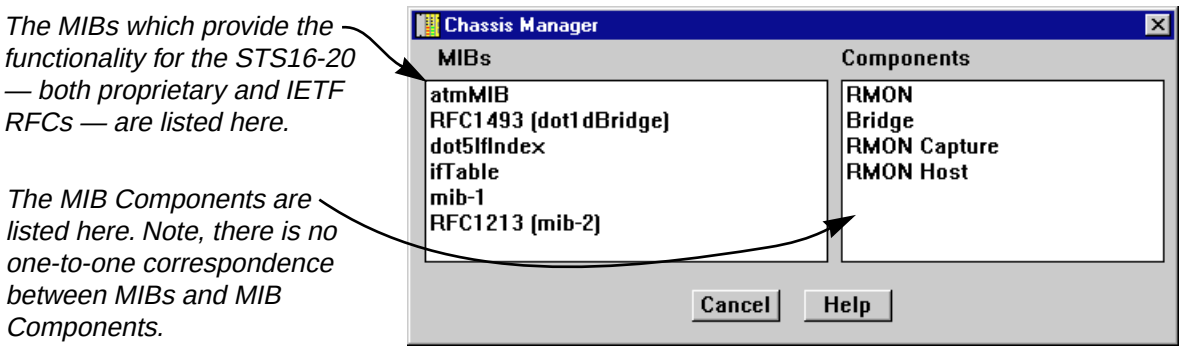



Figure 2-4. Chassis Manager Window

## Viewing Hardware Descriptions

Menu options available at the device and port levels provide specific information about the physical characteristics of the STS16-20 and its ports.

### Viewing the Device Type

The Device Type window displays a hardware description of the device.

To open the Device Type window:

1. Click on **Device** in the Chassis View menu bar to access the Device menu.
2. Click on **Device Type**. A Device Type window, similar to the one shown in Figure 2-5, will appear.

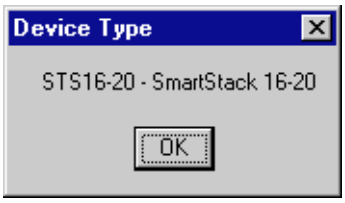



Figure 2-5. Sample Device Type Window

### Viewing the Interface Description

The Interface Description window displays a text description, which includes the product name and hardware version number.

To open the Interface Description window:

1. Click on the port of interest to access the Port menu.
2. Click on **Description**; an Interface Description window, similar to the examples shown in Figure 2-6, will appear.

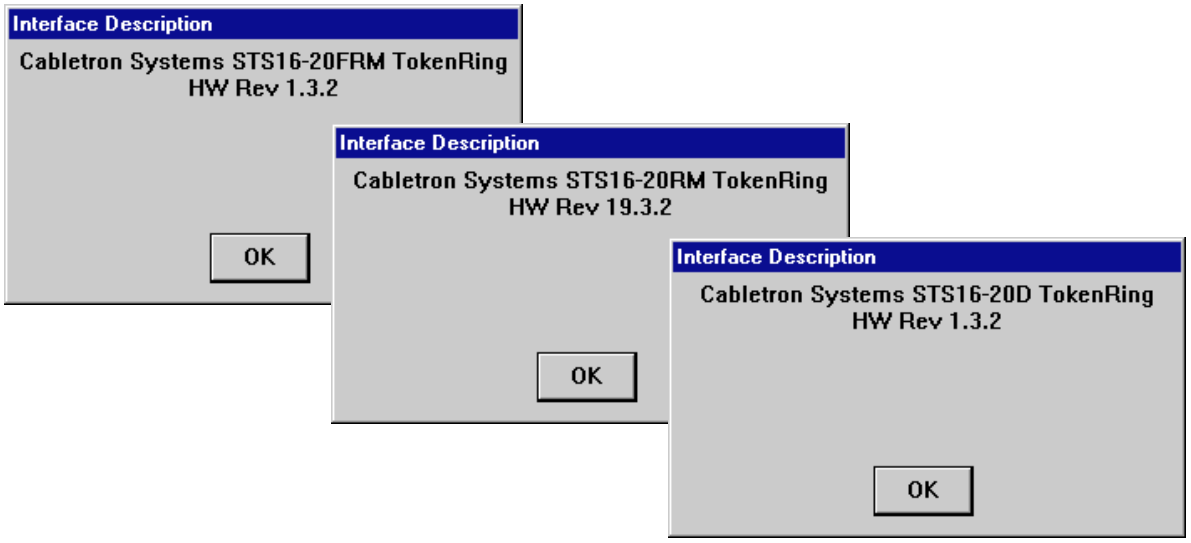



Figure 2-6. Sample Interface Description Windows

## Viewing System Group Information

The System Group window allows you to view and modify the contact, name, and location for your STS16-20. The System Group window also provides direct access via SNMP to MIB II variables; refer to the ***Generic SNMP User's Guide*** for more information.

To open the System Group window:

1. Click on **Device** in the Chassis View menu bar to access the Device menu.
2. Click on **System Group**. The System group window, as shown in Figure 2-7, will appear.

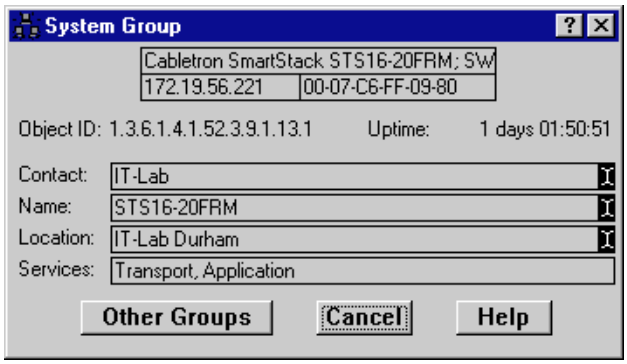



Figure 2-7. System Group Window

The System Group window contains the following fields:

**Contact**
Displays the user-defined name of the contact person responsible for the device.

**Name**
Displays the user-defined name of the device.

**Location**
Displays the user-defined location of the device.

**Services**
Displays the level of OSI service supported by the device.

To add or modify System Group information:

1. Click on the I-bar button in the **Contact**, **Name**, or **Location** fields. A text window will appear which allows you to add or modify the entry.
2. Enter the new or modified contact, name, or location information.
3. Click **OK** to accept the changes or **Cancel** to exit without saving changes.

## Viewing I/F Summary Information

The **I/F Summary** option displays statistics for the traffic processed by each network interface on your device. The I/F Summary window also provides access to a detailed statistics window via the **Detail** button that breaks down transmit and receive traffic for each interface.

To open the I/F Summary window:

1. Click on **Device** on the Chassis View menu bar to access the Device menu.
2. Click on **I/F Summary**. The I/F Summary window, as shown in Figure 2-8, will appear.

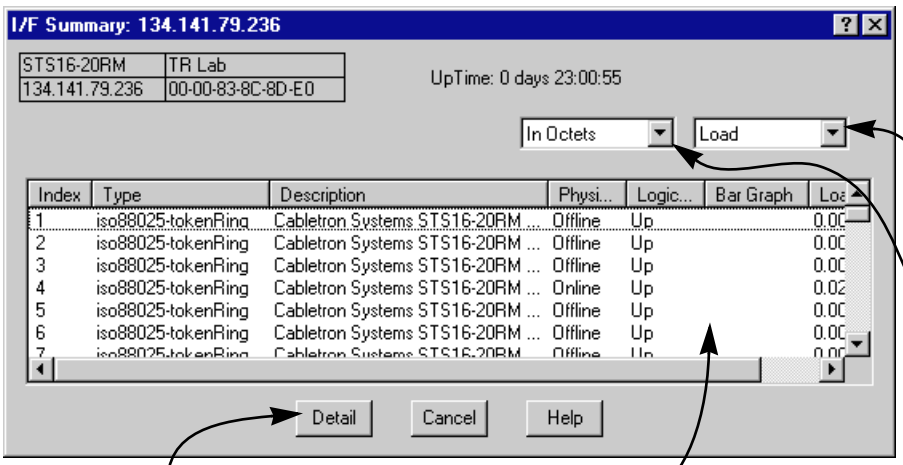



Figure 2-8. I/F Summary Window

The **I/F Display** section lets you view descriptive information for each interface. The two drop-down lists (in the upper right corner) are used to display interface performance statistics and, where applicable, bar graphs. The **Detail** button provides additional statistics on the transmit and receive traffic for each interface.

NOTE

*The **I/F Display** section for the STS16-20 lists interface information for each of the 20 built-in ports, followed by any installed SSIMs, and internal interfaces. When two or more STS16-20 SmartSTACK switches are stacked together, the **I/F Display** section will list the interfaces for each switch in the stack as described previously.*

The following descriptive information is provided for each interface:

**Index**
The index value assigned to each interface on the device.

**Type**
The type of the interface, distinguished by the physical/link protocol(s) running immediately below the network layer: **Token Ring** for the built-ports; other values, such as **ATM**, will display for the installed SSIMs.

**Description**
A text description of the interface: the device type (e.g. STS-16-20RM) will display for the 20 built-in Token Ring ports; the SSIM type (e.g. SSIM-A8-01) will display for any installed SSIMs; and other values will display for any internal interfaces.

**Physical Status**
The current physical status—or operational state—of the interface: **Online** or **Offline**.

**Logical Status**
The current logical status—or administrative state—of the interface: **Up** or **Down**.

## Displaying Interface Performance Statistics and Bar Graphs

The statistical values (and, where available, the accompanying bar graphs) provide a quick summary of interface performance. You can select the type of statistical value and the unit to be displayed by using the two drop-down lists directly above the I/F Display section, as follows:

1. From the right-most drop-down list of the I/F Summary window, click on the unit in which you wish to display the selected statistic: **Load**, **Raw Counts**, or **Rate**.
2. Once you have selected the base unit, click on the left-most drop-down list to specify the display statistic. Note that the options available from this menu will vary depending on the base unit you have selected.


*Bar graphs are only available when **Load** is the selected base unit; if you select **Raw Counts** or **Rate**, the Bar Graph column will be removed from the interface display.*

After you select a new display mode, the statistics (and bar graphs, where applicable) will refresh to reflect the current mode, as described below.

### Raw Counts

The total count of network traffic received or transmitted on the selected interface since device counters were last reset. Raw counts are provided for the following parameters:

- **In Octets** — for octets received on the interface, including framing characters.
- **In Packets** — for packets (both unicast and non-unicast) received by the device interface and delivered to a higher-layer protocol.
- **In Discards** — for packets received by the device interface that were discarded even though no errors prevented them from being delivered to a higher layer protocol (e.g., to free up buffer space in the device).
- **In Errors** — for packets received by the device interface containing errors that prevented them from being delivered to a higher-layer protocol.
- **In Unknown —** for packets received by the device interface that were discarded because of an unknown or unsupported protocol.
- **Out Octets** — for octets transmitted by the interface, including framing characters.
- **Out Packets —** for packets transmitted, at the request of a higher level protocol, by the device interface to a subnetwork address (both unicast and non-unicast).
- **Out Discards** — for outbound packets that were discarded by the device interface even though no errors were detected that would prevent them from being transmitted. A possible reason for discard would be to free up buffer space in the device.
- **Out Errors** — for outbound packets that could not be transmitted by the device interface because they contained errors.

### Load

The number of bytes processed by the selected interface during the last poll interval in comparison to the theoretical maximum load for the selected interface type (4 or 16 Mbps for the built-in Token Ring ports; 100 Mbps for the high-speed Token Ring and Ethernet SSIMs; and 155 Mbps for the ATM SSIMs).

Load is further defined by the following parameters:

- **In Octets** — the number of bytes received by this interface, expressed as a percentage of the theoretical maximum load.
- **Out Octets** — the number of bytes transmitted by this interface, expressed as a percentage of the theoretical maximum load.

When you select this option, a **Bar Graph** field will be added to the I/F Display section; this field is only available when **Load** is the selected base unit.

**Rate**
The count for the selected statistic during the last poll interval. The parameters for **Rate** are the same as those provided for **Raw Counts**; for a complete description, see **Raw Counts**, page 2-14.

## Viewing Interface Detail Statistics

The Interface Statistics window provides detailed traffic statistics for each individual interface, including counts for both transmit and receive packets, and error and buffering information. Color-coded pie charts graphically display statistics for both received and transmitted unicast, multicast, discarded, and error packets.

The I/F Statistics window can be accessed from the I/F Summary window and from the individual Port menus.

To open the Interface Statistics window from the I/F Summary window:

1. Click to select the interface for which you would like to view more detailed statistics. The selected interface will be highlighted blue.
2. Click on the **Detail** button; the I/F Statistics window, as shown in Figure 2-9, will appear.

To open the Interface Statistics window from a Port menu:

1. From the Chassis View's port status display, click to select the port of interest to access the Port menu.
2. Click on **I/F Statistics**; the I/F Statistics window, as shown in Figure 2-9, will appear.

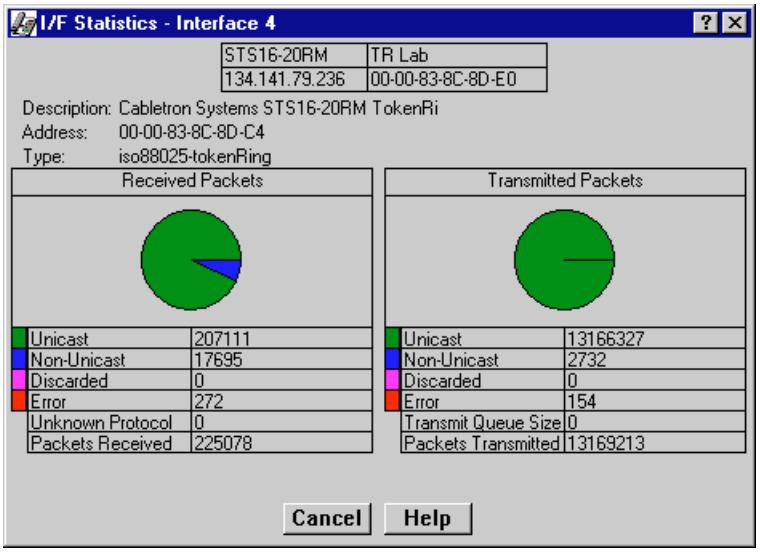



Figure 2-9. Interface Statistics Window

The following three informational fields appear in the upper portion of the window:

**Description**
The interface description for the currently selected interface.

**Address**
The MAC (physical) address of the selected interface.

**Type**
The interface type of the selected port.

The lower portion of the window provides the following transmit and receive statistics. The first four statistics are also displayed in pie charts.

**Unicast**
The number of packets transmitted to or received from this interface that had a single, unique destination address. These statistics are displayed in the pie chart, color-coded green.

**Non-Unicast**
The number of packets transmitted to or received from this interface that had a destination address that is recognized by more than one device on the network segment. The multicast field includes a count of broadcast packets—those that are recognized by *all* devices on a segment. These statistics are displayed in the pie chart, color-coded dark blue.

**Discarded**
The number of packets which were discarded even though they contained no errors that would prevent transmission. These statistics are displayed in the pie chart, color-coded magenta.

Good packets are typically discarded to free up buffer space when the network becomes very busy. If this occurs routinely, it usually indicates that network traffic is overwhelming the device. To solve this problem, you may need to reconfigure your bridging parameters, or perhaps reconfigure your network to add additional bridges or switches. Refer to the ***Network Troubleshooting Guide*** for details.

**Error**
The number of packets received or transmitted that contained errors. These statistics are displayed in the pie chart, color-coded red.

**Unknown Protocol** *(Received Packets only)*
The number of packets received which were discarded because they were created under an unknown or unsupported protocol.

**Packets Received** *(Received Packets only)*
The number of packets received by the selected interface.

**Transmit Queue Size** *(Transmit Packets only)*
The number of packets currently queued for transmission from this interface. The amount of device memory devoted to buffer space and the traffic level on the target network determines how large the output packet queue can expand before the module will begin to discard packets.

**Packets Transmitted** *(Transmit Packets only)*
The number of packets transmitted by this interface.

### Making Sense of Detail Statistics

By using a few simple calculations, the I/F Statistics window can give you a good sense of the activity level and performance of the selected interface:

To calculate the percentage of input errors:

```
Received Errors /Packets Received
```

To calculate the percentage of output errors:

```
Transmitted Errors /Packets Transmitted
```

To calculate the total number of inbound and outbound discards:

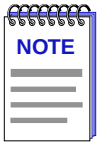
```
Received Discards + Transmitted Discards
```

To calculate the percentage of inbound packets that were discarded:

```
Received Discards /Packets Received
```

To calculate the percentage of outbound packets that were discarded:

```
Transmit Discards /Packets Transmitted
```




*Unlike the Interface Detail window, which this window replaces, the Interface Statistics window does not offer* ***Disable*** *or* ***Test*** *options. These options are available in the Interface Group window, accessed via the System Group window (***Device—>System Group***). Refer to your* **Generic SNMP User's Guide** *for more information on the System Group and Interface Group windows.*

Chapter 3

# Configuring ATM Connections

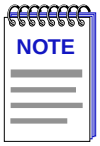
*Viewing connection data; adding and deleting Permanent Virtual Circuits (PVCs)*

The ATM Connections window is available when an ATM SSIM is installed in the STS16-20RM or STS16-20FRM. An ATM SSIM allows you to integrate the STS16-20 with an ATM backbone.

An ATM network uses two types of virtual channels or circuits: Switched Virtual Circuits (SVCs) and Permanent Virtual Circuits (PVCs). SVCs are created and dismantled dynamically on an as-needed basis, and require no management definition. By contrast, PVCs must be individually and manually configured. The ATM Connections window lets you view and modify Permanent Virtual Circuits established at the device.

To access the ATM Connections window:

1. Click on **Device** in the Chassis View menu bar to display the Device menu.
2. Click on **ATM Connections**. The Current ATM Connections window, as shown in Figure 3-1, will appear.




*The ATM Connections option will only be available when at least one ATM SSIM (A2-01 or A8-01) is installed in the device.*

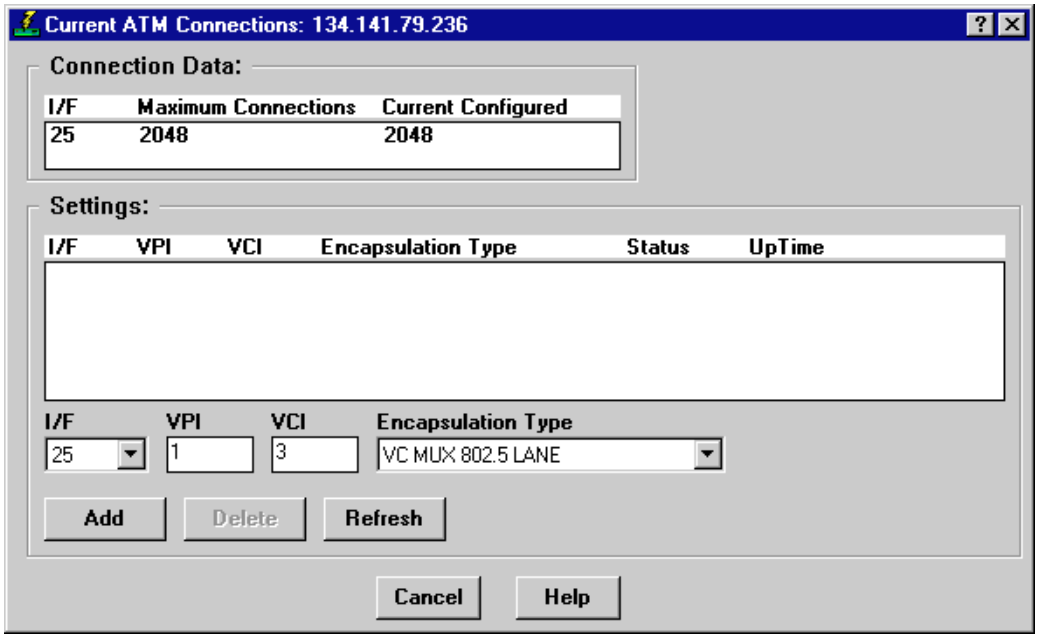



Figure 3-1. Current ATM Connections Windows

The Current ATM Connections window provides the following information about the device's ATM connections:

### Connection Data

The Connection Data list box displays the configuration parameters for each ATM interface available on the device.

| | |
|---|---|
| I/F | The index number assigned to each ATM SSIM installed in the STS16-20. If an ATM SSIM is installed in the left hand slot, the value in this field will be 21; if an ATM SSIM is installed in the right hand slot, the value in this field will be 25. |
| Maximum Connections | The maximum number of connections allowed by the current version of firmware. |
| Current Configured | The maximum number of connections the port will keep active at one time; the default value is 2048. |

### Settings

The Settings group box contains information about each of the currently configured PVCs, as well as the fields used to configure new connections.

| | |
|---|---|
| I/F | The device interface index on which the PVC was configured. An ATM SSIM installed in the left hand slot will have an I/F value of 21; an ATM SSIM installed in the right hand slot will have an I/F value of 25. |
| VPI | The Virtual Path Identifier assigned to the connection. Allowable values are 0 - 3. VPIs are used to group virtual connections, allowing for channel trunking between ATM switches. Each VPI can be configured to carry many different channels (designated by Virtual Channel Identifiers) between two points. |
| VCI | The Virtual Channel Identifier assigned to the connection. Allowable values are 0 - 1023 *for each VPI*. Each assigned VCI must be unique within its defined VPI. However, you can assign the same VCI to multiple VPIs (e.g., VPI 0/VCI 14, VPI 1/VCI 14, VPI 2/VCI 14, etc.). Remember, it is the combined VPI and VCI designations assigned to a channel that create the grouping of virtual connections. |
| Encapsulation Type | The method used to encapsulate LAN packets on the selected circuit. Current versions of ATM SSIM firmware use VC MUX 802.5 LANE as the encapsulation method. |
| Status | The current administrative status of the connection: **Enabled** or **Disabled**. |
| UpTime | The length of time the selected connection has been enabled. |

## Configuring Permanent Virtual Circuits

You can use the **Add**, **Delete**, or **Refresh** command buttons at the bottom of the Current ATM Connections window to add or delete a Permanent Virtual Circuit (PVC), or refresh the window.

- **Add** — adds a new connection or modifies an existing connection, using the parameters entered in the fields below the **Settings** list box. A confirmation window will appear for additions and modifications.
- **Delete** — deletes the selected connection; a confirmation window requires that you confirm the deletion.
- **Refresh** — refreshes the connection information displayed in the window.

## Adding a Permanent Virtual Circuit

To configure a new Permanent Virtual Circuit (PVC), enter the following information in the fields which appear just below the **Settings** list box:

1. From the **I/F** menu, select the interface for which you wish to configure a connection. All available ATM interfaces will be listed in this menu. The I/F menu will display 21 if an ATM SSIM is installed in the left hand slot and/or 25 if an ATM SSIM is installed in the right hand slot of the switch.
2. In the **VPI** text box, enter the Virtual Path Identifier you wish to assign to this connection. Allowable values are 0 to 3. The VPI you assign will be used to group virtual connections, allowing for channel trunking between ATM switches.
3. In the **VCI** text box, enter the Virtual Channel Identifier you wish to assign to this connection. Allowable values are 0 to 1023 *for each VPI*. For example, you could assign the same channel identifier as many as four times: once with a VPI of 0, once with a VPI of 1, and so on. Remember that it is the combination of VPI and VCI that will be used to direct cells through the intermediate switches between the source and destination.
4. From the **Encapsulation Type** menu, select the desired encapsulation type; the STS16-20 uses **VC MUX 802.5 LANE** as the encapsulation method.
5. Click on the **Add** button; the parameters for the new Permanent Virtual Circuit will be added to the **Settings** list box.

The circuit is automatically enabled, and will remain in place until it is manually deleted.

## Deleting a Permanent Virtual Circuit

Permanent Virtual Circuits remain in place until they are manually removed using the Current ATM Connections window.

To delete an existing PVC:

1. In the **Settings** list box, click to select the Permanent Virtual Circuit you wish to delete. The selected PVC will be highlighted blue.
2. Click on the **Delete** button. A confirmation window will appear, listing the parameters assigned to the connection and asking you to verify the action.
3. Click **OK** to proceed with the deletion; the selected PVC will be deleted.

# Index

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