CHAPTER 4

Monitoring a LightStream 2020 Switch

This chapter tells you how to determine the status of a LightStream 2020 multiservice ATM switch (LS2020 switch) and its components. It shows command examples and explains how you can obtain additional information about the LS2020 components and subsystems. It includes the procedures for using the CiscoView 2020 monitor, the LS2020 topology map, and the CLI.

Introduction to Monitoring

Three tools are available for monitoring the LS2020 switch: the CiscoView 2020 monitor program, the LS2020 topology map, and the CLI. The LS2020 monitor and topology map programs are based on a graphical user interface (GUI); the CLI is not. In the monitor program, you click on components to display information about them. In the topology map program, you click on components to display a map that represents the actual topology of the LS2020 network. In the CLI, you use various attribute agruments of the **show** command to display the value of specified parameters. When you issue a **show** command, the switch retrieves the requested information from the MIB. You may see a collection of MIB attributes displayed or you may see only a single attribute.

You can monitor the following LS2020 components and subsystems:

- Hardware components (chassis, card, port, DSU/CSU, modem, and redundant systems)
- Configuration and status (connections and processes)
- Alarm and LED status
- Test and control system (TCS)
- SNMP parameters
- Traps

For a description of trap monitoring, see the *LightStream 2020 Traps Reference Manual*.

Using the CiscoView 2020 Monitor

The CiscoView 2020 monitor is a GUI-based device management software application that provides dynamic status, statistics, and configuration information for the LS2020 switch. It is an SNMP-based management tool and displays a physical view of the switch. Although CiscoView is primarily a monitor application, you can use it to configure a small subset of chassis, card, and port parameters and perform minor troubleshooting tasks.

Note If you run CiscoView on a UNIX operating system, you must have a SparcStation 5 or above. You cannot use a Sun SparcStation IPC model.

The CiscoView 2020 monitor uses color to indicate the status of various entities; therefore, you must have a color monitor to make effective use of the monitor software. To start the CiscoView 2020 monitor, follow these steps:

Step 1 Log in to the NMS workstation.

Step 2 Make sure the environment variable "NMSROOT" is set correctly.

For a standalone environment, NMSROOT should be set to `/usr/LightStream-xxx`, where `xxx` is the release number. For example, `/usr/LightStream-2.2.1`.

For an HP Openview environment, NMSROOT should be set to `/usr/OV/bin/ls_bin`.

Step 3 Make sure the "PATH" environment variable includes the following:

For a standalone CiscoView environment, PATH should include `/usr/LightStream-xxx/bin` where `xxx` is the release number. For example, `/usr/LightStream-2.2.1/bin`.

For CiscoView running under HP OpenView, PATH should include `/usr/OV/bin/ls_bin/bin`

Note For HP OpenView itself, do not forget that PATH should include `/usr/OV/bin`.

Step 4 Invoke the CiscoView 2020 monitor by selecting it from the HP OpenView menu or by entering the following command at the system prompt:

```
% nmcview -host <hostname>
```

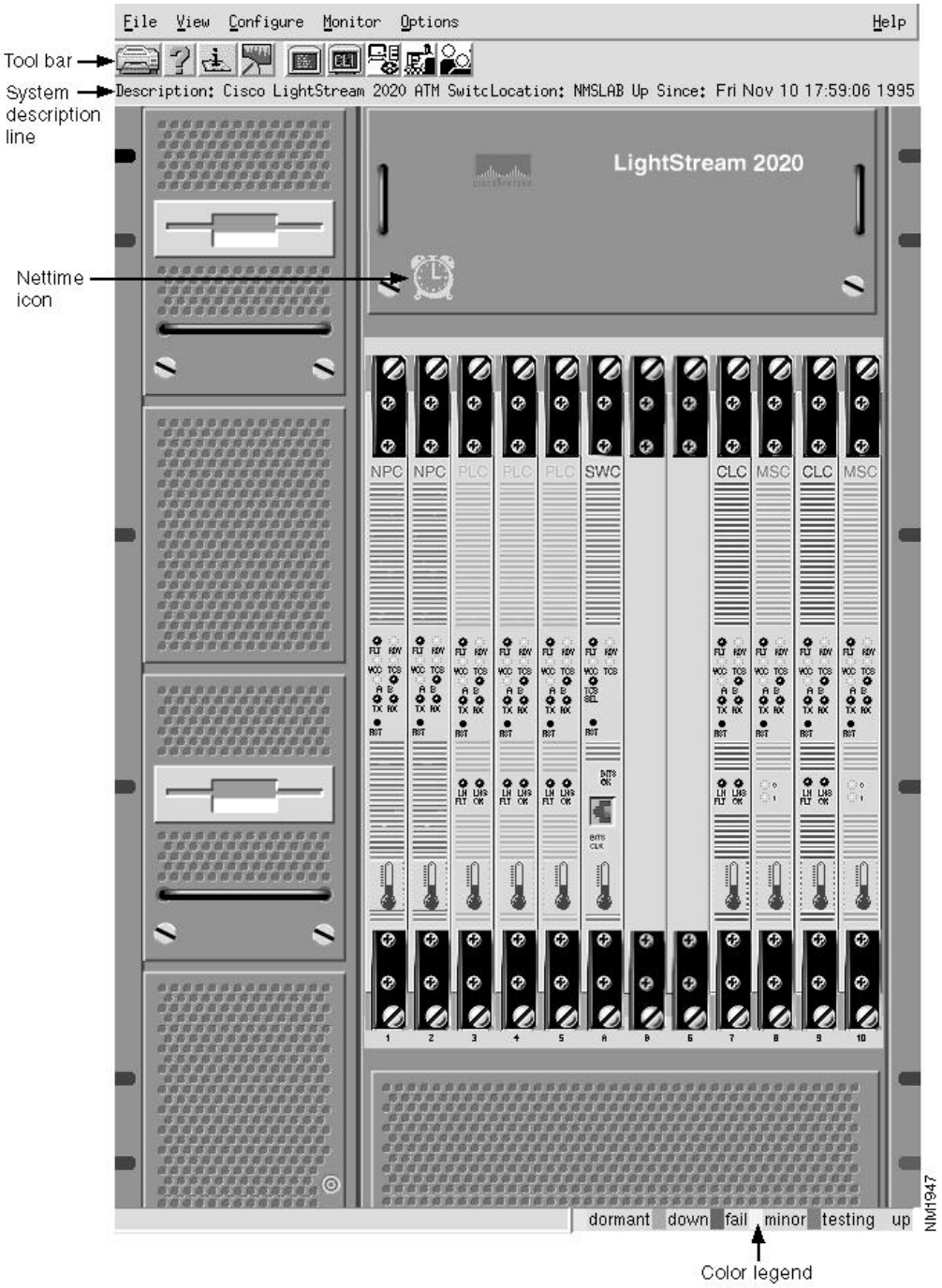
In this case, <hostname> is the name of the switch you want to view.

Front View of the Chassis

When you select the front view of the chassis, you see a physical representation of the line cards showing LED status, thermometer icons for each card, a Nettime color-coded icon, a system description line, and a color legend.

The display that results when you select a front view of the chassis is like the one shown in Figure 4-1. It shows the front view of the LS2020 chassis, its components, and their status. The name that appears at the top of the CiscoView 2020 monitor window reflects the name of the device you selected for monitoring. The front and rear displays are logical representations of the LS2020 chassis. They are not physical representations that you can modify.

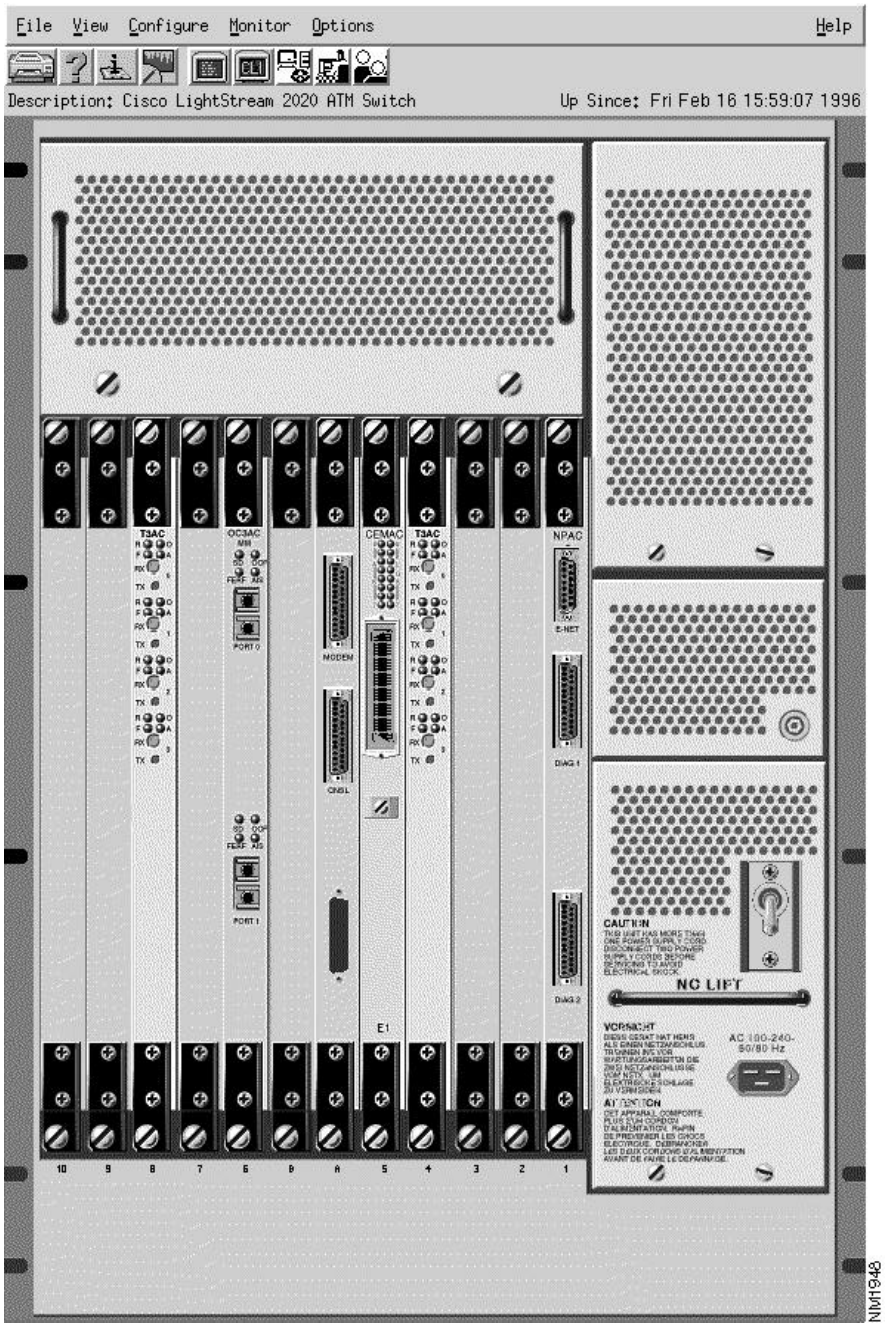
Figure 4-1 Example of a Chassis Front View



Rear View of the Chassis

When you select the rear view of the chassis, you can identify an access card, select a port for configuration and monitor information, get color-coded port status, and check whether a card is operational. (If the corresponding front line card is not operational, the access card is displayed with no ports shown.) Figure 4-2 shows an example of a chassis rear view.

Figure 4-2 Example of a Chassis Rear View



Expanded Front and Rear Views

The expanded front and rear chassis views are the same as the front and rear chassis views, except that they eliminate the chassis display information and they magnify the front and rear cards. All monitor and configuration information for front cards, rear cards, and ports is identical to monitor and configuration information for expanded front cards, expanded rear cards, and expanded ports.

Selecting a Menu Option

To select an option from the top menu bar on the monitor display (see Figure 4-1), follow these steps:

Step 1 Point and click on the menu option (for example, File or View) and hold the button down.

Step 2 Slide the mouse button down to display the available menu options.

Step 3 Release the button on the option to select it.

Table 4-1 lists the options on the monitor menu. Available options are highlighted.

Table 4-1 Menu Bar Options on the Monitor Display

This menu...	Includes an option...	To let you...
File	Open Device	Access the switch you want to configure or monitor and set a read/write community.
	Open Previous	Access a switch you previously opened.
	Print	Print screen capture.
	Print Setup	Choose your print options.
	Exit	Exit the monitor application.
View	Refresh	Refresh current view.
	50%	Reduce the chassis view by 50% (toggles between 50% and 100%).
	front	Display the front components of a chassis.
	rear	Display the rear components of a chassis.
	expanded_front	Display a magnified version of the front cards.[1]
	expanded_rear	Display a magnified version of the rear cards.[2]
Configure	device	Invoke a device window to view chassis information or to change a chassis parameter (see the section on “Configuring a Chassis”).
	front_card expanded_front_card	Invoke an expanded front window to view front card information or to change a front card parameter (see the section on “Configuring a Chassis”).
	port expanded_port	Invoke a port window to view port information or to change a port parameter (see the section on “Configuring a Chassis”).
Monitor	device	Invoke a monitor device window to display chassis information.
	front_card expanded_front_card	Invoke a front card window to display line card information.

	port expanded_port	Invoke a port window to display port information.
	rear_card expanded_rear_card	Invoke a rear window to display access card information.
Options	Show Tool Bar	Display tool bar icon.
	Show Legend	Display color bar legend.
	Show System Info	Display system information, such as chassis description, location, and up time.
	Properties	Invoke Properties window to modify community name and to modify the SNMP information fields (such as polling frequency, timeout, and so on).
Help	Contents	Invoke the "Managing Devices with CiscoView" help window.
	Using Help	Invoke the "How to Use Help window," which describes hyperhelp basics and lists help topics.
	Using CiscoView	Invoke the "Using CiscoView" help window, which lists features, explains how to navigate through the CiscoView application, and describes component dialog boxes.
	About CiscoView	Invokes a popup dialog box, which contains the CiscoView software version and copyright information.

1. On the CiscoView 2020 menu bar, the term "front card" refers to what is elsewhere called the "line card."
2. On the CiscoView 2020 menu bar, the term "rear card" refers to what is elsewhere called the "access card."

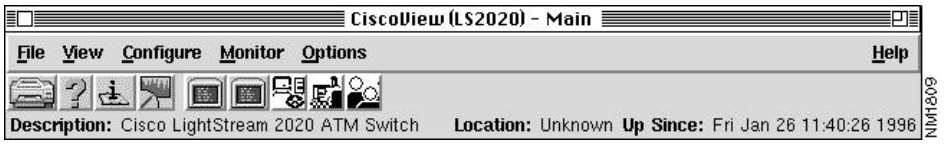
Using the Tool Bar and Menu Bar

The tool bar display (see Figure 4-3) provides quick access to monitoring and configuration information. It lets you print screen displays, access online help, and launch other applications. The tool bar display contains nine icons. When you click on one of these icons, the corresponding window is displayed:

- Print—invokes a print setup window
- Help—invokes the Using CiscoView help window
- Configure—invokes a configuration device window (on the entity selected – device, front card, or port)
- Monitor—invokes a monitor device window (on the entity selected – device, front card, rear card, or port)
- Telnet—launches a Telnet session to the target chassis
- CLI—launches a CLI session for the target chassis
- CFG—starts the StreamView configurator
- PVC—starts the StreamView PVC tool
- VLI—starts the StreamView VLI tool

In addition to using the tool bar, you can use the menu bar to invoke the same options.

Figure 4-3 CiscoView 2020 Monitor Tool Bar Display



Configuring and Monitoring the Chassis

The CiscoView 2020 monitor application provides three levels of device configuration and device monitoring capability—chassis, front/read card, and port. You can access this information from the tool bar or from the menu bar.

The next sections describe the following:

- Using the tool bar and menu bar to obtain configuration and monitoring information
- Configuration information: chassis, card, and port options that you can configure
- Monitoring information: chassis, card, and port parameters that you can monitor

Each section lists the items you can change or monitor. There is no prescribed order for the activities discussed in this secion. The order in which you perform these tasks depends on what you want to achieve.

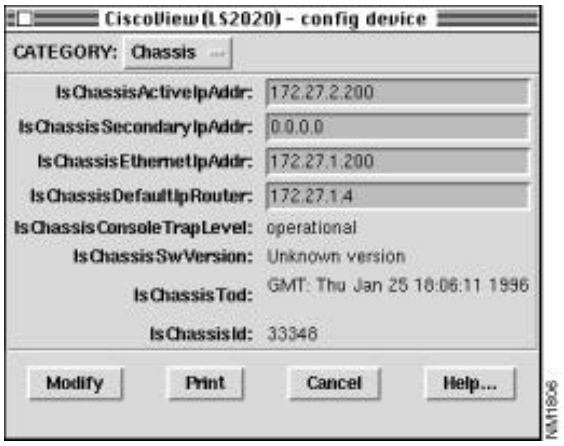
Configuring a Chassis

The CiscoView 2020 monitor application lets you set some chassis, card, and port parameters. This section concentrates on chassis level parameters (also known as “device” level). You can set many, but not all, of the chassis parameters. The changes you make affect run-time memory only. If the chassis is reset, the changes are overwritten by the configuration parameter settings in the configuration database.

Configuration Device Window

To invoke the Config Device window, first click on the chassis itself (anywhere in the logo area) and then either click on the third icon from the left on the tool bar (see Figure 4-3) or select the device option from the “Configure” menu. A Config Device window is displayed (see Figure 4-4).

Figure 4-4 Config Device Window



When you click on the CATEGORY pushbutton in the upper left corner of the Config Device window, five options are listed:

- Chassis
- Management
- Physical
- Nettime Switch Source
- Nettime Source Status

When you select one of these options, the corresponding dialog box is displayed.

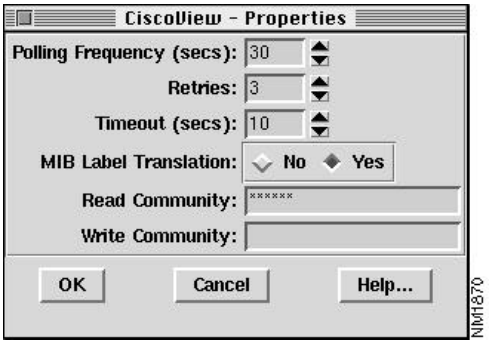
The fields represented by input boxes are configurable. However, before you attempt to change any of the configurable items, you need to change the Write Community field to the correct write community password string. If you do not change this field and try to modify an item, a “permission denied” message is displayed.

To change the Write Community field, follow these steps:

Step 1 From the Options pulldown menu, select the Properties option. A Properties window is displayed (see Figure 4-5).

Step 2 Enter the correct write community password string in the Write Community field. As you enter the password string, the system displays an asterisk (*) for each letter for security reasons.

Figure 4-5 Properties Window



The following paragraphs discuss the five options associated with the CATEGORY pushbutton–Chassis, Management, Physical, Nettime Switch Source, and Nettime Clocking Status.

Config Device Window – Chassis

You can set the first four items in the Config Device window—Active IP address, secondary IP, Ethernet IP address, and default router IP address.

To use the Config Device:Chassis window to modify one of the chassis properties, follow these steps:

Step 1 Click on the CATEGORY pushbutton and select the Chassis option. The Config Device window is displayed (see Figure 4-4).

Step 2 Enter the new value into the text edit field.

Step 3 Click on the Modify pushbutton.

Config Device Window – Management

You can set the first three items in the Config Device:Management window—Device Name, Contact, and Location.

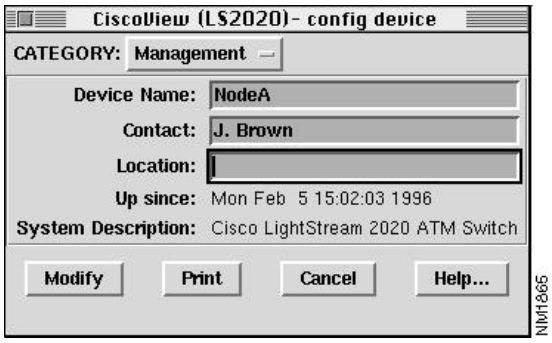
To use the Config Device:Management window to modify one of the chassis properties, follow these steps:

Step 1 Click on the CATEGORY pushbutton and select the Management option. The Config Device:Chassis window is displayed (see Figure 4-6).

Step 2 Enter the new value in the text edit field.

Step 3 Click on the Modify pushbutton.

Figure 4-6 Config Device Window - Management

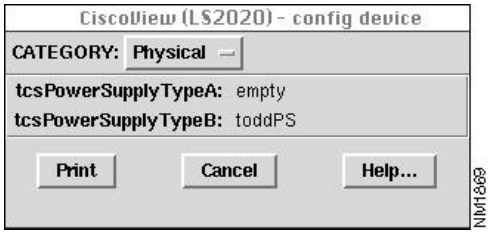


Config Device Window – Physical

You see chassis physical information when you invoke the Config Device:Physical window. You cannot set any items in this window.

To display the Config Device:Physical window, click on the CATEGORY pushbutton and select the Physical option. The Config Device:Physical window is displayed (see Figure 4-7).

Figure 4-7 Config Device Window - Physical



Config Device Window – Nettime Switch Source

You can change the first item in the Config Device:Nettime Switch Source window—pushbutton.

To use the Config Device:Nettime Switch Source window to select one of the chassis properties, follow these steps:

Step 1 Click on the CATEGORY pushbutton and select the Nettime Switch Source option. The Config Device:Nettime Switch Source window is displayed (see Figure 4-8).

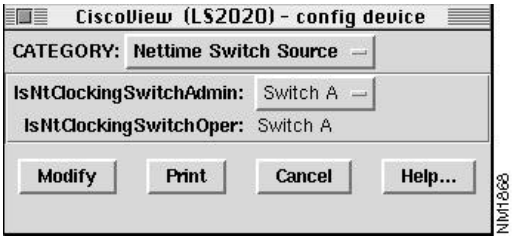
Step 2 Click on the pushbutton next to the lsNtClockingSwitchAdmin field. The name displayed on this pushbutton varies. It reflects the one of three options you can select—switchA, switchB, or autoSelect.

Step 3 Select one of the options.

If you select switchA or switchB, the node routes the Nettime service through that particular switch. If you select autoSelect, the node decides which switch, switchA or switchB, to route the Nettime service.

Step 4 Click on the Modify pushbutton.

Figure 4-8 Config Device Window - Nettime Switch Source



Config Device Window – Nettime Clocking Status

You can set the items in the column labeled lsNtCfgSource in the Config Device:Nettime Clocking Status window.

To use the Config Device:Nettime Clocking Status window to modify existing entries, follow these steps:

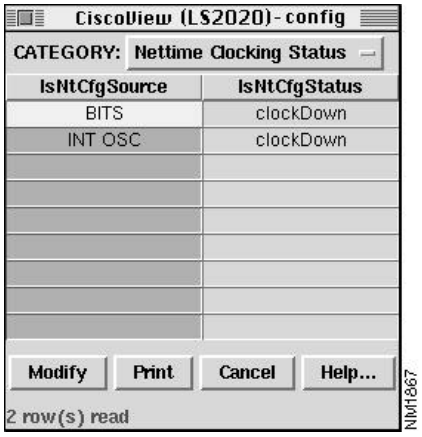
Step 1 Click on the CATEGORY pushbutton and select the Nettime Clocking Status option. The Config Device:Nettime Clocking Status window is displayed (see Figure 4-9).

Step 2 Enter the new value into the text edit field.

Step 3 Click on the Modify pushbutton.

Note In this version of the CiscoView monitor, you cannot add new entries. You can only modify existing ones.

Figure 4-9 Config Device Window - Nettime Clocking Status



Configuring a Card

The Front Card Configuration dialog box includes information such as board type, LC software version, LCC software version, card name, and number of ports. For a given card, you may be able to obtain all or some of this information. Some of the card level configuration parameters can be changed.

To change card level configuation parameters, follow these steps:

Step 1 Click on the card located on the front of the chassis you want to configure. The Configure pulldown menu is displayed.

Step 2 Select front_card. The Config Front Card dialog box is displayed (see Figure 4-10).

Step 3 Enter the new value into the text edit field.

Step 4 Click on the Modify pushbutton.

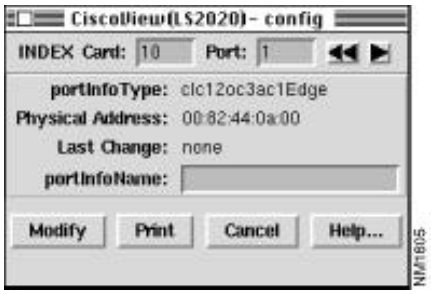
Figure 4-10 Example of Front Card Configuration Dialog Box

You can display several line cards at the same time. By selecting more than one card (by dragging the mouse across several cards on the front of the chassis and highlighting them), you can cause several cards to be displayed in one Configure dialog box.

Configuring a Port

The Port Configuration dialog box includes fields with port type and name, physical address, and last change information (see Figure 4-11). Some of the port level configuration parameters can be changed (for example, the port name field).

Figure 4-11 Example of Port Configuration Dialog Box



You can display information for several ports at the same time. By selecting more than one port (by dragging the mouse across several ports and highlighting them), you can cause information about several ports to be displayed in one Configure Port dialog box.

Monitoring a Chassis

The CiscoView 2020 monitor lets you monitor chassis, card, and port information. You can change the polling frequency for all monitor parameters.

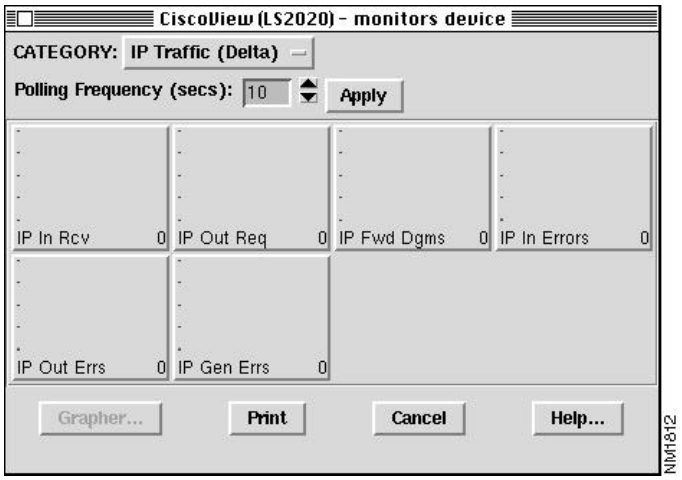
To invoke the Monitor Device window, first click on the device itself, and then either click on the fourth icon from the left on the tool bar or select the device option from the Monitor menu. A Monitor Device window is displayed (see Figure 4-12).

When you click on the CATEGORY pushbutton in the upper left corner of the Monitor Device window, five traffic categories are listed:

- IP
- ICMP
- TCP
- UDP
- SNMP

When you select one of these categories, the corresponding dialog box is displayed.

Figure 4-12 Monitors Device Window



Changing the Polling Frequency

When you monitor chassis traffic, you can set the polling frequency only. The five traffic dialog boxes, which you can invoke from the Chassis Device Monitor window, are similar to one another. (The five dialog boxes correspond to the five traffic categories listed previously: IP, ICMP, TCP, UDP, and SNMP.) For that reason, this section presents one dialog box as an example—the IP Traffic dialog box.

To modify the IP traffic polling frequency, follow these steps:

Step 1 Click on the CATEGORY pushbutton on the chassis Monitors Device window. The Monitors Device window is displayed.

Step 2 Click on the IP Traffic option. The IP Traffic dialog box is displayed (see Figure 4-12)

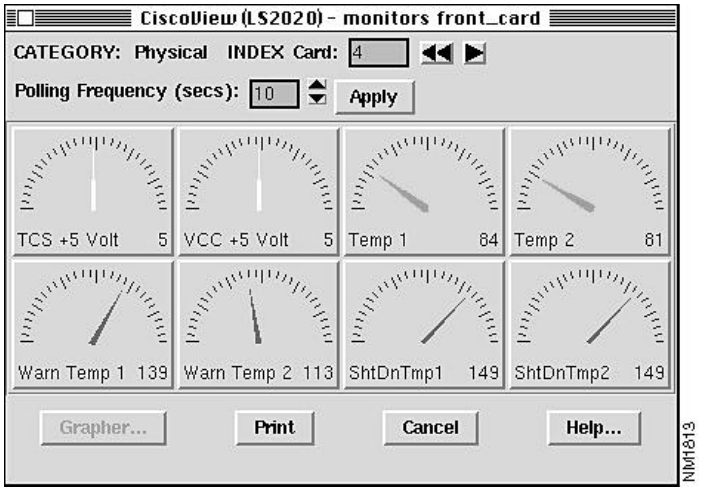
Step 3 Click on the scroll bar to change the number of seconds in the Polling Frequency field. (The up arrow increases the number of seconds; the down arrow decreases the number of seconds.)

Step 4 Click on the Apply pushbutton.

Monitoring a Card

When you monitor a front card or rear card, you see card information, such as voltage and temperature readings. You cannot change the card level monitor parameters, but you can change the polling frequency for all card level monitor statistics. You can also traverse the line cards using the increment and rewind buttons (see Figure 4-13).

Figure 4-13 Example of a Line Card Monitor Dialog Box

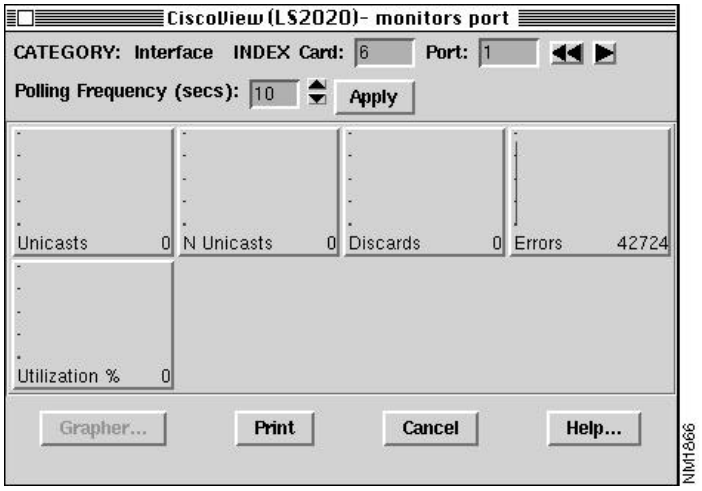


You can monitor several line cards or access cards at the same time. To display several cards in one monitor dialog box, drag the mouse across several cards to highlight them and click on the appropriate option from the Monitor pulldown menu.

Monitoring a Port

When you monitor a port, you see port information, such as number of errors, utilization percentages, and so on. The port level monitor parameters cannot be changed. However, you can change the polling frequency for all port level monitor statistics from each individual dialog box. You can also traverse the ports using the increment and rewind buttons (see Figure 4-14).

Figure 4-14 Example of Port Monitor Dialog Box



You can monitor several ports at the same time. To display several ports in one monitor dialog box, drag the mouse across several ports to highlight them and click on the appropriate option from the Monitor pulldown menu.

Accessing Online Help

If you need help using the CiscoView 2020 monitor application, you can access online help by clicking on the second icon from the left on the tool bar icon or by selecting an option from the Help menu. If you select the icon from the tool bar icon, the Using CiscoView help window is displayed (see Figure 4-15).

Figure 4-15 Example of Using CiscoView Help Window

If you select the Help pulldown menu, the following options are available (see Table 4-1):

- Contents
- Using Help
- Using CiscoView
- About CiscoView

Using the LS2020 Topology Map

The LS2020 topology map application displays a map that represents the actual topology of an LS2020 network. The map is a set of related objects, symbols, and submaps that provide a graphical and hierarchical presentation of the network.

The LS2020 topology map application runs on HP OpenView. If you are not familiar with the HP OpenView Windows product, see the *HP OpenView User's Guide*. When you start HP OpenView, the LS2020 Topology map application is automatically invoked. Once you start the application, it builds the current LS2020 submap and then periodically polls each LS2020 node for status information. When creating a new HP OpenView map, you can turn off the LS2020 topology function. You must have a color monitor to use the LS2020 topology map application.

The LS2020 topology map provides

- A view of the physical topology of an LS2020 network
- Autodiscovery and automatic entry of LS2020 nodes and trunks between nodes
- Verification of new nodes and trunks added to or removed from the LS2020 network
- Automatic placement of nodes
- Status information about each node and trunk
- A display of trunk connections between two LS2020 nodes
- Invocation of other LS2020 applications (configurator and monitor)

Once the LS2020 submap is created, you can modify it by

- Moving nodes
- Changing node or trunk labels
- Grouping nodes into domains
- Deleting nodes or trunks
- Changing map attributes

You can also show multiple trunk connections, which are represented by meta-connection symbols. The symbol for a meta-connection is <*n*>, where *n* is the number of connections being represented (see Figure 4-17).

Building a Topology

As previously mentioned, once you start HP OpenView, it can create any number of maps, and each map is able to be configured to build an LS2020 topology. However, you do not view a map directly. You view the submaps that make up the map. A submap is a particular view of the network environment. Each submap displays a different view of your map. The application creates a Root submap for each LS2020 map. The Root submap provides a standard, top-level submap for every network map.

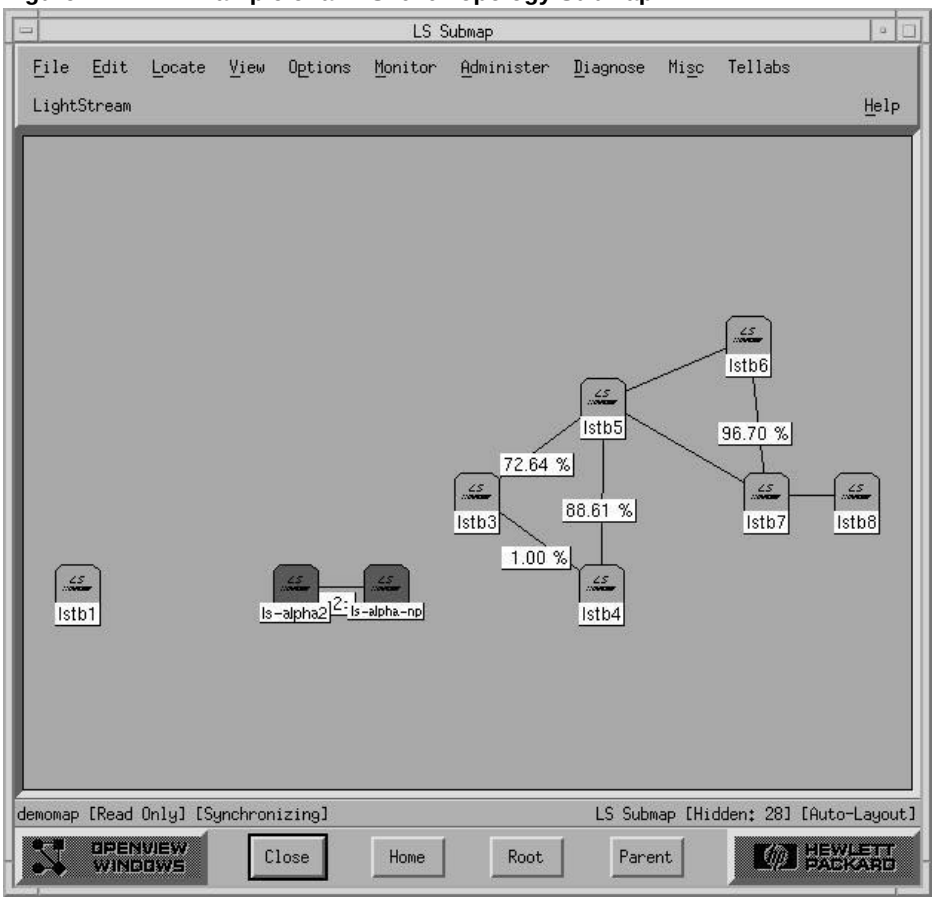
Figure 4-16 shows an example of a Root submap. In this figure, the Root submap contains two symbols: one that represents the Internet and another that represents an LS2020 network.

Figure 4-16 Example of a Root Submap

When you open a map, you actually view submaps of the map. To open the LS2020 submap, double-click on the LightStream symbol. Figure 4-17 shows a sample LS2020 topology submap.

In this example, the trunk between the ls-alpha2 and ls-alpha-np nodes actually represents two trunks, as indicated by the meta-connection symbol <2>.

Figure 4-17 Example of an LS2020 Topology Submap



Displaying Meta-Connections

When a meta-connection is first drawn, its symbol is not displayed. To display a meta-connection symbol (see Figure 4-18), follow these steps:

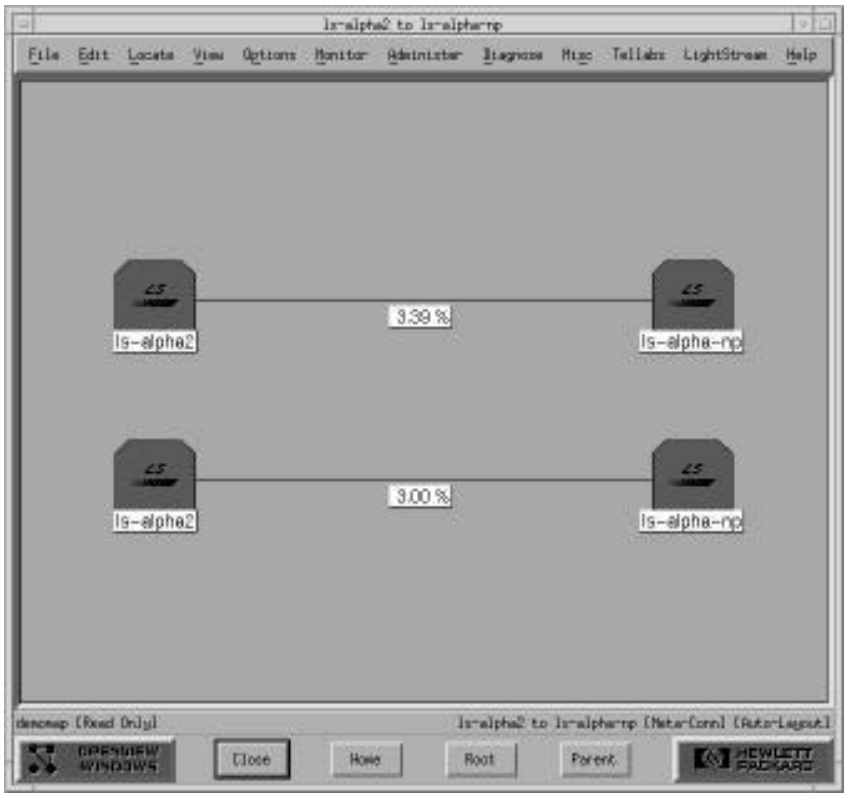
Step 1 Click the right mouse button on the trunk.

Step 2 Select Describe/Modify Symbol... from the option menu.

Step 3 Select the Display Label.

The next sections describe how to modify the LS2020 submap and view its meta-connection submap.

Figure 4-18 Meta-connection Submap



Creating LS2020 Domains

LightStream domains (logical groups of nodes) can consist of any number of LS2020 nodes. All trunk connections between selected nodes and nonselected nodes are redrawn between the LS2020 domain and the non-selected nodes. Any meta-connections between an LS2020 domain icon and either another LS2020 domain or a node show the two nodes that are connected. When you show an exploded view of an LS2020 domain icon, the nodes that make up the domain and any trunk connections between these nodes are displayed.

To create an LS2020 domain, follow these steps:

Step 1 Select the LS2020 nodes that you want grouped together.

Step 2 Pull down the LightStream menu from the menu bar, and click on Topology...Build Domain.

The selected nodes are removed from the map and replaced by a single domain icon.

Removing an LS2020 Domain

When you remove a domain from the topology map, the LS2020 nodes that were originally grouped in that domain are redrawn onto the current submap. To remove an LS2020 domain, follow these steps:

Step 1 Select the domain you want to remove.

Step 2 Pull down the LightStream menu from the menu bar, and click on Topology...Remove Domain.

Deleting a Node or Connection

If you want to remove a node or connection from the LS2020 submap, follow these steps:

Step 1 Double-click on the node or trunk that you want to delete.

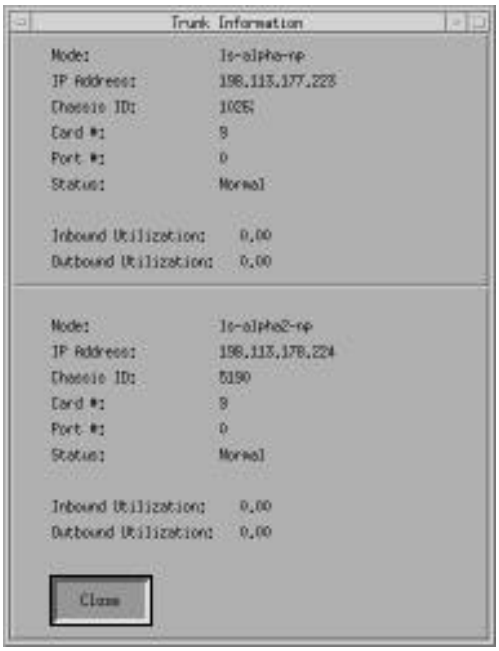
Step 2 Pull down the Edit pulldown menu on the menu bar, and click on Delete.

When you remove a node or trunk connection from the LS2020 submap, it is rediscovered and placed back on the map. To prevent this from happening, click on Hide on the Edit menu. This option keeps a node or trunk connection from being rediscovered and placed back into the submap.

Displaying Trunk Information

Within the LS2020 submap, a trunk connection is displayed including its interface bandwidth. If you want to get chassis, port, and utilization information about this connection, you click the left mouse button on a trunk. A pop-up dialog box appears and information similar to the following displays (see Figure 4-19).

Figure 4-19 Example of a Trunk Connection



Updating a Topology

The LS2020 Topology Manager periodically queries each LS2020 node for its trunk information to see if new trunks have been added or known trunks have been removed. It also communicates with HP OpenView for any new objects that are discovered. If new objects are found, the LS2020 Topology Manager (LTM) checks to see if the object's SysOid number matches its own.

Changing LS2020 Topology Map Attributes

The LS2020 submap attributes that you can modify are

- LTM enabled/disabled
- Status polling interval
- Timeout for trunk removal
- Rules
- Timeout to clear a rule
- Marginal/major status timeout

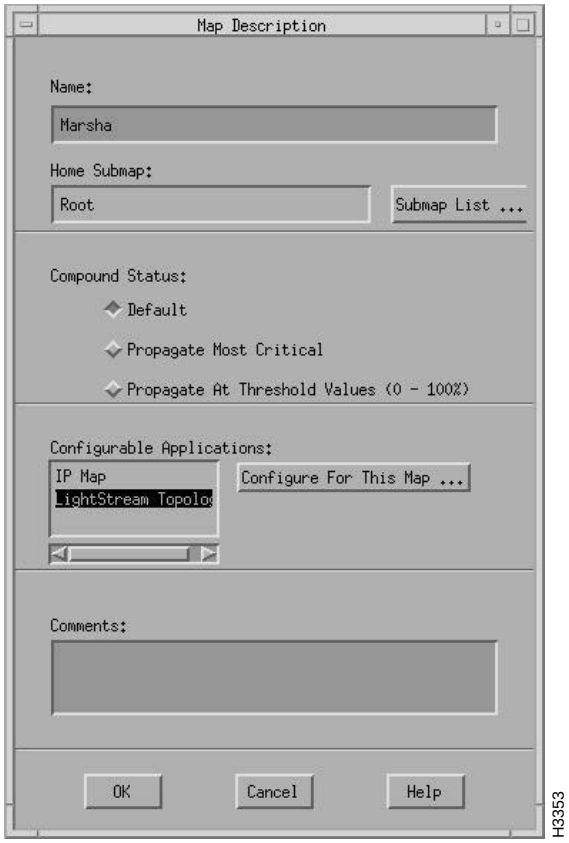
The next sections provide a brief description of the attributes and the steps for changing them.

Procedure to Change the LS2020 Topology Map Attributes

You can modify these attributes from either the OpenView Root dialog box or the LS2020 Submap dialog box:

Step 1 Pull down the File menu on the menu bar, and click on Describe/Modify Map. The Map Description dialog box appears (see Figure 4-20).

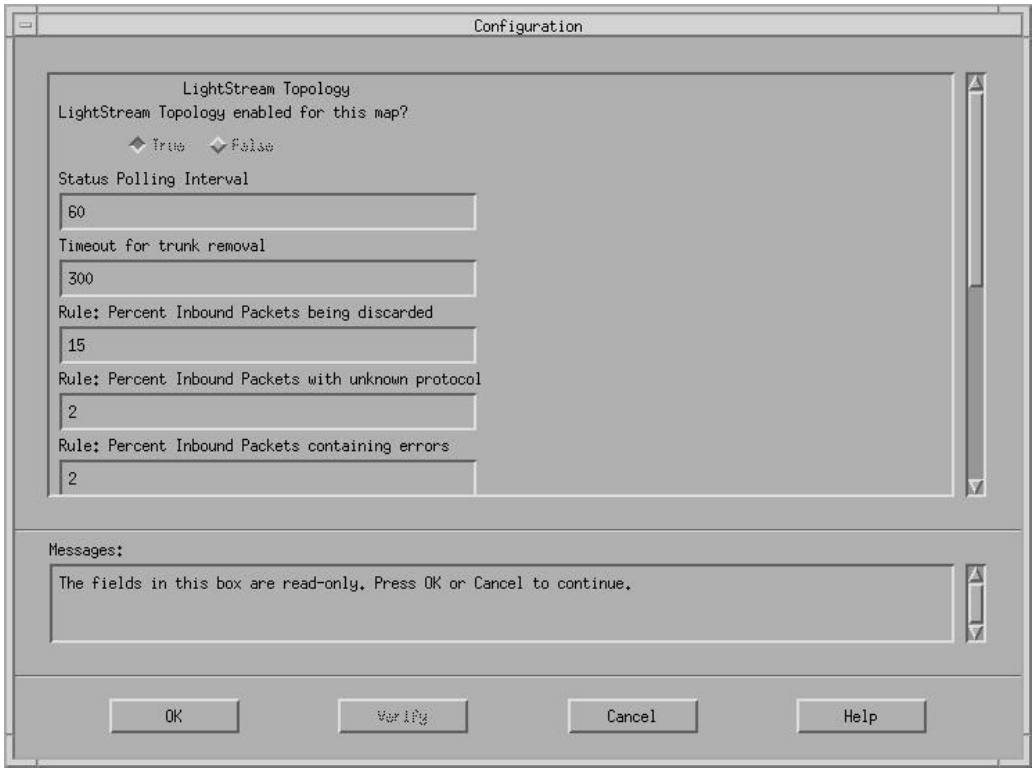
Figure 4-20 Example of Map Description Dialog Box



Step 2 Click on the appropriate entry in the Configurable Applications list.

Step 3 Click on the Configure for this Map button. For example, if you click on the LS2020 Topology Map, the Configuration box appears (see Figure 4-21).

Figure 4-21 Example of Configuration Dialog Box



From the Configuration box, you can enable or disable the LS2020 Topology Manager (LTM) and select the attributes that you want to modify, such as status polling interval, timeout for trunk removal, and so on.

LTM Enabled/Disabled

The default is to enable the LS2020 Topology Manager (LTM) when you start HP OpenView.

Status Polling Interval

The LS2020 topology map application polls each LS2020 node periodically for status information (the default polling time is 60 seconds).

Status changes in the network are displayed through changing colors on the network map and writing messages to HP OpenView Alert window.

Status Definitions

Table 4-2 lists the possible status conditions of a node in the network and their meanings. Table 4-3 lists the same information for a trunk connection in the network.

Table 4-2 Node Status Definitions

Status	Meaning
Unknown	Unable to access the node through SNMP.
Critical	One of the following problems has been detected: a chassis ID conflict, a bad power supply, abnormal temperature, or a diagnostic error on a card.
Major	One or more cards within the node reported a down operational status.
Marginal	One of the following problems on an edge port has been detected: congestion, high error rate, large amount of discarded traffic, or attempt to use an improperly configured PVC. If any of these problems is detected, a message appears in the HP OpenView Events window. Note that for Release 2.1 edge port monitoring is turned off.
Normal	No known problems detected.
Unmanaged	The user has configured the node to be unmanaged.

Table 4-3 Trunk Connection Status Definitions

Status	Meaning
Unknown	Unable to get port information through SNMP.
Critical	The ifOperStatus reported down for either port in the connection, or the trunk is no longer being discovered in the GID table.
Major	One of the following problems on either of the ports on the trunk connection has been detected: high number of packets being discarded, high trunk utilization, high error rate, or attempt to use an improperly configured PVC. If any of these problems are detected, a message appears in the HP OpenView Events window.
Warning	One of the following problems on either of the ports on the trunk connection has been detected: high number of packets with unknown protocols being received or the output queue length is excessively high.
Normal	No known problems detected.
Unmanaged	The user has configured the trunk to be unmanaged.
Testing	The ifOperStatus reported testing for either port in the connection.

Timeout for Trunk Removal

The default for the timeout for trunk removal attribute is 300 seconds.

Rules

The LS2020 topology map application collects information for each interface to determine the condition of the LS2020 network. There are rule definitions that apply to the data collected. For example, the default value for the percent inbound packets being discarded is 15 percent. If the percent of packets being discarded exceeds either the default value or the value you set, a message gets logged to the HP OpenView Alert window. You can change the rate of the default value according to your network needs. Table 4-4 lists the rules and their default values that are applied to the data collected.

Table 4-4 Rule Definitions

Rule	Default Value
Percent inbound packets being discarded	15%
Percent inbound packets with unknown protocol	2%
Percent inbound packets containing errors	2%
Percent outbound packets being discarded	15%
Percent outbound packets containing errors	2%
High output queue length	10

Marginal/Major Status Timeout

Marginal status indications for nodes and major status indications for connections indicate potential network integrity problems. Once a problem is discovered, such as a large number of packets being discarded, the appropriate status is set. The status remains in effect until a time period (the default is 5 minutes) elapses without the problem being discovered. To change the default, select the File...Describe/Modify menu item.

Using the CLI to Monitor Hardware Components

This section provides the steps for monitoring the hardware components of an LS2020 switch:

- Chassis
- Cards
- Ports
- DSU/CSUs
- Modems
- Redundant components

Monitoring a Chassis

To monitor the chassis, follow these steps. The information that displays applies to the LS2020 switch.

Step 1 Verify that the target switch is correct by entering the following at the `cli>` prompt:

```
cli> show snmp
```

If you need instructions on changing the target switch, see the section on “Setting the Target Switch for CLI Commands” in the chapter entitled “Command Line Interface.”

Step 2 Enter the following at the `cli>` prompt:

```
cli> show chassis <parameter>
```

Where

<parameter> is all (default)
general
agent
congestion
primaryswitch

powersupply
cards
listff
listdlci
listvci
listvpi
listtrunk
listpvc
atm-netprefix
atm-default-port
lecs-address

The following example shows what information displays when you enter **show chassis all**.

```
Name:                    node_A
Description:             Cisco LightStream 2020 ATM Switch
Contact:                 Rick Bell
Location:                Saturn
System Up Time           95 Hr 12 Min 47 Sec

Software Version:        2.
Console Trap Level:      Oper
Chassis ID:              5143
Slot of Primary NP:      1
Slot of This NP:         1

Primary Addr:            196.113.179.15
Secondary Addr:          0.0.0.0
Subnet Mask:             255.255.255.0
Ethernet Address:        196.113.178.15
Ethernet IP Mask:        255.255.255.0
Default Router:          196.113.178.1

MMA Trap Filter Level:   Oper
MMA Trap Logging State:  On
MMA Collection Size:     32 KB
Config DB Active:        On

MMA PID:                 56
Configuration Host:
Configuration Author:
Configuration ID:        2

Maximum Interval between Permit Limit Updates:     5000 ms.
Minimum Interval between Permit Limit Updates:     1000 ms.
Minimum Interval between CA Updates:               1000 ms.

Primary Switch:                Switch A, Synchronized
Secondary Switch Users:        None
Secondary Switch Clock Faults: None
Power Supply A:          Empty
Power Supply A Type:     Empty
Power Supply B:          Good
Power Supply B Type:     1200W AC Power Supply

Slot 1:  NP
Slot 2:  OC3 Trunk
Slot 3:  OC3 Edge
Slot 4:  T3 Trunk
Slot 5:  T3 Edge
Slot 6:  MS Trunk
Slot 7:  Serial Edge
```

```
Slot 8:  OC3 Trunk
Slot 9:  FDDI
Slot 10: Ethernet
Slot SA: Switch2
Slot SB: Empty

This chassis has no Frame Forwarding connections

This chassis has no Frame-Relay DLCIs

This chassis has no ATM-UNI VCIs

This chassis has no ATM-UNI VPIs

                      Trunk list:
                      -----------
S    Local        stat   Remote        Raw BW  Data BW  Ctrl BW
-    -----        ----   ------        ------  -------  -------
      lstb5:2.0    ->    lstb4:8.0     353208   349675     3532
      lstb5:2.0    <-    lstb4:8.0     353000   349470     3530
      lstb5:4.0    ->    lstb6:10.0     96000    93120     2876
      lstb5:4.0    <-    lstb6:10.0     96000    83810     2876


      lstb5:4.1    ->    lstb6:10.1     96000    83810     2820
      lstb5:4.1    <-    lstb6:10.1     96000    93120     2844
      lstb5:4.2    ->    lstb6:10.2     96000    93120     2872
      lstb5:4.2    <-    lstb6:10.2     96000    93120     2880
      lstb5:4.3    ->    lstb7:5.1      96000    86402     2844
      lstb5:4.3    <-    lstb7:5.1      96000    86402     2832

      lstb5:8.0    ->    lstb3:5.0     353208   333647     3464
      lstb5:8.0    <-    lstb3:5.0     353208   333647     3436

This chassis has no CBR PVCs

cli>
```

Note The column labeled S indicates the state of the connection. If there is an asterisk in the state column for a particular connection, the connection is down. If the state column is blank, the connection is up.

If you enter any parameter except **all**, a subset of the **show chassis** command is displayed. For example, if you enter the command **show chassis agent**, information similar to the following is displayed:

```
cli> show chassis agent
MMA Trap filter Level:            Oper
MMA Trap Logging State:           On
MMA Collection Size:              32 KB
Config DB Active:                 On
MMA PID:                          11
Configuration Host:               boston
Configuration Author:             Bob Williams
Configuration ID:                 26
cli>
```

Monitoring Cards

You can monitor network processor (NP) cards, edge cards, trunk cards, and switch cards. You select the card you want to monitor by specifying its card number (slot number).To determine a card's slot number, you can look at the front of the system to see the numbered slots (see Figure 4-1). When you specify a card, you also get information on its associated access card. To monitor the cards in the LS2020 switch, follow these steps.

Step 1 Verify that the target switch is correct by entering the following at the `cli>` prompt:

```
cli> show snmp
```

If you need instructions on changing the target switch, see the section on "Setting the Target Switch for CLI Commands" in the chapter entitled "Command Line Interface."

Step 2 Enter the following at the `cli>` prompt:

```
cli> show card <card#> <parameter>
```

Where

<card #> is the slot in which the card you want to monitor is located.
- 1 — 2 for NP cards
- 2 — 10 for line cards
- switcha or switchb for switch cards

<parameter> is all (default)
- name (no information available for switch cards)
- processid
- status
- version
- peak-cell-rate
- hardware
- ports (no information available for NP or switch cards)

The results of this command vary, depending on the type of card in the slot. If you enter any parameter except the **all** parameter, a subset of the attributes is displayed.

When you enter **show card 5 all**, information similar to the following (for a medium-speed card) is displayed:

```
cli> show card 5 all
Card Name:              emtb7.5_ms-t
Card PID:               31
Operational Status:     Up
Administrative Status:  Up
Configuration Register: Up

Maximum Number of VCs: 800

LC Software Version:    Version: 1.3.20.1 Compiled cp_ms1.aout: compiled Oct 16 1995 @
09:51:16
LCC Software Version:   LCC (Version 1.000 of Oct 16 1995)

Card Type:                MS Trunk
Top Temperature:          72 F (22 C)
Bottom Temperature:       70 F (21 C)
TCS Voltage:              4.931 volts
VCC Voltage:              4.980 volts
VEE Voltage:              2.499 volts
Access Card Region 1 Temperature: 68 F (20 C)
Access Card Region 2 Temperature: 71 F (21 C)
```

```
Port   Protocol          Name                        Admin Stat     Oper Stat
----   --------          ----                        ----------     ---------
5.0    MS Trunk          tb7.5.0-tr-t                   Up            Up
5.1    MS Trunk          tb7.5.1-tr-t                   Up            Up
cli>
```

Monitoring Ports

These steps allows you to monitor the ports on a particular card. You can look at information for a single port, a collection of ports, or a range of ports.

Note No information is available for ports on NP and switch cards.

Step 1 Verify that the target switch is correct by entering the following at the `cli>` prompt:

```
cli> show snmp
```

If you need instructions on changing the target switch, see "Setting the Target Switch for CLI Commands" in the chapter entitled "Command Line Interface."

Step 2 Enter the following at the `cli>` prompt:

```
cli> show port <c.p> <parameter1> <parameter2>
```

In this example, <c.p> is the number of the port for which information displays. The port number is in card.port format (card is 2 — 10; port is 0 — 7) and <parameter> is one of the parameters listed in the following columns.

all (default)	dlci	stb
name	cbrpvc	uni
status	vci	ilmi-uni
statistics	vpt-vpi	signalling-uni
physical	vpi	atm-esi
frameforward	fddi	atm-netprefix
framerelay	datarate	local-atm-address
vp-switching	wgrp	extern-atm-address
listdlci	bflt	bflt-def
listpvc	ipflt	ipflt-def
listvci	ipxflt	ipxflt-def
listvpi	np-deliver	bcast-limit
	sonet	

The following text shows an example of the display you see when you enter **show port 8.0 all** for an OC3 edge port.

```
cli> show port 8.0 all
Description:              CLC1 OC3 Edge Line Card Rev 1.0
Port Name:                lstb3.8.0
Port Type:                OC3 Edge
MIB2 Type:                sonet
OC3 Medium Type:          Sonet (STS-3c)
Port MTU:                 53 Octets
Port Speed:               155520000 bps

Admin Status:             Up
Oper Status:              Down
Transmit safety:          Disabled
Oper loop:                No Loop
Admin loop:               No Loop
Last Oper Change:         281 Hr 38 Min 30 Sec ago

Octets Rcvd:              0          (Delta: 0          Rate: 0.00/sec)
Normal Cells Rcvd:        0          (Delta: 0          Rate: 0.00/sec)
Multicast Cells Rcvd:     0          (Delta: 0          Rate: 0.00/sec)
Discarded Rcvd Cells:     0          (Delta: 0          Rate: 0.00/sec)
Output Errors:            561

Oper Protocol:                ATM-UNI
Admin Protocol:               ATM-UNI
Port Data Cell Capacity:      353208 cells
Port Available Capacity:      349393 cells
Link Transmit Utilization:    4 cells/sec.
Clocking:                     internal
Cell Payload Scrambling:      Enabled (read only)
VP Switching:                 Enabled

This port has no VCIs

This port has no VPIs

Medium
        Time Elapsed in current interval:   263
        Number of valid interval(s):        73
Section
        Status:                             <Loss of signal><Loss of frame>
        Error seconds:                      263
        Severe error seconds:               263
        Severe framing error seconds:       263
        Coding violations:                  10154001
Line
        Status:                             <AIS>
        Error seconds:                      0
        Severe error seconds:               0
        Unavailable seconds:                441
        Coding violations:                  0
Path
        Path width:                         sts3cSTM1
        Status:                             <STSLOP><STSAIS><STSRDI>
        Error seconds:                      0
        Severe error seconds:               0
        Unavailable seconds:                441
        Coding violations:                  0
```

```
ATM Interface Configuration:
Class:                    private
Role:                     network
Type:                     uni3-0
ILMI status:              enable
Signalling status:        enable

Number of active VPI bits 0
Number of active VCI bits 15

ILMI Configuration:
State:                    starting
VCI:                      16

Signalling Layer Configuration:
Signalling VCI:           5
Minimum VCI value:        48
Maximum VCI value:        32767
Minimum VPI value:        0
Maximum VPI value:        0
Address format:           both
Routing on subaddress:    yes
Maximum signalling rate:  14129 cells/sec
SSCOP state:              state -1: disabled

This port has no ESI data base configured


This port has no Network Prefix data base configured

This port has no Local ATM Address data base configured


This port has no External ATM Address data base configured

cli>
```

Note When the Operational Status for the trunk port is down, the Port Available Capacity field shows the capacity that has been configured for the trunk port, rather than a capacity of zero (0).

Monitoring DSU/CSU Statistics

The **csumon** tool, available from the bash shell, lets you monitor the DSU/CSU for the following:

- Low-speed line card
- Medium-speed line card

In addition, you can use **csumon** to issue commands to an external DSU/CSU attached to a low-speed interface.

Monitoring the DSU/CSU on a Low-Speed Line Card

You can obtain CSU statistics by connecting to an external data service unit/channel service unit (DSU/CSU) from an LS2020 switch through a serial line. This provides a terminal to the DSU/CSU. You use its own interface to set up and monitor the DSU/CSU. (See the documentation for the DSU/CSU for details.)

Step 1 Connect the LS2020 switch to the external DSU/CSU by connecting an EIA/TIA-232 serial cable from the control port on the fantail to the CSU craft (or console) port.

Note EIA/TIA-232 and EIA/TIA-449 were known as recommended standards RS-232 and RS449 before their acceptance as standards by the Electronic Industries Association (EIA) and Telecommunications Industry Association (TIA).

Step 2 To access the bash shell prompt, log in as root or fldsup on the LS2020 switch to which the DSU/CSU you want to monitor is attached.

Step 3 Test the connection by using the following command:

```
LSnode:# csumon <.card.port#>
```

Where

<.card.port#> is The target switch card and port number in the LS2020 switch, entered in .card.port format (card 2 – 10; port 0 – 7)

Note You must use the leading "." in the card and port entry shown above.

Figure 4-22 shows a screen displaying the kind of information you might see in a DSU/CSU status display. The display you see may vary, depending on the DSU/CSU you are using.

Figure 4-22 Example Showing csumon Display for a Low-Speed Line Card

```
bash$ csumon .7.5

    ========== P O R T 5 ==========    ========== P O R T 6 ==========

      Current   Intrvl 7      Total    Current   Intrvl 7        Total

PES         0          0          2          0          0            2
PSES        0          0          2          0          0            2
SEFS        0          0          2          0          0            2
UAS         0          0          6          0          0            9
LCV         0          0          0          0          0            0
PCV         0          0          2          0          0            0
LES         0          0          0          0          0            0
CCV         0          0          2          0          0            0
CES         0          0          2          0          0            2
CSES        0          0          2          0          0            2

CONFIG T1,  NORM,  CBIT, SHORT           T1,  NORM, CBIT, SHORT
STATUS OK                                OK

CELLS IN:   20936  OUT:       20998      IN   20925   OUT:        20990
=================================      ================================
Enter: ? to refresh, + to increment interval, ± to decrement interval
```

H3326

Note While the statistics are displayed, you can refresh the screen or alter the counter display. See the last line in the previous screen display for instructions on how to do this.

Step 4 Terminate the display by pressing **^C**. This returns you to the bash shell prompt.

Step 5 To learn about commands you can issue to the DSU/CSU, consult its documentation. To obtain help on **csumon**, enter the following command:

```
LSnode:1# csumon
```

Monitoring the DSU/CSU on a Medium-Speed Line Card

The medium-speed line card (MSC) has a built-in DSU/CSU. Use the following steps to monitor and display the DS3 MIB statistics for MSC ports. MSC CSU statistics are available through use of the standard DS3 MIB variables.

Step 1 To access the bash shell prompt, log in as root or fldsup to the LS2020 switch.

Step 2 Enter the following:

```
LSnode:1# csumon <.card.port#>
```

Where

<.card.port#> is the target switch card and port number in the LS2020 switch, entered in .card.port format (card 2 — 10; port 0 — 7).

Note You must use the leading "." in the card and port entry previously shown.

A screen similar to the one in Figure 4-23 is displayed. Although you enter only one port number, information for both ports on the MSC displays.

Figure 4-23 Example Showing csumon Display for a Medium-Speed Line Card

```
LSnode:2$ csumon .7.0

MS1 Line Card S/W Version:      1.2
Time Since Line Card Boot:      1 hour 46 minutes 9 seconds
Current Interval Elapsed Time:  1 minute 7 seconds
Number of Valid Intervals:      7

    ========== P O R T 0 ==========   ========== P O R T 1 ==========

      Current   Intrvl 7      Total    Current   Intrvl 7        Total

PES         0          0         2          0          0            2
PSES        0          0         2          0          0            2
SEFS        0          0         2          0          0            2
UAS         0          0       804          0          0          804
LCV         0          0      1786          0          0         1786
PCV         0          0         2          0          0            0
LES         0          0         0          0          0            0
CCV         0          0         2          0          0            0
CES         0          0         2          0          0            2
CSES        0          0         2          0          0            2

CONFIG T3,  NORM,  CBIT, SHORT          T3,  NORM, CBIT, SHORT
STATUS OK                               OK

CELLS IN:   20936  OUT:       20998     IN   20925   OUT:        20990
==================================      ==============================
Enter: ? to refresh, + to increment interval, ± to decrement interval
```

H3327

Note While the statistics are displayed, you can refresh the screen or alter the counter display. See the last line in the previous screen display for instructions on how to do this.

Monitoring Modems

To monitor the modem port on the switch card's console/modem assembly, follow these steps:

Note If you have a redundant switch card, you can monitor the modem port on either the active or backup switch card. This command is not used for monitoring modems connected to line card ports and is not available on the SUN4 version of the CLI.

Step 1 Verify that the target switch is correct by entering the following at the `cli>` prompt:

```
cli> show snmp
```

If you need instructions on changing the target switch, see "Setting the Target Switch for CLI Commands" in the chapter entitled "Command Line Interface."

Step 2 Enter the following at the `cli>` prompt:

```
cli> show modem <slot#> <parameter>
```

Where

<slot #> is sa or sb for the switch cards

<parameter> is all
initstring

The following is an example of the display you see when you enter **show modem sa all:**

```
cli> show modem sa all
Initstring: AT&S&D2&&C1SO=1S7=30S36=7S95=44
cli>
```

The DS3 MIB maintains these counters over a 24-hour period in 15-minute intervals. The Total column in the display includes up to 96 complete intervals. The Current column includes all counts that will make up the next complete interval. The Intrvl column shows the selected complete interval (from 1 to 96), depending on the actual number of complete intervals. The values that change are updated once per second.

Table 4-5 and Table 4-6 list the counters and their definitions.

Table 4-5 csumon Display Term Definitions

Counter[1]	Definition
PES	P-bit Errored Seconds
PSES	P-bit Severely Errored Seconds
SEFS	Severely Errored Framing Seconds
UAS	UnAvailable Seconds
LCV	Line Coding Violations
PCV	P-bit Coding Violations
LES	Line Error Seconds
CCV	C-bit Coding Violations
CES	C-bit Errored Seconds
CSES	C1-bit Severely Errored Seconds

1. See RFC 1407 for a further description of these counters.

Table 4-6 csumon Status Term Definitions

Status Term	Definition
OK	No alarms present
RED	Loss of Framing
YELLOW	Far End Receive Failure
BLUE	Receiving an Alarm Indication Signal

Step 3 Terminate the display by pressing **^C**. This returns you to the bash shell prompt.

Step 4 To obtain help on **csumon**, enter the following command at the bash shell prompt:

```
LSnode:1# csumon
```

Monitoring Switch Cards, NPs, and Power Supplies

These steps tell you how to monitor the status of your redundant components (switch cards, NPs, and power supplies):

Step 1 Verify that the target switch is correct by entering the following at the `cli>` prompt:

```
cli> show snmp
```

If you need instructions on changing the target switch, see "Setting the Target Switch for CLI Commands" in the chapter entitled "Command Line Interface."

Step 2 To look at the status of switch cards, enter the following at the `cli>` prompt:

```
cli> show chassis primaryswitch
```

This command indicates which switch card is the active switch card. If you have a second switch card, you can assume it is the backup switch card.

Step 3 To look at the slot associated with each of the NPs, enter the following at the `cli>` prompt:

```
cli> show chassis general
```

This command displays a number of details including the slot for the active NP, the slot of this NP, and the system up time. The system up time indicates how long this NP has been up.

Step 4 To look at the status of power supplies, enter the following at the `cli>` prompt:

```
cli> show chassis powersupply
```

This command displays the status and type of the two power supplies, A and B.

The following example shows the output for the three commands previously described.

```
cli>  show chassis primaryswitch
Switch:                   Switch A

cli> show chassis general
Name:                     lstb8
Description:              Cisco LightStream 2020 ATM Switch
Contact:                  Jones
Location:                 Venus
System Up Time            121 Hr 14 Min 3 Sec

Software Version:         2.1.1
Console Trap Level:       Info
Chassis ID:               5142
Slot of Primary NP:       1
Slot of This NP:          1

Primary Addr:             196.113.179.18
Secondary Addr:           196.113.179.28
Subnet Mask:              255.255.255.0
Ethernet Address:         196.113.178.18
Ethernet IP Mask:         255.255.255.0
Default Router:           196.113.178.1

cli> show chassis powersupply
Power Supply A:           Empty
Power Supply A Type:      Empty
Power Supply B:           Good
Power Supply B Type:      1200W AC Power Supply

cli>
```

Using the CLI to Monitor Configuration and Status

This section provides steps for monitoring the configuration and status of the following connections and processes of an LS2020 switch:

- Connections (ATM UNI, Frame Relay, frame forwarding, Ethernet, FDDI, OC3, and CBR)
- Processes (CLI, collector, GID, and ND)

Monitoring ATM Connections

The ATM connections include:

- Permanent virtual connection (PVC)
- Permanent virtual path (PVP)

Permanent Virtual Connection

To monitor the ATM UNI permanent virtual connection (PVC) configured on a particular ATM UNI port, follow these steps. They provide you with information on the individual connections configured on each port. This information is available for ATM UNI ports only.

Step 1 Verify that the target switch is correct by entering the following at the `cli>` prompt:

```
cli> show snmp
```

If you need instructions on changing the target switch, see "Setting the Target Switch for CLI Commands" in the chapter entitled "Command Line Interface." To get a list of all VCIs configured on a particular ATM UNI port, enter the following at the `cli>` prompt:

```
cli> show port <c.p> listvci
```

Where

<c.p> is the number of the port for which information displays. The port number is in card.port format (card is 2 — 10; port is 0 — 7).

Step 2 Once you have a list of all ATM-UNI VCIs, you can look at a particular VCI by entering the following at the `cli>` prompt:

```
cli> show port <c.p> vci <vci#>
```

Where

<vci#> is the number of the VCI for which information displays.

The following text is an example of the display you see when you enter **show port 8.0 vci 1000**.

```
cli> show port 8.0 vci 1000
Source Node:              lstb3
Source Port:              8.0
Source VCI:               1000
Src Admin Insured Rate:   12000 cells/sec
Src Oper Insured Rate:    12000 cells/sec
Src Admin Insured Burst:  300 cells
Src Oper Insured Burst:   300 cells
Src Admin Max Rate:       13000 cells/sec
Src Oper Max Rate:        13000 cells/sec
Src Admin Max Burst:      600 cells
Src Oper Max Burst:       600 cells

Dest Oper Node:           lstb5
Dest Oper Port:           3.0
Dest Oper VCI:            1000
Dest Oper Insured Rate:   12000 cells/sec
Dest Oper Insured Burst:  300 cells
Dest Oper Max Rate:       13000 cells/sec
Dest Oper Max Burst:      600 cells

Oper Prin Service Type:   guaranteed
Admin Prin Service Type:  guaranteed
Oper Transmit Priority:   1
Admin Transmit Priority:  1

To-Net Circuit ID:        1000
To-Net Circuit State:     Active
From-Net Circuit ID       1000
From-Net Circuit State:   Active
Last ATMM/Appl. Error:    ATMM error 0: OK
Cells Required:           12020

CLP=0 Cells to Switch:    0
CLP=0/1 Cells to Switch:  0
CLP=1 Cells to Switch:    0
Discarded Cells:          0
cli>
```

You can also get a list of all the ATM UNI VCIs for the entire chassis by entering the **show chassis listvci** command.

Permanent Virtual Path

To monitor the ATM UNI permanent virtual path (PVP) configured on a particular ATM UNI port, follow these steps. They provide you with information on the individual connections configured on each port. This information is available for ATM UNI ports only.

Step 1 Verify that the target switch is correct by entering the following at the `cli>` prompt:

```
cli> show snmp
```

If you need instructions on changing the target switch, see "Setting the Target Switch for CLI Commands" in the chapter entitled "Command Line Interface." To get a list of all PVPs configured on a particular ATM UNI port, enter the following at the `cli>` prompt:

```
cli> show port <c.p> listvpi
```

Where

<c.p> is the number of the port for which information displays. The port number is in card.port format (card is 2 — 10; port is 0 — 7).

Step 2 Once you have a list of all ATM-UNI VPIs, you can look at a particular VPI by entering the following at the `cli>` prompt:

```
cli> show port <c.p> vpi <vpi#>
```

Where

<vpi#> is the number of the VPI for which information displays.

The following text is an example of the display you see when you enter **show port 8.0 vpi 50**.

```
cli> show port 8.0 vpi 50

Source Node:              lstb3
Source Port:              8.0
Source VPI:               50
Src Admin Insured Rate:   34000 cells/sec
Src Oper Insured Rate:    34000 cells/sec
Src Admin Insured Burst:  600 cells
Src Oper Insured Burst:   600 cells
Src Admin Max Rate:       34800 cells/sec
Src Oper Max Rate:        34800 cells/sec
Src Admin Max Burst:      1023 cells
Src Oper Max Burst:       1023 cells

Dest Oper Node:           lstb5
Dest Oper Port:           3.0
Dest Oper VPI:            50
Dest Oper Insured Rate:   0 cells/sec
Dest Oper Insured Burst:  0 cells
Dest Oper Max Rate:       0 cells/sec
Dest Oper Max Burst:      0 cells

Oper Prin Service Type:   guaranteed
Admin Prin Service Type:  guaranteed
Oper Transmit Priority:   1
Admin Transmit Priority:  1

To-Net Circuit ID:        0
To-Net Circuit State:     Inactive
From-Net Circuit ID       0
From-Net Circuit State:   Inactive
Last ATMM/Appl. Error:    ATMM error 53: Unexpected LCM error
Last ATM Error Location:  lstb5:3.0
```

```
Cells Required:           34016

CLP=0 Cells to Switch:    0
CLP=0/1 Cells to Switch:  0
CLP=1 Cells to Switch:    0
Discarded Cells:          0
cli>
```

You can also get a list of all the PVPs for the entire chassis by entering the **show chassis listvpi** command.

Monitoring Frame Relay Connections

These steps allow you to monitor individual data link connections configured on Frame Relay ports. These connections are recognized by their data link connection identifiers (DLCIs).

Step 1 Verify that the target switch is correct by entering the following at the `cli>` prompt:

```
cli> show snmp
```

If you need instructions on changing the target switch, see "Setting the Target Switch for CLI Commands" in the chapter entitled "Command Line Interface." To get a list of all data link connections configured on a particular Frame Relay port, enter the following at the `cli>` prompt:

```
cli> show port <c.p> listdlci
```

Where

<c.p> is the number of the port for which information displays. The port number is in card.port format (card is 2 — 10; port is 0 — 7).

Step 2 Once you have a list of DLCIs, you can look at a particular connection by entering the following at the `cli>` prompt:

```
cli> show port <c.p> dlci <dlci#>
```

Where

<dlci#> is the DLCI number for which information displays. The DLCI number must be between 16 and 991.

Note See the *LightStream 2020 CLI Reference Manual* for information on setting and showing port attributes with the CLI.

Figure 4-24 shows an example of the display you see when you enter **show port 10.7 dlci 141**.

Figure 4-24 Example Showing the show port 10.7 dlci 141 Display

```
cli> show port 10.7 dlci 141

Src Node:                              Light8
Src Port:                              10.7
Src DLCI:                              141
Src Admin Insured Rate:                32000 bps
Src Oper Insured Rate:                 31713 bps
Src Admin Insured Burst:               1516 bytes
Src Oper Insured Burst:                1491 bytes
Src Admin Max Rate:                    64000 bps
Src Oper Max Rate:                     63767 bps
Src Admin Max Burst:                   3032 bytes
Src Oper Max Burst:                    2983 bytes

Dest Admin Node:                       Light6
Dest Admin Port:                       3.4
Dest Admin DLCI:                       141

Dest Oper Node:                        Light6
Dest Oper Port:                        3.4
Dest Oper DLCI:                        141

Dest Oper Insured Rate:                31713 bps
Dest Oper Insured Burst:               1491 bytes
Dest Oper Max Rate:                    63767 bps
Dest Oper Max Burst:                   2983 bytes

Local LMI State:                       Inactive
Remote LMI State:                      Active
To-Net Circuit ID:                     36
To-Net Circuit State:                  Active
From-Net Circuit ID:                   31
From-Net Circuit State:                Active
Last ATMM Error:                       OK
Last ATM Error Location:
Cells Required:                        116


cli>
```


You can also get a list of all the Frame Relay connections for the entire chassis by entering the **show chassis listdlci** command.

Monitoring CLI Attribute Settings

These steps let you monitor the attribute settings for the CLI program itself:

Step 1 Enter the following at the `cli>` prompt:

```
cli> show cli <parameter>
```

Where

<parameter> is all (default)
echosource
lineedit
log
term
timer
timestamp
timeout
traplevel
debug
banner

The following is an example of the display you see when you enter **show cli:**

cli> **show cli**

```
Echo source:         on
Line Edit:           on
Logging:             off
Terminal Type:       vt100
Date/Time:           Thu Jun 15 16:02:40 1995
SNMP Timeout value=  6 seconds
Timestamp:           off
Timer:               4 Hour(s) 37 Minute(s)  38 seconds
Traplevel:           Debug
Debug:               off
Banner:              CLI (Version 2.100 of May 24 1995
PROGRAM: cli:        compiled May 24 1995 @ 02:31:40
```

Monitoring the Collector

The collector lets you run up to 25 collections at one time. You can set up the collections to save user-defined data for a specified time interval and you can use this data for future analysis. For further information on creating collections, see the “LightStream 2020 Statistics and Data Collection” chapter.

To monitor the status of a particular collection, follow these steps:

Step 1 Verify that the target switch is correct by entering the following at the `cli>` prompt:

```
cli> show snmp
```

If you need instructions on changing the target switch, see “Setting the Target Switch for CLI Commands” in the chapter entitled “Command Line Interface.” To look at the status of a particular collection, enter the following at the `cli>` prompt:

```
cli> show collection [<collection #>]
```

Where

[<collection #>] is the number of any collection that has been defined. If you do not enter a collection number, CLI displays all collections that have been defined.

The following is an example of the display you see when you enter **show collection 1:**

```
*cli> show collection 1
             *** Collection 1 ***
Collection Status:            Under Creation
Operational Status:           Under Creation
Begin Time:                   06/22/1995 08:02:43 EDT (06/22/1995 12:02:43 GMT)
End Time:                     01/18/2038 22:14:07 EST (01/19/2038 03:14:07 GMT)
Interval:                     60 sec
File:                         /usr/tmp/collector/collect.1

Collection Items:
Name: CollectDBObjectID.1.1   Value: ifInOctets.3000
Name: CollectDBObjectID.1.2   Value: ifInOctets.3001
Name: CollectDBObjectID.1.3   Value: ifInOctets.3002
Name: CollectDBObjectID.1.4   Value: ifInOctets.3003
```

Monitoring GID

The global information distribution (GID) system is a service that maintains a consistent network-wide database. It ensures that every switch has an up-to-date copy of all the information in the database.

To monitor the status of the GID software, follow these steps:

Step 1 Verify that the target switch is correct by entering the following at the `cli>` prompt:

```
cli> show snmp
```

If you need instructions on changing the target switch, see the section on "Setting the Target Switch for CLI Commands" in the chapter entitled "Command Line Interface."

Step 2 Enter the following at the `cli>` prompt:

```
cli> show gid <parameter>
```

Where

<parameter> is all (default)
general
synchronization
cards
clients
neighbors
ports
ip

The following is an example of the display you see when you enter **show gid all:**

```
cli> show gid all
Software Version Number:        gidd: (ls2_1_1) compiled Oct 16 1995 @ 01:52:23
GID Process ID (PID):           76
Memory In Use:                  0 Bytes
Memory Allocation Failures:     0

Neighbors in Existent Sync State:       0
Neighbors in Exchange Start State:      0
```

```
Neighbors in Exchange State:           0
Neighbors in Loading Sync State:       0
Neighbors in Full Sync State:          3

                  Cards Managed by Gid:
                  ---------------------

 Chassis    Slot      Seq#    Age  Originating-NP  Ports
 -------    ----      ----    ---  --------------  -----
lstb8         1   139863522    543       lstb8.1      0
lstb8         2   141243346   1327       lstb8.2      0
lstb8         3   139863833   1439       lstb8.1      8
.
.
.

                  Clients Managed by Gid:
                  -----------------------

Client PID    LSA-Rx    IPA-Rx    Gen-Rx Events-Tx Paths-Generated
------ ---    ------    ------    ------ --------- ---------------
   69           0         0         0         0           0
   70           0         0         0         0           0
   77      1316353       243       163       519        6257
   .
   .
   .
                Neighbors Managed by Gid:
                -------------------------
 Chassis     VCI    State    SYNC RLL  SLL Hello  LSA  NLSA   IPA NIPA   GA  NGA
 -------     ---    -----    ---- ---  --- -----  ---  ----   --- ----   --  ---
 lstb8.2   62722  full        8   0    0    2   196   196   131  131    5    4
 lstb7.1   79105  full        7   0    0    2  6212  5876   381  366   62   62
 .
 .
 .

                    Ports Managed by Gid:
                    ---------------------

 Chassis     Port Service Up/Down      BW0       BW1       BW2    Remote-Port
 -------     ---- ------- -------      ---       ---       ---    -----------
 lstb8         3.0   edge      Up       188       188         0        none.none
 lstb8         3.1   edge    Down         0         0         0        none.none
 lstb8         3.2   edge      Up      2628      1298         0        none.none
 .
 .
 .
                  IP Addresses Managed by GID:
                  ----------------------------

 IP Address       Age    Seq#   Advertising-NP    Net-Mask          Port
 ----------       ---    ----   --------------    --------          ----
196.113.178.13   2430  146596901    lstb3.1    255.255.255.0        lstb3.0.11
196.113.178.14   2059  146605717    lstb4.1    255.255.255.0        lstb4.0.11
196.113.178.15   2154  146603365    lstb5.1    255.255.255.0        lstb5.0.11
.
.
.
cli>
```

If you enter any parameter except **all**, a subset of the attributes is displayed.

Monitoring ND

The neighborhood discovery (ND) process runs on every NP in an LS2020 network. It collects information about the local topology of the network, keeps track of the interface modules that are added to or removed from service, and determines which NP controls each interface module.

To monitor the status of the ND software, follow these steps:

Step 1 Verify that the target switch is correct by entering the following at the `cli>` prompt:

```
cli> show snmp
```

If you need instructions on changing the target switch, see the section on "Setting the Target Switch for CLI Commands" in the chapter entitled "Command Line Interface."

Step 2 Enter the following at the `cli>` prompt:

```
cli> show nd <parameter>
```

Where

<parameter> is all (default)
general
ndcards
neighbors
switchupdown
switchstat
client

The following is an example of the display you see when you enter **show nd all**:

```
cli> show nd all
Software Version Number:             ndd: (ls2_1_1) compiled Oct 16 1995 @ 02
ND Process ID (PID):                 49
Memory In Use:                       347686 Bytes
Timers Processed:                    1456263
Number of Line Cards managed by ND:  7
Neighbor NPs known to ND:            4
Registered ND Client Processes:      16

Cards Managed by ND:
EIA: lstb8.3    Channel: 26115   State: Up
EIA: lstb8.4    Channel: 9988    State: Up
EIA: lstb8.5    Channel: 5637    State: Up
.
.
.

ND Neighbor Information
EIA: lstb8.1          Channel:     34049 State: Up
EIA: lstb8.2          Channel:     62722 State: Up
.
.
.

ND Up/Down Parameters:
Slot:  1 Oper Intvl: 900   J: 2     K: 31    M: 2     N: 32
         Admn Intvl: 900   J: 2     K: 31    M: 2     N: 32
Slot:  2 Oper Intvl: 900   J: 2     K: 31    M: 2     N: 32
         Admn Intvl: 900   J: 2     K: 31    M: 2     N: 32
Slot:  3 Oper Intvl: 900   J: 2     K: 31    M: 2     N: 32
```

```
         Admn Intvl: 900   J: 2     K: 31    M: 2     N: 32
.
.
.

ND Switch Statistics:
Slot:  1  In Cells:    485589  Errs:         0  Out Cells:    485589  Errs: 0
Slot:  2  In Cells:    486066  Errs:         0  Out Cells:    485688  Errs: 0
Slot:  3  In Cells:    484356  Errs:         0  Out Cells:    485689  Errs: 0
.
.
.

ND Clients:
PID:  56        Type: sys       Subtype:    5 EIA: 0.0             Mask: 0x0
PID:  68        Type: Unknown   Subtype:   11 EIA: 0.0             Mask: 0x200
PID:  69        Type: Unknown   Subtype:    9 EIA: 0.0             Mask: 0x230
.
.
.
cli>
```

If you enter any parameter except **all**, a subset of the attributes shown above is displayed.

Monitoring Processes

These steps let you monitor the status of a particular process. You select the process you want to monitor by entering its number or name.

Step 1 Verify that the target switch is correct by entering the following at the `cli>` prompt:

```
cli> show snmp
```

If you need instructions on changing the target switch, see the section on "Setting the Target Switch for CLI Commands" in the chapter entitled "Command Line Interface."

Step 2 If you do not know which processes are running, enter the following at the `cli>` prompt:

```
cli> walksnmp pidName
```

This command lists the process identification (pid) numbers and alias names of all processes running on this LS2020 switch. The pid numbers follow the term "Name: lwmaTrapCliAlias," and the alias names follow the term "Value."

The following is an example of the display you see when you enter **walksnmp pidName**:

```
cli>   walksnmp pidName
Name: pidName.49              Value: ndd
Name: pidName.54              Value: lcmon
Name: pidName.55              Value: trapmon
Name: pidName.56              Value: watchdog
Name: pidName.57              Value: mma
Name: pidName.68              Value: sysinit
.
.
.
cli>
```

Step 3 Choose the processes that you want to monitor from this list.

Step 4 To display the status of a particular process, enter the following at the `cli>` prompt:

```
cli> show pid {<#>|<alias>} [<parameter>]
```

Where

{<#> | <alias>} is the number of the process or the alias name of the process from which you want to display status.

[<parameter>] is all (default)
name
clialias
createtime
adminstatus
operstatus
traplevel

The following is an example of the display you see when you enter **show pid 9 all:**

```
cli> show pid 71 all
PID Name:                       rmon
PID Alias:                      RMON
PID Up Time:                    121 Hr 43 Min 25 Sec
PID Administrative Status:      Active
PID Operation Status:           Active
PID Trap Level:                 Info
cli>
```

The same information displays when you enter **show pid lcc9.** (The lcc9 entry is the alias name for process 9.)

If you enter any parameter except **all**, a subset of these attributes displays.

Monitoring SNMP Parameters

SNMP operation is controlled by a number of parameters that are set to default values when the system is started. These parameters can be changed through use of the **set snmp** command. (See the "SNMP Commands" chapter for a discussion of this command.)

To monitor SNMP parameters, enter the **show snmp** command at the `cli>` prompt. The following is an example of the display you see when you enter **show snmp:**

```
cli> show snmp

Community: public
HostName:  localhost
cli>
```

Monitoring the Test and Control System

The test and control system (TCS) is a fully integrated, yet autonomous, computer system with the LS2020 chassis. There is a TCS microcomputer on each NP, interface, and switch module in an LS2020 chassis. The TCS has a separate communications path from the LS2020 switch.

The main functions of the TCS are to manage low-level operations of each module and to provide access to all modules in the chassis through a local console port, which is supported by the TCS microcomputer on the switch card.

Monitoring TCS

To monitor the values collected by the TCS on a particular card in the chassis, follow these steps. The cards you can monitor are in slots 1 — 10, switch A (SA), and switch B (SB).

Step 1 Verify that the target switch is correct by entering the following at the `cli>` prompt:

```
cli> show snmp
```

If you need instructions on changing the target switch, see the section on "Setting the Target Switch for CLI Commands" in the chapter entitled "Command Line Interface."

Step 2 Enter the following at the `cli>` prompt:

```
cli> show tcs <card #> [<parameter1>] [<parameter2>]
```

Where

<card #> is 1 — 2 for NPs
2 — 10 for line cards
SA and SB for switch cards

Note This command is not available on the SUN4 version of the CLI.

Table 4-7 describes <parameter1> and <parameter2>.

Table 4-7 Parameter Options—show tcs Command

<parameter1> =	**<parameter2>[1] =**
all (default)	N/A
state	N/A
config	all assembly postcode serialnum slavecode type
daughter	all assembly serialnum
paddle	all assembly serialnum
oem	all assembly serialnum
midplane	all assembly serialnum nodeaddress
temperature	N/A
voltage	N/A
power	N/A

1. Parameter2 is dependent on parameter1. When you enter a command, you first select the value of parameter1 from this table. Based on that selection, you can choose a value of parameter2 that is associated with parameter1.

When you enter **show tcs 1 all**, information similar to the following is displayed. If you use any value except **all** for the argument, a subset of this information is displayed.

```
cli> show tcs 1 all
Slot  1 State:
        Power Supply:           OK
        Temperature:            OK
        Clock:                  OK
        POST:                   OK
        XILINX Load:            OK
        Application Load:       OK
        Paddle Card:            PRESENT
        Paddle Card:            OK
        Paddle Card Override:   DISABLED
        Paddle Power Override:  DISABLED
        Flash:                  ENABLED
        CP POST:                ENABLED
        Application:            ENABLED
        Card:                   ENABLED
        TCS VCC Power:          OK
        VCC Power:              OK
```

```
        VPP Power:              OK
        SCSI Power:             OK
        Top Temperature:        OK
        Bottom Temperature:     OK
        Board Initialization:   OK
        Flash Initialization:   OK
        TCS HUB:                OK
Slot  1 Config Assembly:        2121701G01
Slot  1 Config Postcode:        00
Slot  1 Config Serialnum:       AA841905
Slot  1 Config Slavecode:       C1
Slot  1 Config Type:            N1
Slot  1 Daughter Assembly:      2121861G02
Slot  1 Daughter Serialnum:     AA841914
Slot  1 Paddle Assembly:        2121992G01
Slot  1 Paddle Serialnum:       315-03
Slot  1 Oem Assembly:
Slot  1 Oem Serialnum:
Slot  1 State:
        Top:     89 F (warning 165 F, shutdown 174 F)
                 31 C (warning  73 C, shutdown  78 C)
        Bottom:  93 F (warning 131 F, shutdown 174 F)
                 33 C (warning  55 C, shutdown  78 C)
Slot  1 Voltage:
        TCS VCC Voltage:        5.004 (Normal Range: 4.614 / 5.371)
        VCC Voltage:            5.004 (Normal Range: 4.370 / 5.615)
        SCSI Voltage:           4.785 (Normal Range: 4.614 / 5.371)
        VPP Voltage*:           0.000 (Normal Range: 11.067 / 12.858)
                *VPP Voltage Is Valid Only During FLASH Initialization

Slot 1 power: On
cli>
```