Configuration Procedures

This chapter tells you how to perform configuration tasks for a LightStream 2020 multiservice ATM switch (LS2020 switch). It tells you how to create configuration objects (chassis, cards, and ports), how to provision for permanent virtual circuits (PVCs), and how to configure virtual LAN internetworking attributes. It also describes general database management functions, such as saving and backing up the global database and updating a local database.

This chapter does not define configuration attributes, nor does it recommend attribute settings: that material is provided in the following chapter, "Configuration Attributes."

Preparing to Configure a Network

To create a new configuration, you need information on each LS2020 switch. If the switch is already installed in the network, you can use the configurator's Verify function to obtain default settings for many attributes. The section entitled "Verifying a Database" later in this chapter has information on the verification procedures.

If the switch is not installed, you need to consider the following points:

- Hardware configuration:

    — Determine how many network processors (NPs) are in the chassis.

    — Determine which NPs, if any, require NP IP addresses as well as NP IP masks. (For information on IP addresses, refer to the section "IP Address Attributes" in the following chapter.)

    — Obtain the primary Ethernet IP address, secondary IP address (if one is needed), subnet mask, and default router address (if one exists).

    — Determine the number of line cards of each type (LSC, MSC, PLC, and CLC).

    — Determine whether the line cards are to be configured as edge or trunk interfaces.

    — Determine the location (chassis slot) of each line card.

    — Determine how many ports of each type are to be configured on each line card.

- Determine the names you will assign to the nodes, cards, and ports in your LS2020 network. (The configurator creates default names for cards and ports, but you can change them if you want to.)

- Obtain the chassis ID number for each node. Use the CLI command **show chassis** to display it.

- Determine how many trunk ports will connect this LS2020 switch to others in the network. What will be the bit rate on each trunk?

- Determine how many edge ports will connect this LS2020 switch to devices outside the LS2020 network. For serial ports, what will be the bit-rate for each one?

- Familiarize yourself with the configuration of edge devices that will connect to the LS2020 network. For example, you should know

  — What types of interface are present (frame relay, FDDI, ATM UNI, etc.)?

  — What is the destination and what are the bandwidth requirements for each PVC?

  — Which local management interface (LMI) is used?

  — Which device provides the clocking? What is the speed?

- List attributes and values for each chassis, card, and port.

- If your LS2020 network is configured with bridging interfaces, you should have information on the following points:

  — Are the default values for the spanning tree bridge attributes acceptable for your application?

  — Do you want to specify any custom filters for those ports?

  — Do you need to specify any static bridge filters for devices on the attached LANs?

  — Do you want to create any workgroups for those ports? multicast groups? traffic profiles?

- For each virtual circuit, you will be required to specify the node, card, and port at each end and the required bandwidth. As you configure the virtual circuits, you might find it helpful to create a form like the one shown in Figure 3-1.

Figure 3-1   Sample Chart of Virtual Circuits

Node A				Node B			
Node Name	**Slot No.**	**Port No.**	**DLCI/VCI**	**Node Name**	**Slot No.**	**Port No.**	**DLCI/VCI**
LS1	2	0	16	LS2	9	0	500
LS1	2	0	17	LS2	9	1	510
LS1	2	0	18	LS2	9	1	520
LS1	3	2	40	LS2	2	1	600
LS1	4	2	50	LS2	3	1	650

Now you are ready to use the configurator to create and load a configuration database.

Starting the Configurator

The StreamView configurator includes three separate configuration programs:

- Node Configure (also known as CFG), which you use to configure chassis, cards, ports, internetworking entities (such as bridges and filters), and SNMP trap attributes

- PVC Configure (also known as PVC), which you use to configure permanent virtual circuit (PVC) attributes

- VLI Configure (also known as VLI), which you use to configure virtual LAN internetworking (VLI) attributes

All of the configuration programs read from and write to the same database. A locking mechanism allows only one configurator to write to the global database at a time. (See the section entitled "Overriding a Configurator Lock" later in this chapter for information on the locking mechanism.)

You can start and run the configurator under HP OpenView or without it. The following sections describe both procedures.

Starting Under HP OpenView

You start each of the three configuration programs in much the same way. In the following procedure, Node Configure is used as an example, with any differences being noted. The assumption here is that HP OpenView is installed and functioning properly.

To start the configurators, use the following procedure:

Step 1   In the OpenView Root dialog box, shown in Figure 3-2, double-click on the IP Internet icon. An IP Internet map is displayed (Figure 3-3).

Figure 3-2   **HP OpenView Root Dialog Box**
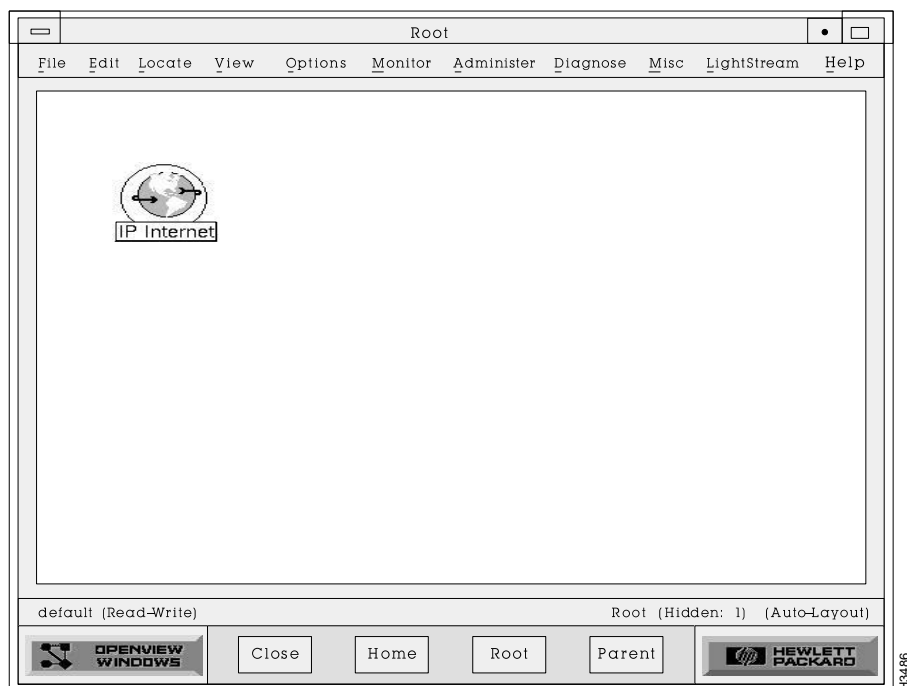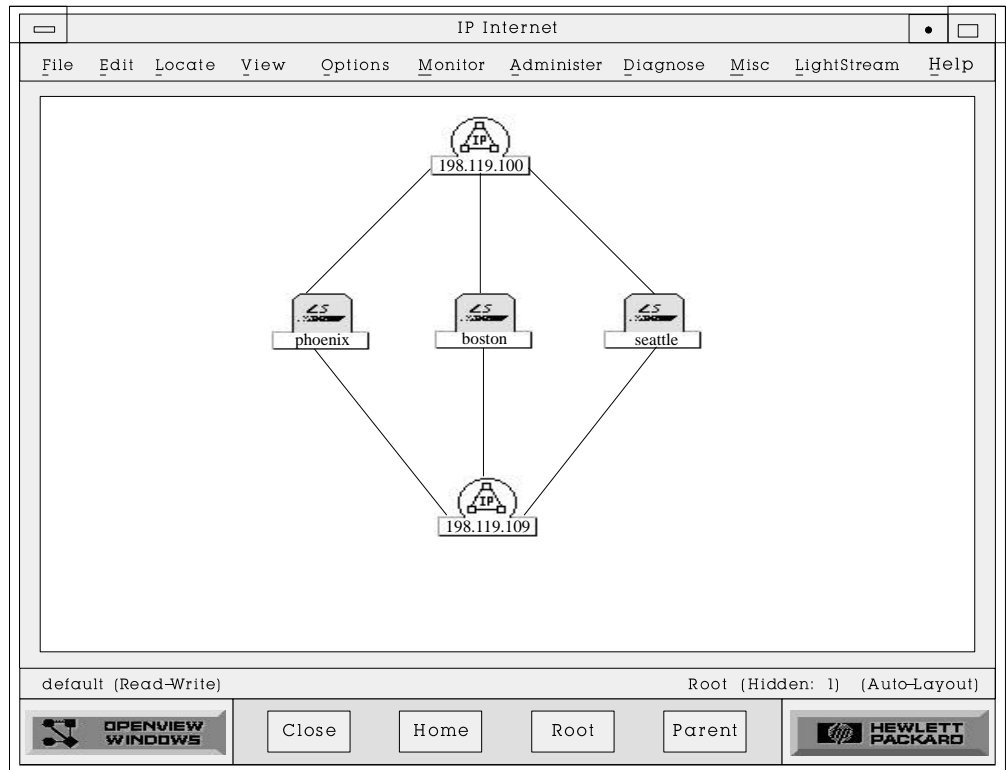
Figure 3-3   IP Internet Map

Step 2   Pull down the LS2020 menu on the menu bar, and click on Node Configure, PVC Configure, or VLI Configure.

Step 3   Select the database access mode on the pop-up dialog box that is displayed. If you select read/write, the database is locked to other users and you can make changes to the database file. If you select read only, the file is not locked but you can only examine the settings in the file. If the configurator reports that someone else is using the database, see the section entitled "Overriding a Configurator Lock" later in this chapter before proceeding.

Note   The configurator automatically opens the default database file (defined by the LSC_DATABASE variable that is set during installation). You can open a different file, such as a backup file, using the procedure in the section entitled "Opening a Database File" later in this chapter.

Starting Without HP OpenView

To start the configurators without HP OpenView, use this procedure:

Step 1   At the system prompt, type **cfg, pvc**, or **vli.**

Step 2   Select the database access mode on the resulting pop-up dialog box. If you select Read/Write, the database is locked to other users, and you can make changes to the database file. If you select Read Only, the file is not locked, and you can only examine the settings in the file. If the configurator reports that someone else is using the database, see the section entitled "Overriding a Configurator Lock" later in this chapter before proceeding.

Note The configurator automatically opens the default database file that is set during installation. You can open a different file using the procedure in the section entitled "Opening a Database File" later in this chapter.

General Configuration Procedures

Table 3-1 summarizes steps for performing some frequently used configuration procedures.

Note The configurator uses standard Motif conventions for the graphical interface. See your Motif documentation for more detailed information.

Table 3-1   Frequently Used Configuration Procedures

Action	Procedure
Store changes made in dialog box	Click on the OK button at the bottom of the dialog box.
Discard changes made in dialog box	Click on the Cancel button at the bottom of the dialog box.
Return to the previous dialog box	Click on the OK button (any changes are stored). Click on the Cancel button (any changes are ignored).
Save changes to global database	Pull down the File menu on the Node Configurator dialog box and select Save. If you specify a chassis update, changes are written to the global database immediately and sent to the local database at the time specified by the UpdateTime attributes.
Enter information in a field box	Click inside the box and type the information.
Edit information in a field box	Use the left and right arrows on the right keypad to move around the field box. Double-click on an entry to select it, or press the left mouse button and, keeping it down, drag it over the characters you want to select. Use the Backspace key to delete selected items one character at a time.
Select a radio button attribute	Click on one of two (or more) radio buttons to select among mutually exclusive settings (for example, enable/disable).
Select a check button attribute	Click on a check button to select that attribute value. (You can click on more than one check button: check buttons are used for values that are not mutually exclusive.)
Select from an Option button list	**1** Click on the arrow beside the option button to display all available selections. **2** Scroll through the list by clicking repeatedly on either the up or down arrow, or by clicking on the scroll bar and sliding it in the desired direction. **3** Click on the desired setting; the list disappears and the selected value is displayed in the option button.

Action	Procedure
Select from a list box	**1** To select one entry, click once on that entry.
	2 To select multiple contiguous entries, click on the first entry, press the mouse button and, keeping it down, drag over the entries you want to select. (In some cases, the configurator does not support multiple selections in a list. These are noted where appropriate.)
	3 To select multiple noncontiguous entries, click on the first entry, press the Control key, and click on the other desired entries. (In some cases, the configurator does not support multiple selections in a list. These cases are identified in the text.)
Deselecting from a list box	Click on a pre-selected entry, or hold the Control key down and click the mouse button.
Add to a list box	**1** Enter new information in field boxes or by selecting a radio or check button.
	2 Click on the Add button and the entry is added to the list.
Delete an entry from a list box	**1** Click on the entry to be deleted.
	2 Click on the Delete button and the entry is removed from the list.
Edit an entry in a list box	**1** Click on the entry to be edited.
	2 Enter changes and click on the Edit button. The list is updated with the new attributes.

Once you start the configurators, you can make entries or changes in the global configuration database. The information is not written to the global database until you perform the save operation. The save operation is discussed in the section entitled "Saving or Aborting Changes" later in this chapter. Information from the global database is not sent to a switch until you specify an update time.

Creating a Chassis

This section tells you how to create and configure an LS2020 chassis object, starting at the Node Configurator dialog box. Use the Node Configure tool (cfg) to create a chassis object.


Note In order for the configurator to be able to access an LS2020 node through IP, your network administrator must establish and maintain the /etc/hosts file on the Sun workstation running the configurators. This file correlates the LS2020 node name with an IP address and is needed for communication between the NMS and the switches.

You can create a configuration file for a node before or after it is installed. In either case, the name given to the chassis during installation should be the same name used during configuration and the same name that is entered in the /etc/hosts file. (A chassis can be configured with the IP address being used as a name if the /etc/hosts file or name server is not available.)

Note This section does not give recommended settings nor does it describe the various attributes that you can configure using this procedure. See the following chapter, "Configuration Attributes," or the online help for that type of information.

In the Node Configurator dialog box (Figure 3-4), the Chassis Name list box gives the names of all LS2020 chassis that are currently entered in the global database file. This does not mean that the chassis have been installed; it simply means that someone has used the configurator to create database entries for them.

Figure 3-4   **Node Configurator Dialog Box**
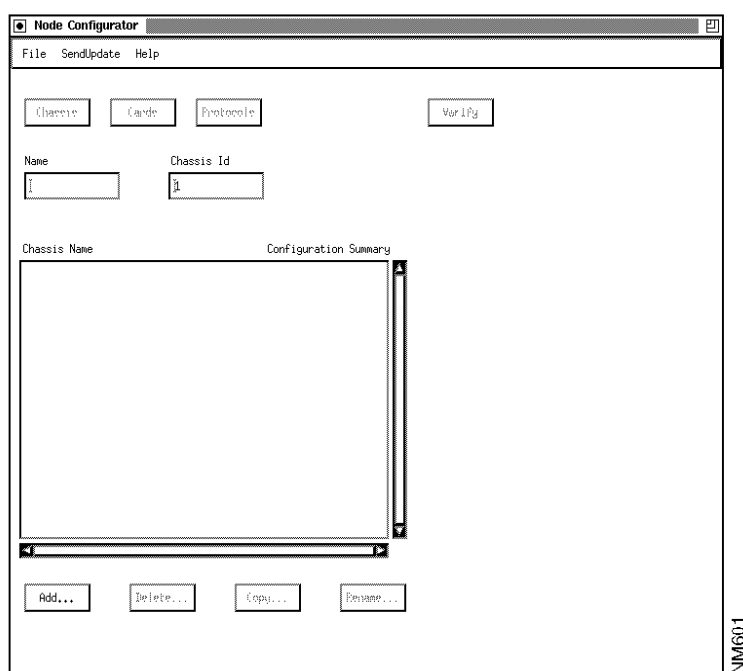
Here are the steps for creating a node configuration file. The attributes used in this task are described in the following chapter in the section "Chassis Attributes."

Step 1   If you are adding a new chassis, click in the Name field box above the list and type in a name. The name should be unique and should have no more than 39 characters. (Do not use a name that begins with a number or that includes quotation marks or other special characters.)

Step 2   If the chassis has not been installed yet, click in the Chassis ID field box and type in a unique ID number. You can use a temporary number. (Once the chassis is installed, you can use the Verify function to get the actual ID number.)

Step 3   Click on the Add push button, and the new chassis name is added to the list.

Step 4   Click on the entry in the Chassis Name list to select the chassis you are going to configure.

Step 5   If you are configuring a chassis that has already been installed, you can use the Verify function to retrieve the configuration attributes that were entered during installation (or set to default values by the software). This saves you from having to re-enter that information. The Verify function is discussed later in this chapter under the heading "Verifying CFG Attributes."

Step 6   Click on the Chassis button to reach the Chassis Configuration dialog box (Figure 3-5).

Figure 3-5   Initial Chassis Configuration Dialog Box

Step 7   The dialog box provides field boxes for the primary and secondary IP addresses, IP subnet mask, NP (Ethernet) IP address, NP IP subnet mask, and default router address attributes. You must set a primary IP address and subnet mask. Set any other address or mask attributes as required. (If you want more information on the attributes, click on the Help button.)

Step 8   The dialog box also contains two optional attributes, system contact and system location. Make entries as desired.

Step 9   You can set SNMP agent attributes in this dialog box: you can set the trap filter level or enable or disable the trap log.

Step 10 To store the changes you have made in this dialog box, click on the OK button. This returns you to the Node Configurator dialog box.

You have now created and configured a chassis object; you can go on to configure card objects, or you can delete, copy, or rename a chassis.

Deleting a Chassis

To delete a chassis, use the following procedure:

Step 1   Click on the appropriate entry in the Chassis Name list.

Step 2   Click on the Delete button.

Step 3   A pop-up dialog box is displayed asking if you want to delete the chassis. Click on the OK button to delete the chassis. The record is deleted and the entry is removed from the Chassis Name list. (Click on the Cancel button if you do not want to delete the chassis.)

Note   You cannot delete a chassis that has been configured with PVCs. You must delete the PVCs and update the chassis before you can delete the chassis.

Copying a Chassis

To copy a chassis, use the following procedure:

Step 1   Click on the appropriate entry in the Chassis Name list.

Step 2   Click on the Copy button. A pop-up dialog box is displayed.

Step 3   Enter a new chassis name and chassis ID in the field boxes provided. Make entries for the NP IP address and for the primary and secondary IP addresses.

Step 4   Click on the OK button to copy the chassis. All chassis, card, port, and bridging attributes are copied to the new chassis, and the entry is added to the Chassis Name list. (Click on the Cancel button if you do not want to copy the chassis.)

Note   The PVC and VLI attributes for the chassis are not copied.

Step 5   Rename the cards and ports, if desired. The configurator does not do this for you.

Renaming a Chassis

To rename a chassis, use the following procedure:

Step 1   Click on the appropriate entry in the Chassis Name list.

Step 2   Click on the Rename button. A pop-up dialog box is displayed.

Step 3   Enter a new chassis name in the field box provided.

Step 4   Click on the OK button to rename the chassis. The new chassis name is added to the Chassis Name list, and the previous name is removed. (Click on the Cancel button if you do not want to rename the chassis.)

Note   When you rename a chassis, the PVC and VLI attributes associated with the chassis are retained. You do not have to re-enter them.

Creating Cards

This section describes the procedure for creating and configuring database objects for the following kinds of LS2020 card:

- Network processor (NP)

- Low-speed line card (LSC)

- Medium-speed line card (MSC)

- Packet line card (PLC)

- Cell line card (CLC)

The NP has no ports and must be inserted in slot 1. (If you have a backup NP, insert it in slot 2.) The NP receives little attention in this manual because it lacks edge and trunk connections and so differs from the other cards discussed here. Switch cards have no configurable attributes and thus are not listed here at all.

Before executing this procedure, you must have created a chassis object. In this procedure, you are assumed to be starting out in the Node Configurator dialog box (Figure 3-4), where the last procedure, Creating a Chassis, ends.

Before you configure any cards, you need to know what cards are installed, their slot numbers, and their special (nondefault) configuration attributes. You use this information as you create the configuration file. If the switch has already been installed, you can use the Verify button on the Node Configurator dialog box to retrieve card configuration information from the switch. The information was entered during installation or set to default values by the software.

To configure cards, use this procedure. The attributes used in this task are described in the next chapter in the section "Card Attributes."

Step 1 In the Node Configurator dialog box, click on the chassis you wish to configure cards for and then click on the Cards push button. The Cards Configuration dialog box (Figure 3-6) appears. The box shows the slot numbers in the LS2020 chassis.

Figure 3-6   **Cards Configuration Dialog Box**
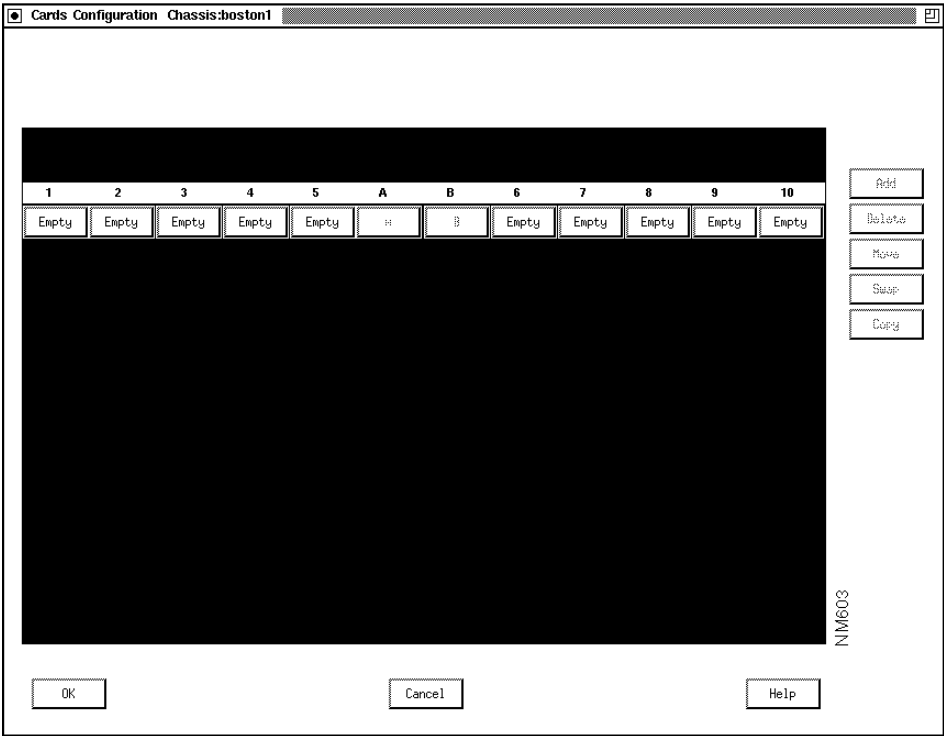
Note   The NP card normally occupies slot 1; slot 2 holds either a backup NP card or a line card. Slots 3 through 10 are for line cards only. Slots A and B are for switch cards.

Step 2 Click on the push button below the number of the slot that you want to configure. This button is labeled Empty, or, if it has been previously configured, it is labeled with an abbreviation for the card type. After you click on a push button, card configuration attributes are displayed across the top of the dialog box (see Figure 3-7).

Figure 3-7   Cards Configuration Dialog Box with Card Attributes Displayed
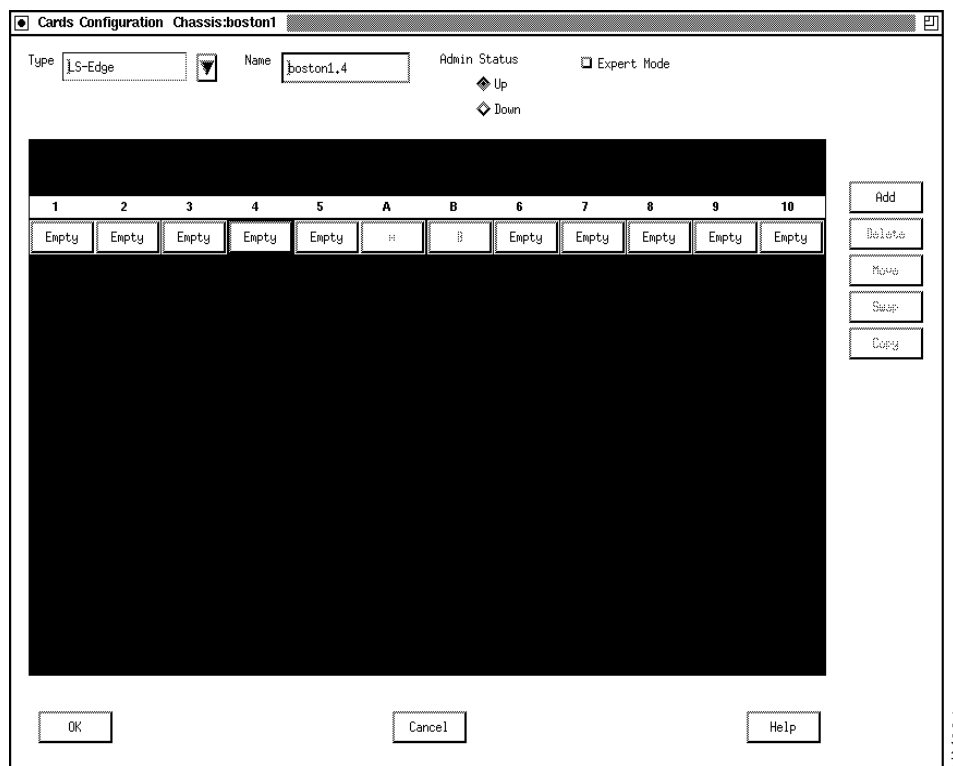
Step 3 To select a card type, pull down the Type button and click on the desired card type. The list closes, and the selected type is displayed on the Type option button.

Step 4 You can enter a name for the card by clicking in the Name field and then typing a name. (Naming a card is optional. Choose a name with no more than 19 characters, and do not use a name that begins with a number or includes quotation marks.) If you do not enter a name, the configurator provides a default name, which uses the switch name as a base. For example, if the chassis name is Boston1, the default name for the card in slot 4 is Boston1.4.

Step 5 To change the administrative status of a card, click on the appropriate radio button. The default card status is up. It is usually best to leave the status set to up in the configuration.

Note   If you are an expert user, continue to Step 6. Otherwise, go to Step 7.

Step 6 To change the maximum number of virtual circuits allowed on the card, click on the Expert radio button. A default value is provided for this attribute, and in most cases you should not change it.

Step 7 Click on the Add push button. The push button below the slot number is filled in with an abbreviation for the card type that you configured. Push buttons (labeled with question marks) appear in the corresponding slot, the number of push buttons displayed indicating the number of ports available for that type of card.

You have now created and configured a card object. You can delete, move, swap, or copy a card, or you can create ports on the cards that you have configured.

Deleting a Card

To delete a card and its associated ports, use this procedure:

Step 1 In the Cards Configuration dialog box, click on the push button below the number of the card you want to delete.

Step 2 Click on the Delete button. The card name disappears from the button and is replaced with the word Empty, and any port icons are removed.

Note If any PVCs are configured for the card, they must be deleted and the switches must be updated before you can delete the card.

Moving a Card to Another Slot

To move a card and its associated ports from one slot to another, use this procedure:

Step 1 In the Cards Configuration dialog box, click on the push button below the number of the card you want to move.

Step 2 Click on the Move button. The dialog box displays the Selected Destination Slot field (see Figure 3-8).

Note If any PVCs are configured for the card, they must be deleted and the switches must be updated before you can move the card.

Figure 3-8 **Moving a Card from One Slot to Another**
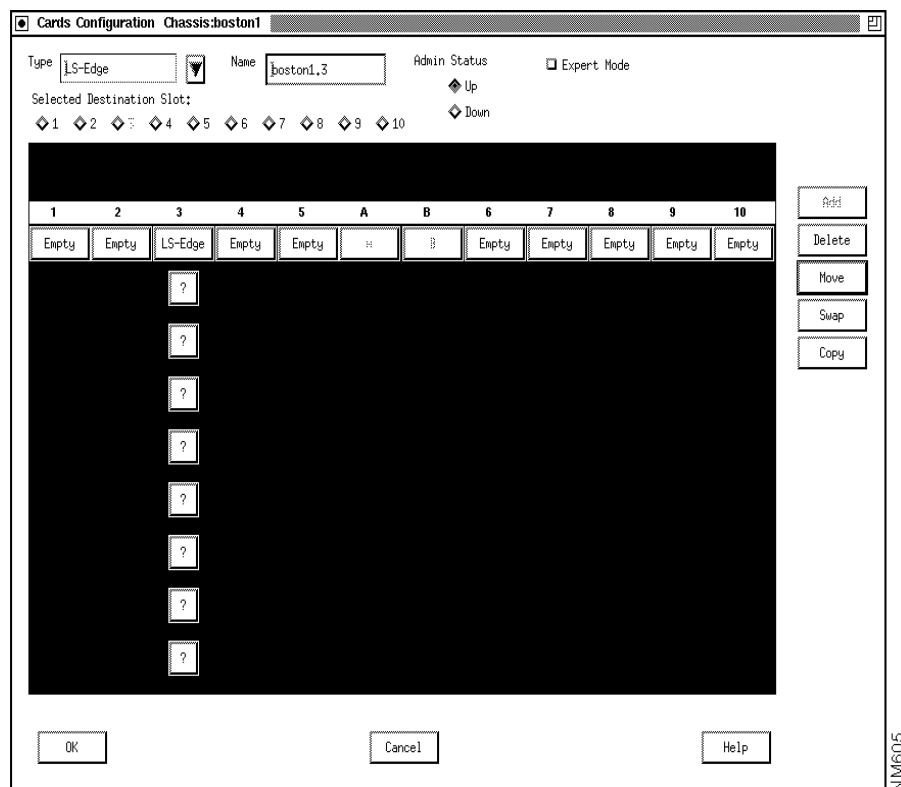
Step 3 Click on the radio button labeled with the destination slot number, and the dialog box is updated to show the card in its new slot. The old slot is labeled Empty.

Step 4 Rename the card and its ports, if desired. The configurator does *not* do this for you.

Swapping Cards Between Slots

To swap two cards and their associated ports between slots:

Step 1 In the Cards Configuration dialog box, click on the push button below the number of one of the cards you want to exchange.

Step 2 Click on the Swap button. The dialog box displays the Selected Destination Slot field.

Note If any PVCs are configured for either card, they must be deleted, and the switches must be updated before you can swap the cards.

Step 3 Click on the radio button labeled with the destination slot number, and the dialog box is updated to show the cards in their new slots.

Step 4 Rename the card and its ports, if desired. The configurator does *not* do this for you.

Copying a Card to Another Slot

To copy a card and its associated ports to a slot:

Step 1 In the Cards Configuration dialog box, click on the push button below the number of the card you want to copy.

Step 2 Click on the Copy button. The dialog box displays the Selected Destination Slot field.

Note PVCs configured for the card are not copied.

Step 3 Click on the radio button labeled with the destination slot number. The dialog box is updated to show the same type of card and ports in the new slot.

Note All port attributes are also copied to the new slot.

Step 4 It is advisable to rename the card and its ports. (This eliminates the confusion that could easily result from the use of duplicate names.) The configurator does *not* do this for you.

Creating Ports

This section explains how to create and configure LS2020 ports with the StreamView configurator. A port's type is determined by its configuration settings and its interface module (line card and access card combination). To configure a port, you first select a card type in the Cards Configuration dialog box. This gives you access to individual port attributes.

The configurator card type names do not correspond directly to interface module names. Table 3-2 matches port types and interface modules with configurator edge card types. Table 3-3 matches port types and interface modules with configurator trunk card types.

Table 3-2   Configuring Edge Ports

If you want to configure this type of port	And you have this type of interface module	You select this type of card in the configurator
Frame relay/frame forwarding	PLC with SAC	SAC-Edge (8 port)
	LSC with LSAC	LS-Edge (8 port)
ATM UNI over T3	CLC with 4 port T3AC	T3-Edge (4 port)
	CLC with 8 port T3AC	T3-Edge (8 port)
	MSC with T3 MSAC	T3-Edge (2 port)
ATM UNI over E3	CLC with 4 port E3AC	E3-Edge (4 port)
	CLC with 8 port E3AC	E3-Edge (8 port)
	MSC with E3 MSAC	E3-Edge (2 port)
ATM UNI over OC-3c	CLC with OC3AC SM	OC3-Edge (1 or 2 ports)
	CLC with OC3AC MM	OC3-Edge (1 or 2 ports)
FDDI LAN	PLC with FAC	FDDI (2 port)
Ethernet LAN	PLC with EAC	Ethernet (8 port)
Fiber Ethernet LAN	PLC with FEAC	Ethernet (8 port)
Circuit emulation	PLC with CEMAC	CEMAC (8 port)

Table 3-3   Configuring Trunk Ports

If you want to configure this type of port	And you have this type of interface module	You select this type of card in the configurator
T1 trunk	PLC with SAC	SAC-Trunk (8port)
	LSC with LSAC	LS-Trunk (8port)
T3 trunk	CLC with 4 port T3AC	T3-Trunk (4 port)
	CLC with 8 port T3AC[1]	T3-Trunk (4 port)
	MSC with T3 MSAC	T3-Trunk (2 port)
E3 trunk	CLC with 4 port E3AC	E3-Trunk (4 port)
	CLC with 8 port E3AC[1]	E3-Trunk (4 port)
	MSC with E3 MSAC	E3-Trunk (2 port)
OC-3c trunk	CLC with 1 port OC3AC SM	OC3-Trunk (1 port)
	CLC with 2 port OC3AC SM[2]	OC3-Trunk (1 port)
	CLC with 1 port OC3AC MM	OC3-Trunk (1 port)
	CLC with 2 port OC3AC MM[2]	OC3-Trunk (1 port)

1. Up to four ports can be used when the module is configured as a trunk.
2. Although the card has two physical ports, only one port can be used when the module is configured as a trunk.

Before creating a port, you must create at least one chassis object and one card object. The card must be the type that is appropriate for the port you want to create (see Table 3-2 and Table 3-3). (For example, if you want to create a frame relay port, you can select LS-Edge or SAC-Edge as the card type.)

If you are configuring the switch before it has been installed, you need to create the configuration file, where you enter the port types for each card as well as the card's nondefault configuration attributes. If the switch has already been installed, you can use the Verify function to retrieve previously set card and port configuration information. This information might have been entered during switch installation, or it could be based on default software values.

Be aware of two conventions used by the configurator, regardless of the type of port you are configuring:

- Each port number is assigned by the configurator based on the position of the Port push button in the Cards Configuration dialog box. Ports are assigned numbers, starting at 0, from top to bottom of the dialog box.

- The configurator creates a default name for each port, which is a concatenation of the chassis name, slot number, and port number. For example, in the chassis named Boston, the name of the first port in the third slot would be Boston.3.0. You can give the port another name if you wish.

The following procedure is for the creation of trunk and edge ports. The general procedure is the same, regardless of the interface type; only the attributes vary.

The port configuration procedure begins in the Cards Configuration dialog box. Figure 3-9 shows the Cards Configuration dialog box, configured with many of the card types described in this section.

Note Configure port 0 on all cards, even if it is not going to be used. Card type is derived from the setting for the lowest configured port. Configuring an unused port does not affect system operation.

Figure 3-9   **Sample Cards Configuration Dialog Box with Several Slots Occupied**
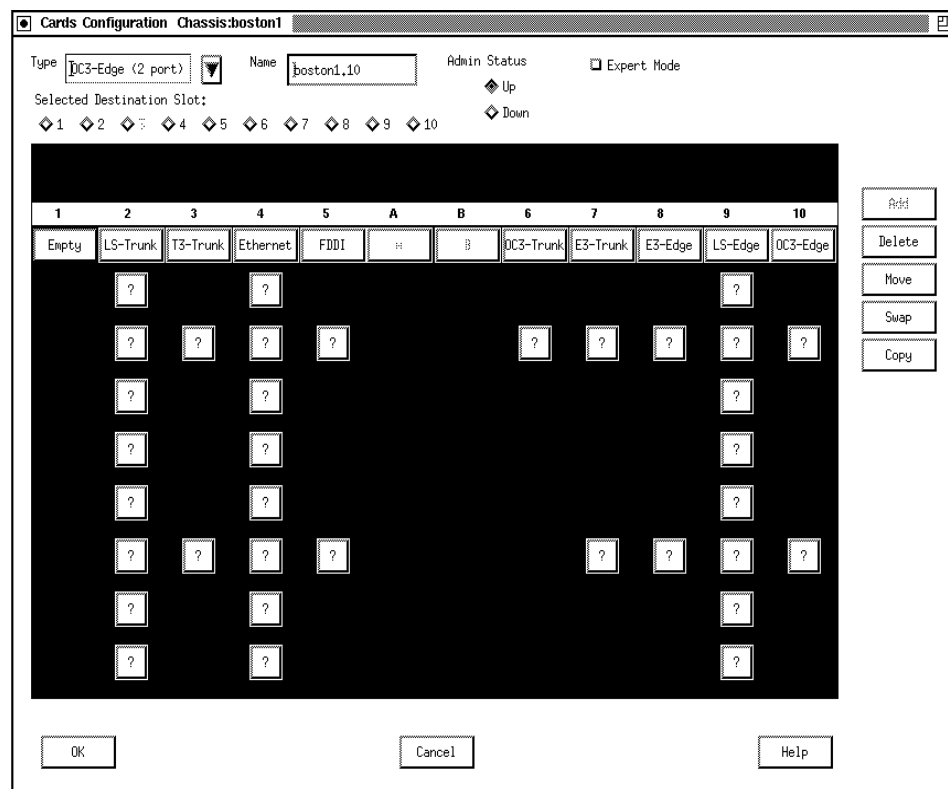
To create a trunk or edge port, use this procedure. The attributes used in this task are described in the next chapter in the section "Port Attributes."

Step 1   In the Cards Configuration dialog box, click on a port button that is labeled with a question mark. A port configuration dialog box is displayed. This dialog box shows the attributes appropriate for the type of port that you are configuring. It also provides default settings for all attributes.

Note   The dialog boxes for the various port types are shown at the end of this procedure.

Step 2   You can use the default name or enter a name for the port. (Naming ports is optional. Choose a name with no more than 19 characters, and do not use a name that begins with a number or includes quotation marks.)

Step 3   Examine the other default values and reset any that require adjustment. Click on the OK button at the bottom of the dialog box; you are returned to the Card Configuration dialog box. If you need information on attributes, click on the Help button on the dialog box or refer to the following chapter, "Configuration Attributes."

You have now finished configuring the physical-level components for your switch: chassis, cards, and ports. You can go on to configure network-level attributes (such as bridging and filtering) and internetwork-level attributes (such as PVC and VLI).

Changing Port Types

To change any port type except the LSC edge port, you must delete the card that the port is on, create the desired card type, and then configure the ports. For instance, to change an E3 edge port to an E3 trunk port, you must

1   Delete PVCs associated with the port and update the switches

2   Delete the E3 edge card

3   Create the E3 trunk card

4   Configure the E3 trunk ports

When you are changing between a frame relay port and a frame forwarding port on an LSC edge card, you must

1   Delete PVCs associated with the port and update the switches.

2   Click on the appropriate radio button at the top of the Frame Relay Port Configuration or Frame Forwarding Port Configuration dialog box. Figure 3-14 shows the frame forwarding port configuration dialog box, and Figure 3-15 shows the frame relay port configuration dialog box.

3   Configure the ports.

Trunk Port Dialog Boxes

The screens in Figure 3-10 through Figure 3-13 show the trunk port dialog boxes.

Figure 3-10   LS Trunk and SAC Trunk

Figure 3-11   T3 Trunk, Four Port
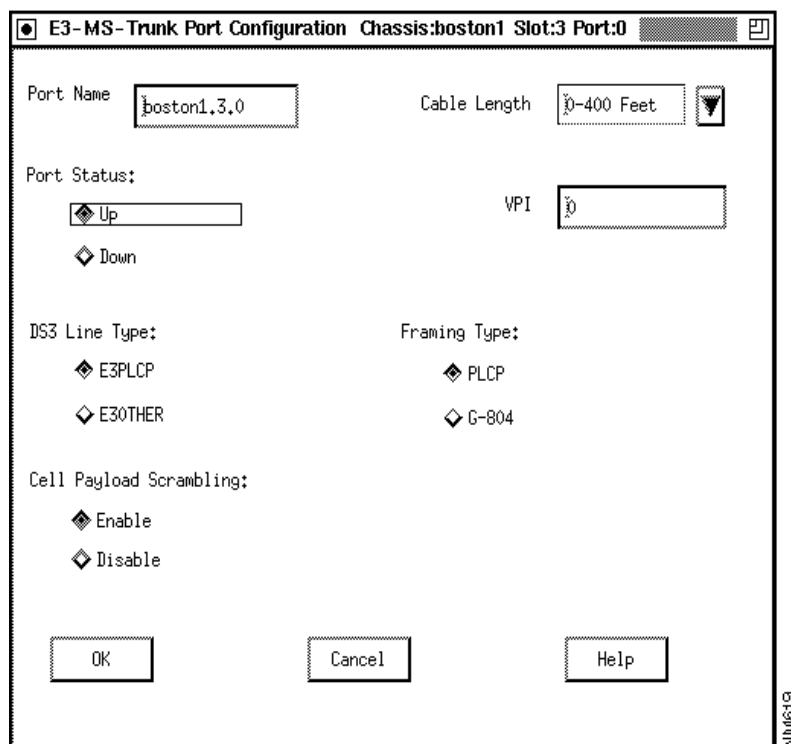
Figure 3-12   E3 Trunk, Four Port

Figure 3-13   OC-3 Trunk

Edge Port Dialog Boxes

The screens in Figure 3-14 through Figure 3-22 show representative edge port dialog boxes. The full listing of all edge port types is available in the Type list box in the Cards Configuration dialog box. The following chapter, "Configuration Attributes," gives details about all fields for all cards.

LS Edge/SAC Edge Port—Frame Relay

At the top left of the dialog box, there are two radio buttons for selecting frame relay and frame forwarding. Frame relay is the default setting. If you want to configure a frame forwarding port, click on that radio button; the dialog box is changed to show frame forwarding attributes. Figure 3-14 shows the frame forwarding dialog box, and Figure 3-15 shows the frame relay dialog box.

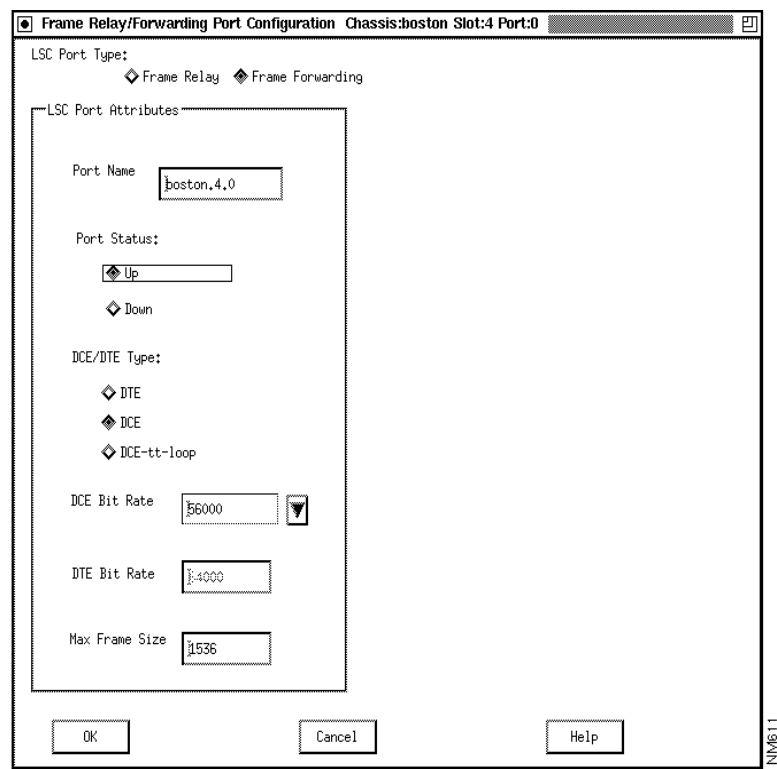**Figure 3-14   LS Edge and SAC Edge, Frame Forwarding**

Figure 3-15   LS Edge and SAC Edge, Frame Relay

Figure 3-16   T3 Edge, Four Port

Figure 3-17   E3 Edge, Four Port
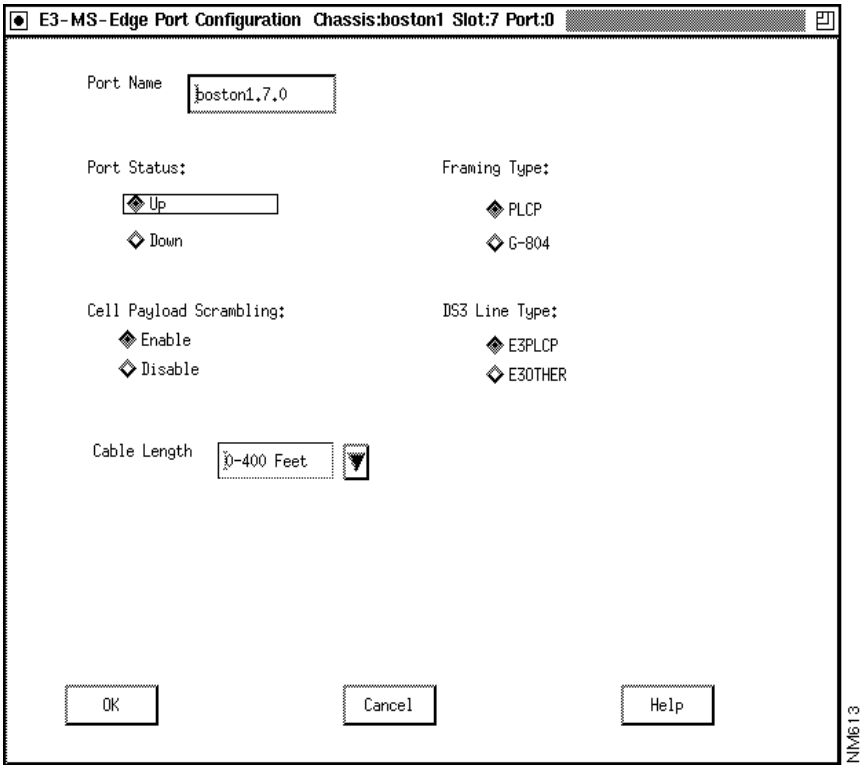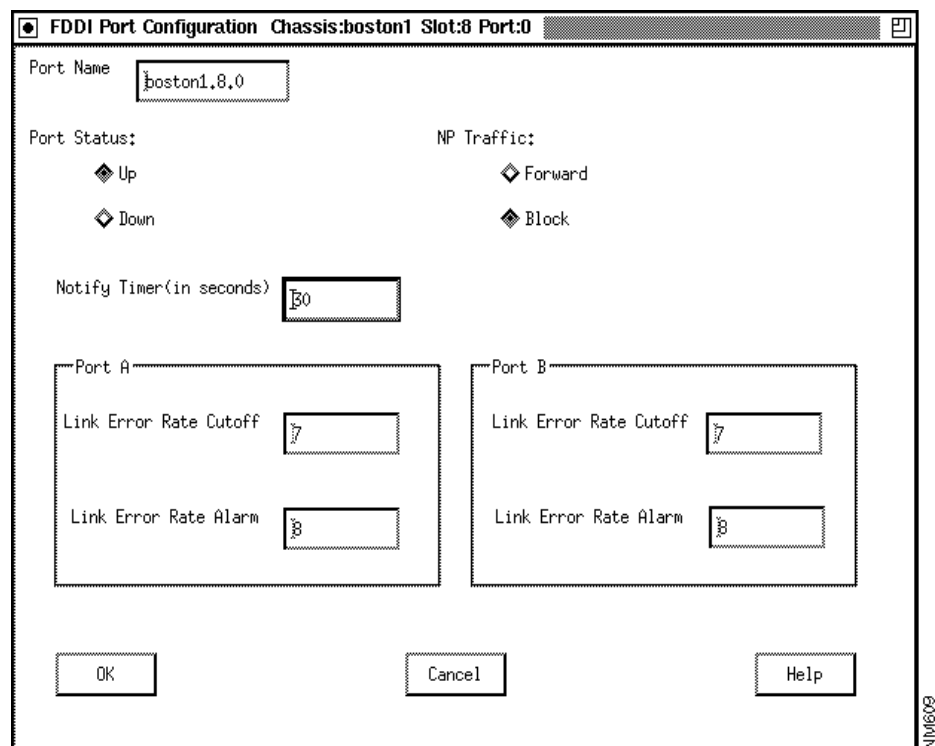
Figure 3-18   FDDI Port
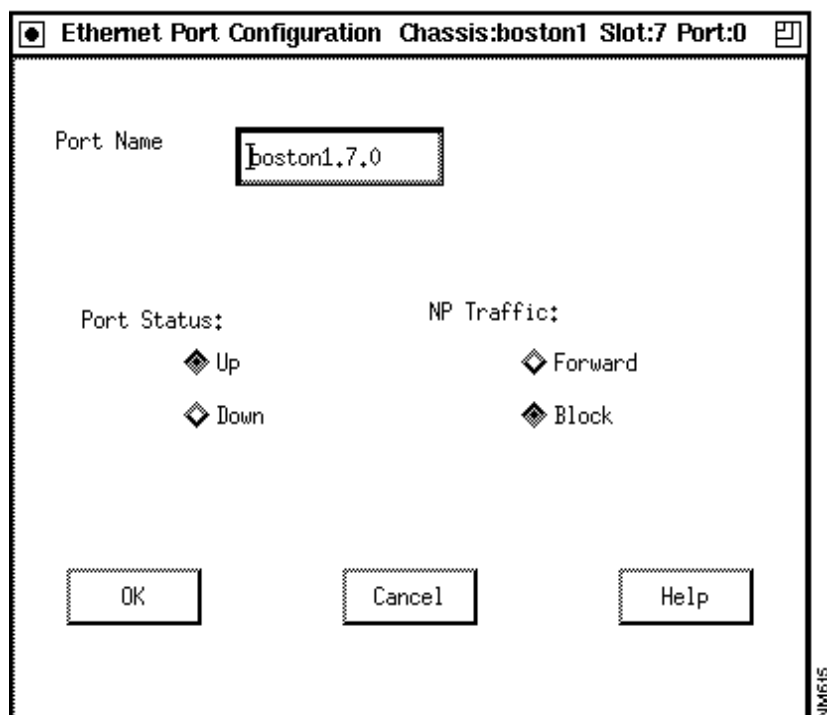
Figure 3-19   Ethernet Port
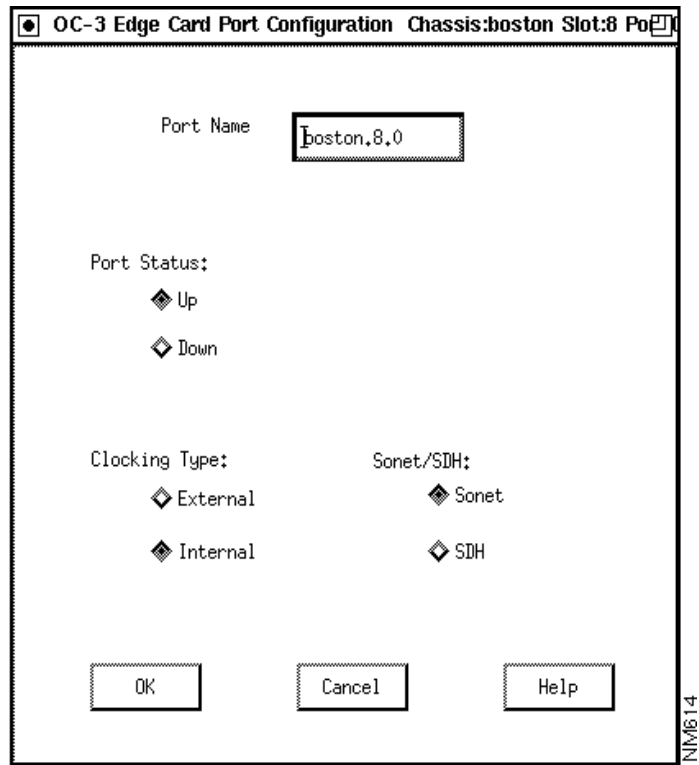
Figure 3-20   Fiber Ethernet Port
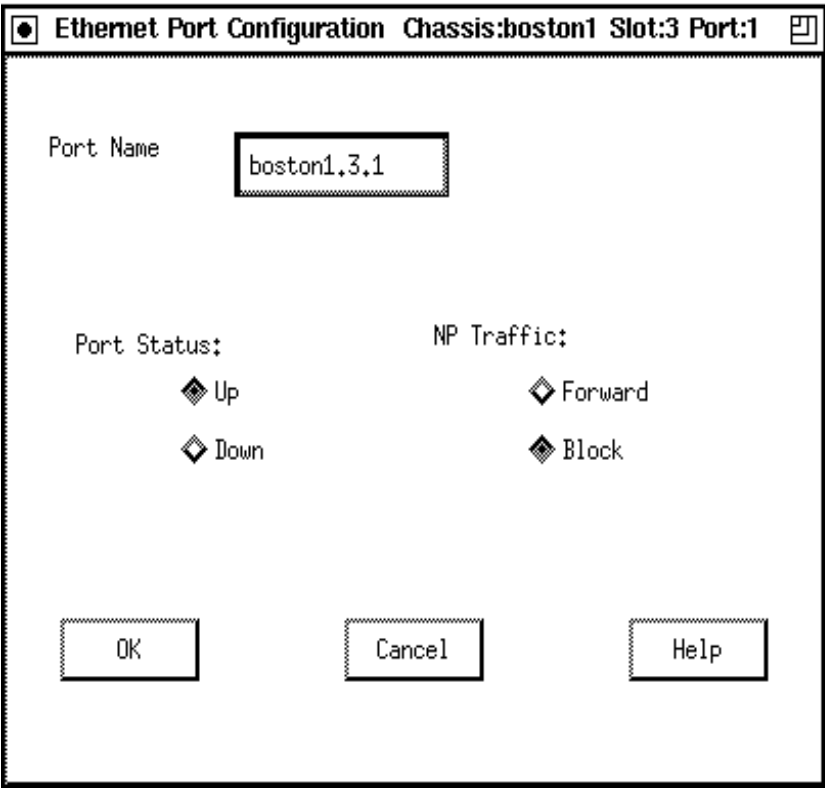
Figure 3-21   OC-3 Edge, One Port

Figure 3-22   T1 CEMAC
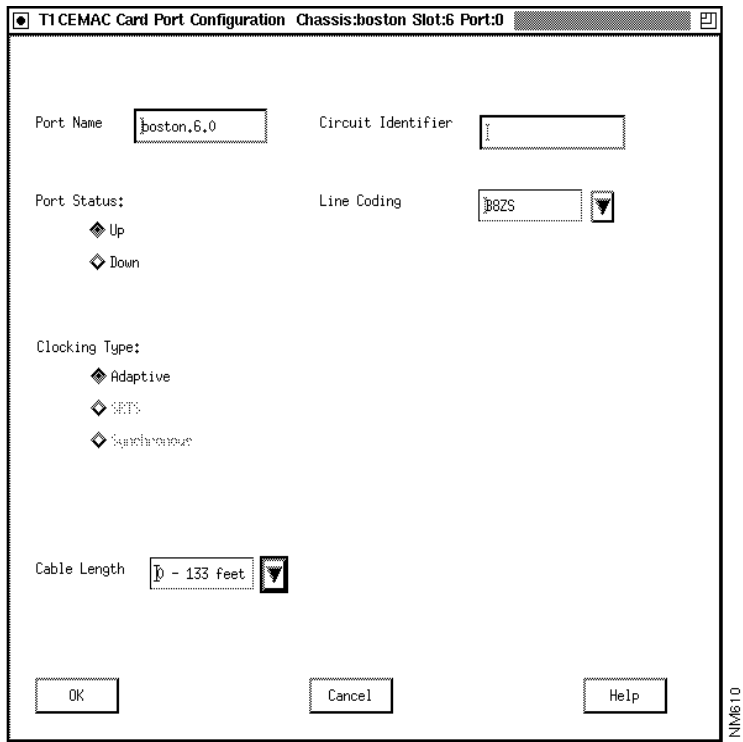
Configuring Network Timing on a Chassis

This procedure explains how to configure a prioritized list of timing sources for the node. This list, called the Preference Table, holds up to ten entries. The entries are listed in order from most desirable timing source to least. The Nettime attributes are described in the next chapter in the section "Nettime Attributes."

Note   The network timing feature is not available in LS2020 nodes that have Release 1 switch cards.

Step 1   In the Node Configurator dialog box, click on the chassis you wish to configure cards for and then click on the Cards push button. The Cards Configuration dialog box (Figure 3-23) appears. The box shows the slot numbers in the LS2020 chassis.

Figure 3-23   Cards Configuration Dialog Box
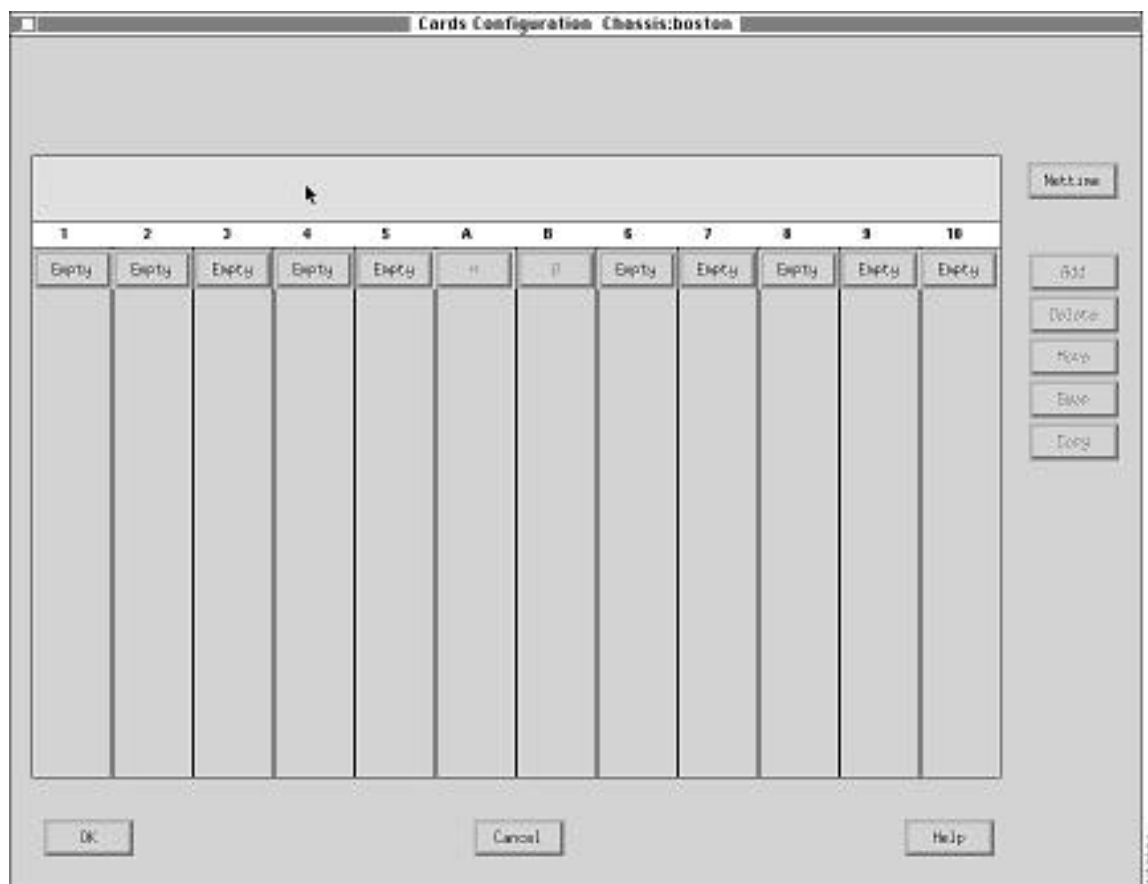
Step 2   In the upper right corner of the Cards Configuration dialog box, click on the Nettime push button. The Nettime dialog box (Figure 3-24) appears. (If the Nettime button is grayed out, the system has detected one or more Release 1 switch cards in the target node and the network timing feature is therefore unavailable.)

Figure 3-24 **Nettime Dialog Box**
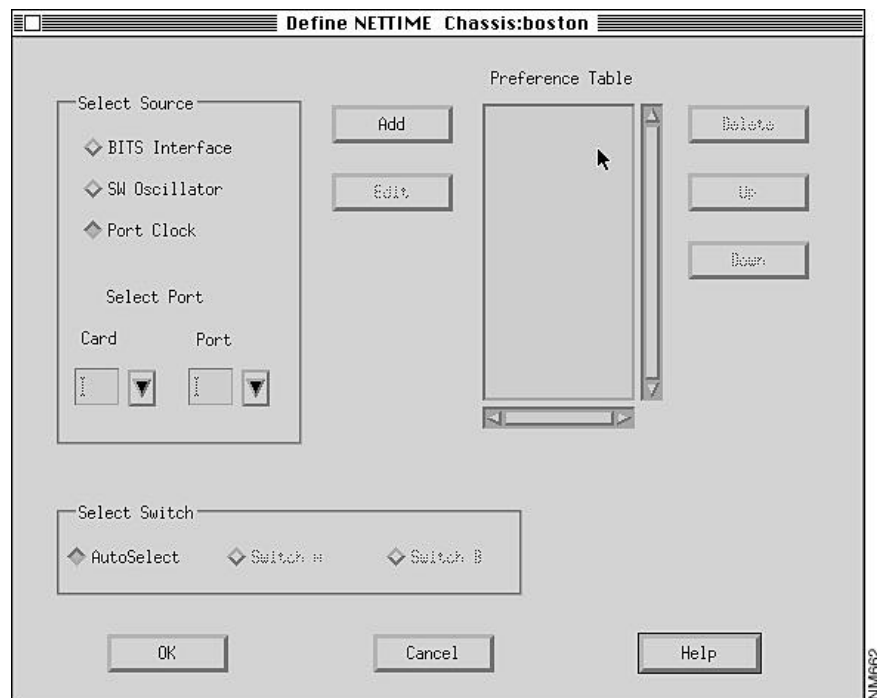
Step 3 To add an entry to the Preference Table, click on one of the timing sources in the Select Source portion of the dialog box. If you select BITS Interface or SW Oscillator, click on the Add button to add that source to the Preference Table. If you select Port Clock, you must specify the card and port from which the timing will be derived. Then click on the Add button to add that source to the Preference Table.

To delete an entry from the Preference Table, select it and click on the Delete button.

To move an entry up or down in the Preference Table, select it and click on the Up button or the Down button.

To replace an entry with a different entry in the same position in the Preference Table, select the entry. In the Select Source portion of the dialog box, click on the radio button for the replacement entry. Then click on the Edit button. The old entry is replaced with the new one in the Preference Table.

Step 4 In the Select Switch portion of the dialog box, you can select the switch card that will provide clocking to the node: Switch A, Switch B, or Autoselect.

Configuring Bridging Attributes

If you have configured any FDDI or Ethernet ports (including Fiber Ethernet ports) in your network, you can configure

- Bridge-level and port-level spanning tree bridge attributes
- Custom filters for ports
- Traffic profiles
- Multicast groups

- Static bridge filters

The following sections describe the procedures you use to configure each of these entities.

Spanning Tree Bridge

Use the following procedure to configure spanning tree bridge attributes. The spanning tree bridge attributes are described in the following chapter, in the section "Spanning Tree Attributes."

Step 1 Click on the Protocols button on the Node Configurator dialog box (Figure 3-4). A dialog box like the one shown in Figure 3-25 is displayed.

Figure 3-25   Protocols Configuration Dialog Box
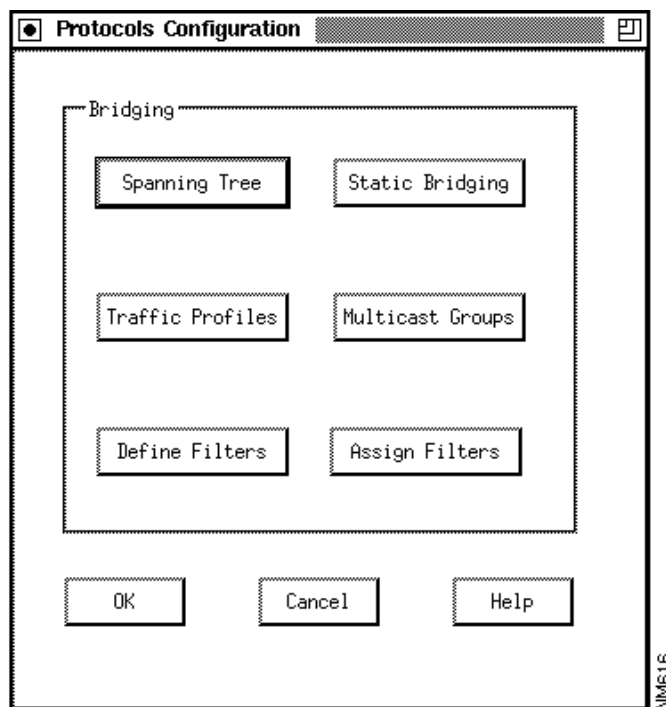
Step 2 Click on the Spanning Tree button. A dialog box like the one shown in Figure 3-26 is displayed.

Figure 3-26   Bridging Configuration Dialog Box

Step 3   The Spanning Tree Parameters portion of the dialog box defines chassis-level bridging attributes. To change an attribute, click in the field box and type in a new value.

Step 4   The Interface list in the lower half of the dialog box displays all configured bridge ports on the chassis with their default settings. If you want to change a value, click on a port to select it, and then type in the Port Priority or Path Cost field box to set the value for the port. You can also enable or disable spanning tree bridging on a per-port basis by clicking on the STB Enable check button.

Step 5   Click on the Edit button to store the changes. The parameters in the list box are updated to reflect the newly entered values.

Step 6   Repeat Step 4 and Step 5 for any other ports that have values you want to change.

Step 7   Store the changes you have made to this dialog box by clicking on the OK button. (You can also click on the Cancel button to discard the changes.)

Custom Filters

You can use the custom filters capability to set up multiple per-port filters on a chassis. The filters applied to a port determine the action taken on incoming frames at that port.

You create custom filters on a per-port basis. Creating a custom filter consists of defining the filter and then assigning the filter to a port or ports. You can assign multiple filters to one port, and you can assign the same filter to multiple ports.

Before you can create custom filters, you must configure a chassis. Before you assign the filter to a port, you must configure at least one FDDI, Ethernet, or Fiber Ethernet card with its associated ports.

Note Filters are optionally used to identify a flow for traffic profiles and multicast groups. (A filter can, of course, be used without a traffic profile or a multicast group.) The filter is assigned to the port where the traffic profile or multicast group is to be created. The profile or multicast group is thus said to be assigned to a filter-port pair. The filter specifies the packets to which the multicast group or traffic profile applies.

Defining a Filter

Use the following procedure to define a filter. The custom filter attributes are described in the following chapter in the section "Custom Filter Attributes."

Step 1 Click on the Define Filters button in the Protocols Configuration dialog box (Figure 3-25). A screen like the one shown in Figure 3-27 is displayed.

Figure 3-27   Define Custom Filters Dialog Box

Step 2 In the Select Filter Type box, select the type of filter you want to create. The types are Bridge, IP, and IPX. Notice that the values in the Fields and Operators portions of the screen change according to the type of filter you specify.

Step 3 Enter an ID in the Filter ID box.

Step 4 Create the filter expression in the Filter Expression field by entering fields, constants, and operators in the Filter Expression field box. You can enter a maximum of 250 fields, constants, and operators. There are two ways to enter the values that you want to use:

— Click on the appropriate Fields and Operators radio buttons. The field or operator is immediately added to the Filter Expression field box. To enter a constant, type in a value in the Constant field box and click on an Operators radio button. The operator and the constant are added to the Filter Expression field box.

— Click in the Filter Expression field box and type in the fields, constants, and operators.

Note In the Filter Expression field box, you can use the Backspace key to delete characters and the left and right arrows on the right keypad to move through the text. In the Filter Expression box, you can double-click on a constant, field, or operator to select it, or you can press the first mouse button and, while holding the button down, drag past the characters you want to select. You can then delete the selected characters.

Step 5 To add the filter you have defined, click on the Add button; the Filter ID list is updated with the new filter. (Be sure to click on Add rather than on OK. If you click on OK rather than Add, the filter you just defined disappears and you are returned to the Protocols Configuration dialog box.)

The dialog box in Figure 3-28 shows a switch that has been configured with a single custom filter (macProto == 6004).

Figure 3-28   Sample Custom Filter Definition
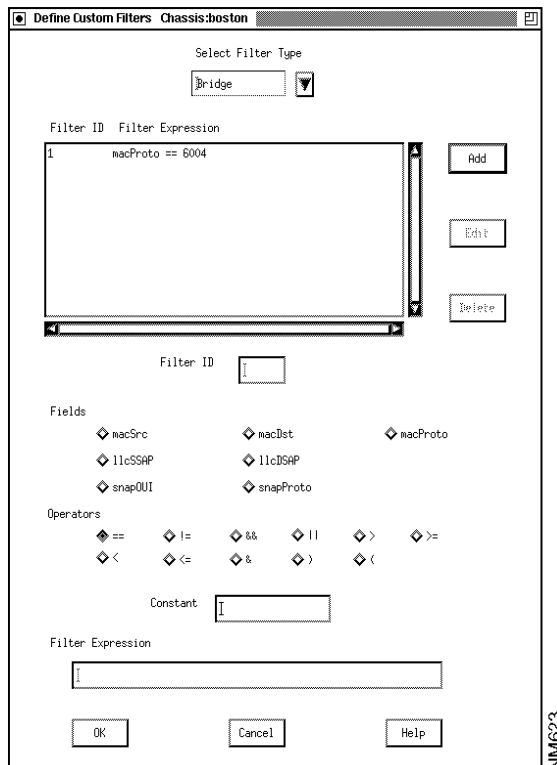
The procedure for entering the filter shown in Figure 3-28 has four steps:

Step 1 Click on the macProto radio button. macProto is added to the Filter Expression box.

Step 2 Enter 6004 in the Constant field box.

Step 3 Click on the == radio button and ==6004 is added to the Filter Expression box.

Note A constant is a decimal value by default unless it is preceded by 0x, in which case it is hexadecimal. Exceptions here include macDest and macSrc in the bridge category and ipxSrcNd and ipxDstNd in the IPX category.

Step 4 Click on the Add button to update the Filter ID list with the new filter.

Now you can assign the filter to a port, using the procedure described later in this chapter under the heading "Assigning a Filter." (A defined filter does not take effect until it has been assigned to a port.) If you are not going to assign any filters right now, you can keep the changes you have made in this dialog box by clicking on the OK button at the bottom of the dialog box. (You can also click on the Cancel button to discard the changes.)

Editing or Deleting a Filter

To edit or delete a filter, use the Define Custom Filters dialog box (Figure 3-27). To edit an existing filter, use this procedure:

Step 1 Click on the filter entry in the Filter ID list. The filter is displayed in the Filter Expression field box at the bottom of the dialog box.

Step 2 Change the expression in the Filter Expression field box as desired.

Step 3 Click on the Edit button. The Filter ID list is updated with the changed filter.

To delete an existing filter, use this procedure:

Step 1 Click on the filter ID in the Filter ID list.

Step 2 Click on the Delete button. The filter ID is removed from the Filter ID list.

If you want to assign an edited filter to a port, use the procedure described in the next section. If you are not going to assign any filters right now, you can keep the changes you have made to this dialog box by clicking on the OK button at the bottom of the dialog box. (You can also click on the Cancel button to discard the changes.)

Note You cannot delete a filter if it is assigned to a port. You must cancel the assignment first.

Assigning a Filter

After you have created or modified a filter, you can assign it to a port or to multiple ports. The attributes used in this task are described in the following chapter in the section "Assigning Filters." To assign a filter, use this procedure:

Step 1 Select Assign Filters from the Protocols Configuration screen (Figure 3-25). A screen like the one shown in Figure 3-29 is displayed.

Figure 3-29   Sample Assign Custom Filters Dialog Box

Step 2   In the list at the top of the screen, select the type of filter you want to assign.

Step 3   In the list of interfaces, click on the interface for which you want to assign a filter.

Step 4   In the Defined Filters list, click on the ID for the filter you want to assign.

Step 5   Below the List of Filter IDs, select Forward or Block.

Step 6   Enter the priority of the filter. Filters are executed in order of their priority settings. The lowest numerical value has the highest priority.

Step 7   Click on the Add button next to the list of filter IDs. The filter is assigned to the interface and is displayed in the list of filter IDs.

Step 8   Repeat the procedure in Step 2 through Step 7 for as many filters as you want to assign to the interface.

Step 9   When you are finished, click on the OK button at the bottom of the Assign Custom Filters screen. This assigns the filter(s) to the selected port(s). You are returned to the Protocols Configuration screen.

You have now defined and assigned your per-port custom filters. You can store the changes you have made in this dialog box by clicking on the OK button. (You can also click on the Cancel button to delete these changes.) Remember that these values are not written to the global database until you perform a Save operation (see the section entitled "Saving or Aborting Changes" later in this chapter).

Editing or Removing a Filter from a Port

After you have assigned a filter to a port, you can change its Action or its Priority setting, or you can remove it from among the active filters for the port. To edit a filter or cancel its assignment to a port, use the Assign Custom Filters dialog box (Figure 3-29).

To edit the filter, use this procedure:

Step 1 In the list of interfaces at the top of the box, click on the number of the interface that has the filter you want to edit. The list of applied filters is displayed below in the List of Filter IDs.

Step 2 In the List of Filter IDs, click on the desired filter.

Step 3 You can change the Action or Priority setting and then click on the Edit button.

Step 4 To store the change you have made, click on the OK button at the bottom of the dialog box. (You can also click on the Cancel button to delete your change.)

To remove a filter from a port, use this procedure:

Step 1 In the list of interfaces at the top of the box, click on the number of the interface that has the filter you want to remove. The list of applied filters is displayed.

Step 2 In the List of Filter IDs, click on the desired filter.

Step 3 Click on the Delete button. The filter is removed from the list.

Step 4 To store the change you have made, click on the OK button at the bottom of the dialog box. (You can also click on the Cancel button to delete your change.)

Traffic Profiles

You can use the Traffic Profiles option to set up one or more traffic profiles on a chassis. A traffic profile is a network-wide construct. After you define a profile, you can assign it to one or more ports.

Note Remember that you are actually assigning the profile to a filter-port pair.

Before you can create a traffic profile, you must configure one chassis and at least one FDDI, Ethernet, or Fiber Ethernet card with its associated ports.

Defining a Traffic Profile

To define a profile, use this procedure. The attributes used in this task are described in the following chapter in the section "Traffic Profiles."

Step 1 Click on the Traffic Profiles button in the Protocols Configuration dialog box (Figure 3-25). A screen like the one shown in Figure 3-30 is displayed.

Figure 3-30   **Define Traffic Profiles Dialog Box**

Step 2   Enter an ID, an insured rate, and a max rate for the profile, using the fields below the Traffic Profile list box. If you are an expert user, go to Step 3. Otherwise, go to Step 5.

Step 3   Click on Expert Mode. Five more options are displayed in the Expert Settings box.

Step 4   Choose values for the five Expert Settings options: Insured Burst, Max. Burst, Secondary Scale, Principal Service Type, and Transmit Priority.

Step 5   Click on the Add button. The profile appears in the Defined Traffic Profiles list.

Step 6   Repeat the procedure from Step 2 through Step 5 for each traffic profile you want to define.

Step 7   When you have finished defining traffic profiles, click on OK. The profiles are stored. You can also click on Cancel if you decide not to add the profiles you have defined.

Editing or Deleting a Traffic Profile

You can edit or delete a traffic profile if it is not assigned to an interface. To edit a traffic profile, use this procedure:

Step 1   Click on the profile entry in the Defined Traffic Profiles list in the Define Traffic Profiles dialog box (Figure 3-30).

Step 2   Make changes to the entries in the boxes below the list.

Step 3   Click on the Edit button. The Traffic Profiles list is updated with the new information.

Step 4   Click on the OK button to save the modified traffic profile information.

If you want to assign the edited profile to an interface, use the procedure described in the next section.

To delete an existing profile, use this procedure:

Step 1 Click on the profile entry in the Defined Traffic Profiles list in the Define Traffic Profiles dialog box (Figure 3-30).

Step 2 Click on the Delete button. The traffic profile is removed from the Defined Traffic Profiles list.

Step 3 Click on the OK button to save the modified traffic profile information.

Assigning a Traffic Profile

After you have created or modified a traffic profile, you can assign it to one or more filter-port pairs. To do so, use this procedure. The attributes used in this task are described in the following chapter in the section "Assigning Filters."

Step 1 Select Assign Filters from the Protocols Configuration dialog box (Figure 3-25). A screen like the one shown in Figure 3-29 is displayed.

Step 2 In the list of interfaces in the upper right portion of the screen, select the interface for which you want to assign a profile.

Step 3 In the list of defined filters, select the filter that you want to use.

Step 4 In the list of defined traffic profiles, select the profile that you want to assign to the interface.

Step 5 Specify the priority level that you want to assign to this filter.

Step 6 Make sure that Forward is selected in the Action field beneath the list of filter IDs.

Step 7 Click on the Add button. The filter and traffic profile are displayed in the List of Filter IDs.

Step 8 Repeat the procedure in Step 3 through Step 7 for each profile you want to assign.

Step 9 When you have added all of the traffic profiles you wish to use, click on the OK button at the bottom of the screen. Once you click on that button, the traffic profile assignments are saved.

Editing or Removing an Assigned Traffic Profile

After you have defined a traffic profile and assigned it to a port, you can modify its priority level or cancel its assignment to the port.

Note You cannot modify the profile itself once it has been assigned. If you want to edit an existing profile, you must first cancel its assignment to any port.

To modify the priority level of a filter assigned to the profile, use this procedure:

Step 1 Select Assign Filters from the Protocols Configuration screen (Figure 3-25). A screen like the one shown in Figure 3-29 is displayed.

Step 2 Select an assigned filter from the list of filter IDs. An entry is displayed in the List of Filter IDs showing the ID, priority, and traffic profile you have selected.

Step 3 Enter a new value in the Priority field beneath the List of Filter IDs box.

Step 4 Click on Edit. The new priority is assigned.

Step 5   Click on the OK button at the bottom of the screen to save your changes. Alternatively, you can click on Cancel to return the priority level to its previous setting.

To cancel the assignment of an assigned traffic profile, use this procedure:

Step 1   Select Assign Filters from the Protocols Configuration screen (Figure 3-25). A screen like the one shown in Figure 3-29 is displayed.

Step 2   Select the interface and traffic profile whose priority you want to modify. An entry is displayed in the List of Filter IDs showing the ID, priority, and traffic profile you have selected.

Step 3   Click on the entry for the profile in the List of Filter IDs box.

Step 4   Click on the Delete button. The profile is deleted.

Multicast Groups

You can use the Multicast Groups option to set up one or more such groups. Multicast groups are network-wide constructs. They can be configured whether or not a chassis has been specified. Once you create a multicast group, you can assign it to one or more interfaces. The group is associated with (assigned to) a filter-port pair.

Defining Multicast Groups

Use the following procedure to define a multicast group. The attributes used in this task are described in the following chapter in the section "Multicast Groups."

Step 1   Click on the Multicast Groups button in the Protocols Configuration dialog box (Figure 3-25). A screen like the one shown in Figure 3-31 is displayed.

Figure 3-31   Define Multicast Groups Dialog Box

Step 2   Enter an ID for the multicast group you want to define.

Step 3   Click on Add in the Definition portion of the screen.

Step 4   Select a chassis, card, and port from the Member Association portion of the dialog box. This is the interface that you want to put in the multicast group.

Step 5   Click on the Add button in the Member Association portion of the dialog box. The port is entered in the Group Members list box.

Step 6   Repeat the procedure in Step 4 and Step 5 for each port that you want to add to the group.

Step 7   Repeat the procedure in Step 2 through Step 6 for each additional group that you want to define.

Step 8   When you have added all members of all groups that you want to define, click on the OK button at the bottom of the dialog box. Doing so stores your definitions in the database in run-time memory on the management station. You are returned to the Protocols Configuration screen.

Editing or Deleting a Multicast Group

After you have defined a multicast group, you can modify it by adding or deleting group members. You can also delete the entire group.

Note   You cannot edit or delete a multicast group assigned to an interface.

To delete a member from a group, use this procedure:

Step 1 In the Define Multicast Groups dialog box (Figure 3-31), select the ID of the group that you want to modify by clicking on the ID for the group. The members of the group are displayed in the Group Members portion of the screen.

Step 2 Click on the group member (interface) that you want to delete.

Step 3 Click on the Delete button.

Step 4 Click on the OK button to activate your choice, or click on Cancel if you decide against the deletion.

To add a member to a group, use this procedure:

Step 1 In the Define Multicast Groups dialog box (Figure 3-31), select the ID of the group that you want to modify.

Step 2 Use the field boxes beneath the Group Members list area to specify the interface (chassis, card, and port) that you want to add to the group.

Step 3 Click on the Add button to the right of the Group Members list.

Step 4 Click on the OK button at the bottom of the screen. The interface that you have specified is added to the group member list.

Assigning a Multicast Group to an Interface

To assign a defined multicast group to an interface, use this procedure. The attributes used in this task are described in the following chapter in the section "Assigning Filters."

Step 1 Select Assign Filters from the Protocols Configuration dialog box (Figure 3-25). A screen like the one shown in Figure 3-29 is displayed.

Step 2 In the list of interfaces in the upper right portion of the screen, select the interface for which you want to assign a multicast group.

Step 3 In the list of defined filters, select the filter that you want to use.

Step 4 In the list of defined multicast groups, select the multicast group that you want to assign to the interface.

Step 5 Specify the priority level that you want to assign to this filter.

Step 6 Make sure that Forward is selected in the Action field beneath the list of filter IDs.

Step 7 Click on the Add button. The filter and multicast group are displayed in the list of filter IDs.

Step 8 Repeat the procedure in Step 3 through Step 7 for each multicast group you want to assign.

Step 9 When you have added all of the multicast groups that you want to use, click on the OK button at the bottom of the screen. Once you do that, the multicast group assignments are saved.

Figure 3-32 shows an example of a multicast group assignment. In the figure, multicast group 1020 is assigned to port 6 on card 3 in the chassis named Boston.

Figure 3-32   Example Showing the Assignment of a Multicast Group

Canceling the Assignment of a Multicast Group

To cancel the assignment of an assigned multicast group, use this procedure:

Step 1   Select Assign Filters from the Protocols Configuration screen (Figure 3-25). A screen like the one shown in Figure 3-29 is displayed.

Step 2   Select the interface and multicast group that you want to modify. An entry is displayed in the List of Filter IDs showing the ID, priority, and multicast group that you have selected.

Step 3   Click on the entry for the multicast group in the List of Filter IDs box.

Step 4   Click on the Delete button. The multicast group is deleted.

Static Bridge Filters

This section tells you how to create entries for static bridge filters in the bridge's filtering database. (This functionality is specified in IEEE 802.1d-1990.)

The filtering database matches a MAC destination address with (1) an LS2020 port that can receive frames with this MAC destination address and (2) a set of LS2020 ports on which the frames should be transmitted.

The bridge forwarding process uses the entries in the filtering database to determine the forwarding route for frames with a given MAC address. You create static bridge filters on a per-chassis basis.

Creating a Static Bridge Filter

To create a static bridge filter in the bridge filtering database, use this procedure. The attributes used in this task are described in the following chapter in the section "Static Bridge Filtering."

Step 1   Click on the Static Bridging button in the Protocols Configuration dialog box (Figure 3-25). The Static Bridging dialog box is displayed (Figure 3-33).

Figure 3-33   Static Filtering Dialog Box
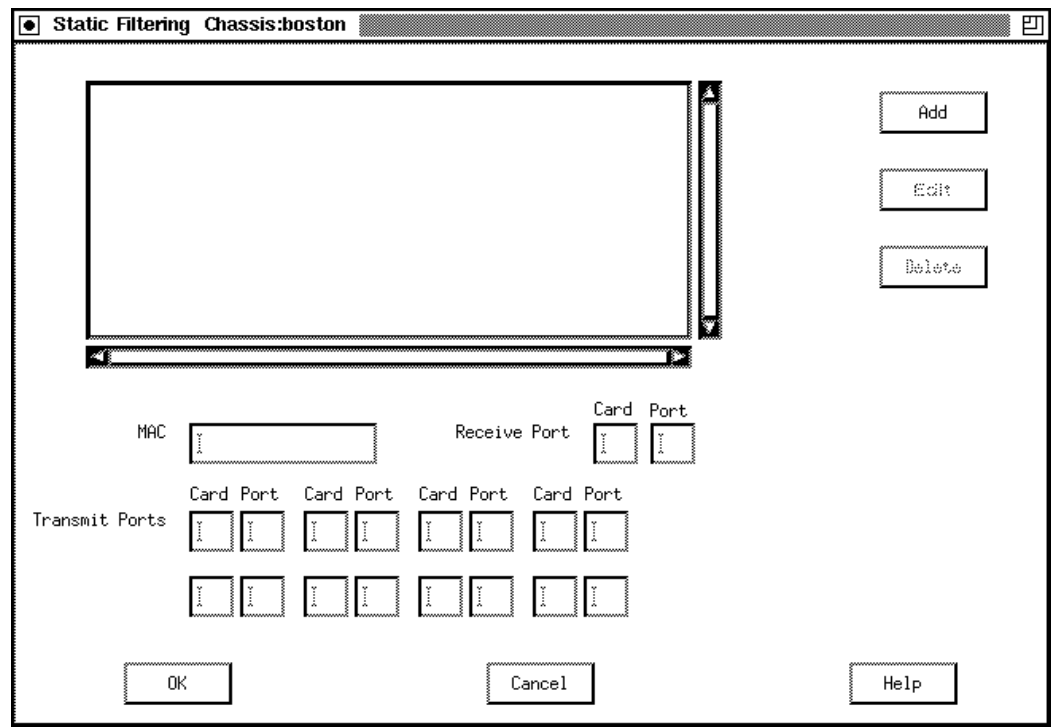
Step 2   Enter the MAC address, the receive port address, and the transmit port address(es) in the field boxes provided.

Step 3   Click on the Add button. The list box is updated with the new static bridge filter.

In the list, the first grouping of numbers is the MAC address. The second is the receive interface (card and port number). The next pair of numbers is the first transmit interface (card number and port number). Any other pairs of numbers are additional transmit interfaces. Figure 3-34 shows a Static Filtering dialog box with two multicast bridge filters defined.

Step 4   Click on the OK button to store the bridge filter.

Figure 3-34   Static Filtering Dialog Box with Two Multicast Filters Defined
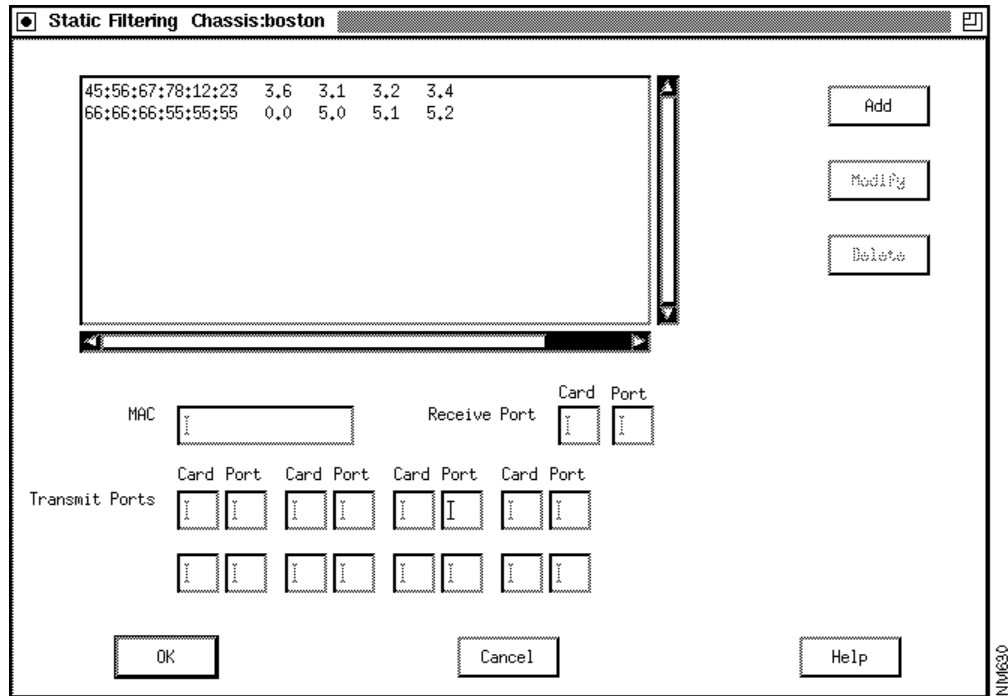
Editing or Deleting Static Bridge Filters

To edit an existing static bridge filter, use this procedure:

Step 1   Click on the target bridge filter in the Static Filtering list box (see Figure 3-34). The card and port values associated with that bridge filter are displayed in the boxes below the list box.

Step 2   Make your changes to the values in the individual card and port boxes.

Step 3   Click on the Modify button. The entry in the list box is modified to reflect your changes. (Remember that the first pair of boxes to the right of the MAC address refers to the receive interface.)

Step 4   Click on the OK button to save the changes you have made.

To delete an entire bridge filter, use this procedure:

Step 1   Click on the bridge filter in the static filtering list box.

Step 2   Click on the Delete button.

Step 3   Click on the OK button to confirm the action. The bridge filter is deleted.

You have now defined your per-port static bridge filters. Remember that the values you have entered are not written to the global database until you perform a Save operation (refer to the section entitled "Saving or Aborting Changes" later in this chapter).

Provisioning for PVCs

In provisioning for PVCs, you must specify the endpoints and the characteristics of the circuit that you want to create. You can use the procedure given here to set up PVCs between

- Two frame relay ports
- Two frame forwarding ports
- Two ATM UNI ports (for example, T1/E1 or T3/E3 edge ports)
- Two CEMAC ports

Although PVCs can be created for each of these port types, the circuits created differ in certain respects, depending on the type of card for which they are created (see Table 3-4).

Note   To configure a PVC, you must have previously configured the two edge ports that it will connect.

Table 3-4   **PVC Characteristics for Various Types of Interface Card**

Type of Card	Type of Circuit ID	Measure of Circuit Capacity	Other Circuit Characteristics
Frame relay	DLCI	Insured rate and maximum rate in bps	
Frame forwarding	None	Not given on screen	Only one PVC between any two frame forwarding ports
ATM UNI	VCI	Insured rate and maximum rate in bps	
CEMAC	None	Target depth and maximum depth in bytes	Only one PVC between any two CEMAC ports

Configuring a PVC

To set up a PVC, use this procedure. The attributes used in this task are described in the following chapter in the section "PVC Attributes."

Step 1   Start the PVC configuration tool. To do so, use the procedure described earlier in "Starting the Configurator." A dialog box like the one shown in Figure 3-35 is displayed.

Figure 3-35   PVC Definition Dialog Box

Step 2 Specify a name, card, and port for chassis A.

Note If you started the configurator from the IP Internet map (Figure 3-3) with two chassis selected, the names of those chassis are already in the chassis A and chassis B Name field boxes.

Step 3 Specify a name, card, and port for chassis B.

Step 4 Click on New at the bottom of the screen. The configurator supplies default transmission rates for the type of circuit involved. It also supplies DCLI or VCI values if those are relevant for the circuit.

Step 5 Enter the insured rate and the maximum rate for each chassis. The rates for chassis A need not match those for chassis B. Chassis A attributes are for the VC from chassis A to chassis B. Chassis B attributes are for the VC from chassis B to chassis A.

Step 6 Click on Add. Information about the new circuit is displayed in the Existing PVCs list box. Figure 3-36 shows an example of the PVC dialog box with one new frame relay circuit added.

Step 7 To save the PVC you have configured, click on Save from the File pull-down menu. If you do not want to save the circuit configuration, click on the Close button.

Figure 3-36   PVC Dialog Box with One Frame Relay Circuit Defined
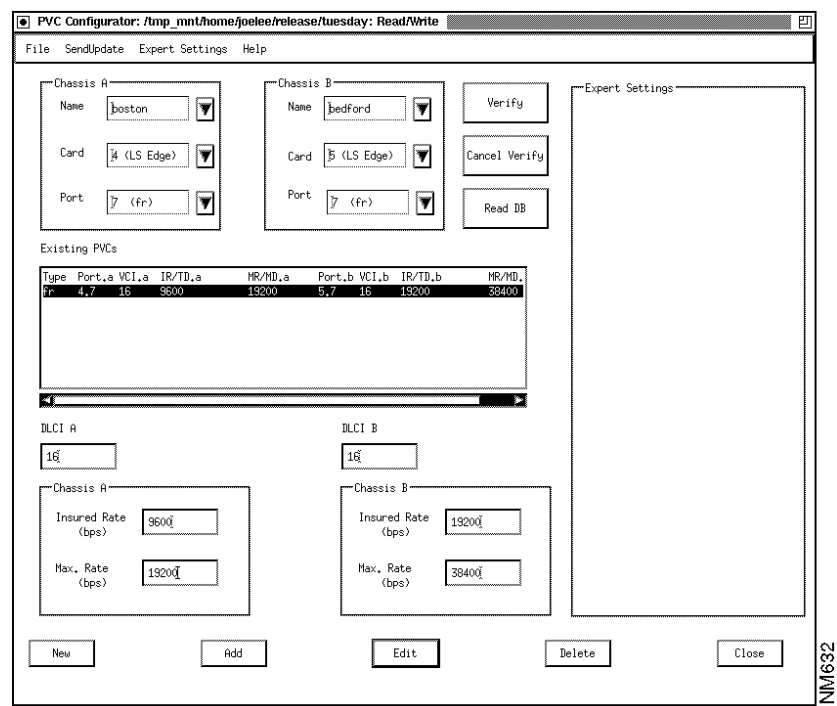
Displaying Currently Configured PVCs

If you want to retrieve settings from the local database stored in run-time memory on the nodes, click on the Verify button. (For more information on Verify, see the section entitled "Verifying PVC Attributes" later in this chapter.)

To retrieve the settings in the global database for all PVCs configured between two chassis, use this procedure:

Step 1   In the PVC Configuration dialog box, select the two chassis in the list boxes at the top of the screen.

Step 2   Select All in the Card field for each chassis. (All is also displayed in the Port field for each chassis.)

Step 3   Click on the Read DB button. All PVCs defined in the database between the two chassis are listed in the Existing PVCs box.

To retrieve from the global database the settings of all PVCs for a given pair of ports, use this procedure:

Step 1   In the PVC Configuration dialog box, select the chassis, card, and port for each end of the PVC.

Step 2   Click on the Read DB button. All PVCs between the two endpoints you have specified are displayed.

Editing a PVC Configuration

Using the PVC Edit feature, you can modify the insured and maximum rates for a given PVC.

⚠ **Caution** If you click once to select a circuit and then click on Edit, all circuit parameters are removed, because the circuit edit fields have not been filled in. Be sure that you have entered the proper values in the fields before you click on Edit.

There are two ways to modify a circuit. Here is the first way:

Step 1 In the Existing PVCs portion of the PVC Configurator dialog box, click once on the circuit you want to modify.

Step 2 Enter new values for fields you want to modify in the Chassis A and Chassis B blocks at the bottom of the screen.

Step 3 Click on Edit. The circuit is updated with the values you have specified.

Here is the second way you can modify a circuit:

Step 1 Double-click on a circuit in the Existing PVCs portion of the PVC Configurator dialog box. The values from this circuit are loaded into the Chassis A and Chassis B boxes at the bottom of the screen.

Step 2 Modify the parameters as necessary.

Step 3 Click on Edit. The circuit is updated with the values you have specified.

If you want two or more circuits to have the same values, use this procedure:

Step 1 In the Existing PVCs portion of the PVC Configurator dialog box, double-click on a circuit whose values you want to use as a template. The values from this circuit are loaded into the Chassis A and Chassis B boxes at the bottom of the screen.

Step 2 Change the values if necessary.

Step 3 In the Existing PVCs list, select the circuits to which you want to assign the values. (For adjacent circuits, single-click and drag; for nonadjacent circuits, press Control and hold it down while clicking on the target circuits.)

Step 4 Click on Edit. The new values are assigned to the selected circuits.

Deleting a PVC Configuration

You can delete a PVC once it has been defined. To do so, use this procedure:

Step 1 In the PVC Configuration dialog box, click on the entry in the Existing PVCs listing that you want to delete.

Step 2 Click on the Delete button at the bottom of the dialog box. The entry is deleted.

Step 3 To confirm (save) the deletion, click on Save from the File pull-down menu.

Copying a PVC Configuration

To copy a PVC, use this procedure (the PVCs, original and copy, must be for the same endpoints):

Step 1   In the Existing PVCs listing (in the PVC Configuration dialog box), double-click on the entry that you want to copy. The current attribute settings for that PVC are displayed in the attribute fields.

Step 2   Change the attributes as necessary.

Step 3   Click on the New button.

Step 4   Click on the Add button. The Existing PVCs list is updated with the new entry.

Step 5   To store the addition, click on Save from the File pull-down menu.

Using Expert Settings

You can display expert mode settings in the PVC dialog box. To do so, click on the Expert Settings pull-down menu at the top of the screen and select Show. A screen like the one in Figure 3-37 is displayed. The appendix "Expert Mode" discusses expert mode fields and the options that they make available to you.

Figure 3-37   PVC Dialog Box with Expert Mode Settings Displayed

No expert mode settings are available for CEMAC circuits.

VLI Configuration

This section discusses virtual LAN internetworking (VLI), showing you how to set up the workgroups that are the basis for VLI configuration. In order to work with VLI configurations, you must configure at least one chassis and one Ethernet, FDDI, or fiber Ethernet card.

All interfaces in an LS2020 network belong to a default workgroup, which allows them to communicate with one another. Once you assign an interface to a workgroup that you define, however, that interface is removed from the default workgroup.

There are three main stages to setting up workgroups:

1 Creating the workgroup itself

2 Creating the lists of workgroup members

3 Assigning the members to the workgroup

These steps are discussed in the following paragraphs.

Creating Workgroups

To create a VLI workgroup, use this procedure. The attributes used in this task are described in the following chapter in the section "VLI Attributes."

Step 1 Start the VLI configuration tool by using the procedure described under "Starting the Configurator" earlier in this chapter. A screen like the one shown in Figure 3-38 is displayed.

Figure 3-38   VLI Dialog Box
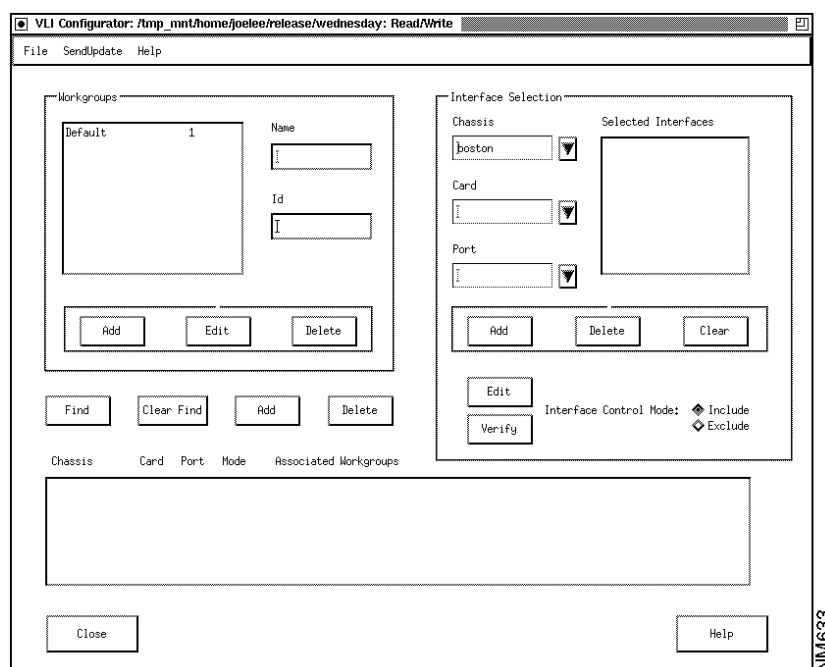
Step 2 Click in the Name field and enter a workgroup name.

Step 3   Click in the Id field and enter an ID. (Do not use 1, because that is the number for the default workgroup.)

Step 4 Click on the Add button. The workgroup name and ID are stored and displayed in the
Workgroups list.

Modifying a Workgroup

To change a workgroup name or ID, use this procedure:

Step 1 Click on the entry in the Workgroups list.

Step 2 Click in the Name or Id field box (depending on which element you want to change), and
make whatever change you wish.

Step 3 Click on the Edit button beneath the Workgroups list box. The workgroups list is modified
according to the change you have made.

To delete a workgroup, use this procedure:

Step 1 Click on the entry for the workgroup in the Workgroups field box.

Step 2 Click on the Delete button beneath the list. The workgroup is deleted, and its name and ID
are removed from the list.

Assigning Interfaces to Workgroups

To assign interfaces (ports) to a workgroup, use this procedure:

Step 1 In the list of workgroups, click on the first workgroup whose members you want to specify.

Step 2 Select an interface by specifying a chassis, card, and port. Use the list boxes in the Interface
Selection portion of the screen.

Step 3 Click on the Add push button just below the list boxes in the Interface Selection section.
The interface is listed in the Selected Interfaces box.

Step 4 Repeat Step 2 and Step 3 for each interface that you want to be a member of this workgroup.

Step 5 Click on the Add push button next to Clear Find (beneath the Workgroups listing). The
button is just above the field box that lists associated workgroups. All entries from the
Selected Interfaces list now appear in the Associated Workgroups list.

Step 6 Repeat Step 1 through Step 5 for each workgroup whose membership list you want to
define. Figure 3-39 shows a VLI dialog box with members of two workgroups listed in the
Associated Workgroups field box.

Figure 3-39   VLI Configuration Dialog Box with Two Defined Workgroups
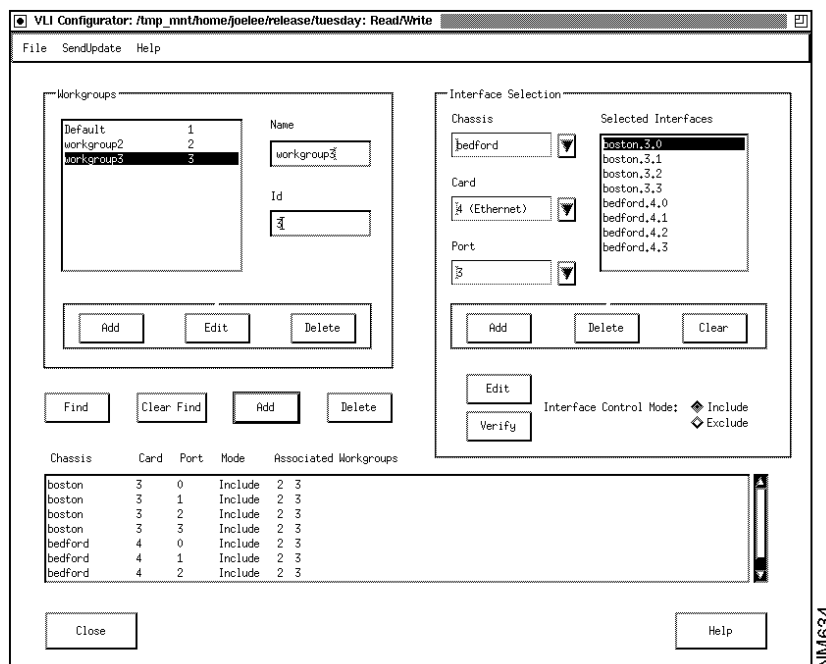
Modifying Workgroup Lists

Even after the membership in a workgroup is defined, you can add members to or delete members from the group. First, though, you may want to check on group membership—confirm, that is, just which interfaces or ports belong to each group.

To determine the membership of a group, use this procedure:

Step 1   In the Workgroups field box, click on the workgroup whose membership you want to examine.

Step 2   Click on the Find push button beneath the Workgroups box. A list in the Associated Workgroups box shows all interfaces in the workgroup that you have specified. It also shows any other workgroups that the various interfaces may belong to. At the same time, fields unrelated to your request for information are grayed out.

Step 3   When you have checked the membership list, click on the Clear Find push button. The screen is returned to its normal appearance.

To add one or more members to a group that has already been defined, use this procedure:

Step 1   In the Workgroups list in the VLI Configuration dialog box, highlight the name of the group to which you want to add members.

Step 2   In the Interface Selection block, press the Clear push button if any interfaces are listed there other than those you will want to add.

Step 3   Use the Chassis, Card, and Port list boxes to specify the interfaces that you want to add.

Step 4   When the list of interfaces is complete, click on the Add push button just above the Associated Workgroups box. The interfaces you have specified are added to the workgroup listings.

Step 5   Click on Save from the File pull-down menu to save the changes you have made.

To delete a member from a workgroup that has already been defined, you use one of two procedures, depending on whether the interface is in one workgroup (not counting the default workgroup) or more than one.

If the interface is in only the one workgroup, use this procedure:

Step 1   In the VLI Configuration dialog box, click on the line in the Associated Workgroups box where the interface is defined.

Step 2   Click on the Delete push button just above the Associated Workgroups box. The interface is deleted from the list.

If the interface to be deleted is in more than one workgroup but you want to delete it from only one, use this procedure:

Step 1   In the Interface Selection box, identify the interface that you want to delete. (Use the Chassis, Card, and Port list boxes to specify the interface.)

Step 2   Click on the Add push button in the Interface Selection box. The interface is listed under Selected Interfaces.

Step 3   In the Associated Workgroups list, click on the workgroup from which you want the interface to be removed.

Step 4   Click on the Delete push button that is above the Associated Workgroups list. The interface you have specified is removed from the selected workgroup.

After you add or delete an interface, select Save from the File pull-down menu to store the change you have made.

Changing Interface Control Mode

The default interface control mode is Include, and that is probably the choice you will use most often in defining workgroup membership. You can use Exclude, however, if you want a given interface (port) to be able to communicate with all but a few ports.

If you select a port and assign the Exclude control mode for one group, Exclude pertains to that port in any other workgroup to which it belongs. You cannot exclude an interface from some workgroups and include it in others. For example, if a port is a member of workgroups a, b, and c, you can change its control mode to Exclude for group b, but the same setting will then pertain for groups a and c.

To exclude an interface from a selected workgroup, use this procedure:

Step 1   In the VLI Configuration dialog box, click on the workgroup in the Workgroups list box where you intend to change a control mode setting.

Step 2   In the Interface Selection block, specify the interface whose control mode you want to change. Use the Chassis, Card, and Port list boxes to specify the interface.

Step 3   Click on Exclude in the block for the interface control mode setting.

Step 4   Click on Edit in the Interface Selection block. The interface that you have specified now shows Exclude next to it in the Associated Workgroups list box. The Exclude setting pertains to all workgroups in the list for that interface.

Step 5   If you want this change to be permanent, select Save from the File pull-down menu,

Database Management Operations

Exiting the Configurator

Use the following procedure to exit from any of the configurators:

Step 1   Pull down the file menu from the main (opening) screen of the configurator. (Figure 3-4, for example, shows the node configurator opening screen.)

Step 2   Select Exit.

Step 3   If you select Exit without saving your changes first (see the following procedure), the configurator prompts you to save, discard, or cancel.

- Click on Save to save your changes to the database file specified when you started the configurator.

- Click on Discard if you want to exit the configurator without saving any changes.

- Click on Cancel if you want to continue the configuration session and do not want to exit from the configurator.

When the exit is complete, the configurator's dialog box closes.

Saving or Aborting Changes

Use the procedures described in the following paragraphs to save or abort changes made to a configuration database.

Saving Changes

You can save changes periodically during your configuration session. To do so, pull down the File menu from the Node Configurator dialog box. Click on Save. Any changes made up to that point are saved to the global database.

Note   Once you save changes, you *cannot* revert to the version of the database that existed before the save.

Aborting Changes

You can abort changes at the database level or at the dialog box level. At the database level, use this procedure:

Step 1   Select Exit from the main (opening) screen of the configurator. The configurator asks you to save, discard, or cancel.

Step 2   Click on discard if you do not want to save any changes.

Within a dialog box, if you want to negate the change you have just made, click on the Cancel button.

Updating a Configuration

This section explains how to set update times for the configurator programs. Each configurator requires you to set update time attributes for each LS2020 node. (If you do not set these times, the nodes are not updated.) The update time attributes determine when the local databases will be updated and the type of update to be performed. Once you perform a save operation, the configurator updates the local databases at the times you have specified.

The update times for the different configurators need not coincide. The same switch can have different update times for its CFG, PVC, and VLI updates.

Note   You may want to do a CFG update before a PVC/VLI update if the PVC/VLI values depend on node attribute values. Conversely, you should do PVC updates that involve PVC deletions before you do a CFG update if the node update involves deletion of cards with attached PVCs.

When an LS2020 switch is updated, the new configuration begins to take effect immediately, and the new data is completely distributed within a few minutes. If the update involves the reloading of an operating node, the flow of traffic may be briefly disrupted. (Only those ports or lines whose attributes are changed by the new configuration are affected.) If you are concerned about interrupting traffic, download configurations when the interruption will be least disruptive.

The following procedure is based on three assumptions:

- You have already created a configuration and saved it.

- The switch to be updated has been installed with a basic configuration.

- The workstation where the configuration program is running has network access to the switch to which you want to download configuration data. (IP connectivity to and then indirect connection through any LS2020 node is sufficient.)

Note   If the update you are loading changes trunk parameters and if the update information is incompatible with the data it is replacing, update first the more distant nodes that have trunk parameter changes. (Distance here refers to the combined IP and LS2020 path from the NMS to the target node.) You will lose contact with those nodes until intermediate nodes receive the new parameters.

The CFG and VLI configurators have similar Update Time screens and similar update procedures, but the PVC configurator screens and procedures are different.

CFG and VLI Configuration Updates

In order to schedule a CFG or VLI configuration update, use this procedure:

Step 1   In the first dialog box displayed by the configuration tool, pull down the SendUpdate menu from the menu bar.

Step 2   Click on Update Time. The resulting dialog box displays the names of all chassis configured in the global database, as well as the update status and time for each chassis. (Figure 3-40 shows an example of this dialog box.)

Figure 3-40   Sample Update Time Dialog Box for CFG and VLI Configurators

Step 3   Click on the name of the chassis that you want to update. You cannot select multiple chassis in this list.

Step 4   Select the type of update. Accept the default, which is to send only the changed attributes, or click on the Send all attributes radio button to select a full update.

Step 5   Select the date and time for the update. You have two options: (1) Click on Send Update Immediately After Save, or (2) select a year, day, and time for the update, using the field boxes and click on Edit. Clicking on Edit stores your changes so that they can be written to the global database. (The time is specified in 24-hour format.)

Step 6   Repeat the procedure in Step 3 through Step 5 for each chassis that you want to update.

Step 7   Click on the OK button to close the dialog box. After you save a configuration to the global database, the configurator updates each local database at the date and time you have specified.

The chassis list referred to in Step 3 includes (1) the status of the update at the time the dialog was displayed and (2) the timestamp of the currently configured update. The status is not updated while the dialog box is being displayed. Update status can be any one of the following:

- Complete—The update has been successfully completed.

- Failed—The attempt to update the node has failed.

- No Entry—There is no entry for update time in the global database for the node.

- In Progress—The configuration agent is in the process of updating the switch at the time the UpdateTime dialog box is being displayed.

- Scheduled—You have scheduled an update for some time in the future, and the global database entry for that update exists.

Note If a chassis configuration is being updated and changes are made to a second chassis'
configuration in the global database, those changes cannot be saved to the database while the
download is in progress.

PVC Configuration Updates

To enter an update time for a PVC pair, use this procedure:

Step 1 In the first dialog box displayed by the configuration tool, pull down the SendUpdate menu
from the menu bar.

Step 2 Click on UpdateTime. The resulting dialog box displays entries for chassis pairs whose
update times are configured in the global database. The entry also gives the update status
(in the column headed Update) and the update time. Figure 3-41 shows an example of the
PVC Update Time dialog box.

Figure 3-41   Sample Update Time Dialog Box for PVC Configurator

Step 3 Specify the chassis pair whose update time you want to set. Use the Chassis A and
Chassis B list boxes to specify the two chassis.

Step 4 Select the type of update. Accept the default, which is to send only the changed attributes,
or click on the Send all attributes radio button to select a full update.

Step 5 Select the date and time for the update. You have two options: (1) Click on Send Update
Immediately After Save, or (2) select a year, day, and time, using the field boxes and click
on Edit. (The time is specified in 24-hour format.)

Step 6 Repeat the procedure in Step 3 through Step 5 for each chassis pair that you want to update.

Step 7 Click on the OK button to close the dialog box. After you save the configuration to the global database, the configurator updates each local database at the time you have specified.

To change update time attributes for one pair, click on the desired entry in the list, make your changes, and click on the Edit button. The list is updated to show your changes.

Note Do not attempt to load PVC data during a CFG update. Before a PVC download, verify that both end ports are up and running and that the port types are correct.

To delete an entry, click on the desired entry in the list and click on the Clear button. The entry is removed from the list.

If you make changes to the update schedule, click on OK and then save the changes, so that the new values are entered in the global database.

Common Update Errors

This section tells you how to react to three error messages commonly encountered during an update. The error messages are recorded in the configurator's log files. See the following section for more information.

During the update, you may receive the following message:

```
can't get lock on chassis chassis name ... gave up
```

If you receive this message, use Table 3-5 to determine the cause of the error. Reschedule the update after the problem has been corrected.

Table 3-5   Responding to Can't Get Lock on Chassis Error Message

Possible Cause	Response
The SNMP set community name of the NMS does not match a community name on the switch that has read/write permission.	Determine the set community name of the NMS and the community name on the switch that has read/write permission. Change one of them (or both, if you like) so that they are the same. The *LightStream 2020 Network Operations Guide* has information on (1) determining which community has read/write permission on the switch and (2) the procedure for changing the community name. To determine the set community name on the NMS if you are running under HP OpenView, pull down the Options menu and select SNMP Configuration. Change the set community name to match a community name on the switch that has read/write permission. To determine the set community name on the NMS if you are running without HP OpenView, open the ovsnmp.conf file using a text editor. Change the set community name in the file to match a community name on the switch that has read/write permission.
The chassis is being updated by another NMS, or someone has locked the local database file using the CLI.	Use the CLI **show config** command to find out whether the local database file is locked. The system tells you whether the database is locked or unlocked. If the database has been locked through the CLI, you can unlock it using the CLI. If the database has been locked because another NMS is updating the database, wait until the update has been completed and the lock is released.
The switch is down.	Use the **ping** command to determine whether the switch is down. The **ping** command is described in the *LightStream 2020 Network Operations Guide*.

During an update, you may receive the following message:

SNMP timed out—chassis *chassis name* `is not responding`

If you receive that message, use Table 3-6 to determine the cause of the error. Reschedule the update after the problem has been corrected.

Table 3-6   Responding to SNMP Timed Out Error Message

Possible Cause	Response
The default values for the timeout for SNMP **set** commands is set too low on the NMS.	If you are running under HP OpenView, pull down the Options menu and select SNMP Configuration. Change the timeout value to 7 seconds and the retry value to 5.

If you are running without HP OpenView, open the ovsnmp.conf file using a text editor. Change the timeout value to 7 seconds and the retry value to 5. (These are the default settings that have been provided at installation.) |
| The chassis went down during the update. | Use the **ping** command to determine if the switch is down. The **ping** command is described in the *LightStream 2020 Network Operations Guide*. |

During an update, you may receive the following message:

```
no such item <MIB object name>
```

If you receive that message, use Table 3-7 to determine the cause of the error. Reschedule the update after the problem has been corrected.

Table 3-7   Responding to No Such Item Error Message

Possible Cause	Response
No software process is currently registered for the object named in the error message.	In many cases, the named object is cardName.card#, which indicates that the card being loaded is down. To get the card's status, use the CLI **show card status** command.

Reading Log Files

The configurator creates a log file for each update of each switch. Use one of the following procedures to display the contents of a log file.

Using the Configurator

Use the following procedure to read log files from the CFG, PVC, or VLI configurator:

Step 1   Display the Update Time dialog box for the configurator.

Step 2   Click on the chassis or chassis pair in the list box.

Step 3   Click on the Show Log button.

Step 4   Click on the desired log file from the list displayed in the pop-up dialog box.

Step 5   Click on the OK button in the pop-up dialog box; the contents of the file are displayed.

To display a different log file, click on the Another Log button and repeat Step 3 and Step 4. (If there are no other log files for the selected chassis or chassis pair, the button is grayed-out.)

To delete the log file, click on the Remove Log button. The file is deleted immediately.

Note   You can delete a log file whether you are in read/write mode or read-only mode.

To return to the dialog box, click on the Close button.

Using UNIX Utilities

You can use a UNIX utility such as **cat** or **more** to display the contents of a log file. (Log files reside in a directory pointed to by LSC_LOGPATH variables.) See the appropriate UNIX documentation for information on using those utilities.

If you are running under HP OpenView, log files reside in the following path: /usr/OV/log. If you are running without HP OpenView, the log files reside in /usr/LightStream-2.1/log.

The configurator creates a subdirectory for each switch. The subdirectory is named with the switch's chassis ID. For example, log files for a switch that has chassis ID 5144 and that was created by a configurator running without HP OpenView are stored in /usr/LightStream-2.1/log/5144. PVC directory names consist of two node IDs with an underscore between them. The two IDs can be the same—for example, 5144_5144 is a valid name.

Log file names include the date, time, and configurator. See the following examples:

- Jul-25-95_14:15.cfg is a log file for the CFG configurator
- Jul-25-95_14:15.pvc is a log file for the PVC configurator
- Jul-25-95_14:15.vli is a log file for the VLI configurator

You can use a UNIX utility such as **rm** to delete a log file.

Database Procedures

It is advisable to keep at least one up-to-date backup of your global configuration database on the NMS, disk space permitting. You should also make a copy of the global database on a tape or disk. See the documentation that came with your management station for information on how to copy to and restore from backup media.

Note   If you need to restore a local database, simply update the switch from the global database. The procedure for doing so is described in the section entitled "Updating a Configuration" earlier in this chapter.

Saving a Backup Copy of the Configuration Database

Use the following procedure to save a backup copy of your configuration database:

Note   Backup files are meant to be used for archiving. They can be read and even changed, but they cannot be used to update a switch.

Step 1   Pull down the File menu on the menu bar of the Configurator dialog box.

Step 2   Select Save As. A pop-up menu like the one shown in Figure 3-42 is displayed.

Figure 3-42   Node Configurator Save As File Pop-up Menu
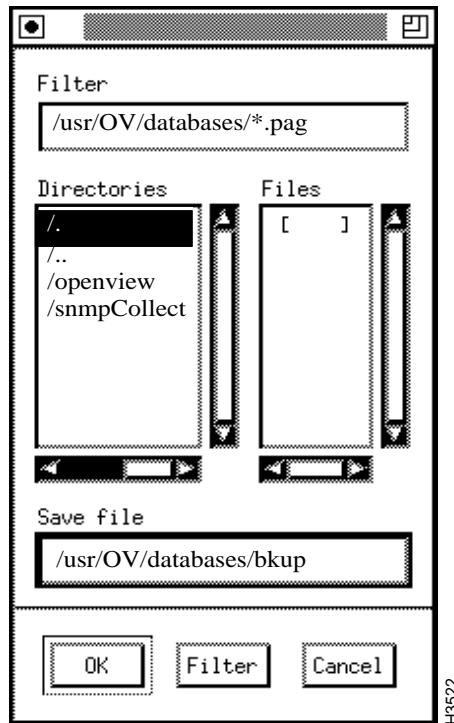
Step 3   Double-click in the Directories list to select a directory path. The path you select is shown in the Save File edit box.

Step 4   Click in the Save File edit box and enter a name for your backup copy. Use a name that is easily distinguished from the name for your operational copy.

Note   After you enter a new file name in the Save file edit box, you may be asked to enter "an ordinary file name." This message is probably caused by your having entered a path for a file name that does not exist.

Step 5   Click on the OK button. The copy is written to the hard disk with the new name.

Note   Actually two files are created—one with a .pag extension and one with a .dir extension. (If the file name you enter already ends in .pag, the name is not modified.) The .pag version is the only one that appears in the Files list, but the configurator uses both of them.

To verify that the copy was created, you can pull down the File menu again and select Open. The pop-up menu that appears lists all database files that are present on the hard disk. Check that the backup file you just created is listed there. Click on the Cancel button.

In Step 3 above, there is a different way to specify a path name. You can also single-click in the Save File edit box and enter a file name. One problem with this approach, however, is that the cursor position is no longer visible. A "virtual cursor" exists at the point where the screen arrow was when you clicked the mouse button. As you start to type, new characters will appear, and from their position you will be able to tell where the cursor was and whether you placed it correctly.

You can also double-click in the Save File edit box at the point where you want to start entering a new file name. Doing so causes the path/file name already entered there to be highlighted in reverse video. The new path/file name that you enter then replaces the highlighted (existing) one.

Note   You can use the Filter push button in combination with the Filter edit box to limit the display of file names to certain types. For example, suppose you enter a directory name in the Filter edit box followed by /*.pag and then click on the Filter push button. The only files displayed in the list box will be those in the directory you named that have a .pag file extension.

Opening a Database File

Use the procedure given here to open a configuration file. You can use this procedure to open a database file that is not specified by the LSC_DATABASE variable (for instance, a backup file).

Step 1   Pull down the File menu on the menu bar of the Node Configurator dialog box.

Step 2   Select Open. A pop-up menu like the one shown in Figure 3-43 is displayed.

Figure 3-43   **Using the Filter Pop-up Menu to Open a Database File**
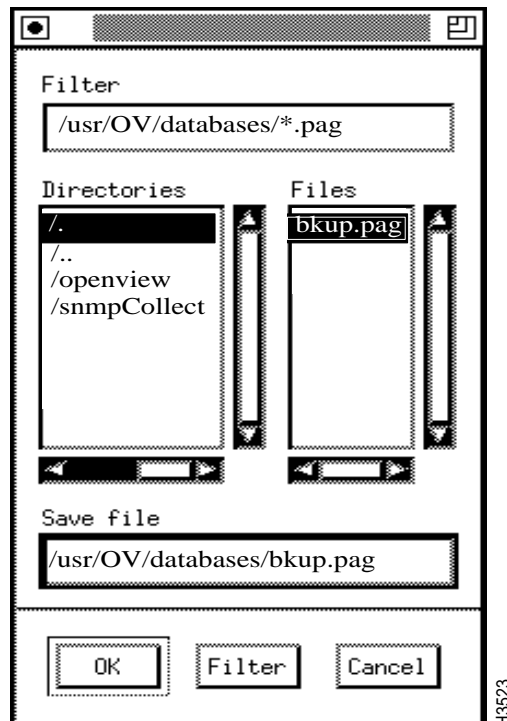
Step 3   In the Directories list on the menu, double-click on the correct path.

Step 4   In the File list, double-click on the name of the backup copy you wish to open.

Step 5   Click on the OK button. A pop-up dialog box is displayed.

Step 6   Select the database access mode. If you select read/write, the database is locked to other users and you can make changes to the database file. If you select read only, the file is not locked and you can only examine the settings in the file. If the configurator reports that someone else is using the database, you can override the configurator lock. (See the following section, "Overriding a Configurator Lock," though, before proceeding.)

Changes you make during the configuration session are now saved to the file you have specified.

Note   You cannot use a database unless it is specified by LSC_DATABASE to send the configuration to a chassis.

You can use the Filter button in the pop-up menu to search a directory for files with common strings in their names. For example, in the screen shown in Figure 3-43, the filter field shows as a default a search for files ending in .pag. To search for other files, you can click in the Filter field, change the search string, and then click on the Filter button to display files that correspond to the search string you have specified.

Making a Backup Configuration File Operational

Do one of the following if you wish to use your backup files as your operational database files:

- Remove the current default database files and change the backup file names to the default database names: configure.netdb.pag and configure.netdb.dir. (Use the Save As option from the File menu. Do not use a UNIX command.)

- Enter the configurator and open the backup file. Select Save As from the File menu and specify the default database file name, configure.netdb.pag. This writes the contents of your backup file into the default file.

- Set the LSC_DATABASE environmental variable to define your backup file as the default database.

Copying a Backup Database to Diskette

Use the following procedure to archive a backup copy of the database to a diskette:

Step 1   Create your backup files using the procedure described in "Saving a Backup Copy of the Configuration Database" earlier in this chapter.

Step 2   To compress the files, enter the following command at the system prompt:

```
compress <filename>.*
```

Step 3   Insert a diskette into the disk drive attached to your workstation.

Step 4   Format the diskette by entering the following string:

fdformat /dev/rfd0

The system responds

```
Please hit return to start formatting floppy. [Return]
................................................
```
You may need more than one diskette, depending on the size of the database.

Step 5   Once the floppy has been formatted, enter the following string:

```
bar cvf /dev/rfd0 <filename>*
```

The system responds

```
a filename.dir.Z 1 blocks 1
a filename.lock.Z 1 blocks 1
a filename.pag.Z 87 blocks 1
```

Note   The sizes of your files in blocks may vary from those shown here.

If you are prompted for another diskette, remove the diskette from the drive and insert another one. If more than one diskette is required, number the diskettes in the order that you make them. When the copy is finished, remove the last diskette from the drive and number it. Store the diskette(s) in a safe place.

To recover the files from the floppy, use this procedure:

Step 1   Change to the desired directory, by entering

```
cd <directory name>
```

Step 2   Begin the recovery procedure by entering

```
bar xvf /dev/rfd0
```

The system responds

```
x filename.dir.Z, 253 bytes, 1 tapr blocks 1
x filename.lock.Z, 53 bytes, 1 tape blocks 1
x filename.pag.Z, 44188 bytes, 87 tape blocks 1
```

Note   The sizes of your files in blocks may vary from those shown here.

If you are prompted for the next diskette, remove the diskette from the drive and insert the next one. When you have finished retrieving the files from diskette, remove the last diskette from the drive.

To uncompress the files, enter **uncompress** <filename>*.Z

Copying a Database to Another Site

If you want added backup protection, copy the backup database to another site. The configurator does not provide this function. Use the **ftp** command at the system prompt to transfer the .pag and .dir backup files to another site.

Verifying a Database

Each configurator provides a Verify function. Use the Verify function to

- Retrieve configuration values entered at installation and default values provided by software when you are configuring a new switch that has already been installed on the network.

- Retrieve the configuration values that are currently running in an LS2020 switch (if you want to get values that have been changed through the CLI). You can retrieve these values using the Verify function and store them in the global database.

The Verify function retrieves information from the NP's run-time memory. The following sections discuss verification of CFG, PVC, and VLI attributes.

Verifying CFG Attributes

The Verify function does a node/global database comparison of parameters in eight groups:

1 Chassis level (for example, location, name, IP address)

2 Bridge static table

3 Spanning tree

4 Bridge custom filters

5 IP custom filters

6 IPX custom filters

7 Traffic profiles

8 Multicast groups

To verify CFG attributes, use the following procedure:

Step 1 Click on the name of the chassis that you want to verify in the Name list. (The list displays any chassis defined in your global database file.)

Step 2 Click on the Verify button on the Node Configurator dialog box. All of the configuration settings are retrieved from the switch's run-time memory. The dialog box is updated to contain a summary of differences found between the global database and the switch database.

Step 3 Check the list to see the differences between the two databases.

Caution If a card is down because of a fault or an administrative action, do not do an exhaustive card verify compare. Only the card type, slot number, and status are available to the Verify function. If you save the results of the Verify when a card is down, all of the other card and port attribute values in the configurator's temporary workspace are erased, and you will have to reconfigure them. If you accidentally save the results of the Verify (if you press Apply), you can either exit from the configurator without saving or you can wait until the card comes up and perform another Verify. (If you exit without saving, you lose any other changes you have made during the editing session.)

Step 4 To store the settings from the local database in the configurator's temporary workspace, click on the Apply button. (This replaces any settings that were there.) If you don't want to incorporate the local settings, click on the Discard button.

Step 5   To save the settings from the local database in the global database, pull down the File menu and click on Save. Verifying more than eight nodes without saving can exceed the capacity of the switch's memory and result in failure of the save operation. It is therefore recommended that you save the global database after verifying eight nodes.

If you want to replace the local settings with the global settings, update the local database (see the section entitled "Updating a Configuration" earlier in this chapter).

Verifying PVC Attributes

You can retrieve configuration information for PVCs between switches, cards, or ports using the following procedure:

Step 1   Start PVC Configure.

Step 2   Select the names of the chassis you want to verify in the Node A and Node B Name field boxes. You can refine your search further by selecting a card and/or port under the Node A and Node B field boxes.

Step 3   To retrieve configuration values from the switch, click on the Verify button. The configurator gets the current configuration from the local switch's run-time memory. It displays matching PVCs in the Existing PVCs list. Any differences between the global and local databases are displayed in a pop-up dialog box.

To retrieve the settings from the global database, click on Read DB. The Existing PVCs list is updated to show all PVCs currently configured between the specified endpoints in the global database.

Caution   If a card or port is down because of a fault or an administrative action, no PVCs are displayed. If you save the results of the Verify when a card or port is down, it erases all of the PVC attribute values for the selected endpoints in the global database. You must either reconfigure them or wait until the card/port comes up and perform another Verify.

Step 4   To store the values from the local database in the global database, click on Save from the pop-up menu. The Verify function for the PVC configurator is different from that for the node and VLI configurators. It writes information from the switch directly to the global database, rather than to a temporary workspace. If you don't want to save the values, click on Cancel.

Verifying more than eight nodes without saving can exceed the capacity of the switch's memory and result in failure of the save operation. It is therefore recommended that you save the global database after verifying eight nodes.

Note   Cancelling the verify operation discards all the PVCs read from the switch that appear in the list box and removes the pop-up menu from the screen.

Verifying VLI Attributes

To verify VLI attributes, use this procedure:

Step 1   Start VLI Configure.

Step 2   Click on the interface that you want to verify in the Selected Interfaces list.

Step 3 To retrieve configuration values from the switch, click on the Verify button. The configurator gets the current configuration from the local switch's run-time memory and displays it in the Workgroups summary box.

Caution If a card or port is down because of a fault or an administrative action, no workgroups are displayed. If you save the results of the Verify when a card is down, you erase all of the workgroup attribute values for that interface in the configurator's temporary workspace. You will have to reconfigure them. If you accidentally save the results of the Verify, you can exit from the configurator without saving or you can wait until the card/port comes up and perform another Verify. (If you exit without saving, you lose any other changes you made during the configuration session.)

Step 4 To store the values from the switch in the configurator's temporary workspace, click on Save from the pop-up menu. This replaces any values that were in the temporary workspace with the information from the switch. (Click on Cancel if you do not wish to store the values.) Verifying more than eight nodes without saving can exceed the capacity of the switch's memory and result in failure of the save operation. It is therefore recommended that you save the global database after verifying eight nodes.

Overriding a Configurator Lock

When the configuration database is locked, the database is in read-only mode. You should not edit it without investigating the reason for the lock. A database can become locked for either of two reasons:

- Someone is editing the database (the most likely cause of a lock).

- The configurator exited ungracefully because of a power failure or a hardware or software problem.

When you open the database file, one of two messages is shown:

- If the database is unlocked, you are asked which database access mode you want, read/write or read-only. If you select read/write, the database is locked to other users, and you can make changes to the database file. If you select read-only, it is not locked, and you can only examine the settings in the file.

- If someone else is using the database in read/write mode or if the configurator has exited ungracefully, the configurator reports that the database is locked and gives you the current user's name. (If the configurator has exited, it gives you the name of the user who was running the configurator at the time.) At this point, you can look at the database in read-only mode, or you can override the lock. Override the lock only if the configurator has exited ungracefully.

Caution If another user is editing the database, do **not** override the lock or you will corrupt the database. Wait until the other user exits and the configurator automatically removes the lock, or use the database in read-only mode.

There is one lock for the database, regardless of the tool used to access the database (Node Configure, PVC Configure, or VLI Configure). Use of any one of the configurators in read/write mode precludes the use of either of the others. For example, if someone is using the node configurator in read/write mode, the database is reported as locked if you try to open the file with PVC Configure or VLI Configure.

If you discover that the database is being edited simultaneously by two configuration tools, complete your edits with the second tool invoked, save, and exit. Then reopen the database with the remaining tool before editing.