CHAPTER 4

Configuration Attributes

This chapter describes the configuration attributes available in basic mode for LightStream 2020 multiservice ATM switches (LS2020 switches) and offers advice on how to set them. Use this chapter as a reference when setting attributes during configuration.

The chapter is organized into sections according to the order in which you configure an LS2020 node: (1) chassis, (2) cards, (3) ports, (4) protocol attributes, (5) PVC end points, and (6) VLI attributes. Within each section, the attributes are arranged in alphabetical order.

The attribute fields accommodate fill-in or multiple choice values. Fill-in fields accept only printable ASCII text, and most accept a limited number of characters. The configurator provides a field box for any value that you have to fill in. The configurator provides either an option button or a radio button for any value that has multiple choice selections. To select a value for either type of button, you simply click on the correct setting.

You can set all the attributes described here using the configurator. The LS2020 switch uses a number of attributes that cannot be configured, and those are not listed here. For example, there are two card status attributes: cardAdminStatus, which is listed in this section, and cardOperStatus, which is not. The cardAdminStatus attribute specifies whether you want a card to be up or down. The cardOperStatus attribute, which is set by the system, indicates the actual status of the card.

Entries in this chapter list interrelationships among attributes, if any exist. Some attributes listed under the Interrelationships heading are given English names like Hello Time, and others are given MIB names such as ls1InfoOperRcvBaudRate. If the English name is provided, that means the referenced attribute is configurable, and you can look it up in this chapter. If the MIB name is provided, the attribute is not configurable through the GUI-based configurator and is not described in this chapter.

Chassis Attributes

This section describes the attributes that you can set from the Chassis Configuration dialog box. These attributes are associated with the switch as a whole, and they include system attributes, IP addresses, and SNMP agent attributes.

Note Remember that, for ease of reference, the attributes are presented in alphabetical order—not in the order in which they appear in the dialog box.

System Attributes

Chassis ID

Specifies the vendor's unique identification number for the system. If you do not know the chassis ID, you can use the configurator's Verify function or the **show chassis general** command in the CLI to display it.

MIB name	chassisID
Field type	Fill-in
Legal values	Printable ASCII numbers in the range 1 – 16777215
Default value	None

Contact

Identifies the person responsible for this node and includes information on how to contact him/her. The field holds up to 29 characters.

MIB name	sysContact
Field type	Fill-in
Legal values	Printable ASCII characters
Default value	None

Location

Specifies the physical location of this node. (For example: telephone closet, 3rd floor.) The field holds up to 29 characters.

MIB name	sysLocation
Field type	Fill-in
Legal values	Printable ASCII characters
Default value	None

Name

Specifies a name for the switch. The field holds up to 39 characters.

MIB name	sysName
Field type	Fill-in
Legal values	Alphanumeric characters (Do not use a name that begins with a number or that contains special characters such as dots or quotation marks.)
Default value	None

Note This must be the same as the name entered during installation and in the /etc/hosts file.

IP Address Attributes

An IP address is a 32-bit identifier assigned to hosts that use the Internet Protocol. The address is represented by four octets (8-bit fields). In decimal form, an IP address comprises four fields separated by dots; each field contains a value in the range 0 – 255.

An IP address consists of two parts. The first part of the address, called the network number, identifies a network on the internet; the remainder, called the host ID, identifies an individual host on that network. All internal NP IP addresses within the same LS2020 network must have the same network number, and each must have a unique host ID.

Default Router

Specifies the IP address of the default router for the Ethernet port on the LS2020 NP card. The router is used if the NP communicates with the network management system (NMS) through an Ethernet LAN but the NMS is not directly connected to the LAN. The router provides a route from the NP to the NMS.

The IP address for the default router has the network number for the attached Ethernet LAN (not the network number of the LS2020 network), followed by a host number that is assigned by the network administrator of the Ethernet LAN.

MIB name	chassisDefaultIpRouter
Field type	Fill-in
Legal values	Four decimal numbers in the range 0 – 255, separated by periods
Default value	None

NP IP Address

Specifies the IP address for the NP Ethernet port. An Ethernet LAN may be attached to the NP so that management traffic can be carried between the node and an NMS. If an Ethernet LAN is connected to the NP, the NP's Ethernet IP address must be configured. If there is a backup NP, both NPs must be attached to the same Ethernet segment, and the NP's Ethernet IP address is used by whichever NP is primary.

Note Be sure that the NP IP address differs from the primary and secondary addresses. Even the network ID number portion of the address should be different from the network numbers(s) used for the other two. When the software calculates the net ID of the NP IP address, it takes into account the NP IP mask. When it calculates the primary and secondary net IDs, it takes into account the subnet mask.

The NP Ethernet IP address has the network number for the attached Ethernet LAN (not the network number of the LS2020 network), followed by a host number that is assigned by the administrator of the Ethernet LAN.

Note Network management can also be done through a LAN that is connected to an ordinary Ethernet or FDDI edge port on any LS2020 node. The NMS must be directly attached to that LAN or connected to it through a bridged network. If you are using that type of configuration, do not configure any NP Ethernet port IP address or default router address.

MIB name	chassisEthernetIpAddr
Field type	Fill-in
Legal values	Four decimal numbers in the range 0 – 255, separated by periods
Default value	None
Interrelationships	NP IP Mask

NP IP Mask

Specifies the subnet mask for the NP Ethernet port's IP address. The subnet mask indicates which portion of the IP address is the network number and which portion is the host ID. This mask is the same for all nodes on the Ethernet LAN that is attached to the primary NP. You obtain it from the administrator of that Ethernet LAN.

MIB name	chassisEthernetIpMask
Field type	Fill-in
Legal values	Four decimal numbers in the range 0 – 255, separated by periods
Default value	None
Interrelationships	NP IP Address

Primary IP Address

The IP address of the active NP for the node. Nodes in an LS2020 network use their primary IP addresses to communicate network management traffic to one another. The address can also be used by any external system that has an IP connection to any port of the LS2020 network. If an LS2020 node has two NPs and the active NP fails, the backup becomes primary. The two NPs exchange management IP addresses so that the primary IP address remains with the active NP.

Note Be sure that the primary IP address you use differs from the secondary IP address. The two should, however, have the same network number. (They should be on the same IP network.)

Host IDs are assigned by the administrator of the network. The network number is assigned by the administrator of the internetwork. For a public network on the Internet, the network number is assigned by the Network Information Center (NIC).

MIB name	chassisActiveIpAddr
Field type	Fill-in
Legal values	Four decimal numbers in the range 0 – 255, separated by periods
Default value	None
Interrelationships	Secondary IP Address Subnet Mask

Secondary IP Address

Specifies the secondary IP address for the chassis. If a node has a backup NP, it uses its primary and secondary IP addresses to pass network management traffic between the two NPs within the node.

Note Be sure that the secondary IP address you use differs from the primary IP address. The two should, however, have the same network number. (They should be on the same network.)

The secondary IP address is used by the backup NP. All internal IP addresses in an LS2020 network must have the same network number, and each must have a unique host ID.

MIB name	chassisSecondaryIpAddr
Field type	Fill-in
Legal values	Four decimal numbers in the range 0 – 255, separated by periods
Default value	None
Interrelationships	Primary IP Address Subnet Mask

Subnet Mask

Specifies the subnet mask used for the IP addresses associated with switch ports (the primary and secondary IP addresses). The subnet mask specifies which portion of the IP address is the network number and which portion is the host ID. This mask is the same for all nodes on a given LS2020 network.

If you plan to handle just one physical LS2020 network under your network ID number (that is, if you do not plan to use subnetting) and the LS2020 network is a class C network, enter 255.255.255.0 as the subnet mask. (The mask is 255.255.0.0 for a class B network with no subnetting, and 255.0.0.0 for a class A network with no subnetting.)

MIB name	chassisNetworkMask
Field type	Fill-in
Legal values	Four decimal numbers in the range 0 – 255, separated by periods
Default value	None
Interrelationships	Primary IP Address Secondary IP Address

SNMP Agent Attributes

Trap Filter

Specifies the lowest priority of traps that are sent from the NP to the CLI and the NMS. Priorities from highest to lowest are operational, informational, trace, and debug. (The default value, Oper, works well in most cases.)

MIB name	mmaTrapFilter
Field type	Multiple choice
Legal values	Oper, Info, Trace, Debug
Default value	Oper

Trap Log Status

This parameter specifies the trap log control field. If enabled, the NP logs traps that it receives to the disk. As new traps are added, old traps are deleted. (The default value works well in most cases.)

MIB name	mmaTrapLog
Field type	Multiple choice
Legal values	Enabled, Disabled
Default value	Enabled

Nettime Attributes

The attributes listed here support the LS2020 network timing feature, Nettime. Nettime lets you specify a prioritized list of timing sources for each chassis in the LS2020 network.

Preference Table

Specifies, in decreasing order of desirability, up to ten timing sources for the node. The node uses the first available timing source listed in the Preference Table. Three timing sources can be listed:

- BITS Interface: The BITS CLK (building-integrated time source clock) port on the switch card. You must connect a T1 BITS line to the BITS CLK port to use this timing source. In a system with two switch cards, you must connect BITS lines to the BITS CLK ports on both switch cards.
- Int. Oscillator: The oscillator on the switch card.
- Port: Any port that is capable of distributing its received clock signal. This includes CLC/T3 ports, CLC/E3 ports, OC-3c ports, and CEMAC ports whose Clocking Type attribute is set to SRTS or synchronous.

An LS2020 node uses a given timing source until the source becomes unavailable or until a **set nettime reset-level** CLI command is issued, triggering a change of timing source. If the node reaches the end of the Preference Table without finding an available timing source, it uses the internal oscillator on the active switch card.

You may find it useful to enter the most desirable timing sources in the table more than once. One strategy, supposing the most desirable timing source is A, is to list sources in the pattern A, B, A, C, A, D, and so on. This causes the node to retry the best timing source after every failure to find a less desirable source, which increases the likelihood that the best source will be used.

MIB name	lsNtCfgSource
Field type	List
Legal value	A set of up to ten entries, where each entry is one of the following: BITS Interface, Int. Oscillator, Port number *card.port*
Default value	In CFG: no entries—the list is empty In LS2020 local database: BITS Interface, Int. Oscillator
Interrelationships	Select Switch

Select Switch

Specifies the switch card that will provide the network timing signal for the node.

MIB name	lsNtClockingSwitchAdmin
Field type	Multiple choice
Legal values	AutoSelect, Switch A, Switch B
Default value	AutoSelect
Interrelationships	Preference Table

Card Attributes

This section describes attributes associated with function cards.

Note Remember that the attributes are presented in alphabetical order—not in the order in which they appear in the dialog box.

Admin Status

Specifies the desired status of the card. (See also "Port Status" later in this chapter.) The system makes the card's actual status match this value as soon as you do a Send Update operation for the node. Set this attribute to Up in the configuration database; you can change the status temporarily from the CLI.

MIB name	cardAdminStatus
Field type	Multiple choice
Legal values	Up, Down
Default value	Up
Interrelationships	cardOperStatus

Name

This parameter specifies the name for an NP or line card. The field holds up to 19 characters. You can leave this field blank if you wish.

MIB name	cardName
Field type	Fill-in
Legal values	Alphanumeric characters (Do not use a name that begins with a number or that contains special characters such as dots or quotation marks.)
Default value	None

Type

Specifies the card category (for example, LS-Edge, T3-Trunk).

MIB name	cardBoardType
Field type	Multiple choice
Legal values	LS-Edge, LS-Trunk, SAC-Edge, SAC-Trunk, T3-Trunk, E3-Trunk, T3-Edge, E3-Edge, FDDI, Ethernet, Fiber Ethernet, OC3-Trunk, OC3-Edge, T1 CEMAC, E1 CEMAC, NP
Default value	LS-Edge

Port Attributes

This section describes attributes associated with ports. Within this section, attributes are grouped as follows:

- Common Attributes (shared by all cards)
- PLC Port Attributes
- CLC Port Attributes
- LSC Port Attributes
- MSC Port Attributes

Note Configure port 0 on all cards, even if the port will not be used. The card type is derived from the setting for port 0. Configuring an unused port does not affect system operation.

Common Attributes

Port Name

Specifies the name of this port. The field holds up to 19 characters.

MIB name	portInfoName
Field type	Fill-in
Legal values	Alphanumeric characters (Do not use a name that begins with a number or that contains special characters such as dots or quotation marks.)
Default value	Combination of chassis name, card slot number, and port number in the following form: <chassis name.card#.port#>

Port Status

Specifies the intended status of the port. The system makes the port's actual status match this value as soon as it can. A port automatically enters testing mode when you load the diagnostics on its parent card. Set this attribute to Up in the database; you can use CLI to change the value for short periods as needed.

MIB name	ifAdminStatus
Field type	Multiple choice
Legal values	Up, Down, Testing mode
Default value	Up
Interrelationships	ifOperStatus

PLC Port Attributes

The following subsections contain the definitions of all attributes associated with CEMAC, Ethernet, FDDI, and fiber Ethernet ports, which are provided by the PLC. Attributes are listed in alphabetical order.

CEMAC Port Attributes

Each T1 or E1 circuit emulation access card (CEMAC) provides eight constant bit rate interfaces to the LS2020 system at T1 or E1 rates.

Cable Length

Specifies the operational value for cable length used for this port.

MIB name	cemacInfoLineBuildOut
Field type	Multiple choice
Legal values	0 – 133 feet (0 – 40.5 meters), 133 – 266 feet (40.5 – 81 meters), 266 – 399 feet (81 – 121.6 meters), 399 – 533 feet (121.6 – 162.5 meters), 533 – 655 feet (162.5 – 199.6 meters) –7.5 dB, –15.0 dB, 0.0 dB
Default value	533 – 655 feet (162.5 – 199.6 meters)

Circuit Identifier

MIB name	dsx1CircuitIdentifier
Field type	Fill-in
Legal values	Printable ASCII characters
Default value	None

Clocking Type

Specifies the type of clock recovery used by the output processing hardware. To use the Nettime network timing feature, set Clocking Type to SRTS or Synchronous.

MIB name	cemacInfoClkMode
Field type	Multiple choice
Legal values	Adaptive, SRTS, Synchronous
Default value	Adaptive

Line Coding

MIB name	dsx1LineCoding
Field type	Multiple choice
Legal values	T1 CEMAC: B8ZS, AMI E1 CEMAC: HDB3, AMI
Default values	T1 CEMAC: B8ZS E1 CEMAC: HDB3

Ethernet Port Attributes

NP Traffic

Specifies whether traffic on the link between the NMS and the LS2020 node is forwarded or blocked. This determines whether inbound frames received on this port are delivered to any NP in the network.

MIB name	lsLanPortNpTrafficFilter
Field type	Multiple choice
Legal values	Forward, Block
Default values	Block

Fiber Ethernet Port Attributes

NP Traffic

Specifies whether traffic on the link between the NMS and the LS2020 node is forwarded or blocked. This determines whether inbound frames received on this port are delivered to any NP in the network.

MIB name	lsLanPortNpTrafficFilter
Field type	Multiple choice
Legal values	Forward, Block
Default values	Block

FDDI Port Attributes

Note Port A and Port B attributes are displayed in one dialog box. The attribute descriptions are the same for each port.

Link Error Rate Alarm

Specifies the bit error rate estimate at which a link connection generates an alarm, expressed in negative powers of 10, for example, 8 means 10^{-8} (or .00000001%).

MIB name	fddimibPORTLerAlarm
Field type	Fill-in
Legal values	4 – 15
Default value	8

Link Error Rate Cutoff

Specifies the bit error rate estimate at which a link connection is broken, expressed in negative powers of 10, for example, 7 means 10^{-7} (or .0000001%).

MIB name	fddimibPORTLerCutoff
Field type	Fill-in
Legal values	4 – 15
Default value	7

Notify Timer

Specifies the length of the timer (in seconds) that is used in the FDDI SMT Neighbor Notification protocol.

MIB name	fddimibSMTTNotify
Field type	Fill-in
Legal values	2 – 30 seconds
Default value	30 seconds

NP Traffic

Specifies whether traffic on the link between the NMS and the LS2020 node is forwarded or blocked. This determines whether inbound frames received on this port are delivered to any NP in the network.

MIB name	lsLanPortNpTrafficFilter
Field type	Multiple choice
Legal values	Forward, Block
Default values	Block

SAC Port Attributes

This subsection contains the definitions of all attributes associated with serial edge and trunk ports provided by the PLC-SAC module. These attributes are found in the SAC-Edge Frame Forwarding, SAC-Edge Frame Relay, and SAC-Trunk Port Configuration dialog boxes. Some attributes apply to only one type of port, and others apply to several. Attributes are listed in alphabetical order.

DCE Bit Rate

Specifies, in bits per second, the desired line rate for an edge or trunk port. This rate is in effect only when the interface's DCE/DTE Type is configured as DCE, as DCE-tt-loop (in the configurator), or as dce-internal (in the CLI) and the interface is, therefore, providing the clock signal.

The DCE Bit Rate that a port can support is dependent in part on the length of the data cable connected to the port and on the response time (clock-in to data-out) of the device at the other end of the cable. Due to physical constraints, data rates are generally slower in DCE-tt-loop (self clock) mode than they would be in a reflected clock mode (the DCE or DTE settings). If you encounter errors on a line whose DCE/DTE Type is set to DCE-tt-loop, try setting its DCE Bit Rate to a lower value or using a shorter cable. For detailed information on how to calculate DCE Bit Rate, see the appendix "Clocking on the Serial Access Card."

MIB name	ls1InfoAdminRcvBaudRate
Field type	Multiple choice
Legal values	55,854 bps, 56,109 bps, 64,000 bps, 128,000 bps, 192,000 bps, 256,000 bps, 384,000 bps, 438,857 bps, 455,111 bps, 512,000 bps, 768,000 bps, 877,714 bps, 945,230 bps, 1,228,800 bps, 1,365,333 bps, 1,536,000 bps, 1,755,428 bps, 2,048,000 bps, 2,457,600 bps, 3,072,000 bps, 4,096,000 bps, 6,144,000 bps
Default value	55,854 bps
Interrelationships	DTE Bit Rate DCE/DTE Type

Note Each SAC port can sustain a maximum throughput of 6,144,000 bps. However, the aggregate throughput across all eight ports on the card will not exceed 24.576 Mbps (4 x 6,144,000 bps). If you configure aggregate bit rates in excess of this maximum, the system issues a warning.

DCE/DTE Type

Specifies the desired physical network interface type for a trunk or edge port. If the port is configured as a DCE, the LS2020 port provides the clock signal. If the port is configured as a DTE, the external device connected to the LS2020 port provides the clock signal. The DCE-tt-loop setting is used for connecting to DTEs that do not reflect clock (TT) signals. (The reflecting of clock signals is necessary for full V.35 compliance.)

MIB name	ls1InfoAdminNetIntType
Field type	Multiple choice
Legal values	DTE, DCE, DCE-tt-loop
Default value	DCE
Interrelationships	DCE Bit Rate DTE Bit Rate ls1InfoOperNetIntType

DTE Bit Rate

Specifies, in bits per second, the line rate for a trunk or edge port. This rate is in effect only if the port is configured as a DTE and is therefore receiving clock from an external device. If you specify an invalid value, the line card generates a trap.

The DTE Bit Rate that a port can support is dependent in part on the length of the data cable connected to the port. If you encounter errors on a serial line, try setting its DTE Bit Rate to a lower value or using a shorter cable. For more information, see the appendix “Clocking on the Serial Access Card.”

MIB name	ls1InfoAdminRcvBaudRate
Field type	Fill-in
Legal values	9,000 bps to 6,000,000 bps
Default value	64,000 bps
Interrelationships	DCE Bit Rate DCE/DTE Type

Full Enquiry Interval

Specifies, for frame relay edge ports, the number of status enquiry intervals that pass before the user portion of this frame relay interface (if it is configured as an NNI) issues a full status enquiry message. Local management interface (LMI) parameter reference: nN1/N391.

MIB name	frProvMiUserFullEnquiryInterval
Field type	Fill-in
Legal values	Decimal numbers in the range 1 – 255
Default value	6
Interrelationships	LMI Type

LMI Type

Specifies, for frame relay edge ports, the data link connection management scheme, or local management interface (LMI), that is active on this frame relay port. “LMI FRIF” is the original LMI; it uses DLCI 1023 for LMI messages. “ITU-TSS Q.933A” was formerly known as CCITT Q.933A; it uses DLCI 0 for LMI messages. “ANSI T1.617D” also uses DLCI 0.

MIB name	frProvMiState
Field type	Multiple choice
Legal values	LMI FRIF, ANSI T1.617D, ITU-TSS Q.933A, No LMI
Default value	No LMI

Max Frame Size

Specifies, for edge ports, the desired maximum frame size for this port, in bytes. (The default value of this attribute, 1536 bytes, is the maximum size of an encapsulated Ethernet frame.)

MIB name	edgeMaxFrameSize
Field type	Fill-in
Legal values	Decimal numbers in the range 48 – 8152
Default value	1536

Max Supported VCs

Specifies, for frame relay edge ports, the maximum number of virtual circuits allowed for this interface. This number is usually dictated by the frame relay network.

MIB name	frProvMiMaxSupportedVCs
Field type	Fill-in
Legal values	Decimal numbers in the range 2 – 976
Default value	100
Interrelationships	Max VCs (expert mode attribute set on a per-card basis)

Note The total of the Max Supported VCs values for all the ports on a card should not exceed the value of the per-card Max VCs attribute, which is limited to 2000. For information on the Max VCs attribute, see the section “Max VCs” in the “Expert Mode” appendix.

Net Error Threshold

Specifies, for frame relay edge ports, the maximum number of unanswered status enquiries the system tolerates before declaring the LMI port unreliable at the network end. (If the LMI port is declared unreliable, all PVCs are reported inactive.) Status enquiries are counted over a number of polling intervals; the default number of such intervals is five. See the entry for "Net Monitored Events" later in this chapter for more information. LMI parameter reference: nN2/N392.

MIB name	frProvMiNetErrorThreshold
Field type	Fill-in
Legal values	Decimal numbers in the range 1 – 10
Default value	5
Interrelationships	LMI Type Net Monitored Events

Net Interface Type

Specifies, for frame relay edge ports, the type of frame relay network interface on this port: UNI for user network interface, NNI for network-to-network interface.

MIB name	frProvMiNetInterfaceType
Field type	Multiple choice
Legal values	UNI, NNI
Default value	UNI

Net Monitored Events

Specifies, for frame relay edge ports, the number of status polling intervals over which the Net Error Threshold is counted. If this interface receives the number of errors specified in Net Error Threshold within this number of events, the LMI port is declared unreliable. (If the LMI port is declared unreliable, all PVCs are reported inactive.) LMI parameter reference: nN3/N393.

MIB name	frProvMiNetMonitoredEvents
Field type	Fill-in
Legal values	Decimal numbers in the range 1 – 10
Default value	5
Interrelationships	LMI Type Net Error Threshold

Net Request Interval

Specifies, for frame relay edge ports, the maximum number of seconds the system expects to elapse between status enquiry messages from the user end of the frame relay connection. If a status enquiry message does not arrive within this time, and if the system has been configured to report trace-level traps, trap number LCC_3036 is issued. LMI parameter reference: nT2/T392.

MIB name	frProvMiNetRequestInterval
Field type	Fill-in
Legal values	5, 10, 15, 20, 25, or 30
Default value	10
Interrelationships	LMI Type

Polling Interval

Specifies, for frame relay edge ports, the number of seconds between consecutive status enquiries sent by the user portion of a frame relay interface that has an LMI. This attribute is used only when the LS2020 interface is configured as an NNI. LMI parameter reference: nT1/T391.

MIB name	frProvMiUserPollingInterval
Field type	Fill-in
Legal values	5, 10, 15, 20, 25, or 30
Default value	10
Interrelationships	LMI Type Net Interface Type User Error Threshold frProvMiUserMonitoredEvents

User Error Threshold

Specifies, for frame relay edge ports, the maximum number of unanswered status enquiries the LS2020 system tolerates before it declares the LMI port unreliable at the user side of the interface. (If the LMI port is declared unreliable, all PVCs are reported inactive.) This attribute is used only when the LS2020 interface is configured as an NNI.

MIB name	frProvMiUserErrorThreshold
Field type	Fill-in
Legal values	Decimal numbers in the range 1 – 10
Default value	5
Interrelationships	LMI Type Net Interface Type frProvMiUserMonitoredEvents Polling Interval

CLC Port Attributes

This section contains the definitions of all attributes associated with (1) OC-3c ports provided by the CLC and (2) T3/E3 ports on the 4- and 8-port T3/E3 cards. These attributes are found in the OC3-Trunk and OC3-Edge Configuration dialog boxes and in the 4- and 8-port versions of the T3 and E3 trunk dialog boxes. Attributes are listed in alphabetical order.

Cable Length

Specifies the length of the cable connected to this T3 or E3 trunk or edge port. If this attribute is set incorrectly, the connection may be noisy, or it may not come up.

MIB name	t3e3InfoCableLen
Field type	Multiple choice
Legal values	T3: 0 – 450 feet (0 – 137 meters) 450 – 900 feet (137 – 274 meters) E3: 0 – 400 feet (0 – 122 meters) 300 – 1000 feet (91 – 305 meters) 800 – 1300 feet (244 – 396 meters) 1100 – 1900 feet (335 – 579 meters)
Default value	T3 Trunk or Edge: 0 – 450 feet (0 – 137 meters) E3 Trunk or Edge: 0 – 400 feet (0 – 122 meters)

Cell Payload Scrambling

Specifies whether cell payload scrambling is enabled for this trunk or edge port. Cell payload scrambling is a configurable option for T3/E3 cards but not for OC-3c cards.

MIB name	clc1InfoAdminScramble
Field type	Multiple choice
Legal values	enable, disable
Default value	enable

Clocking Type

Specifies the source of the transmit clock used for this OC-3c, T3, or E3 trunk or edge port. If you specify external, recovered receive clock (clock derived from the receive data input) is used for the transmit clock. If you specify internal, a local timing source (such as an oscillator) on the switch card generates the transmit clock.

MIB name	clc1InfoAdminClock
Field type	Multiple choice
Legal values	internal, external
Default value	internal

DS3 Line Type

Specifies the type of DS3 line used on this T3 or E3 trunk port. If necessary, check with your carrier to learn the characteristics of the line it provides. (Clear channel is sometimes referred to as M13.)

MIB name	dsx3LineType
Field type	Multiple choice
Legal values	T3: C-bit Parity, Clear Channel E3: E3PLCP, E3OTHER
Default value	T3: C-bit Parity E3: E3PLCP

Framing Type

Specifies the ATM framing and cell delineation combination in use on this port.

MIB name	t3e3InfoFraming
Field type	Multiple choice
Legal values	T3: PLCP and T3-Hec E3: PLCP and G.804
Default values	T3 and E3: PLCP

Sonet/SDH

Specifies whether a SONET or an SDH signal is used across this interface (OC-3c only).

MIB name	oc3InfoMediumType
Field type	Multiple choice
Legal values	Sonet, SDH
Default values	Sonet

VPI

Specifies the identifier for the virtual path associated with this trunk card. Enter 0 if you want to disable VPI selection.

MIB name	vptVPI
Field type	Fill-in
Legal values	An integer in the range 0 – 255
Default values	0

LSC Port Attributes

This subsection contains the definitions of all attributes associated with low-speed edge and trunk ports provided by the LSC. These attributes are found on the LS-Edge Frame Forwarding, LS-Edge Frame Relay, and LS-Trunk Port Configuration dialog boxes. Some attributes apply to only one type of port, and others apply to several. Attributes are listed in alphabetical order.

DCE Bit Rate

Specifies, in bits per second, the desired line rate for an edge or trunk port. This rate is in effect only when the interface is configured as DCE, DCE-tt-loop (in the configurator), or as dce-internal (in the CLI) and is, therefore, providing the clock signal.

The DCE Bit Rate that a port can support is dependent in part on the length of the data cable connected to the port and on the response time (clock-in to data-out) of the device at the other end of the cable. Due to physical constraints, data rates are generally slower in DCE-tt-loop (self clock) mode than they would be in a reflected clock mode (the DCE or DTE settings). If you encounter errors on a line whose DCE/DTE Type is set to DCE-tt-loop, try setting its DCE Bit Rate to a lower value or using a shorter cable.

MIB name	ls1InfoAdminRcvBaudRate
Field type	Multiple choice
Legal values	56,000 bps, 64,000 bps, 128,000 bps, 192,000 bps, 256,000 bps, 384,000 bps, 448,000 bps, 512,000 bps, 768,000 bps, 896,000 bps, 1,344,000 bps, 1,536,000 bps, 1,792,000 bps, 2,688,000 bps, 3,584,000 bps, 4,000,000 bps, 5,376,000 bps
Default value	56,000 bps
Interrelationships	DTE Bit Rate DCE/DTE Type

Note Although the configurator accepts rates above 3,584,000 bps, sustained port throughput cannot exceed that rate.

DCE/DTE Type

Specifies the desired physical network interface type for a trunk or edge port. If the port is configured as a DCE, the LS2020 port provides the clock signal. If the port is configured as a DTE, the external device connected to the LS2020 port provides the clock signal. The DCE-tt-loop setting is used for connecting to DTEs that do not reflect clock (TT) signals. (The reflecting of clock signals is necessary for full V.35 compliance.) DCE-tt-loop is not recommended for use on trunk ports.

MIB name	ls1InfoAdminNetIntType
Field type	Multiple choice
Legal values	DTE, DCE, DCE-tt-loop
Default value	DCE
Interrelationships	DCE Bit Rate DTE Bit Rate ls1InfoOperNetIntType

DTE Bit Rate

Specifies, in bits per second, the line rate for a trunk or edge port. This rate is in effect only if the port is configured as a DTE and is therefore receiving clock from an external device. If you specify an invalid value, the line card generates a trap.

The DTE Bit Rate that a port can support is dependent in part on the length of the data cable connected to the port. If you encounter errors on a serial line, try setting its DTE Bit Rate to a lower value or using a shorter cable.

MIB name	ls1InfoAdminRcvBaudRate
Field type	Fill-in
Legal values	9,000 bps to 6,000,000 bps
Default value	64,000 bps
Interrelationships	DCE Bit Rate DCE/DTE Type

Full Enquiry Interval

Specifies, for frame relay edge ports, the number of status enquiry intervals that pass before the user portion of this frame relay interface (if it is configured as an NNI) issues a full status enquiry message. Local management interface (LMI) parameter reference: nN1/N391.

MIB name	frProvMiUserFullEnquiryInterval
Field type	Fill-in
Legal values	Decimal numbers in the range 1 – 255
Default value	6
Interrelationships	LMI Type

LMI Type

Specifies, for frame relay edge ports, the data link connection management scheme, or local management interface (LMI), that is active on this frame relay port. “LMI FRIF” is the original LMI; it uses DLCI 1023 for LMI messages. “ITU-TSS Q.933A” was formerly known as CCITT Q.933A; it uses DLCI 0 for LMI messages. “ANSI T1.617D” also uses DLCI 0.

MIB name	frProvMiState
Field type	Multiple choice
Legal values	LMI FRIF, ANSI T1.617D, ITU-TSS Q.933A, No LMI
Default value	No LMI

Max Frame Size

Specifies, for edge ports, the desired maximum frame size for this port, in bytes. (The default value of this attribute, 1536 bytes, is the maximum size of an encapsulated Ethernet frame.)

MIB name	edgeMaxFrameSize
Field type	Fill-in
Legal values	Decimal numbers in the range 48 – 8152
Default value	1536

Max Supported VCs

Specifies, for frame relay edge ports, the maximum number of virtual circuits allowed for this interface. This number is usually dictated by the frame relay network.

MIB name	frProvMiMaxSupportedVCs
Field type	Fill-in
Legal values	Decimal numbers in the range 2 – 976
Default value	100
Interrelationships	Max VCs (expert mode attribute set on a per-card basis)

Note The total of the Max Supported VCs values for all the ports on a card should not exceed the value of the per-card Max VCs attribute, which is limited to 2000. For information on the Max VCs attribute, see the section “Max VCs” in the “Expert Mode” appendix.

Net Error Threshold

Specifies, for frame relay edge ports, the maximum number of unanswered status enquiries the system tolerates before declaring the LMI port unreliable at the network end. (If the LMI port is declared unreliable, all PVCs are reported inactive.) Status enquiries are counted over a number of polling intervals; the default number of such intervals is five. See the entry for "Net Monitored Events" later in this chapter for more information. LMI parameter reference: nN2/N392.

MIB name	frProvMiNetErrorThreshold
Field type	Fill-in
Legal values	Decimal numbers in the range 1 – 10
Default value	5
Interrelationships	LMI Type Net Monitored Events

Net Interface Type

Specifies, for frame relay edge ports, the type of frame relay network interface on this port: UNI for user network interface, NNI for network-to-network interface.

MIB name	frProvMiNetInterfaceType
Field type	Multiple choice
Legal values	UNI, NNI
Default value	UNI

Net Monitored Events

Specifies, for frame relay edge ports, the number of status polling intervals over which the Net Error Threshold is counted. If this interface receives the number of errors specified in Net Error Threshold within this number of events, the LMI port is declared unreliable. (If the LMI port is declared unreliable, all PVCs are reported inactive.) LMI parameter reference: nN3/N393.

MIB name	frProvMiNetMonitoredEvents
Field type	Fill-in
Legal values	Decimal numbers in the range 1 – 10
Default value	5
Interrelationships	LMI Type Net Error Threshold

Net Request Interval

Specifies, for frame relay edge ports, the maximum number of seconds the system expects to elapse between status enquiry messages from the user end of the frame relay connection. If a status enquiry message does not arrive within this time, and if the system has been configured to report trace-level traps, trap number LCC_3036 is issued. LMI parameter reference: nT2/T392.

MIB name	frProvMiNetRequestInterval
Field type	Fill-in
Legal values	5, 10, 15, 20, 25, or 30
Default value	10
Interrelationships	LMI Type

Polling Interval

Specifies, for frame relay edge ports, the number of seconds between consecutive status enquiries sent by the user portion of a frame relay interface that has an LMI. This attribute is used only when the LS2020 interface is configured as an NNI. LMI parameter reference: nT1/T391.

MIB name	frProvMiUserPollingInterval
Field type	Fill-in
Legal values	5, 10, 15, 20, 25, or 30
Default value	10
Interrelationships	LMI Type Net Interface Type User Error Threshold frProvMiUserMonitoredEvents

User Error Threshold

Specifies, for frame relay edge ports, the maximum number of unanswered status enquiries the LS2020 system tolerates before it declares the LMI port unreliable at the user side of the interface. (If the LMI port is declared unreliable, all PVCs are reported inactive.) This attribute is used only when the LS2020 interface is configured as an NNI.

MIB name	frProvMiUserErrorThreshold
Field type	Fill-in
Legal values	Decimal numbers in the range 1 – 10
Default value	5
Interrelationships	LMI Type Net Interface Type frProvMiUserMonitoredEvents Polling Interval

MSC Port Attributes

This subsection contains the definitions of all attributes associated with medium-speed edge and trunk ports provided by the MSC. These attributes are found in the configuration dialog boxes for the two-port T3-Trunk, two-port E3-Trunk, T3-Edge, and E3-Edge. Attributes are listed in alphabetical order.

Cable Length

Specifies the length of the cable connected to this T3 or E3 trunk or edge port. If this attribute is set incorrectly, the connection may be noisy, or it may not come up.

MIB name	ms1InfoAdminCableLength
Field type	Multiple choice
Legal values	T3: 0 – 450 feet (0 – 137 meters) 450 – 900 feet (137 – 274 meters) E3: 0 – 400 feet (0 – 122 meters) 300 – 1000 feet (91 – 305 meters) 800 – 1300 feet (244 – 396 meters) 1100 – 1900 feet (335 – 579 meters)
Default value	T3 Trunk or Edge: 0 – 450 feet (0 – 137 meters) E3 Trunk or Edge: 0 – 400 feet (0 – 122 meters)

Cell Payload Scrambling

Turns cell payload scrambling on or off on this T3 or E3 trunk or edge port. Cell payload scrambling is a technique used for framing support. It rearranges the data portion of a cell to maintain the line synchronization.

MIB name	ms1InfoAdminScramble
Field type	Multiple choice
Legal values	Enabled, Disabled
Default value	Trunk interfaces T3: Enabled E3: Enabled Edge interfaces Enabled

DS3 Line Type

Specifies the type of DS3 line used on this T3 trunk or edge port. Check with your carrier to learn the characteristics of the line it provides. (Clear channel is sometimes referred to as M13.)

MIB name	dsx3LineType
Field type	Multiple choice
Legal values	C-bit Parity, Clear Channel
Default value	C-bit Parity

Internetworking Attributes

This section describes attributes associated with internetworking. These attributes apply only to switches that use packet line cards (PLCs) in conjunction with FDDI, fiber Ethernet, and Ethernet access cards. The attributes are discussed in five main categories:

- Spanning tree bridging
- Custom filters
- Static bridge filtering
- Multicast groups
- Traffic profiles

Spanning Tree Attributes

This section describes the attributes used to affect the operation and configuration of the LS2020 spanning tree bridge. These attributes are found in the Spanning Tree Configuration dialog box. Attributes are placed in one of two subsections, depending on whether they are system level or port level. Within a subsection, attributes are listed in alphabetical order.

You should be familiar with IEEE 802.1d-1990, *MAC Bridges*, before you attempt to set any of these attributes. Specifically, you should be familiar with the following terms: root bridge, designated port, spanning tree bridge, Hello Time, Forward Delay, Max Age, bridge priority, bridge ID, path cost, and port ID. Refer to RFC 1493, *Definition of Managed Objects for Bridges*, for more information on spanning tree bridge attributes.

Switch-Level Attributes

Forward Delay

Specifies the time period, in hundredths of a second, that all bridges use for Forward Delay when this bridge is acting as the root. Forward Delay is the time interval spent while the bridge is in transition between states.

MIB name	dot1dStpBridgeForwardDelay
Field type	Fill-in
Legal values	400 to 3000 (hundredths of a second)
Default value	1500 (15 seconds)
Interrelationships	2 x (Forward Delay – 1) >= Max Age 2 x (Hello Time + 1) <= Max Age

Hello Time

Specifies the time period, in hundredths of a second, that all bridges use for Hello Time when this bridge is root. Hello Time is the time interval between the transmission of consecutive configuration messages sent by a bridge that is, or is attempting to become, the root.

MIB name	dot1dStpBridgeHelloTime
Field type	Fill-in
Legal values	100 to 1000 (hundredths of a second)
Default value	200 (2 seconds)
Interrelationships	2 x (Forward Delay – 1) >= Max Age 2 x (Hello Time + 1) <= Max Age

Max Age

Specifies the time period, in hundredths of a second, that all bridges use for Max Age when this bridge is acting as the root. Max Age is the maximum amount of time that received protocol information is saved before it is discarded.

MIB name	dot1dStpBridgeMaxAge
Field type	Fill-in
Legal values	600 to 4000 (hundredths of a second)
Default value	2000 (20 seconds)
Interrelationships	2 x (Forward Delay – 1) >= Max Age 2 x (Hello Time + 1) <= Max Age

Priority

Specifies the value of the priority portion of the bridge ID (the first two octets of the eight-octet bridge ID). The other six octets of the ID are provided by a read-only MIB attribute: dot1dBaseBridgeAddress. The bridge Priority, along with the Port Priority and Path Cost attributes, is used to manage the spanning tree active topology. The lower the numerical value of the priority attribute, the higher its priority. The bridge with the lowest ID becomes the root bridge. If the priority portion of two IDs is the same, the bridge with the lower address portion of the ID becomes the root.

MIB name	dot1dStpPriority
Field type	Fill-in
Legal values	Integers in the range 0 – 65535
Default value	32768
Interrelationships	dot1dBaseBridgeAddress

Port-Level Attributes

Path Cost

Specifies the contribution of this port to the path cost of paths towards the spanning tree root that includes this port. The Path Cost, along with port Priority and bridge Priority attributes, is used to manage the spanning tree active topology. The higher the Path Cost value is, the less likely the port is to be chosen as part of the spanning tree.

MIB name	dot1dStpPortPathCost
Field type	Fill-in
Legal values	Integers in the range 1 – 65535
Default values	100 for Ethernet 10 for FDDI
Interrelationships	dot1dStpPort

Port Priority

Specifies the value of the priority field, which is contained in the first octet (in network byte order) of the two-octet port ID. The other octet of the ID is provided by a read-only MIB attribute: dot1dStpPort. The port Priority, along with Path Cost and bridge Priority attributes, is used to manage the spanning tree active topology. The lower the attribute value is, the higher its priority: a lower value makes the port more likely to be set by the protocol in forwarding state when the bridge has two or more ports connected in a loop.

MIB name	dot1dStpPortPriority
Field type	Fill-in
Legal values	Integers in the range 0 – 255
Default value	80
Interrelationships	dot1dStpPort

STB Enable

Specifies the status of the port as either enabled or disabled for bridged traffic.

MIB name	dot1StpPortEnable
Field type	Multiple choice
Legal values	Enabled, disabled
Default value	Enabled

Custom Filter Attributes

This section describes the attributes used to create per-node custom filters. These attributes are found in the Define Filter and Assign Filter dialog boxes. Within a subsection, attributes are listed in alphabetical order.

You can create filters for bridge (based on the MAC layer header field), IP, and IPX traffic. Bridge filters are applied before IP and IPX filters. For that reason, you could have a situation in which a bridge forwards a packet but a subsequent IP or IPX filter blocks it.

Here are the rules that govern the creation and use of custom filters:

- You can apply the same filter to multiple ports.
- You can apply multiple filters to the same port, but you cannot assign two filters to the same port and give them the same priority if the filters are of the same protocol type.
- Filters apply only to inbound (receiving) ports. No filters are checked at the outbound (transmitting ports).
- You can have a maximum of 32 filters of any given filter type per port. The total number of filters (all types) that you can assign to a port is therefore 96.
- You can have a maximum of 512 filters per chassis.

Caution It is extremely important that the limit of 512 filters not be exceeded.

- You can have a maximum of 250 fields, constants, and operators in a single filter expression.
- You can have a maximum of three nested parentheses in an expression.
- You can make a maximum of 1024 filter-to-port assignments. (You reach that number by using the same filter more than once, the limit of filters per chassis being 512.)
- 802.3/SNAP encapsulated frames cannot be filtered based on the encapsulated frame.

The attributes associated with custom filters are specified in the LS2020 private MIB; they are not defined in any industry-standard MIBs.

Defining Traffic Filters

You define a traffic filter by formulating a filter expression, made up of fields, constants, and operators. The fields are different for each of the three types of filter you can use with the node configurator program. Table 4-1 lists the fields you can use with the bridge filter. Table 4-2 lists the fields you can use with the IP filter, and Table 4-3 lists the fields you can use with the IPX filter.

Note Not all fields apply to all packet types. Names of fields are not case sensitive.

Table 4-1 Fields Used with the Bridge Filter

Field	Description	Format
macSrc	MAC source address	xx:xx:xx:xx:xx:xx
macDst	MAC destination address	xx:xx:xx:xx:xx:xx
macProto	MAC protocol type	0 – 65535 (0 – 0xffff)
llcSSAP	LLC source SAP	0 – 255 (0 – 0xff)
llcDSAP	LLC destination SAP	0 – 255 (0 – 0xff)
snapOUI	SNAP OUI	0 – 16777215 (0 – 0xffffff)
snapProto	SNAP Ethernet protocol	0 – 65535 (0 – 0xffff)

Points to remember when entering bridge filters:

- FDDI and Ethernet MAC addresses must be entered in canonical form (least significant bit first).
- Colon-separated values in MAC addresses (macSrc and macDst) are hexadecimal digits entered without a leading 0x but with leading zeros for one-digit numbers (for example, 1 must be entered as 01).
- The other constants can be entered either as sequences of decimal digits (the default) or as hex digits (if you add a leading 0x).

Table 4-2 Fields Used with the IP Filter

Field	Description	Format
ipSrc	IP source address	nnn.nnn.nnn.nnn
ipDst	IP destination address	nnn.nnn.nnn.nnn
ipTOS	IP type of service	0 – 255 (0 – 0xff)
ipProto	IP protocol type	0 – 255 (0 – 0xff)
portSrc	TCP/UDP source port	0 – 65535 (0 – 0xffff)
portDst	TCP/UDP destination port	0 – 65535 (0 – 0xffff)

Dot-separated values in IP addresses are decimal digits without leading zeros. You can enter other constants as sequences of decimal digits (the default) or hex digits (with leading 0x).

Table 4-3 Fields Used with the IPX Filter

Field	Description	Format
ipxDstNw	IPX destination network	0 – 4294967295 (0 – 0xffffffff)
ipxSrcNw	IPX source network	0 – 4294967295 (0 – 0xffffffff)
ipxDstNd	IPX destination node	xx:xx:xx:xx:xx:xx
ipxSrcNd	IPX source node	xx:xx:xx:xx:xx:xx
ipxDstSt	IPX destination socket	0 – 65535 (0 – 0xffff)
ipxSrcSt	IPX source socket	0 – 65535 (0 – 0xffff)
ipxType	IPX packet type	0 – 255 (0 – 0xff)

Colon-separated values in IPX addresses ipxDstNd and ipxSrcNd are hex digits entered without a leading 0x, but with leading zeros for one-digit numbers (for example, 1 must be entered as 01). You can enter other values either as sequences of decimal digits (the default) or as hex digits (with leading 0x).

Constant

The configurator allows you to enter constants for use in constructing the filter expression. The format of the constant depends on the associated field (or masked field). Constants in defined filters can be entered in decimal or in hexadecimal. The constants default to base decimal. If you want to enter a hexadecimal value, you must use a prefix of 0x.

Filter Expression

Specifies the expression associated with the filter. An expression is a complex condition applied to incoming frames.

The expression gives values for fields in an incoming frame header. If the contents of a field match the value for that field in a filter condition, an action that you select is performed on the frame.

The syntax of a filter expression is loosely modeled after the syntax of general programming languages, such as C. You create a filter expression by entering fields, operators, and constants and using parentheses. Each of these is described in more detail below.

MIB name	lightStreamBridgeFilterEntry lsIpFilterEntry lsIpxFilterEntry
Field type	Multiple choice
Legal values	Fields, operators, constants, parentheses (see following descriptions)
Default value	None

Filter ID

Specifies the identifying integer assigned to this filter. Each filter ID on a chassis must be unique within a filter type.

MIB name	lightStreamBrFilterId lsIpFilterId lsIpxFilterId
Field type	Fill-in
Legal values	An integer in the range 1 – 65535
Default value	None

Operators

The configurator provides the operators in the following list for construction of the filter expression.

Operator	Description
Boolean	
&&	Boolean AND
||	Boolean OR
Comparison	
==	Equal
!=	Not equal
>	Greater than
>=	Greater than or equal
<	Less than
<=	Less than or equal
Arithmetic	
&	Bitwise AND (used for masking)

Note The following points pertain to these operators:

1. The left and right sides of a Boolean operation must evaluate as either true or false. The result of applying operators in a Boolean expression is true or false.

2. The left side of a comparison operation must be either an arithmetic expression or a field. The right side must be a constant. The result of applying operators in a comparison expression is true or false.

3. The left side of an arithmetic operation must be a field (described above), and the right side must be a constant (described below). The result of applying the operator in an arithmetic expression is a numerical value to be used by a comparison operator.

Parentheses

Use parentheses to

- Force arithmetic operators to be evaluated before comparison operators
- Force comparison operators to be evaluated before Boolean operators
- Determine the order in which Boolean operators are evaluated if you want to use an order other than left to right

Select Filter Type

Specifies the type of filter being defined.

MIB name	None
Field type	Multiple choice
Legal values	Bridge, IP, IPX
Default values	Bridge

Assigning Filters

Action

Specifies the action to be taken if a frame meets the conditions defined by the filter. This is a filter-level attribute. You can specify that the frame be forwarded into the network or blocked. Blocking means that the frame is dropped at the edge. If you do not specify a setting for the filter-level Action attribute, the opposite of the setting for the port-level Default Action attribute is used.

MIB name	lightStreamBrFilterParmAction lsIpFilterParmAction lsIpxFilterParmAction
Field type	Multiple choice
Legal values	Forward or Block
Default value	Block if port Default Action = Forward Forward if port Default Action = Block
Interrelationships	Default Action

Broadcast Limit

Specifies the number of broadcast packets per second that this port accepts and attempts to forward. The node discards all broadcast packets above this number.

MIB name	lightStreamBrPortBcastRateLimit
Field type	Fill-in

Legal values	0 = All broadcast packets are discarded. 1 – 127 = Packets above this number per second are discarded. –1 = All broadcast packets are forwarded.
Default value	– 1

Default Action

Specifies the default action (either forward or block) to be taken for the port if there are no specific port filters or if there is no match with the configured filter(s) for the port. This is a port-level attribute.

MIB name	lightStreamBrPortDefaultAction lsIpPortDefaultAction lsIpxPortDefaultAction
Field type	Multiple choice
Legal values	Forward or Block
Default value	Forward
Interrelationships	Action

Filter ID

Specifies a unique ID for the filter being assigned. (The filter has already been defined.) Each filter ID on a chassis must be unique.

MIB name	lightStreamBrFilterParmFilterId lsIpFilterParmFilterId lsIpxFilterParmFilterId
Field type	Fill-in
Legal values	An integer in the range 1 – 65535
Default value	None

Priority

Specifies the precedence assigned to this filter. The lower the priority number, the higher the filter's priority, compared with the priorities of the other filters assigned to the port. Filters are performed in order of priority, with the highest priority filter being performed first. Bridge filter conditions are applied before IP and IPX filter conditions. This means that if a bridge filter condition causes a packet to be forwarded, an IP or IPX filter can then block the packet.

Here are the rules for the assigning of priority:

- No two filters of the same type on any port should have the same priority.
- You must specify a priority for each filter on each port.

- Do not assign priority numbers sequentially, because that makes it more difficult to change the numbers later. Leave a gap between priority numbers. You can then use one of the unused numbers to either raise or lower the priority level of a port filter without having to adjust any others.

MIB name	lightStreamBrFilterParmFilterPriority lsIpFilterParmFilterPriority lsIpxFilterParmFilterPriority
Field type	Fill-in
Legal values	An integer in the range 1 – 65535
Default value	1 (highest priority)

Select Filter Type

Specifies the type of filter being assigned.

MIB name	None
Field type	Multiple choice
Legal values	Bridge, IP, IPX
Default values	Bridge

Filter Syntax

An expression is evaluated from left to right at both the top level of the expression and within a pair of parentheses. The result of a filter expression is either a Boolean true (if the received packet matches the expression) or a Boolean false (if the received packet does not match). Based on the Action attribute setting and on the default action for the port, the packet is then either blocked or forwarded.

You create a filter expression using the building blocks of fields, operators, constants and parentheses, which have been described above.

The following are some examples of filter syntax:

```
llcSSAP >= 01

(snapOUI & 0xff00) >= 0x5500

macSrc == 00:00:dd:00:00:12

(macSrc==00:00:dd:00:00:12) && (macDst != 00:00:dd:00:00:76)

(macSrc & ff:ff:00:00:00:00) == 00:dd:00:00:00:00

((macSrc & ff:ff:00:00:00:00) == 00:dd:00:00:00:00) &&
((macDst & ff:ff:00:00:00:00) != 00:dd:00:00:00:00)

(llcSSAP >= 01) && (macProto == 1234) && (macSrc == 00:00:dd:00:00:12)
```

```
((llcSSAP == 02) || (llcSSAP == 04)) &&
((macSrc == 00:00:dd:00:00:12) || (macSrc == 00:00:dd:00:00:14))
```

Sample Filters

Example 1—Suppose that you want the network to allow only Local Area Transport (LAT) traffic to be passed between two LANs. You want to create a filter that blocks non-LAT traffic and forwards LAT traffic. You specify the filter this way:

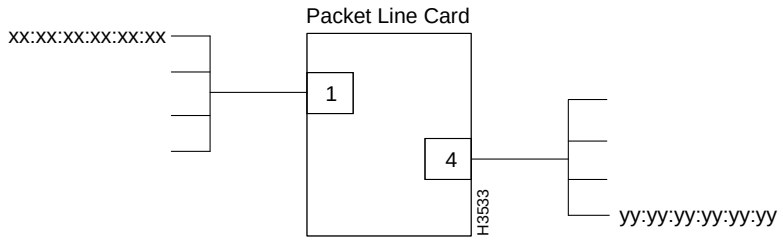
```
macProto==0x6004
```

6004 is the hexadecimal value assigned to the LAT protocol type in RFC 1340, Assigned Numbers.

You apply this filter to the ports that you want to use exclusively for LAT traffic with the Action attribute for the filter set to Forward. You also set the Default Action for the port to Block. This combination of settings causes only LAT frames to be forwarded and all others to be blocked.

Example 2—Consider the connections shown in Figure 4-1. Suppose that you want to prohibit end stations xx:xx:xx:xx:xx:xx and yy:yy:yy:yy:yy:yy from communicating with each other. You create a filter for each port that blocks the traffic to the other end station.

Figure 4-1 Connections to Be Filtered



You specify the filters this way:

For Port 1:

```
(macSrc==xx:xx:xx:xx:xx:xx) && (macDst==yy:yy:yy:yy:yy:yy)
```

For Port 4:

```
(macDst==xx:xx:xx:xx:xx:xx) && (macSrc==yy:yy:yy:yy:yy:yy)
```

You then assign each filter to the appropriate port and set the Action attribute for the filter to block. You set the Default Action for the port to Forward. This combination of settings prevents communication between the two end stations but allows all other communication.

Example 3—Using the same connections shown in Figure 4-1, suppose that you wanted to allow communication only between end stations xx:xx:xx:xx:xx:xx and yy:yy:yy:yy:yy:yy. You create a filter for each port that allows communication between the two end stations. You specify the filter this way:

For Port 1:

```
(macSrc==xx:xx:xx:xx:xx:xx) && (macDst==yy:yy:yy:yy:yy:yy)
```

For Port 4:

```
(macDst==xx:xx:xx:xx:xx:xx) && (macSrc==yy:yy:yy:yy:yy:yy)
```

You then assign each filter to the appropriate port, but this time you set the Action attribute for the filter to Forward. You set the Default Action for the port to Block. This combination forwards traffic between the two end stations and blocks all other traffic.

Static Bridge Filtering

This section describes the attributes used to create entries in the static bridge filtering database. These attributes are found in the Static Bridge Configuration dialog box. Attributes are listed here in alphabetical order.

The filtering database matches (1) a MAC destination address, (2) an LS2020 port that can receive the frames with this MAC destination address, and (3) a set of LS2020 ports on which the frames can then be transmitted. In the forwarding process, entries in the filtering database are used to determine if frames with a given MAC destination address should be forwarded to given port(s).

Through the configurator (or the CLI), you can explicitly make an entry in the filtering database; this is called a static bridge filter. You may, for instance, want to make such an entry if you are directing a broadcast to specific ports in order to limit broadcast propagation. You would also make this type of entry if you have an end station that only receives traffic, in which case the bridge cannot learn about the station.

Here are two rules regarding the creation of static bridge filter entries:

- You can create a maximum of 256 receive port/transmit port pairs.
- You can create a maximum of 1024 static bridge filter entries.

You should be familiar with IEEE 802.1d-1990, *MAC Bridges*, before you attempt to set any of these attributes. Specifically, you should be familiar with the following terms: filtering database, forwarding, MAC destination addresses, receive port, and transmit port. Refer to RFC 1493, *Definition of Managed Objects for Bridges,* for more information on static filtering attributes.

MAC

Specifies the destination MAC address to which this entry in the filtering database applies. The address can be a unicast, multicast, or broadcast address. You can obtain MAC addresses from the appropriate network administrators. Colon-separated values in MAC addresses are hexadecimal digits entered without a leading 0x but with leading zeroes for one-digit numbers (for example, 1 must be written as 01).

MIB name	dot1dStaticAddress
Field type	Fill-in
Legal values	xx:xx:xx:xx:xx:xx (48-bit MAC address)
Default value	None

Receive Port

Specifies the number of an LS2020 interface that must receive the frame in order for this filtering database entry to apply. The interface number comprises the card slot number and the port number.

MIB name	dot1dStaticReceivePort
Field type	Fill-in
Legal values	The number of any valid transmit port that has a LAN interface (for example, Ethernet, FDDI) 0 = this entry applies on all ports of the bridge for which there is no other applicable entry; a frame with the specified MAC address can be received on any port of the bridge.
Default value	None

Note In the dialog box, the card and port numbers are entered in separate field boxes.

Transmit Ports

Specifies the interface numbers of the LS2020 ports that the frames with the associated MAC destination can be transmitted to. You can specify up to eight transmit ports. Transmit ports must be in the same chassis as the receive ports with which they are paired. However, the transmit ports need not be on the same card within the chassis as the receive ports.

MIB name	dot1dStaticAllowedToGoTo
Field type	Fill-in
Legal values	Interface number comprises the card slot number and port number
Default value	None

Note In the dialog box, the card and port numbers are entered in separate field boxes.

Multicast Groups

HPMS, the High Performance Multicast Service, enables you to distribute LAN traffic from one source to multiple destination points. A multicast group is a list of ports on LS2020 nodes in the network. Once you define the group and assign it to a filter-port pair, LAN traffic intended for group members is delivered on an ATM point-to-multipoint VCC.

HPMS can be used to achieve higher packet flooding performance than the LS2020's general purpose flooding mechanism allows (70 to 100 packets per second, depending on node and network configuration). With adequate network capacity, the multicast feature can support flooding at up to LAN port rates. Any application that generates layer 2 or layer 3 LAN broadcast packets can benefit by using HPMS.

LS2020 group entries enable you to define multicast groups and add members to a group or delete members from a group. Each group member is a uniquely identified port in an LS2020 network. You can define up to 255 multicast groups per LS2020 node. Members of a multicast group can be anywhere in the network; they need not all be on the same LS2020 node.

A multicast group is associated with a port by means of a filter that is defined for that port. For that reason, it is more accurate to speak of the multicast group as being assigned to a filter-port pair. Traffic that matches the filter condition is sent to the port. Only one multicast group can be associated with any given filter on a port, and the action of the filter must be forward.

Note A multicast group should be consistently defined throughout the network. If a group is defined on one node, it should be defined analogously on all nodes in the network, regardless of whether it is used immediately on those nodes or not.

Card/Port

MIB name	lsMcastIfIndex
Field type	Fill-in
Legal values	An integer in the range 0 – 11 for cards and in the range 0 – 7 for ports
Default value	None

Chassis

Specifies the name of the chassis where the multicast group is being defined.

MIB name	lsMcastChassisId
Field type	Fill-in
Legal values	1 – 39 characters or a positive integer of eight digits in the range 0 – 99,999,999
Default value	None

Group Members

A multicast group consists of listed multicast group members. A member is a uniquely identified port in the LS2020 network.

MIB name	lsMcastGrpEntry
Field type	Fill-in
Legal values	Each member is defined by the name of the chassis where it belongs, followed by the card number and port number that specify this port.
Default value	None

Multicast Group ID

Specifies the multicast group ID assigned to this multicast group.

MIB name	lsMcastGrpId
Field type	Fill-in
Legal values	An integer in the range 1 – 255
Default value	None

Traffic Profiles

An Application-Specific Quality of Service (AS/QoS) traffic profile is a named set of attribute values assigned to a given port. Used in conjunction with a custom filter, a traffic profile allows you to control the type of service provided to a LAN flow—for example, you can dedicate bandwidth to the flow or give it higher priority. The profile, which is unique within the network, affects the following parameters for data transmitted from the port where the profile is assigned:

- Rate—the amount and type of bandwidth used for the data
- Cell drop eligibility—the relative importance of the data
- Transmit priority—the relative importance of minimizing transit delay
- Inactivity timer—the time for which a connection is maintained when there is no apparent activity

The traffic profile is assigned to a port by means of a filter associated with that port. For that reason, it is more accurate to speak of the traffic profile as being assigned to a filter-port pair.

The system supports a value named “default” for the Max. Rate parameter. The numeric value for “default” is –1.

The system enforces some restrictions on the parameters that make up a traffic profile. The restrictions are in two groups: for profiles that have a nondefault max rate and for profiles that have the default max rate. (See “Max. Rate” later in this chapter for more information on that parameter.)

Here are the restrictions for the nondefault max rate situation:

- The max rate must be greater than or equal to the insured rate.
- The max burst must be greater than or equal to the insured burst.

- The max rate and the max burst must each be greater than 0.
- If the insured rate is 0, the insured burst must also be 0. If the insured rate is greater than 0, the insured burst must also be greater than 0.
- If the max rate equals the insured rate, the max burst must equal the insured burst. If the max rate is greater than the insured rate, the max burst must be greater than the insured burst.

Here are the restrictions for the situation where the default max rate is being used:

- The max burst must be greater than or equal to the insured burst.
- The max burst must be greater than 0.
- If the insured rate is 0, the insured burst must also be 0. If the insured rate is greater than 0, the insured burst must also be greater than 0.

An attempt to set up a traffic profile with an insured rate greater than the capacity of the entry edge port will fail. For example, the software refuses an attempt to set up a traffic profile for an Ethernet port if the profile has a specified insured rate of 50 Mbps.

Traffic profile bandwidth parameters enable you to better manage network bandwidth. One point to consider in this regard has to do with data allocation in ATM cells. Unless a series of LAN frames plus an 80 byte trailer total a value that is a multiple of 48, the last cell used to accommodate the data will be partially empty. For example, a 64-byte Ethernet frame will be segmented into two cells, with the second cell carrying only 16 data bytes.

You should consider this fragmentation loss caused by segmentation when you calculate the circuit bandwidth you need to achieve a given throughput. Consider the following example.

Suppose an application generates 64-byte Ethernet frames and you want to support a transmission rate of 10,000 packets per second. (A 10-Mbps Ethernet can support 14,880 64-byte packets per second.) The network bandwidth you need is calculated this way:

```
bandwidth needed = (desired packets per second) x (cells per packet)
                   x (bytes per cell) x (bits per byte)

                 = 10,000 x 2 x 48 x 8

                 = 7.68 Mbps
```

If there were no fragmentation loss, this would be the calculation:

```
bandwidth needed = (desired packets per second) x (packet size in bytes)
                   x (bits per byte)

                 = 10,000 x 64 x 8

                 = 5.12 Mbps
```

The difference between 7.68 Mbps and 5.12 Mbps can be thought of as resulting from a cell packing factor (1.5 in this case).

When an LS2020 node sets up a circuit for carrying LAN traffic and no traffic profile is specified for the circuit, it uses default parameters, including a cell-packing factor of 1.2. If a traffic profile is used for the circuit, the profile gives the circuit parameters, including a cell-packing factor of 1.0.

Insured Rate

MIB name	lsTpInsuredRate
Field type	Fill-in
Legal values	0 – 119,999,999
Default value	0

Max. Rate

Specifies the value in bits per second of the total bandwidth allotted an entity that is assigned this traffic profile.

If you use “default” as the setting for this object, the behavior of the traffic profile depends on how the profile is being used:

- If the setting is for a unicast circuit, the max rate used is defined by

  min (R, A)

  Where R is 120 Mbps for circuits originating at FDDI ports and 12 Mbps for circuits originating at Ethernet ports; and A is the bandwidth available at the smallest bottleneck in the circuit path as returned by the circuit setup operation. The smallest bottleneck is the smallest physical transmission capacity along the path of the circuit. This includes the output edge.
- If the setting is for a multipoint (multicast) circuit, the max rate used is 500 kbps.

MIB name	lsTpMaxRate
Field type	Fill-in
Legal values	64,000 – 119,999,999
Default value	Default

Traffic Profile ID

Specifies the ID that you assign to this traffic profile.

MIB name	lsTpId
Field type	Fill-in
Legal values	An integer in the range 1 – 255
Default value	1

ATM UNI Attributes

The attributes described in this section control ATM user-to-network interfaces (UNIs). You can configure UNIs on OC-3c modules and on CLC-based T3 and E3 modules (that is, on the 4- and 8-port T3s and E3s only). Before setting ATM UNI attributes, create a chassis and one or more cards and ports. ATM UNI attributes are found in the Define UNI Chassis dialog box, the Define UNI Control dialog box, and the Define UNI Addresses dialog box.

UNI Chassis Attributes

The Define UNI Chassis dialog box presents two groups of attributes:

- Attributes that specify ATM UNI behavior throughout the chassis
- Attributes that specify ATM UNI behavior on a per-port basis

Chassis-wide UNI Chassis Attributes

Chassis Net Prefixes table

A list of ATM address network prefixes for this LS2020. This table is used only by ATM UNI ports that

- have ILMI enabled
- are configured as the network side of a UNI
- have no Port Net Prefix Table configured

If you configure any per-port network prefixes in the Define UNI Addresses dialog box, the per-port network prefix(es) override the chassis network prefixes (for the port in question only).

MIB name: atmChassisNetPrefixTable

Field type: List

Legal values: A set of one or more entries, where each entry is an ATM address network prefix composed of

- An identifier of up to 3 digits, specified in the Id field
- A 2-digit authority and format identifier (AFI) specified in the Type field. AFIs map to formats in the Type list as follows:

AFI	Type
39	Private DCC
47	Private ICD
45	Private E.164
none	Public E.164

- A 15-digit address (for public E.164) or an IDI (for all other format types). Length of IDI varies by format.
- A high-order domain-specific part (HO-DSP) whose length varies by format. (The HO-DSP is not present in public E.164 network prefixes.)

Default value: None

Interrelationships: Local ATM Addresses

Default Ports table

A prioritized list of ports on this LS2020 node to which the LS2020 forwards ATM UNI traffic destined for addresses outside the LS2020 network. The system attempts to use the port with the lowest order number first, and if that port is unavailable it tries ports with successively higher order numbers. If no default ports are configured, the LS2020 forwards such traffic using the External ATM Address table; see the section "External ATM Addresses" for details.

MIB name	sUniDefaultPortOrder
Field type	List
Legal values	A set of up to 100 entries, where each entry consists of a port on the LS2020 node and an order number specifying the port's position in the list.
Default value	None

Port-specific UNI Chassis Attributes

ILMI State

Enables or disables ILMI address processing for the selected ATM UNI port. If ILMI is disabled, you must either accept the node's default ATM addresses or configure ATM addresses manually. Click on the ATM Addresses button to display the dialog box that lets you do so. It is recommended that if you set Signalling Type to IISP 3.0 or IISP 3.1, you should set ILMI State to Disable.

MIB name	sUniIlmiCfgStatus
Field type	Multiple choice
Legal values	Enable, Disable
Default value	Enable
Interrelationships	Signalling Type Local ATM Addresses

UNI Class

Specifies that the selected ATM UNI port is on either a public or a private network.

MIB name	sUniClass
Field type	Multiple choice
Legal values	Public, Private
Default value	Private

UNI Signalling Role

Specifies that the selected ATM UNI port is on the user side of the user-to-network interface, on the network side, or that UNI signalling is disabled (No Signal). If you select No Signal, the port can support PVCs but cannot support SVCs.

MIB names	sUniSigEntityRole sUniSigCfgStatus
Field type	Multiple choice
Legal values	User, Network, No Signal
Default value	Network
Interrelationships	ILMI State Local ATM Addresses

Signalling Type

Specifies the signalling standard to which the ATM UNI port conforms. When UNI 3.0 or UNI 3.1 signalling is selected, ILMI address processing determines ATM addresses by interaction between devices at the two ends of a connection, and the LS2020 should be configured for the user (end station) side of the UNI.

When you select IISP 3.0 or IISP 3.1 signalling, you should also disable ILMI address processing (see the “ILMI State” attribute). In this case you must either accept the node’s default ATM addresses or configure ATM addresses manually. When IISP 3.0 or IISP 3.1 signalling is selected, the LS2020 must be configured for the network (switch) side of the UNI.

MIB name	sUniSvcSigType
Field type	Multiple choice
Legal values	UNI 3.0, UNI 3.1, IISP 3.0, IISP 3.1
Default value	UNI 3.0
Interrelationships	ILMI State

UNI Control Attributes

Attributes in the Define UNI Control dialog box let you set ILMI and signalling parameters for the selected port. This dialog box contains some attributes that are accessible from expert mode. See the appendix “Expert Mode” for information on these attributes.

Max VPI Bits

This attribute determines the value that the LS2020 will use for the atmfAtmLayerMaxVpiBits element of the ILMI MIB. When the LS2020 operates as the user side of a UNI interface, the device on the network side may get this value to determine which VPI values the LS2020 will accept in VPI assignments for SVCs made by the network-side device.

Note that this variable does not affect the ability of the LS2020 to perform VP switching; the LS2020 may use VPI values 0-255 for a VPC.

Changing the value of this attribute currently has no effect. It will be used in a future release.

MIB name atmInterfaceMaxActiveVpiBits

Field type Fill-in

Legal values 0

Default value 0

Max VCI Bits

This attribute determines the value that the LS2020 will use for the atmfAtmLayerMaxVciBits element of the ILMI MIB. When the LS2020 operates as the user side of a UNI interface, the device on the network side may get this value to determine which VPI values the LS2020 will accept in VPI assignments for SVCs made by the network-side device.

Changing this attribute from the default value is not recommended in this release.

MIB name atmInterfaceMaxActiveVciBits

Field type Fill-in

Legal values 0 – 15

Default value 15

Signalling VCI

Specifies the VCI value of the VCC supporting ATM UNI signalling on this ATM interface.

MIB name sUniSigVci

Field type Fill-in

Legal values 1 – 32,000

Default value 5

Sig Max Rate

Specifies the maximum bandwidth available on the selected port for ATM UNI signalling traffic. Signalling traffic exceeding this bandwidth may be discarded. Bandwidth is expressed in cells per second. Signalling is handled on VPI 0, VCI 5.

MIB name sUniSigMaxRate

Field type Fill-in

Legal values — Any value from 0 to the full bandwidth of the interface in cells per second will be accepted.

Minimum recommended value: 167 cps (64 kbps)

Maximum recommended values vary by interface module type. They are 10% of the full bandwidth for the port.

Module	Maximum Recommended Sig Max Rate
OC-3c	35320 cps
T3/PLCP	9600 cps
T3/Hec	10400 cps
E3/PLCP	7200 cps
E3/G.804	8000 cps

Default value — 0 is displayed. The actual default is 4 percent of the raw cell bandwidth, rounded down to the nearest whole cell.

Address Format

Specifies, for use on this port, one of the ATM UNI address formats supported by the local peer UNI (that is, by this interface).

MIB name — sUniSigAddrFormat

Field type — Multiple choice

Legal values — NSAP, E-164, Both

Default value — Both

Subaddress Route

Enables (Yes) or disables (No) routing to external addresses by way of a transit address in an intervening domain, through which traffic must pass on the way to its destination. Typically this is enabled when the intervening domain is in a public network requiring E.164 addresses (unable to parse NSAP addresses), and the adjacent domains are in private networks using NSAP addresses. If you enable subaddress routes, configure transit addresses in the Define UNI Addresses dialog box. See the section “External ATM Addresses” for details.

MIB name — sUniSigRouteSubaddress

Field type — Multiple choice

Legal values — Yes, No

Default value — Yes

Interrelationships — External ATM Addresses

SVC VCI Low

Specifies the low end of a range of VCIs to be used by this port when it is configured as the network side of a circuit. When it selects a VCI from within the range set by this attribute and SVC VCI High, the software attempts to match the VCI value on the user side of the connection without using a VCI

already claimed by an existing circuit. This feature lets you restrict the range of VCIs used by the port in order to accommodate the limitations of other switches with which the LS2020 must interoperate.

MIB name	sUniSvcRangeVciLow
Field type	Fill-in
Legal values	32 – 32767
Default value	48

SVC VCI High

Specifies the high end of a range of VCIs to be used by this port when it is configured as the network side of a circuit. When it selects a VCI from within the range set by this attribute and SVC VCI Low, the software attempts to match the VCI value on the user side of the connection without using a VCI already claimed by an existing circuit. This feature lets you restrict the range of VCIs used by the port in order to accommodate the limitations of other switches with which the LS2020 must interoperate.

MIB name	sUniSvcRangeVciHigh
Field type	Fill-in
Legal values	32 – 32767
Default value	32767

UNI ATM Address Attributes

Attributes in the Define UNI Addresses dialog box let you configure local and external ATM addresses for the chassis. For a discussion of ATM address formats, see the *LightStream 2020 System Overview.*

External ATM Addresses

The External ATM Addresses table gives you the option of specifying the selected port as the egress port for traffic going to a given external address—that is, the port from which traffic destined for that address exits the LS2020 network. Egress ports for each external address are prioritized: if traffic for a given external address cannot exit the LS2020 network from the most preferred port, the network tries other ports with that address listed in order of preference. The list of external addresses and egress ports is thus an LS2020-network-wide construct, and it must be managed as such.

Wherever possible, you should configure partial external addresses; this uses network resources efficiently and allows for a larger network. A partial address is a network prefix or any part of a network prefix. It can be as short as 1 hexadecimal digit or as long as 26 digits (which is a full network prefix). The partial address covers all external addresses that begin with the specified digits. The configurator does not allow you to specify a partial ESI; if you need to configure the ESI, you must configure all 12 hexadecimal digits.

It may not be necessary to configure any external ATM addresses if you have configured one or more default ports. See the section “Default Ports table” for details on default ports.

MIB name: atmExternalATMAddrTable

Field type: List

Legal values: A set of one or more entries, where each entry is an ATM address composed of

- An identifier of up to 3 digits, specified in the Id field
- A 2-digit authority and format identifier (AFI) specified in the Type field. AFIs map to formats in the Type list as follows:

AFI	Type
39	Private DCC
47	Private ICD
45	Private E.164
none	Public E.164

- For private DCC, private ICD, and private E.164 addresses, an IDI of up to 4 or up to 15 decimal digits. Length of IDI varies by format.
- For public E.164 addresses only, an address of up to 15 decimal digits
- For private DCC, private ICD, and private E.164 addresses, a high-order domain-specific part (HO-DSP) of 8 or 20 hexadecimal digits. Length of HO-DSP varies by format.
- For private DCC, private ICD, and private E.164 addresses, an ESI of 12 hexadecimal digits. The ESI specifies the MAC address for the port. An incomplete ESI will not be accepted.

Default value: None

Local ATM Addresses

The Local ATM Addresses area of the Define UNI Addresses dialog box gives you the option of configuring local ATM addresses on a per-port basis.

Note The LS2020 provides preconfigured default local ATM addresses. You should enter addresses in this area only if you wish to configure your own nondefault local addresses. For most users, the default addresses work well.

The Local ATM Addresses area of the Define UNI Addresses dialog box presents one of three different address tables, depending on the configuration of the port selected in the Define UNI Chassis dialog box:

Signalling Role	ILMI State	Local Address Table Used
User or Network	Disabled	Complete local ATM address table
User	Enabled	ESI table
Network	Enabled	Network prefix table

If ILMI is disabled on a port, the chassis must supply complete ATM addresses—both network prefix and ESI—so you configure complete addresses. If ILMI is enabled on a user-side port, the chassis provides only the ESI during ILMI address discovery, so you configure only the ESI portion of the ATM address. If ILMI is enabled on a network-side port, the chassis provides only the network prefix during ILMI address discovery, so you configure only the network prefix portion of the ATM address. In all three cases, you can allow the chassis to use default values; you need not configure the addresses yourself.

Each of the three local address tables is described below.

Local ATM Address table: Complete Address

This address table is displayed if ILMI is disabled on the selected port.If ILMI is disabled on a port, the chassis must supply complete ATM addresses—both network prefix and ESI. You can use this table to configure complete local ATM addresses for the port, or you can leave the table blank. If you leave the table blank, the chassis uses a default address that is not displayed by the configurator.

MIB name: atmATMAddrTable

Field type: List

Legal values: A set of one or more entries, where each entry is an ATM address composed of

- An identifier of up to 3 digits, specified in the Id field
- A 2-digit authority and format identifier (AFI) specified in the Type field. AFIs map to formats in the Type list as follows:

AFI	Type
39	Private DCC
47	Private ICD
45	Private E.164
none	Public E.164

- For private DCC, private ICD, and private E.164 addresses, an IDI of 4 or 15 decimal digits. Length of IDI varies by format.
- For public E.164 addresses only, an address of 15 decimal digits
- For private DCC, private ICD, and private E.164 addresses, a high-order domain-specific part (HO-DSP) of 8 or 20 hexadecimal digits. Length of HO-DSP varies by format.
- For private DCC, private ICD, and private E.164 addresses, an ESI of 12 hexadecimal digits. The ESI specifies the MAC address for the port.

Default value: None

Local ATM Address table: ESI

This address table is displayed if ILMI is enabled on a port on the user side of the UNI. With ILMI enabled on a user-side port, the chassis supplies only the ESI portion of the ATM address. You can use this table to configure ESI values for the port, or you can leave the table blank. If you leave the

table blank, the chassis uses a default ESI that is not displayed by the configurator. The ESI specifies the MAC address for the port. Use this attribute for ATM addresses using the private DCC, private ICD, and pivate E.164 formats; addresses using the public E.164 format do not have ESIs.

MIB name: atmESITable

Field type: List

Legal values: A set of one or more entries, where each entry is an ATM address composed of

- An identifier of up to 3 digits, specified in the Id field
- An ESI of 12 hexadecimal digits

Default value: None

Local ATM Address table: Network Prefix

This address table is displayed if ILMI is enabled on a port on the network side of the UNI. With ILMI enabled on a network-side port, the chassis supplies only the network prefix portion of the ATM address. You can use this table to configure network prefix values for the port, or you can leave the table blank. If you leave the table blank, the chassis uses a default network prefix that is not displayed by the configurator. If you configure any network prefixes in this area, they override any chassis-wide network prefixes configured in the Define UNI Chassis dialog box. See the section "Chassis Net Prefixes table" for more information.

MIB name: atmPortNetPrefixTable

Field type: List

Legal values: A set of one or more entries, where each entry is an ATM address composed of

- An identifier of up to 3 digits, specified in the Id field
- A 2-digit authority and format identifier (AFI) specified in the Type field. AFIs map to formats in the Type list as follows:

AFI	Type
39	Private DCC
47	Private ICD
45	Private E.164
none	Public E.164

- For private DCC, private ICD, and private E.164 addresses, an IDI of 4 or 15 decimal digits. Length of IDI varies by format.
- For public E.164 addresses only, an address of 15 decimal digits
- For private DCC, private ICD, and private E.164 addresses, a high-order domain-specific part (HO-DSP) of 8 or 20 hexadecimal digits. Length of HO-DSP varies by format.

Default value: None

PVC Attributes

The attributes described in this section are used by LS2020 software to set up PVCs between two switches or between two ports on the same switch. These attributes are found in the PVC Configuration dialog box.

The two endpoint switches are called Node A and Node B in the configurator. You need to provide the same type of information for Node A and Node B. Node A attributes are for the PVC from Node A to Node B. Node B attributes are for the PVC from Node B to Node A. The configurator allows you to specify the attributes for both nodes at the same time. By supplying this information, you are provisioning for PVCs. (It is legal for Node A to be the same as Node B.)

Chassis A Attributes

The endpoint identification attributes (A Card, A Name, and A Port) in this section are named from the Chassis A end of the PVC. On the other end of the PVC (Chassis B), the endpoint attributes are reversed: on Chassis A the cktAdminDestNode and cktAdminDestIfIndex contain the values for the node at the other side of the PVC (Chassis B).

A Card

Specifies the LS2020 card at this end of the frame relay, frame forwarding, CEMAC, or ATM UNI virtual circuit.

MIB name	frCktSrcIfIndex ffCktSrcIfIndex sUniCktSrcIfIndex
Field type	Multiple choice
Legal values	An integer in the range 2 – 10
Default value	None

A Insured Rate

Specifies, in bits per second (for FR and FF) or cells per second (for ATM UNI), the data throughput from node A to node B that the LS2020 network commits to support under normal network conditions.

MIB name	frCktAdminSrcInsuredRate ffCktAdminSrcInsuredRate sUniCktAdminSrcInsuredRate
Field type	Fill-in
Legal values	LSC 0 or 5456 – 3,548,000 bps MSC T3: 0 or 109 – 96,000 cps E3: 0 or 109 – 72,000 cps E3/G.804: 0 or 109 – 80,000 cps CLC OC3: 0 or 218 – 350,000 cps T3/PLCP: 0 or 218 – 96,000 cps T3/Hec: 0 or 218 – 104,00 cps E3/PLCP: 0 or 218 – 72,000 cps E3/G.804: 0 or 218 – 80,000 cps PLC SAC: 0 or 5456 – 6,144,000 bps
Default value	LSC: 5456 bps MSC: 109 cps CLC: 218 cps PLC: 5456 bps
Interrelationships	A Insured Burst (expert mode attribute) Max Frame Size

Note The following points pertain to the legal and default values listed above:

1. The Insured Rate cannot be higher than the line rate.

2. The Insured Rate cannot be higher than the Max Rate.

3. If the Insured Rate is not 0, it cannot be lower than the minimum shown above.

4. If the Max Rate equals the Insured Rate, only insured traffic is configured for the PVC, and you must set the Insured Burst equal to the Max Burst.

5. If the Max Rate is less than or equal to the line rate and the Insured Rate equals 0, the PVC is configured to carry all uninsured (excess) traffic.

6. If the Insured Rate is greater than 0 and less than the Max Rate, the difference between the two is the Excess Rate, which is used for uninsured traffic.

A Max. Rate

Specifies the maximum amount of insured plus uninsured data in bits per second (for FR and FF) or cells per second (for ATM UNI) that the LS2020 network will attempt to deliver from node A to node B under normal conditions. The uninsured portion of traffic can be discarded if the network is congested.

MIB name	frCktAdminSrcMaxRate ffCktAdminSrcMaxRate sUniCktAdminSrcMaxRate
Field type	Fill-in
Legal values	LSC 5456 – 3,548,000 bps MSC T3: 109 – 96,000 cps E3: 109 – 72,000 cps E3/G.804: 109 – 80,000 cps CLC OC3: 218 – 353,207 cps T3/PLCP: 218 – 96,000 T3/Hec: 218 – 104,000 E3/PLCP: 218 – 72,000 E3/G.804: 218 – 80,000 PLC SAC: 5456 – 6,144,000 bps
Default value	LSC: Physical line rate for the port MSC: 109 cps CLC OC3: 353,207 cps All others: 218 cps PLC: Physical line rate for the port
Interrelationships	A Insured Rate

Note The following points pertain to the legal and default values listed above:

1. The Max Rate cannot be higher than the line rate.

2. If the Max Rate equals the Insured Rate, only insured traffic is configured for the PVC, and you must set the Insured Burst equal to the Max Burst.

3. If the Max Rate is less than or equal to the line rate and the Insured Rate equals 0, the PVC is configured to carry all uninsured (excess) traffic.

4. If the PVC is configured for any excess traffic, LS2020 software can allocate less than the Max Rate if the link for the circuit does not have enough bandwidth available. LS2020 software can scale back the Max Rate to be as low as the Insured Rate. (The CLI **show port** commands display actual bandwidth allocation.)

A Name

Specifies the LS2020 node at this end of the frame relay, frame forwarding, or ATM UNI virtual circuit.

MIB name	frCktSrcNode ffCktSrcNode sUniCktSrcNode
Field type	Multiple choice
Legal values	Names in chassis list
Default value	None
Interrelationships	frCktOperDestNode ffCktOperDestNode sUniCktOperDestNode

A Port

Specifies the LS2020 port at this end of the frame relay, frame forwarding, or ATM UNI virtual circuit.

MIB name	frCktSrcIfIndex ffCktSrcIfIndex sUniCktSrcIfIndex
Field type	Multiple choice
Legal values	LSC: 0 – 7 MSC: 0 – 1 CLC: 0 – 1 PLC: 0 – 7
Default value	None

DLCI A

Specifies the data link connection identifier (DLCI) of the LS2020 port at this end of the frame relay virtual circuit. The DLCI number identifies the VCC and enables you to distinguish one VCC from another. You are not required to use the same DLCI number at both ends of a connection. You can use the same DLCI number in many places in your network; however, all VCCs connecting to a given port must have different DLCI numbers at that port.

DLCIs identify frame relay VCCs. If you are provisioning for UNI VCCs, the configurator requires a VCI number. If you are provisioning for frame forwarding ports, no number is required.

If a port attaches to a device (such as a frame relay router) that also maintains DLCI numbers, the LS2020 DLCI for the corresponding PVC must be the same number. If you are not the system administrator for the attached router, you should obtain the numbers and associated endpoints from that person. Many routers can automatically learn DLCI numbers if you activate LMI on a port and the router is configured for the same type of LMI.

MIB name	frCktSrcDlci
Field type	Fill-in
Legal values	Decimal numbers in the range 16 – 991
Default value	16 or the next highest unused number

VCI A

Specifies the virtual channel identifier (VCI) at this end of the ATM UNI VCC. The VCI number identifies the VCC and enables you to distinguish one VCC from another. You are not required to use the same VCI number at both ends of a connection. You can use the same VCI number in many places in your network; however, all VCCs connecting to a given port must have different VCI numbers at that port.

If a port attaches to another ATM device that also maintains VCI numbers, the LS2020 VCI for the corresponding PVC must be the same as the number on the other device. If you are not the system administrator for the attached ATM device, you should obtain the numbers and associated end points from that person.

Note VCIs are used to identify ATM UNI VCCs. If you are provisioning for frame relay VCCs, the configurator requires a DLCI number. If you are provisioning for a frame forwarding port, no number is required.

MIB name	sUniCktSrcVCI
Field type	Fill-in
Legal values	MSC: 1 – 8191 CLC: 1 – 32767
Default value	1 or the next highest unused number

Chassis B Attributes

The endpoint identification attributes (B Card, B Name, and B Port) in this section are named from the Chassis B end of the PVC. On the other end of the PVC (Chassis A), the endpoint attributes are reversed: on Chassis B the cktAdminDestNode and cktAdminDestIfIndex contain the values for the node at the other side of the PVC (Chassis A).

B Card

Specifies the LS2020 card at this end of the frame relay, frame forwarding, or ATM UNI virtual circuit.

MIB name	frCktAdminDestIfIndex ffCktAdminDestIfIndex sUniCktAdminDestIfIndex
Field type	Multiple choice
Legal values	An integer in the range 2 – 10
Default value	None

B Insured Rate

Specifies, in bits per second (for FR and FF) or cells per second (for ATM UNI), the data throughput from node B to Node A that the LS2020 network commits to support under normal network conditions.

MIB name	frCktAdminSrcInsuredRate ffCktAdminSrcInsuredRate sUniCktAdminSrcInsuredRate
Field type	Fill-in
Legal values	LSC 0 or 5456 – 3,548,000 bps MSC T3: 0 or 109 – 96,000 cps E3: 0 or 109 – 72,000 cps E3/G.804: 0 or 109 – 80,000 cps CLC OC3: 0 or 218 – 350,000 cps T3/PLCP: 0 or 218 – 96,000 cps T3/Hec: 0 or 218 – 104,00 cps E3/PLCP: 0 or 218 – 72,000 cps E3/G.804: 0 or 218 – 80,000 cps PLC SAC: 0 or 5456 – 6,144,000 bps
Default value	LSC: 5456 bps MSC: 109 cps CLC: 218 cps PLC: 5456 bps
Interrelationships	B Insured Burst (expert mode attribute) Max Frame Size

Note The following points pertain to the legal and default values listed above:

1. The Insured Rate cannot be higher than the line rate.

2. The Insured Rate cannot be higher than the Max Rate.

3. Unless the Insured Rate is 0, it cannot be lower than the minimum listed above.

4. If the Max Rate equals the Insured Rate, only insured traffic is configured for the PVC, and you must set the Insured Burst equal to the Max Burst.

5. If the Max Rate is less than or equal to the line rate and if the Insured Rate equals 0, the PVC is configured to carry only uninsured (excess) traffic.

6. If the Insured Rate is greater than 0 and less than the Max Rate, the difference between the two is the Excess Rate, which is used for uninsured traffic.

B Max. Rate

Specifies the maximum amount of insured plus uninsured data in bits per second (for FR and FF) or cells per second (for ATM UNI) that the LS2020 network will attempt to deliver under normal conditions, from node B to node A. The uninsured portion of this traffic may be discarded if the network is congested.

MIB name	frCktAdminSrcMaxRate ffCktAdminSrcMaxRate sUniCktAdminSrcMaxRate
Field type	Fill-in
Legal values	LSC 5456 – 3,548,000 bps MSC T3: 109 – 96,000 cps E3: 109 – 72,000 cps E3/G.804: 109 – 80,000 cps CLC OC3: 218 – 353,207 cps T3/PLCP: 218 – 96,000 T3/Hec: 218 – 104,000 E3/PLCP: 218 – 72,000 E3/G.804: 218 – 80,000 PLC SAC: 5456 – 6,144,000 bps
Default value	LSC: Physical line rate for the port MSC: 109 cps CLC OC3: 353,207 cps All others: 218 cps PLC: Physical line rate for the port
Interrelationships	A Insured Rate

Note The following points pertain to the legal and default values listed above:

1. The Max Rate cannot be higher than the line rate.

2. If the Max Rate equals the Insured Rate, only insured traffic is configured for the PVC, and you must set the Insured Burst equal to the Max Burst.

3. If the Max Rate is less than or equal to the line rate and the Insured Rate equals 0, the PVC is configured to carry only uninsured (excess) traffic.

4. If the PVC is configured for any excess traffic, LS2020 software can allocate less than the Max Rate if the link for the circuit does not have enough bandwidth available. LS2020 software can scale back the Max Rate to be as low as the Insured Rate. (The CLI **show port** commands display actual bandwidth allocation.)

B Name

Specifies the LS2020 node at this end of the frame relay, frame forwarding, CEMAC, or ATM UNI virtual circuit, using the node's name.

MIB name	frCktAdminDestNode ffCktAdminDestNode sUniCktAdminDestNode
Field type	Multiple choice
Legal values	Names in chassis list
Default value	None
Interrelationships	frCktOperDestNode ffCktOperDestNode sUniCktOperDestNode

B Port

Specifies the LS2020 port at this end of the frame relay, frame forwarding, CEMAC, or ATM UNI virtual circuit.

MIB name	frCktAdminDestIfIndex ffCktAdminDestIfIndex sUniCktAdminDestIfIndex
Field type	Multiple choice
Legal values	LSC: 0 – 7 MSC: 0 – 1 CLC: 0 – 1 PLC: 0 – 7
Default value	None

DLCI B

Specifies the data link connection identifier (DLCI) of the LS2020 port at this end of the frame relay virtual circuit. The DLCI number is used to identify the VCC and to enable you to distinguish one VCC from another. You are not required to use the same DLCI number at both ends of a connection. You can use the same DLCI number in many places in your network; however, all VCCs connecting to a given port must have different DLCI numbers at that port.

DLCIs identify frame relay VCCs. If you are provisioning for UNI VCCs, the configurator requires a VCI number. If you are provisioning for frame forwarding ports, no number is required.

If a port attaches to a device (such as a frame relay router) that also maintains DLCI numbers, the LS2020 DLCI for the corresponding PVC must be the same as the number on the other device. If you are not the system administrator for the attached router, you should obtain the numbers and associated end points from that person. Many routers can automatically learn DLCI numbers if you activate LMI on that port and the router is configured for the same type of LMI.

MIB name	frCktDestDlci
Field type	Fill-in
Legal values	Decimal numbers in the range 16 – 991
Default value	16 or the highest unused number

VCI B

Specifies the virtual channel identifier (VCI) at this end of the ATM UNI VCC. The VCI number is used to identify the VCC and to enable you to distinguish one VCC from another. You are not required to use the same VCI number at both ends of a connection. You can use the same VCI number in many places in your network; however, all VCCs connecting to a given port must have different VCI numbers at that port.

If a port attaches to another ATM device that also maintains VCI numbers, the LS2020 VCI for the corresponding PVC must be the same as the number on the other device. If you are not the system administrator for the attached ATM device, you should obtain the numbers and associated end points from that person.

Note VCIs are used to identify ATM UNI VCCs. If you are provisioning for frame relay VCCs, the configurator requires a DLCI number. If you are provisioning for a frame forwarding port, no number is required.

MIB name	sUniCktAdminDestVCI
Field type	Fill-in
Legal values	MSC: 1 – 8191 CLC: 1 – 32767
Default value	1 or the highest unused number

VLI Attributes

You use workgroups to perform automatic specialized filtering, based on MAC source and destination addresses. This feature allows you to specify which interfaces can communicate with each other.

The configuring of workgroups is optional. If you do not assign an interface to any workgroups, the interface automatically belongs to the Default workgroup (ID = 1).

The following attributes are used to create workgroups and to assign interfaces to those workgroups.

Port Selection Attributes

Card

The card that contains the interface you are assigning to one or more workgroups.

MIB name	cardName
Field type	Multiple choice
Legal values	Names in card list
Default value	None

Chassis

The node that contains the interface you are assigning to one or more workgroups.

MIB name	sysName
Field type	Multiple choice
Legal values	Names in chassis list
Default value	None

Port

The port number of the interface you are assigning to one or more workgroups.

MIB name	lightStreamVliPortWorkGroupPort
Field type	Multiple choice
Legal values	An integer in the range 0 – 7
Default value	None

Interface Control Mode

Determines if the interface is included in or excluded from the workgroup(s) in the list. (Read notes before changing this value.)

As a default, an interface is automatically included in the workgroup called Default that has an ID of 1. Therefore, by default, all interfaces are initially included in the same workgroup and can communicate with one another.

MIB name	lightStreamVliPortCtlMode
Field type	Multiple choice
Legal values	include/exclude
Default value	include

Note The following points pertain to the legal and default values listed above:

1. An interface can be included in up to seven workgroups or excluded from up to six workgroups.

2. An empty include list is treated as belonging to the Default group and therefore allows communication with any other ports included in the Default workgroup.

3. An include list restricts communication between interfaces if the interfaces do not have at least one common workgroup.

4. An empty exclude list allows communication with all ports.

5. An exclude list is the exception because it can stop an interface from communicating with only a small number of workgroups (no more than six). Use the exclude list if you want to ensure that a port will always be able to communicate with all (or almost all) of the workgroups. For instance, within the LS2020 system, all NP management ports belong to an empty exclude list so that each node can be managed from any physical port on the network. (The NP port's workgroup assignment cannot be changed.)

Work Group Selection

ID

The numerical identifier of the workgroup being assigned to the specified port.

MIB name	lightStreamVliPortWorkGroupId
Field type	Fill-in
Legal values	An integer in the range 1 – 65535
Default value	1

Note The following points pertain to the legal and default values listed above:

1. Workgroup IDs must be unique within the entire network.
2. The value 1 is assigned to the Default workgroup and cannot be changed.
3. The value 65535 is reserved and cannot be used.

Name

The name of the workgroup being assigned to the specified port.

MIB name	None
Field type	Fill-in
Legal values	Alphnumeric characters
Default value	None