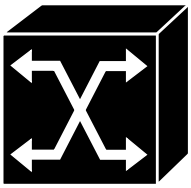
Cisco LightStream 2020



This chapter provides information about the Cisco LightStream 2020 multiservice ATM switch. The information is organized into the following sections:

- Product Overview
  - Standard Features
  - Interface Modules
  - Optional Modules
  - Configuration Guidelines
- Software
  - Software Kits
- Ordering Schemes
  - Packaged Systems
  - Product Numbers

Note The Documentation for the Cisco LightStream 2020 multiservice ATM switch is available in two forms: on a CD-ROM called Cisco Connection Documentation, Enterprise Series and printed books. A CD and hard-copy installation documentation ship with each chassis, and a configuration note ships with each component ordered. All configuration notes are available on the CD. Additional CDs and a subscription CD update service are also available.

You can also access Cisco technical documentation on the World Wide Web, using the URL http://www.cisco.com. For more information, see the chapter “Documentation” at the end of the catalog.

Product Overview

The Cisco LightStream 2020 multiservice ATM switch is a high-performance multiservice ATM switch designed for campus and enterprise backbones, as well as public network deployment.

The core of the LightStream 2020 switch is a high-performance, cell-switching, crossbar fabric. The cell fabrics and network processors are supported by fully redundant, hot-swappable interfaces and power supplies, allowing for the extremely high availability that is key to enterprise-critical applications.

The LightStream 2020 switch midplane supports 12 strams, two of which are reserved for redundant switch modules. Either one or two other slots are used for Network Processor Modules (NPMs), depending upon whether redundancy is required. Up to nine slots are available for customer use. The LightStream 2020 switch supports a variety of fully hot-swappable interface modules to maximize deployment flexibility. See the section "Configuration Guidelines" for more information about module placement in the chassis. Figure 107 shows the front view of a fully loaded LightStream 2020 system. Figure 108 shows the rear view of the same system.

Interface modules consist of a variety of access cards, paired through the midplane with either a high-performance packet or cell line card. The access cards enable a variety of different physical interfaces, and the line cards provide packet or cell adaptation as appropriate.

The packet line card processes incoming non-ATM traffic and adapts it into ATM cells using either segmentation and reassembly into AAL5 packets for data traffic or packing into AAL1 cells for circuit emulation. The specialized, hardware-based packet header recognizer logic allows sophisticated packet filtering and processing options at full line speed.

The cell line cards perform ATM traffic and connection management functions including connection admission control, traffic shaping, and policing. The packet and cell line cards implement the LightStream 2020 switch's sophisticated congestion control mechanisms. All of these functions are implemented on high-performance application-specific integrated circuits (ASICs).

ATM interface modules can be configured either for end-system connectivity or as trunks to allow for high-performance ATM connectivity between multiple LightStream 2020 switches. A system of LightStream 2020 switches is interconnected using ATM trunk ports, while access to the system can be across a mixture of ATM, LAN switch ports, WAN ports, and circuit interfaces. Table 230 lists the interface modules and the ports supported for each module.

Standard Features

The LightStream 2020 switch includes the following standard features:

- 12-slot chassis including card cage, a midplane, and redundant cooling system
- Optionally redundant power supply tray (AC or DC power)
- Switch card module with 32 MB of memory and a network processor
- Filler panels for slots not used
- 2,000-Mbps of switching capacity and up to 3.5-Mcps throughput
- Support for trunks at digital rates ranging from 128 kbps to 155 Mbps
- Support for user ports ranging in speed between 16 kbps and 155 Mbps
- Sophisticated congestion avoidance and multiple classes of service
- High-throughput Frame Relay DCE and NNI switching
- Clocking: network timing, SRTS, and adaptive
- Wire-speed, transparent and translation LAN bridging with advanced virtual LAN features
- ATM Forum UNI support
- Support for frame-based proprietary protocols
- T1 and E1 clear-channel circuit emulation for voice and other isochronous traffic
- SNMP management
- High availability architecture with redundant and hot-swappable components

Interface Modules

The LightStream 2020 switch has several types of interface modules available:

- One-port STS3c/STM-1 (OC-3c) 155-Mbps multimode and single-mode fiber modules
- Two-port STS3c/STM-1 (OC-3c) 155-Mbps multimode and single-mode fiber modules
- Four-port and 8-port T3/E3 modules
- Eight-port circuit emulation modules (T1/E1)
- Eight-port serial interface module (V.35, EIA/TIA-449, X.21)
- Two-port dual-attached station (DAS) FDDI switched LAN module
- Eight-port Ethernet switched LAN modules (10BaseT and 10BaseFL)

Table 230 summarizes the LightStream 2020 interface modules.

STS3c/STM1 (OC-3c) Multimode and Single-mode Modules

The OC-3c multimode and single-mode modules consist of two major components: the cell line card (CLC) and the associated access card. Two module types are available: a module with a single port and a module with two independent ports. Use the single port version to support an internodal trunk line.

T3/E3 Modules

The T3 module consists of the CLC, the associated T3 access card, and the fantail/cable assembly. Fantail cables are available in several lengths (see Table 239). Two module types are available: a four-port module and an eight-port module. Use the four-port version of the T3 module to support internodal trunking.

The E3 module consists of the CLC, the associated E3 access card, and the fantail/cable assembly. Fantail cables are available in several lengths (see Table 239). Only the four-port version of the E3 module is available.

Circuit Emulation (T1/E1) Module

The circuit emulation module provides T1 and E1 circuit emulation. The T1 module consists of the packet line card (PLC) and the associated eight-port T1 circuit emulation access card (CEMAC). Three E1 module types are available:

- A 75-ohm module with BNC connectors, which consists of the PLC, the CEMAC, the BNC fantail, and a fantail cable
- A 75-ohm module with SMZ connectors, which consists of the PLC, the CEMAC, the SMZ fantail, and a fantail cable
- A 120-ohm module, which consists of the PLC and the CEMAC

The E1 fantail cable is available in several lengths (see Table 239).

Serial Interface Module (V.35, EIA/TIA-449, X.21)

The serial interface module consists of four major components: the packet line card (PLC), the serial access card, fantail cables, and the fantails. Each serial module supports up to two fantails and associated fantail cables. Fantail cables are available in several lengths (see Table 239). There are three versions of the fantail: one for V.35, one for X.21, and one for EIA/TIA-449. V.35 and EIA/TIA-449 fantail types have four ports each and can be configured on the same access card. A single X.21 fantail supports eight ports.

Dual-Attached Station Switched LAN FDDI Module

The FDDI module consists of two major components: the packet line card (PLC) and the associated FDDI access card. The FDDI access card has two DAS ports.

Ethernet Switched LAN Modules

The Ethernet module consists of two major components: the packet line card (PLC) and the associated Ethernet access card. Two module types are available: an eight-port 10BaseFL (fiber) version and an eight-port 10BaseT/AUI version.

Optional Modules

Optional modules for the LightStream 2020 switch include the following:

Low-speed Module

The low-speed module consists of four major components: the low-speed line card (LSC), the low-speed access card, fantail cables, and fantails. Each low-speed module supports up to two fantails and associated fantail cables. Fantail cables are available in several lengths (see Table 239). There are three versions of the fantail: one for V.35, one for X.21, and one for EIA/TIA-449. V.35 and EIA/TIA-449 fantail types have four ports each and can be configured on the same access card. A single X.21 fantail supports eight ports.

Cell Line Card

A cell line card (CLC) for the LightStream 2020 switch comes in two versions:

- Part number L2020-CLC-1—single TSU ASIC (standard performance)
- Part number L2020-CLC-2—double TSU ASIC (high performance)

The single-port OC-3c modules and the four-port T3/E3 modules include a CLC with a single-to-switch unit (TSU) ASIC; the two-port OC-3c modules and the eight-port T3 modules include a double TSU ASIC CLC. The double TSU ASIC CLC operates with a one-port OC-3c or four-port T3/E3 access card. If a single TSU ASIC CLC is used with two-port OC-3c or eight-port T3/E3 access cards, only half the ports will be operational. Maintaining double TSU CLC cards is recommended.

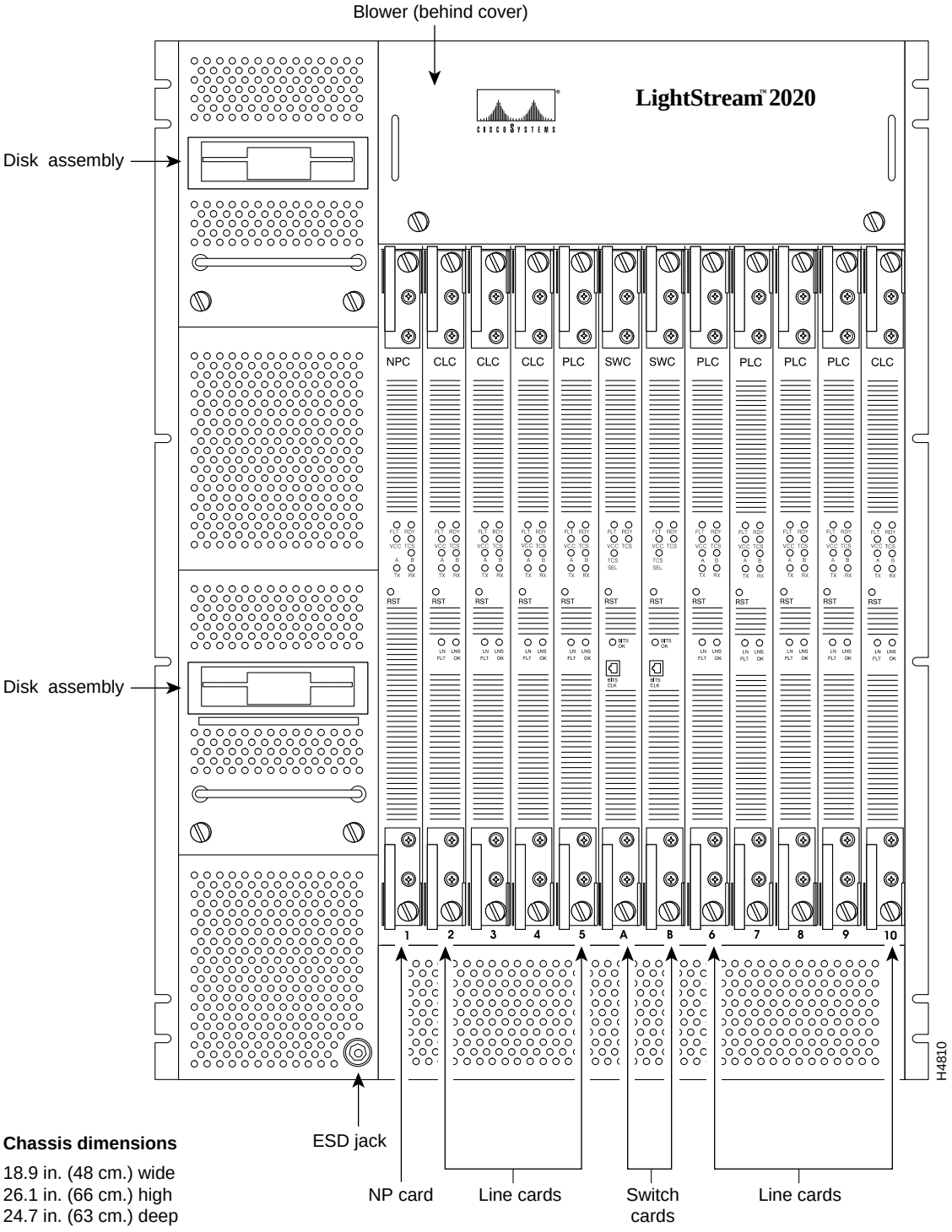
Table 230 LightStream 2020 Interface Module Descriptions

Module Type	As Edge Module	As Trunk Module
STS-3c/STM1 OC-3c		
Speeds	155 Mbps	155 Mbps
Application	ATM Forum UNI	Internodal trunk
Fanout	1 or 2 ports	1 port
Physical I/O	Multimode fiber, single-mode fiber	Single-mode fiber, multimode fiber
T3/E3		
Speeds	34 Mbps or 45 Mbps	34 Mbps or 45 Mbps
Application	ATM Forum UNI	Internodal trunk
Fanout	4/8 ports	4 ports
Physical I/O	Integral T3/E3 CSU/DSU	Integral T3/E3 CSU/DSU

Module Type	As Edge Module	As Trunk Module
T1/E1 Circuit Emulation		
Speeds	1.5 and 2.0 Mbps	–
Application	T1 and E1 Constant Bit Rate (CBR) services clear channel circuit emulation	–
Fanout	8 ports	–
Physical I/O	Integral T1/E1 CSU/DSU	–
Serial Interface		
Speeds	Selected speeds from 56 kbps to 6.144 Mbps	Selected speeds from 256 kbps to 6.144 Mbps
Application	Frame Relay and Frame Forwarding (selectable on a per-port basis)	Internodal trunk
Fanout	8 serial ports	8 serial ports (not to exceed 24.6 Mbps per card total)
Physical I/O	EIA/TIA-449[1], X.21, or V.35	EIA/TIA-449[1], X.21, or V.35
FDDI		
Speeds	100 Mbps	–
Application	Bridging	–
Fanout	2 dual-attach ports	–
Physical I/O	Fiber	–
Ethernet		
Speeds	10 Mbps	–
Application	Bridging	–
Fanout	8 ports	–
Physical I/O	10BaseT or 10BaseFL, with 2 of the 8 ports switchable to AUI	–

1. EIA/TIA-449 is the interface formerly known as RS-449.

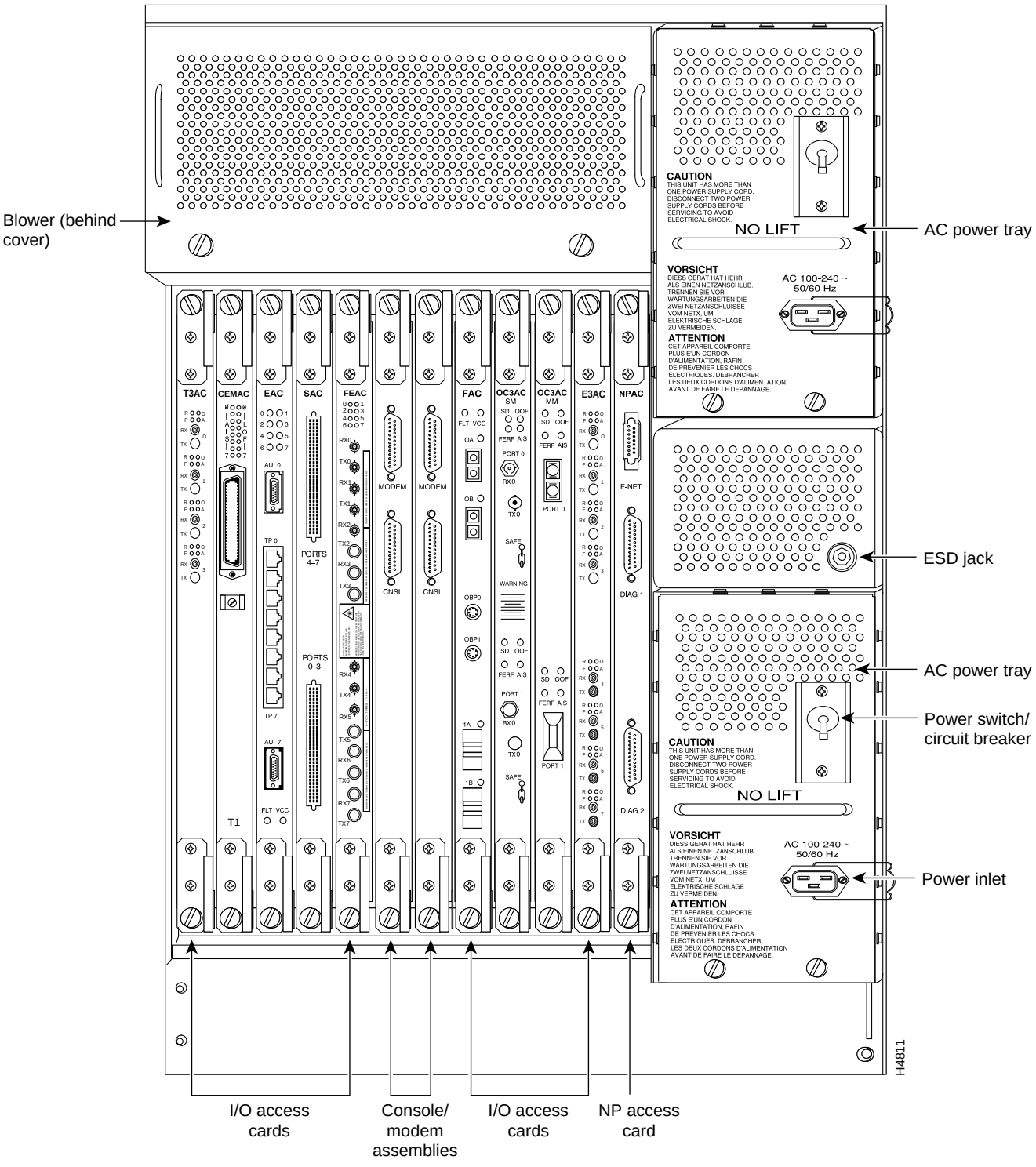
Figure 107 LightStream 2020 Front View (Fully Loaded System)



Chassis dimensions

18.9 in. (48 cm.) wide
26.1 in. (66 cm.) high
24.7 in. (63 cm.) deep

Figure 108 LightStream 2020 Rear View



Configuration Guidelines

This section provides helpful information for planning your LightStream 2020 switch chassis configuration. The LightStream 2020 switch supports 12 slots, two of which are reserved for redundant switch modules. Either one or two other slots are used for network processor modules (NPMs), depending upon whether redundancy is required. Up to nine slots are available for a variety of fully hot-swappable interface modules. Table 231 lists the slot numbers and the modules appropriate for use in those slots.

Table 231 Slot Locations for LightStream 2020 Modules

Slot Number	Module
Slot 1	Network processor
Slot 2	No restriction. Redundant network processor (if required)
Slots 3, 4, and 5	No restrictions on type of line card used
Slot A	Switch card 1
Slot B	Switch card 2
Slots 6, 7, 8, 9, and 10	No restrictions on type of line card

Configuring Ports

The HP OpenView-based management application, called StreamView, is used to configure ports for the LightStream 2020 multiservice ATM switch. The configurator management tool runs on an NMS and is used to create configuration database files for nodes in an ATM network.

The port type is determined by the configuration settings and the line card module (line card and access card combination). To configure a port you first select a card type from the Cards Configuration dialog box, giving you access to individual port attributes. The configurator card type names do not correspond directly to line module names.

The following tables provide information about configuring ports. Table 232 matches port types and interface modules with configurator edge card types. Table 233 matches port types and interface modules with configurator trunk card types. For more information about configuring and creating ports, see the *LightStream 2020 Configuration Guide*.

Table 232 Configuring Edge Ports

To configure this type of port...	with this type of module...	select this type of card in the configurator...
Frame Relay/frame forwarding	PLC with 8-port SAC	LS-edge
ATM UNI over T3	CLC with 4-port T3 MSAC	T3-edge (4-port)
	CLC with 8-port T3 MSAC	T3-edge (8-port)
ATM UNI over E3	CLC with 4-port E3AC	E3-edge (4-port)
ATM UNI over OC-3c	CLC with OC-3c AC SM	OC-3c-edge (1 or 2 ports)
	CLC with OC-3c AC MM	OC3c-edge (1 or 2 ports)
FDDI LAN	PLC with FAC	FDDI

To configure this type of port...	with this type of module...	select this type of card in the configurator...
Ethernet LAN	PLC with EAC	Ethernet
Fiber Ethernet LAN	PLC with FEAC	Ethernet
Clear Channel	PLC with CEMAC	CEMAC

Table 233 Configuring Trunk Ports

To configure this type of port...	with this type of module...	select this type of card in the configurator...
T1 trunk	LSC with LSAC	LS-trunk
T3 trunk	CLC with 4-port T3AC	T3-trunk (4-port)
	CLC with 8-port T3AC[1]	T3-trunk (4-port)
E3 trunk	CLC with 4-port E3AC	E3-trunk (4-port)
OC-3c trunk	CLC with 1-port OC-3c AC SM	OC-3c-trunk (1-port)
	CLC with 2-port OC-3c AC SM[2]	OC-3c-trunk (1-port)
	CLC with 1-port OC-3c AC MM	OC-3c-trunk (1-port)
	CLC with 2-port OC-3c AC MM[2]	OC-3c-trunk (1-port)

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

Software

The latest version of platform software is included with all packaged LightStream 2020 base systems and with all network processors modules and disk assemblies ordered from the spare parts list.

The following software products must be ordered separately:

- StreamView Network Management Software
- Frame Relay DCE and NNI
- ControlStream Traffic Management Software (mandatory)
- VirtualStream Virtual LAN Software

StreamView Network Management Software

The StreamView software option includes three graphical network management tools:

- A configuration tool, which allows configuration of the LightStream 2020 chassis, cards, port and pvc configuration
- A topology map for displaying the ATM topology of the network
- The monitor module, which allows you to view the status of each LightStream 2020 mode in a network, and provides dynamic status, statistics, and configuration for remote management.

The StreamView software requires a Sun SPARCstation running SunOS 4.1.4, HP-UX 9.0.5, and Solaris 2.4. The topology map must be used with the HP OpenView management software. At least one copy of the StreamView software should be purchased for each LightStream 2020 network.

Frame Relay DCE and NNI

The Frame Relay software works with the low-speed interface module to provide Frame Relay DCE and NNI service. Frame Relay software is available on a per-chassis basis.

ControlStream Traffic Management Software

ControlStream software, which is a mandatory component of the platform software, provides sophisticated traffic management capabilities. Primarily, this consists of a variety of mechanisms that operate to provide multiple classes of service and quality of service, and enforce these traffic contracts even during overload conditions. Additionally, ControlStream includes a congestion avoidance and control mechanism for monitoring trunk and egress port loading, feeding back this loading information to all sources and discarding excess traffic, fairly, at the edges of the network. Through ControlStream, traffic can be managed from the sources so that trunk congestion events can be avoided before they occur. ControlStream is available on a per-chassis basis.

VirtualStream Virtual LAN Software

The VirtualStream software option operates with the bridging service available for FDDI and Ethernet users and provides four value-added virtual LAN services:

- The Workgroup feature allows the definition of port-based closed user groups that span the network and allow a LightStream 2020 network manager to control how LAN users access one another.
- The application-specific quality of service (AS/QOS) feature allows the definition of ATM types of service for LAN flows.
- The High Performance Multicast Service (HPMS) allows the use of ATM point-to-multipoint virtual circuits for wire-speed delivery of multicast traffic over an arbitrary and geographically distributed set of LAN ports.
- The custom filters feature lets you tag LAN flows to block, forward, or associate traffic with AS/QOS or HPMS using Boolean expressions. The following header fields can be used in filters:
  - MAC layer
  - TCP/IP
  - IPX

A software license for VirtualStream is required for each Ethernet module or access card and for each FDDI module or access card.

Software Kits

Each LightStream 2020 chassis order includes the following items in the software kit:

- Platform software (factory-installed on the hard disk)
- One set of floppy diskettes containing platform software (for backup purposes)
- A copy of the *LightStream 2020 Release Notes*
- A copy of the Cisco Connection Documentation, Enterprise Series CD, which contains the full LightStream 2020 documentation set as well as other Cisco documentation

Table 234 lists the LightStream 2020 software kits.

Table 234 LightStream 2020 Switch Software

Kit Name	Description	Part Number
LightStream 2020 Release 2.1.1 kit	1 backup set of Release 2.1.1 platform software on floppy diskettes	L2020-SW-2.1.1
LightStream 2020 Release 2.0.9 kit	1 backup set of Release 2.0.9 platform software on floppy diskettes	L2020-SW-2.0.9
StreamView software for Release 2.1.1	StreamView network management software, includes a graphical configuration, monitoring, and topology map tool (purchased per network)	L2020-SV-2.1.1S
StreamView software for Release 2.1. (for Sun OS)	StreamView network management software for Sun OS, includes a graphical configuration, monitoring, and topology map tool (purchased per network)	L2020-SV-2.1S
StreamView software for Release 2.1. (for HP-UX)	StreamView network management software for HP-UX, including graphical configuration, monitoring and network map tools (purchased per network)	L2020-SV-2.1H
StreamView software for Release 2.1. (for Solaris)	StreamView network management software for Solaris, including graphical configuration, monitoring and network map tools (purchased per network)	L2020-SV-2.1L
StreamView software for Release 2.0.9	StreamView network management software, including graphical configuration, monitoring and network map tools (purchased per network)	L2020-SV-2.0.9S
Frame Relay software	Frame Relay DCE and NNI software (purchased per chassis for any system with one or more serial or low-speed modules)	L2020-FR-SW
ControlStream software	ControlStream traffic management software (mandatory, purchased per chassis)	L2020-CS-SW
VirtualStream software	VirtualStream virtual LAN software (purchased per Ethernet or FDDI module)	L2020-VS-SW

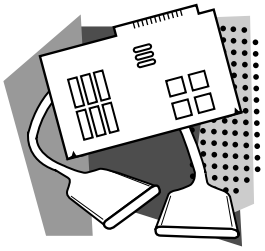
Note The ControlStream traffic management software is not included with the software kit and must be ordered separately.

Table 235 shows the interface modules and the software releases.

Table 235 LightStream 2020 Interface Modules and Software Release Levels

Software Release	OC-3c	T3/E3	T1/E1 Circuit Emulation	Serial Interface	FDDI	Ethernet	MSC[1]	LSC
LightStream 2020 v2.x.x	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
LightStream 2020 v2.1.1	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
LightStream 2020 v2.0.9	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
StreamView v2.1.1	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
StreamView v2.09	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

1. Obsolete, but supported.



Ordering Schemes

You can order LightStream 2020 products in one of the following ways:

- Packaged Systems

  Packaged systems simplify the ordering process by bundling the major building blocks of the LightStream 2020 system. Using the packaged systems list, you can order a new LightStream 2020 switch as well as expansion modules for existing systems.

- Spare Parts

  The spare parts list provides descriptions and part numbers for parts that can be replaced at the FRU (field-replaceable unit) level. Use the spare parts list to stock a repair depot or to replace individual FRUs. (See Table 239.)

Packaged Systems

There are two LightStream 2020 multiservice ATM switch packaged systems to choose from: a base system or a redundant base system. Software must be ordered separately for both packaged systems. Refer to the previous section, “Software Kits,” for descriptions and ordering information. Table 236 lists the items in the LightStream 2020 base system and redundant base system.

Table 236 Items Included with LightStream 2020 Base Systems and Redundant Base Systems

Base System	Redundant Base System
A single chassis including card cage, midplane, and redundant cooling system	A single chassis including card cage, midplane, and redundant cooling system
1 power supply tray (AC power or DC power as ordered)	2 loadsharing power supply trays (AC power or DC power as ordered)
1 network processor module (includes 32 MB of memory, a disk assembly, and platform software)	2 network processor modules (includes 32 MB of memory, two disk assemblies and platform software)
1 switch card module	2 switch card modules

Base System	Redundant Base System
Filler panels necessary to fill slots not used for interface modules in the initial configuration	Filler panels necessary to fill slots not used for interface modules in the initial configuration
A copy of the *LightStream 2020 Release Notes*	A copy of the *LightStream 2020 Release Notes*
A copy of Cisco Connection Documentation CD, Enterprise Series, a CD-ROM that contains the full LightStream 2020 documentation set as well as other Cisco documentation	A copy of Cisco Connection Documentation CD, Enterprise Series, a CD-ROM that contains the full LightStream 2020 documentation set as well as other Cisco documentation

You can order parts for the redundant base system from the spare parts list. (See Table 239).

The peripheral cover is required for configurations with a single disk assembly. Systems with NP/disk redundancy do not require a peripheral cover.

Note A country power kit is required with each base system and must be separately ordered. (There is no charge for country power kits ordered with the base system.) Country power kits include a set of power cords, labels, and instructions appropriate for the country of destination. For more information about country power kits, see Table 240.

Packaged System Checklist

The checklist in Table 237 is provided to assist you when ordering a packaged system. Part numbers for packaged systems are listed in Table 238.

Table 237 LightStream 2020 Packaged System Checklist

	Either a base system or a redundant base system
	Interface modules as needed
	ControlStream software (1 per chassis)
	StreamView software (1 per network)
	Optional software (VirtualStream and Frame Relay) as needed
	An AC country power kit or DC power kit
	Platform software diskettes as needed
	Documentation as needed

Product Numbers

Table 238 lists the part numbers for the LightStream 2020 switch packaged system.

Table 238 LightStream 2020 Packaged System Product Numbers

Description	Product Number
LightStream 2020 base system with AC power[1]	L2020-BASE-AC
Redundant base system with AC power including additional switch, NP with disk assembly, and AC power supply[1]	L2020-BASE-AC-R
LightStream 2020 base system with DC power[1]	L2020-BASE-DC
Redundant base system with DC power including additional switch, NP with disk assembly, and DC power supply[1]	L2020-BASE-DC-R
4-port T3 module—cell line card (CLC) with 4-port T3 access card and fantail/cable assembly with 4-ft (1.2-m) cables	L2020-4T3-M
8-port T3 module—cell line card (CLC) with 8-port T3 access card and fantail/cable assembly with 4-ft (1.2-m) cables	L2020-8T3-M
4-port E3 module—cell line card (CLC) with 4-port E3 access card and fantail/cable assembly with 4-ft (1.2-m) cables	L2020-4E3-M
8-port T1 CE module—packet line card (PLC) with 8-port T1 CE access card	L2020-8T1-CE-M
8-port E1 120-ohm CE module—packet line card (PLC) with 8-port E1 CE access card (no fantail provided)	L2020-8E1-CE-M
8-port E1/BNC CE module—packet line card (PLC) with 8-port E1 CE access card, E1 fantail with BNC connectors, and associated 4-ft (1.2-m) cable	L2020-8E1-CE-BN-M
8-port E1/SMZ CE module—packet line card (PLC) with 8-port E1 CE access card, E1 fantail with SMZ connectors, and associated 4-ft (1.2-m) cable	L2020-8E1-CE-SM-M
8-port serial module—packet line card (PLC) with serial access card, two 4-port V.35 fantails, and associated 8-ft (2.4-m) cables[2]	L2020-8S-V35-M
8-port serial module—packet line card (PLC) with serial access card, one 8-port X.21 fantail, and associated 8-ft (2.4-m) cable[2]	L2020-8S-X21-M
8-port serial module—packet line card (PLC) with serial access card, two 4-port EIA/TIA-449/422 fantails, and associated 8-ft (2.4-m) cables[2]	L2020-8S-449-M
8-port Ethernet 10BaseT/AUI module—packet line card (PLC) with Ethernet access card[3]	L2020-8E-M
8-port Ethernet 10BaseFL module—packet line card (PLC) with fiber Ethernet access card[3]	L2020-8EF-M
2-port FDDI module—packet line card (PLC) with FDDI access card[3]	L2020-2FD-M
1-port OC-3c single-mode module—cell line card (CLC) with OC-3c single-mode access card	L2020-1S-OC3-M
2-port OC-3c single-mode module—cell line card (CLC) with OC-3c single-mode access card	L2020-2S-OC3-M
1-port OC-3c multimode module—cell line card (CLC) with OC-3c multimode access card	L2020-1M-OC3-M
2-port OC-3c multimode module—cell line card (CLC) with OC-3c multimode access card	L2020-2M-OC3-M
North America/Japan country power kit, 125V	L2020-PWR-NA

Description	Product Number
North America/Japan country power kit, 125V, locking plug	L2020-PWR-NA125
North America/Japan country power kit, 250V, locking plug	L2020-PWR-NA250
UK country power kit (also for Hong Kong, Malaysia, Singapore)	L2020-PWR-U
Continental Europe country power kit (for Austria, Belgium, Finland, France, Germany, the Netherlands, Norway, Portugal, Spain, Sweden)	L2020-PWR-E
Denmark country power kit	L2020-PWR-D
Switzerland country power kit	L2020-PWR-CH
Italy country power kit	L2020-PWR-I
Israel country power kit	L2020-PWR-IS
India and South Africa country power kit	L2020-PWR-IN
Argentina, Australia, New Zealand, and Papua New Guinea country power kit	L2020-PWR-A
DC power kit	L2020-PWR-DC

1. Order ControlStream software for each base system or redundant base system.
2. Order Frame Relay DCE and NNI software for each chassis containing one or more serial modules.
3. Order VirtualStream software for each Ethernet or FDDI interface module.

Spare Parts List

You can order all major LightStream 2020 hardware components from the spare parts list. (See Table 239.)

Table 239 LightStream 2020 Spare Parts

Description	Spares Ratio	Product Number
LightStream 2020 chassis with AC power tray	–	L2020-CHAS-AC=
LightStream 2020 chassis with DC power tray	–	L2020-CHAS-DC=
Switch card with console/modem port assembly	–	L2020-SWC=
Switch card without console/modem port assembly	1 to 10	L2020-SWC-NOCAB=
Console/modem port assembly for switch card	1 to 100	L2020-MOD-CBL=
Network processor module (32-MB NP, NP access card, and disk assembly with platform software installed)	–	L2020-NP-DC=
Network processor card	1 to 20	L2020-NP=
Network processor access card	1 to 100	L2020-NP-A=
Network processor disk assembly	1 to 10	L2020-DSK-DC=
Network processor SCSI upper cable assembly	1 to 100	L2020-NP-CU=
Network processor SCSI lower cable assembly	1 to 100	L2020-NP-CL=
Midplane	1 to 100	L2020-MID-PL=
8-port Ethernet module, 10BaseT/AUI (PLC and Ethernet access card)	–	L2020-8E-M=
8-port fiber Ethernet module (PLC and fiber Ethernet access card)	–	L2020-8EF-M=

Description	Spares Ratio	Product Number
2-port FDDI module (PLC and FDDI access card)	–	L2020-2FD-M=
4-port serial V.35 module (PLC, serial access card, two V.35 fantails and two 8-ft [2.4-m] fantail cables)	–	L2020-8S-V35-M=
4-port serial EIA/TIA-449 module (PLC, serial access card, two EIA/TIA-449 fantails and two 8-ft [2.4-m] fantail cables)	–	L2020-8S-449-M=
8-port serial X.21module (PLC, serial access card, X.21 fantail and two 8-ft [2.4-m] fantail cables)	–	L2020-8S-X21-M=
8-port T1 CBR module (PLC and T1 CBR access card)	–	L2020-8T1-CE-M=
8-port E1/BNC CBR module (PLC, E1 CBR access card, E1 fantail with BNC connectors, and 4-ft [1.2-m] fantail cable)	–	L2020-8E1-CE-BN-M=
8-port E1/SMZ CBR module (PLC, E1 CBR access card, E1 fantail with SMZ connectors, and 4-ft [1.2-m] fantail cable)	–	L2020-8E1-CE-SM-M=
Packet line card (PLC)	1 to 5	L2020-PLC=
AUI/10BaseT Ethernet access card	1 to 15	L2020-8E-A=
Fiber Ethernet access card	1 to 15	L2020-8EF-A=
FDDI access card	1 to 15	L2020-2FD-A=
Serial access card	1 to 15	L2020-8SAC=
8-port T1 CBR access card	1 to 50	L2020-8T1-CE-A=
8-port E1 CBR access card	1 to 50	L2020-8E1-CE-A=
E1 fantail with BNC connectors	1 to 100	LS-8E1-CE-FT-BN=
E1 fantail with SMZ connectors	1 to 100	LS-8E1-CE-FT-SM=
1-port OC-3c single-mode module (CLC and OC-3c access card)	–	L2020-1S-OC3-M=
2-port OC-3c single-mode module (CLC and OC-3c access card)	–	L2020-2S-OC3-M=
1-port OC-3c multimode module (CLC and OC-3c access card)	–	L2020-1M-OC3-M=
2-port OC-3c multimode module (CLC and OC-3c access card)	–	L2020-2M-OC3-M=
4-port T3 module (CLC, T3 access card, and T3/E3 fantail assembly with 4-ft [1.2-m] cables)	–	L2020-4T3-M=
8-port T3 module (CLC, T3 access card, and T3/E3 fantail assembly with 4-ft [1.2-m] cables)	–	L2020-8T3-M=
4-port E3 module (CLC, T3 access card, and T3/E3 fantail assembly with 4-ft [1.2-m] cables)	–	L2020-4E3-M=
Cell line card (CLC) with single TSU ASIC	1 to 5	L2020-CLC-1=
Cell line card (CLC) with double TSU ASIC	1 to 5	L2020-CLC-2=
1-port OC-3c single-mode access card	1 to 25	L2020-1S-OC3-A=
2-port OC-3c single-mode access card	1 to 25	L2020-2S-OC3-A=
1-port OC-3c multimode access card	1 to 20	L2020-1M-OC3-A=

Description	Spares Ratio	Product Number
2-port OC-3c multimode access card	1 to 20	L2020-2M-OC3-A=
4-port T3 access card	1 to 20	L2020-4T3-A=
8-port T3 access card	1 to 20	L2020-8T3-A=
4-port E3 access card	1 to 20	L2020-4E3-A=
T3/E3 fantail panel	1 to 100	L2020-T3E3-FT=
4-port T3 cable bundle with 4-ft (1.2-m) cables	1 to 100	LS-CAB-4T3-4B=
4-port T3 cable bundle with 8-ft (2.4-m) cables	1 to 100	LS-CAB-4T3-8B=
4-port T3 cable bundle with 12-ft (3.6-m) cables	1 to 100	LS-CAB-4T3-12B=
8-port T3 cable bundle with 4-ft (1.2-m) cables	1 to 100	LS-CAB-8T3-4B=
8-port T3 cable bundle with 8-ft (2.4-m) cables	1 to 100	LS-CAB-8T3-8B=
8-port T3 cable bundle with 12-ft (3.6-m) cables	1 to 100	LS-CAB-8T3-12B=
4-port E3 cable bundle with 4-ft (1.2-m) cables	1 to 100	LS-CAB-4E3-4B=
4-port E3 cable bundle with 8-ft (2.4-m) cables	1 to 100	LS-CAB-4E3-8B=
4-port E3 cable bundle with 12-ft (3.6-m) cables	1 to 100	LS-CAB-4E3-12B=
4-port low-speed V.35 module (LSC, access card, twoV.35 fantails and two 8-ft [2.4-m] fantail cables)	–	L2020-LSC-V35-M=
4-port low-speed EIA/TIA-449 module (LSC, access card, two EIA/TIA-449 fantails and two 8-ft [2.4-m] fantail cables)	–	L2020-LSC-449-M=
8-port low-speed X.21module (LSC, access card, X.21 fantail and two 8-ft [2.4-m] fantail cables)	–	L2020-LSC-X21-M=
Low-speed line card (LSC)	1 to 20	L2020-LSC=
Low-speed access card	1 to 50	L2020-LSC-A=
V.35 fantail for serial and low-speed modules	1 to 100	L2020-4V35-FT=
X.21 fantail for serial and low-speed modules	1 to 100	L2020-4X21-FT=
EIA/TIA449/422 fantail for serial and low-speed modules	1 to 100	L2020-4RS4-FT=
4-ft (1.2-m) fantail cable for serial and low-speed modules	1 to 100	L2020-CAB-F4=
8-ft (2.4-m) fantail cable for serial and low-speed modules	1 to 100	L2020-CAB-F8=
12-ft (3.6-m) fantail cable for serial and low-speed modules	1 to 100	L2020-CAB-F12=
AC power tray assembly with power inlet on tray (allows dual power cords in systems with 2 trays)	1 to 10	L2020-PS-AC-D=
AC power tray assembly for older systems with single power inlet on chassis	1 to 10	L2020-PS-AC=
DC power tray assembly	1 to 10	L2020-PS-DC=
Dual nonredundant power cord upgrade (two power supplies, 1 disk tray, upgrade documentation)	–	LS2020-PWR-2=
Dual redundant power cord upgrade (two power supplies, 2 disk trays, upgrade documentation)	–	LS2020-PWR-2R=

Description	Spares Ratio	Product Number
Blower assembly	1 to 25	L2020-FAN=
Peripheral cover	1 to 100	L2020-PER-CVR=
Filler panel set (front and back) to cover 1 card slot	1 to 100	L2020-FIL-1=
Filler panel set (front and back) to cover 5 card slots	1 to 100	L2020-FIL-5=
8-port E1 cable bundle with 4-ft (1.2-m) cables	1 to 100	LS-CAB-8E1-4B
8-port E1cable bundle with 8-ft (2.4-m) cables	1 to 100	LS-CAB-8E1-8B
8-port E1 cable bundle with 12-ft (3.6-m) cables	1 to 100	LS-CAB-8E1-12B
Punch down block/RJ45 8-ft cable	–	LS-CAB-8E1-8PD8

Country Power Kits

A country power kit is required with each base system. Country power kits include power cord sets, labels, and instructions appropriate for the country of destination. All power cords are 8 feet 2 inches (2.5 meters) long. Country power kits are available as follows:

- North America (125 VAC, 50–60 Hz; 125 VAC locking, 50–60 Hz; 250 VAC locking, 50–60 Hz)
- Others: Argentina, Australia, Austria, Belgium, Denmark, Finland, France, Germany, Hong Kong, India, Ireland, Israel, Italy, Japan, Malaysia, the Netherlands, New Zealand, Norway, Papua New Guinea, Portugal, Singapore, South Africa, Spain, Sweden, Switzerland, and the United Kingdom

Note DC-powered systems do not use country power kits. Instead, order the DC power kit, L2020-PWR-DC.

Table 240 lists the LightStream 2020 country power kits.

Table 240 LightStream 2020 Country Power Kits

Description	Product Number
Kit for North America and Japan, 125V	L2020-PWR-NA
Kit for North America and Japan, 125V, locking plug	L2020-PWR-NA125
Kit for North America and Japan, 250V, locking plug	L2020-PWR-NA250
Kit for the UK, Hong Kong, Malaysia, and Singapore	L2020-PWR-U
Kit for continental Europe, including Austria, Belgium, Finland, France, Germany, the Netherlands, Norway, Portugal, Spain, and Sweden	L2020-PWR-E
Kit for Denmark	L2020-PWR-D
Kit for Switzerland	L2020-PWR-CH
Kit for Italy	L2020-PWR-I
Kit for Israel	L2020-PWR-IS
Kit for India and South Africa	L2020-PWR-IN
Kit for Argentina, Australia, New Zealand, and Papua New Guinea	L2020-PWR-A
DC power kit	L2020-PWR-DC
System upgrade for dual power cords	L2020-UPG-PS-D=

External Cabling

Table 241 lists the LightStream 2020 external cables.

Table 241 LightStream 2020 External Cables

Description	Product Number
T3 coaxial cable assembly—3 ft (.9 m)	LS-CAB-T3-CX3
T3 coaxial cable assembly—25 ft (7.6 m)	LS-CAB-T3-CX25
T3 coaxial cable assembly—50 ft (15.2 m)	LS-CAB-T3-CX50
T3 coaxial cable assembly—100 ft (30.5 m)	LS-CAB-T3-CX100
X.21 cable assembly, DTE-DCE, male to female—30 ft (9.1 m)	LS-CAB-X21-TC30
X.21 cable assembly, DTE-DCE, male to female—50 ft (15.2 m)	LS-CAB-X21-TC50
X.21 cable assembly, DTE-DCE, male to female—100 ft (30.5 m)	LS-CAB-X21-TC100
V.35 cable assembly, DTE-DCE, male to female—30 ft (9.1 m)	LS-CAB-V35-TC30
V.35 cable assembly, DTE-DCE, male to female—50 ft (15.2 m)	LS-CAB-V35-TC50
V.35 cable assembly, DTE-DCE, male to female—100 ft (30.5 m)	LS-CAB-V35-TC100
V.35 cable assembly, DTE-DTE, female to female—8 ft (2.4 m)	LS-CAB-V35-TT8
V.35 cable assembly, DTE-DTE, female to female—30 ft (9.1 m)	LS-CAB-V35-TT30
V.35 cable assembly, DTE-DTE, female to female—50 ft (15.2 m)	LS-CAB-V35-TT50
V.35 cable assembly, DTE-DTE, female to female—100 ft (30.5 m)	LS-CAB-V35-TT100
EIA/TIA-449 cable assembly, DTE-DCE, male to female—30 ft (9.1 m)	LS-CAB-RS4-TC30
EIA/TIA-449 cable assembly, DTE-DCE, male to female—50 ft (15.2 m)	LS-CAB-RS4-TC50
EIA/TIA-449 cable assembly, DTE-DCE, male to female—100 ft (30.5 m)	LS-CAB-RS4-TC100
EIA/TIA-449 cable assembly, DTE-DTE, female to female—8 ft (2.4 m)	LS-CAB-RS4-TT8
EIA/TIA-449 cable assembly, DTE-DTE, female to female—30 ft (9.1 m)	LS-CAB-RS4-TT30
EIA/TIA-449 cable assembly, DTE-DTE, female to female—50 ft (15.2 m)	LS-CAB-RS4-TT50
EIA/TIA-449 cable assembly, DTE-DTE, female to female—100 ft (30.5 m)	LS-CAB-RS4-TT100

Note For complete information about LightStream 2020 cables, see the chapter "Connectors and Cables" in the *LightStream 2020 Site Planning and Cabling Guide*. For more information on ATM cables and connectors, see Table 334 and Table 335 in the chapter "Cables and Transceivers" later in this catalog.