CHAPTER 3

Connectors and Cables

This chapter describes the interconnection facilities available for the various device interfaces supported by the LightStream 2020 multiservice ATM switch (LS2020 switch). These facilities are described in this chapter in the following order:

- Low-speed access card connectors and data cables for X.21, RS-449, and V.35 serial device interfaces:
  - First-generation, low-speed access card (LSAC)
  - Second-generation, serial access card (SAC)
- Medium-speed access card connectors and data cables:
  - First-generation, two-port access cards:

    T3 MSAC

    E3 G.804 MSAC

    E3 PLCP MSAC

Note The first-generation, medium-speed T3/E3 access cards are no longer orderable. They are available only as spares and supported only on a repair basis.

  - Second-generation, four- or eight-port access cards:

    T3AC

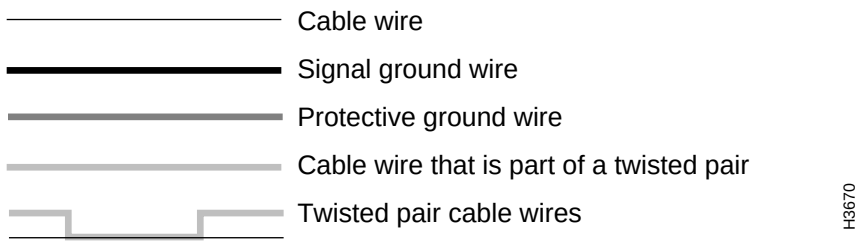
    E3AC
- Circuit emulation access card (CEMAC) connectors and data cables:
  - T1 CEMAC—120-ohm interface only (does not support a fantail)
  - E1 CEMAC—Configurable to support either a 75-ohm interface with an E1 fantail or a 120-ohm interface without a fantail
- OC-3c access card connectors and data cables:
  - Multimode card (OC3AC-MM)
  - Single-mode card (OC3AC-SM)
- FDDI access card (FAC) connectors and data cables
- Ethernet access card (EAC) connectors and data cables

- Fiber Ethernet access card (FEAC) connectors and data cables
- Console and modem assembly connectors and data cables
- Country kits and LS2020 power cordsets

Cable Drawing Conventions

Signal diagrams are provided for the I/O connectors and data cables described in this chapter. Figure 3-1 shows the conventions used in representing the signal paths in these interconnection facilities.

Figure 3-1 LS2020 Cable Signal Diagram Conventions



Cable Part Numbers

For most LS2020 interconnection cables, two part numbers are shown in an associated table in the body of this chapter:

- The manufacturing number, which appears on the cable itself
- The order number, which you use to purchase the cable from Cisco Systems

Note Some cables described in this chapter have no associated order number. Such cables are not offered for sale by Cisco Systems. They are widely available from other vendors as standard items.

LS2020 Function Cards/Access Cards

An LS2020 chassis incorporates both function (line) cards and associated access cards. A variety of line cards may be used to populate the available slots in the front of an LS2020 chassis, depending on the user's communication requirements. Associated access cards, which are field replaceable units (FRUs), are then used to populate the corresponding slots at the rear of the LS2020 chassis.

Together with their associated line cards, the access cards provide data transfer services for an LS2020 switch by means of physical interfaces to which other network devices can be connected. Each line card is connected to its corresponding access card through the chassis midplane. If you remove an access card from the chassis, service to the associated line card is disrupted.

Table 3-1 shows the functional categories of line cards available for use with the LS2020 switch and how they may be combined with various access cards to provide data transfer services within an LS2020 network.

Table 3-1 LS2020 Line Cards and Associated Access Cards

Functional Category	Line Card Type	Access Card Type
Low-speed cards:		
First generation	Low-speed card (LSC)	Low-speed access card (LSAC)—Eight ports.
Second generation[1]	Packet line card (PLC)	Serial access card (SAC)—Eight ports.
Medium-speed cards:		
First generation	Medium-speed card (MSC)	T3 medium-speed access card (MSAC)—Two ports. E3 G.804 medium-speed access card (MSAC)—Two ports. E3 PLCP medium-speed access card (MSAC)—Two ports. (First-generation cards above are no longer orderable.)
Second generation[2]	Cell line card (CLC)	T3 medium-speed access card (T3AC)—Four or eight ports. E3 medium-speed access card (E3AC)—Four or eight ports.
Circuit emulation cards:		
T1	Packet line card (PLC)	T1 card (CEMAC-T1)—Eight ports; does not support a fantail.
E1	Packet line card (PLC)	E1 card (CEMAC-E1)—Eight ports; supports an E1 fantail.
OC3-c cards:		
Single mode	Cell line card (CLC)	OC-3c single-mode access card (OC3AC-SM)—One or two ports.
Multimode	Cell line card (CLC)	OC-3c multimode access card (OC3AC-MM)—One or two ports.
FDDI cards	Packet line card (PLC)	FDDI access card (FAC)—Two ports.
Ethernet cards	Packet line card (PLC)	Ethernet access card (EAC)—Eight ports.
Fiber Ethernet cards	Packet line card (PLC)	Fiber Ethernet access card (FEAC)—Eight ports.

1. Serial interface module (SIM); an upgrade option from first generation low-speed card.

2. An upgrade option from first generation medium-speed cards.

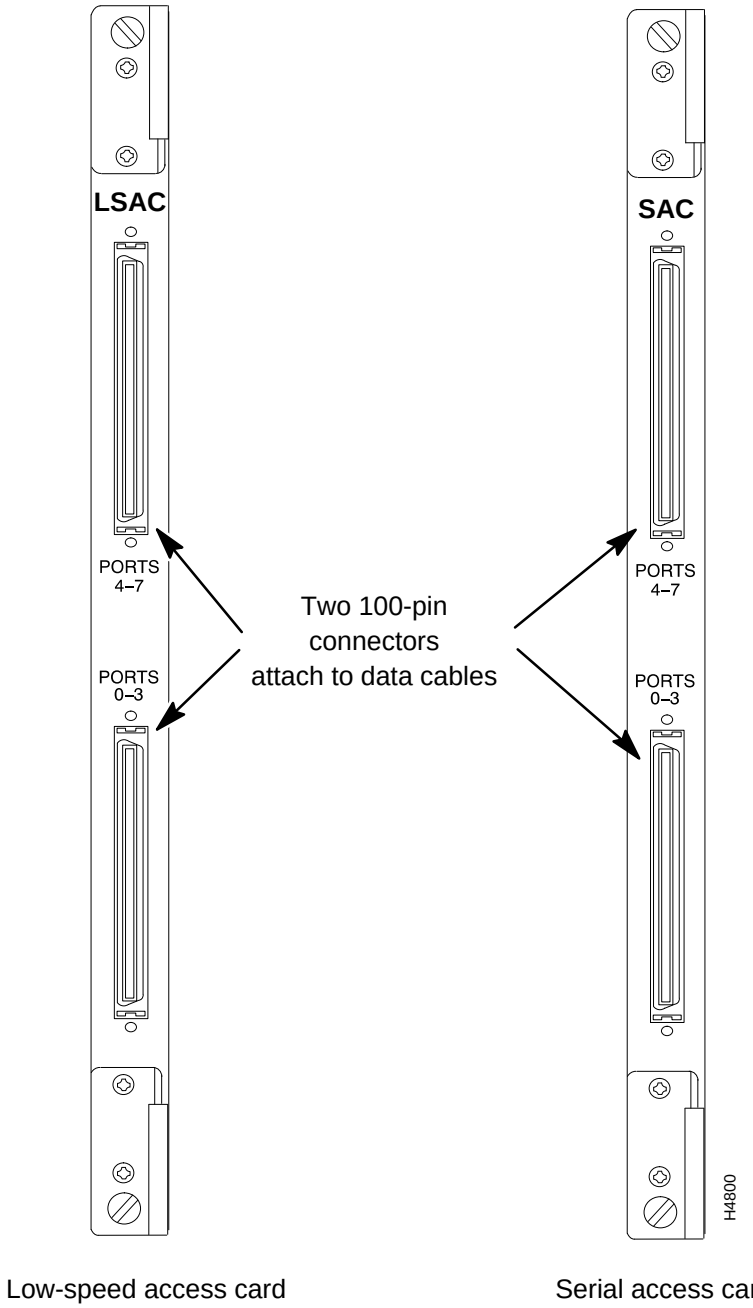
Low-Speed Access Cards, Connectors, and Cables

This section describes the connectors and data cables for the X.21, RS-449, and V.35 I/O interfaces for the serial access cards available for the LS2020 switch. These cards are of two types:

- Low-speed access card (LSAC)
- Serial access card (SAC)

Figure 3-2 shows the bulkhead view of these access cards.

Figure 3-2 Low-Speed Access Cards



Note RS-449 is a popular physical layer interface standard that is now called EIA/TIA-449. Nevertheless, the notation "RS-449," which appears frequently in this section, will be retained to reflect the existing naming and labeling conventions implemented for the LS2020 switch.

The serial access cards use the same types of connectors and cables for hookup. These interconnection facilities are described in the following order:

- X.21 fantail connector—see the section entitled “X.21 Fantail and Connectors.”
- RS-449 fantail connector—see the section entitled “RS-449 Fantail and Connectors.”
- V.35 fantail connector—see the section entitled “V.35 Fantail and Connectors.”
- DSU/CSU control ports on V.35 and RS-449 fantails—see the section entitled “DSU/CSU Control Port Connectors on RS-449 and V.35 Fantails.”
- Internal data cable for connecting a serial access card to a fantail—see the section entitled “Fantail Data Cable.”
- Data cable for connecting an X.21 fantail to an external X.21 device—see the section entitled “X.21 Interface Cable.”
- Data cable for connecting an RS-449 fantail to an external RS-449 DCE device—see the section entitled “RS-449 Interface Straight-Through Cable.”
- Data cable for connecting two LS2020 switches via their RS-449 fantail interfaces, or for connecting an RS-449 fantail to an external RS-449 DTE device—see the section entitled “RS-449 Interface Crossover Cable.”
- Data cable for connecting a V.35 fantail to an external V.35 DCE device—see the section entitled “V.35 Interface Straight-Through Cable.”
- Data cable for connecting two LS2020 switches via their V.35 fantail interfaces, or for connecting a V.35 fantail to an external V.35 DTE device—see the section entitled “V.35 Interface Crossover Cable.”

X.21 Fantail and Connectors

Figure 3-3 shows the X.21 fantail used with the low-speed access card (LSAC) and the serial access card (SAC).

Figure 3-3 X.21 Fantail

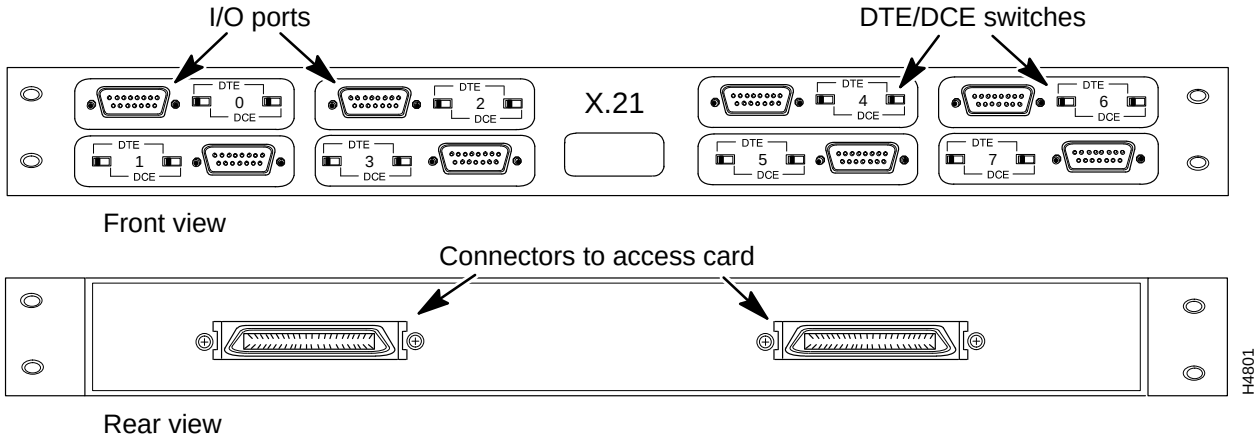
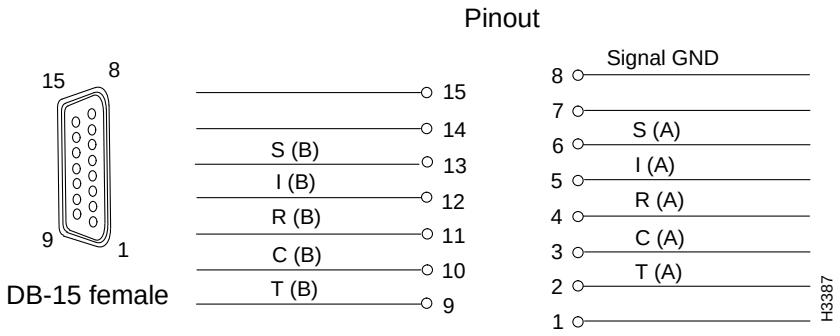


Figure 3-4 shows the pins assignments for the X.21 interface (DB-15) connector.

Figure 3-4 X.21 Interface Connector Pin Assignments



Interface connector type: DB-15 female

Connectors per fantail: eight (numbered 0 – 7)

RS-449 Fantail and Connectors

Figure 3-5 shows the RS-449 fantail used with the low-speed access card (LSAC) and the serial access card (SAC).

Figure 3-5 RS-449 Fantail

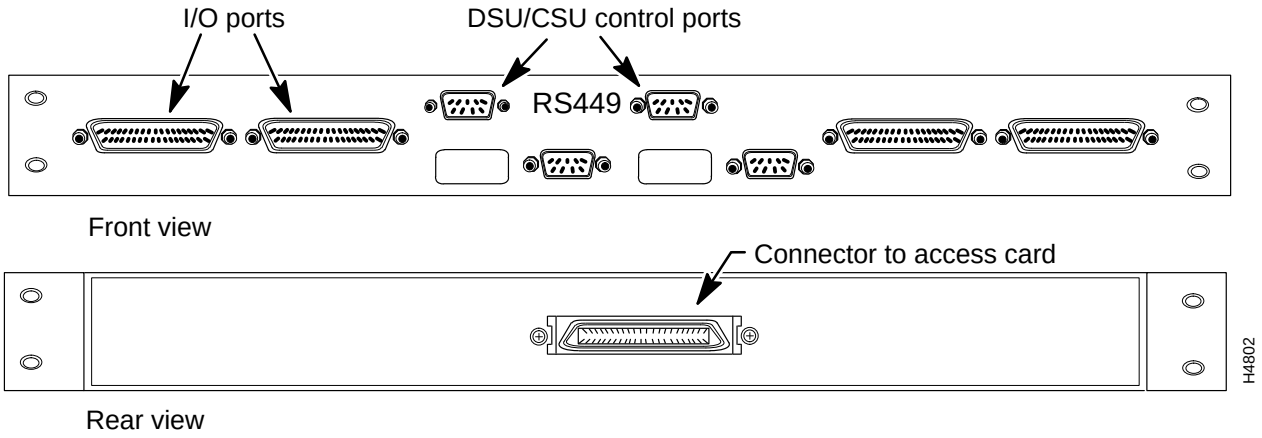
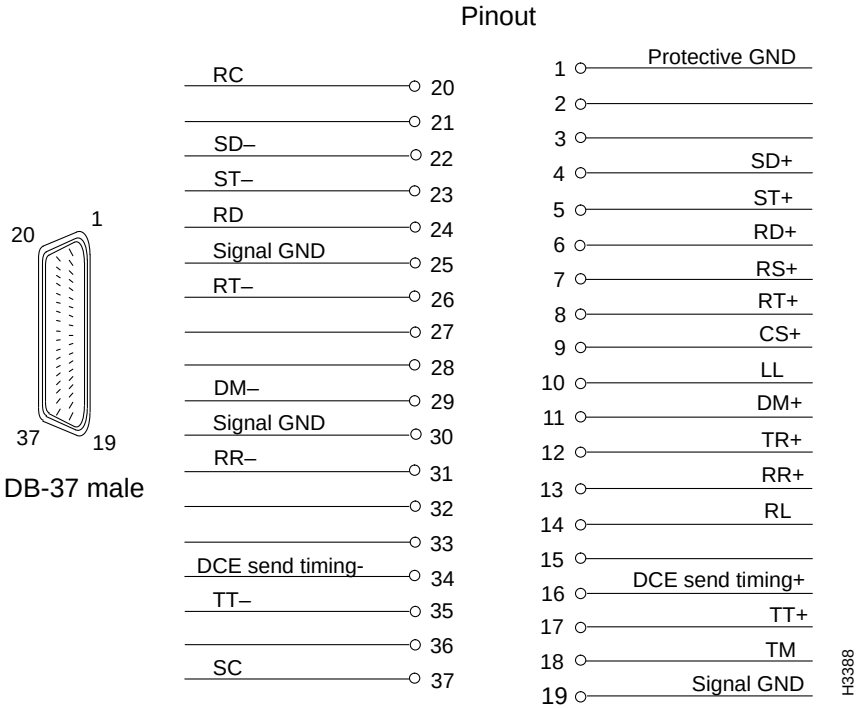


Figure 3-6 shows the pin assignments for the RS-449 interface (DB-37) connector.

Figure 3-6 RS-449 Interface Connector Pin Assignments



Interface connector type: DB-37 male

Connectors per fantail: four (numbered 0 – 3)

V.35 Fantail and Connectors

Figure 3-7 shows the V.35 fantail used with the low-speed access card (LSAC) and the serial access card (SAC).

Figure 3-7 V.35 Fantail

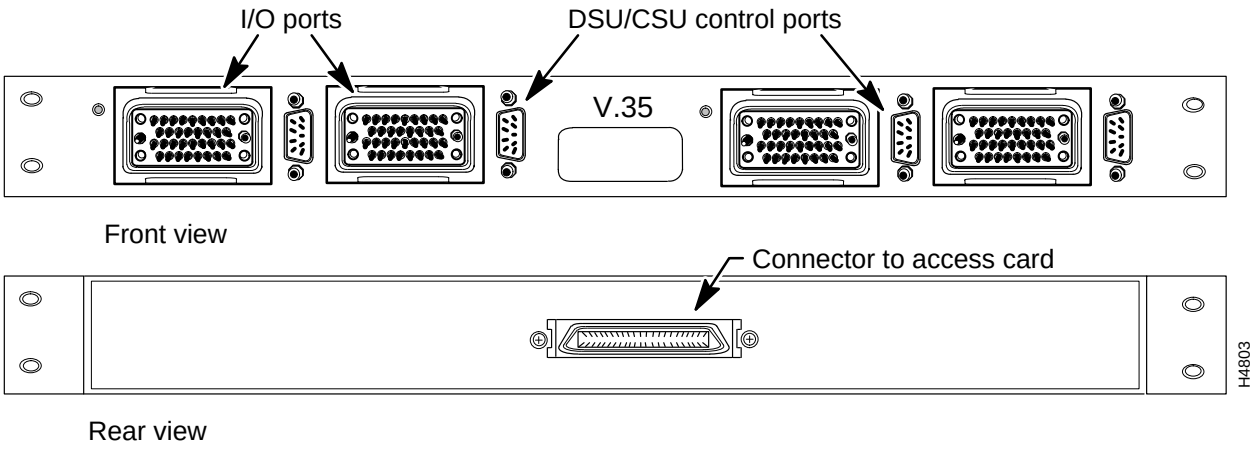
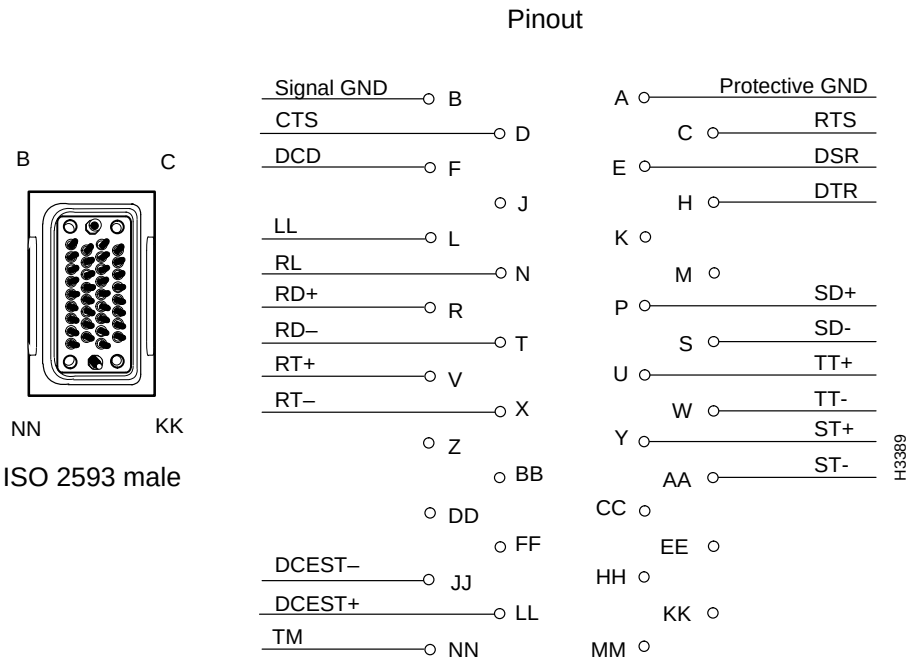


Figure 3-8 illustrates the pin assignments for the V.35 interface (ISO 2593) connector.

Figure 3-8 V.35 Interface Connector Pin Assignments



Interface connector type: ISO 2593 male (34-pin block type)

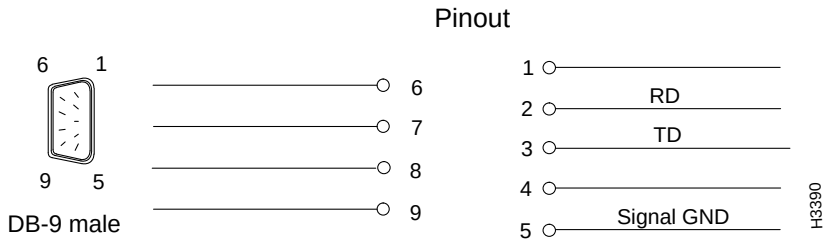
Connectors per fantail: four (numbered 0 – 3)

DSU/CSU Control Port Connectors on RS-449 and V.35 Fantails

RS-232 DSU/CSU connectors appear on both the RS-449 and V.35 fantails. If you connect the control port to the craft port on a DSU/CSU device, you can use the csumon program to communicate remotely with the DSU/CSU from an LS2020 switch.

Figure 3-9 shows the pin assignments for the RS-232 DSU/CSU control port (DB9) connectors on the RS-449 and V.35 fantails.

Figure 3-9 RS-232 DSU/CSU Control Port Pin Assignments



Interface connector type: DB9 male

Connectors per fantail: four (numbered 0 – 3)

Fantail Data Cable

This high-density, 100-pin data cable is used to connect the bulkhead of a low-speed access card (LSAC) or serial access card (SAC) to the back of an X.21, RS-449, or V.35 fantail.

The cable is available from Cisco Systems in three lengths. Use the appropriate order number from the table below.

Manufacturing No.	Length	Order No.
72-1117-01	4 feet (1.2 m)	L2020-CAB-F4=
72-1118-01	8 feet (2.4 m)	L2020-CAB-F8=
72-1119-01	12 feet (3.6 m)	L2020-CAB-F12=

Two such data cables are required for the connection of an LSAC or SAC to the rear of an X.21 fantail: one cable for ports 0 – 3 on the access card bulkhead, and another cable for ports 4 – 7 on the bulkhead. Only one such cable is required to connect an LSAC or SAC to an RS-449 or V.35 fantail.

X.21 Interface Cable

This cable is used to connect an X.21 fantail to an external X.21 device.

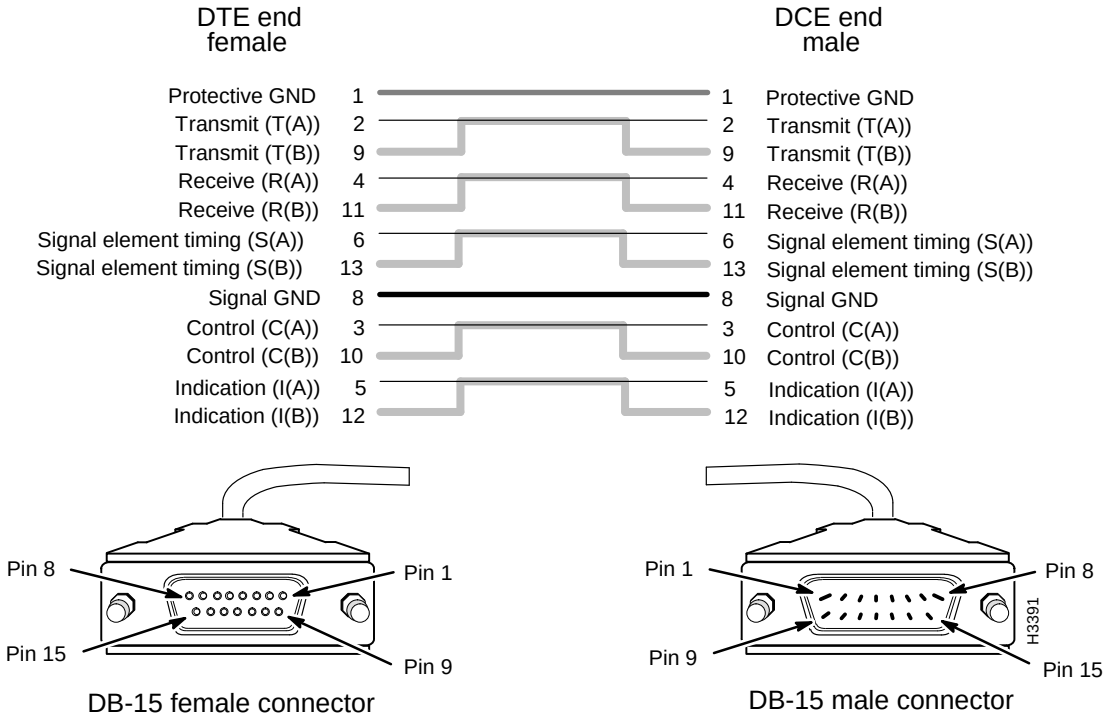
The cable is available from Cisco Systems in three lengths. Use the appropriate order number from the table below.

Manufacturing No.	Length	Order No.
72-0991-01	30 feet (9.1 m)	LS-CAB-X21-TC30=
72-0992-01	50 feet (15.2 m)	LS-CAB-X21-TC50=
72-0993-01	100 feet (30.5 m)	LS-CAB-X21-TC100=

Note Use the switches on the X.21 fantail to select a DTE or DCE interface for each port.

Figure 3-10 is a signal diagram for the X.21 fantail cable.

Figure 3-10 X.21 Cable Signal Diagram



RS-449 Interface Straight-Through Cable

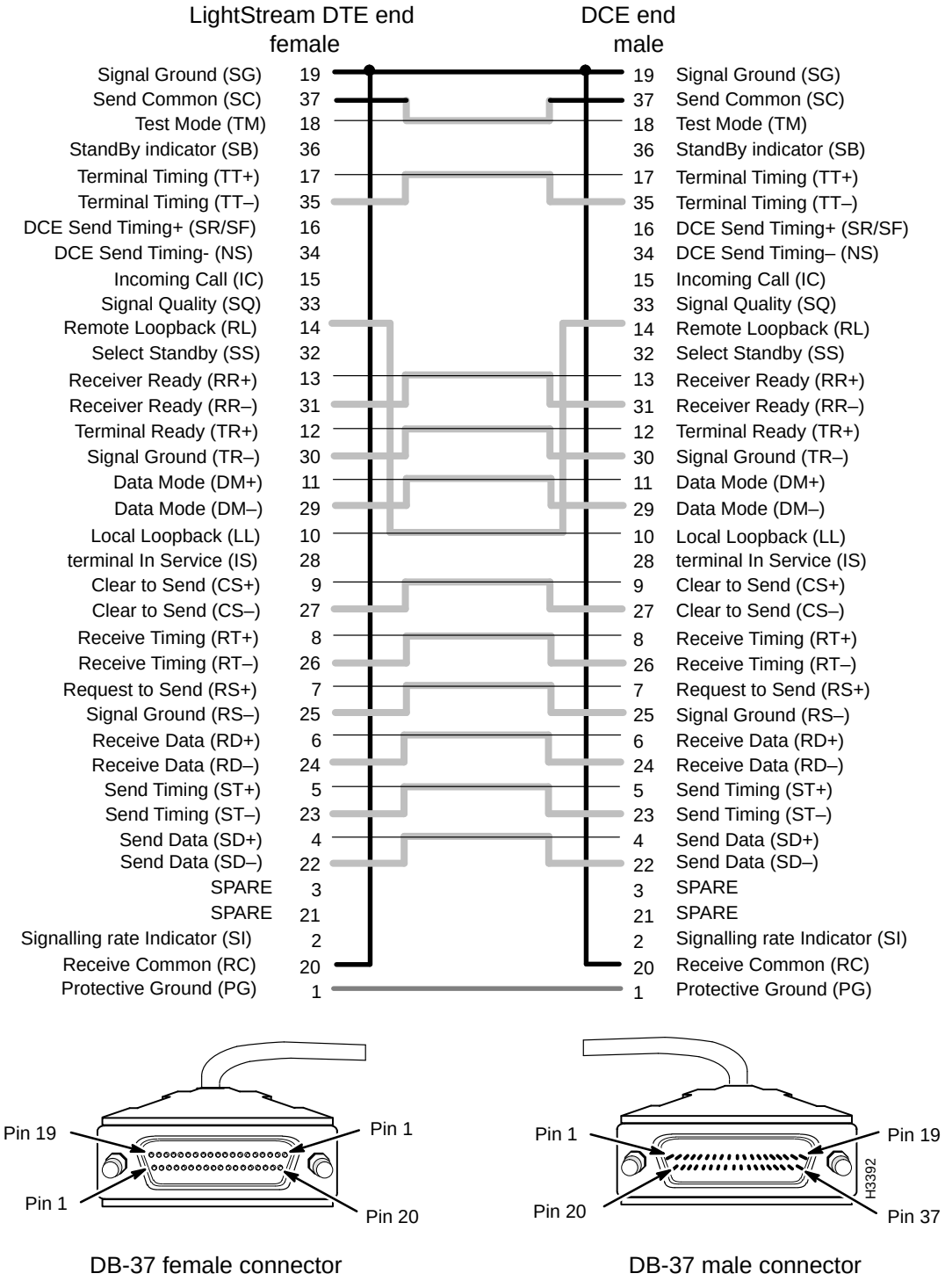
This cable is used to connect an RS-449 fantail to an external RS-449 DCE device.

This cable is available from Cisco Systems. Use the appropriate order number from the table below.

Manufacturing No.	Length	Order No.
72-1002-01	30 feet (9.1 m)	LS-CAB-RS4-TC30=
72-1003-01	50 feet (15.2 m)	LS-CAB-RS4-TC50=
72-1004-01	100 feet (30.5 m)	LS-CAB-RS4-TC100=

Figure 3-11 is a signal diagram for the RS-449 fantail straight-through cable.

Figure 3-11 RS-449 Straight-through Cable Signal Diagram



DB-37 female connector DB-37 male connector

RS-449 Interface Crossover Cable

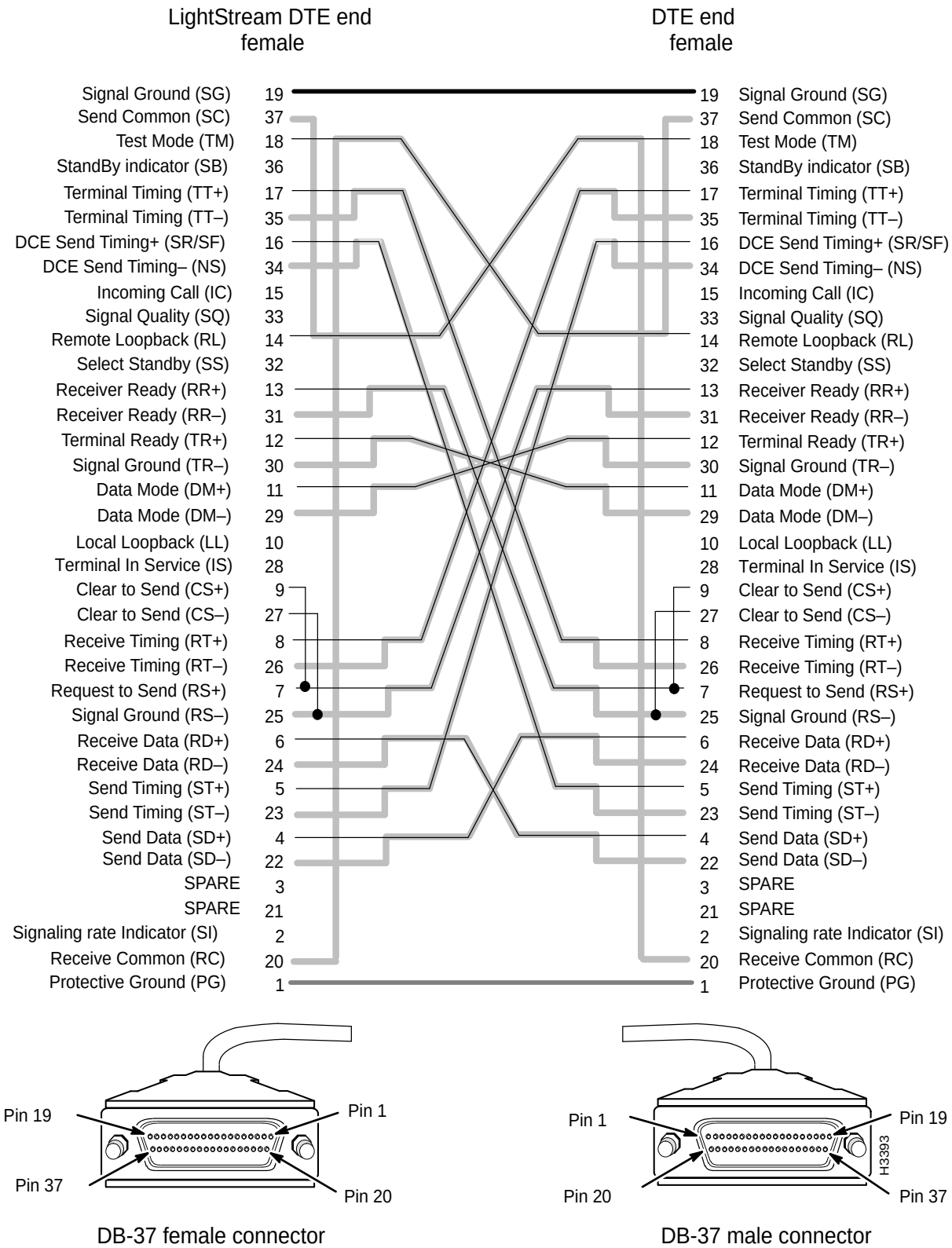
This cable is used to connect two LS2020 switches via their RS-449 fantail interfaces, or to connect an RS-449 fantail to an external RS-449 DTE device.

The cable is available from Cisco Systems. Use the appropriate order number from the table below.

Manufacturing No.	Length	Order No.
72-1008-01	8 feet (2.4 m)	LS-CAB-RS4-TT8=
72-1005-01	30 feet (9.1 m)	LS-CAB-RS4-TT30=
72-1006-01	50 feet (15.2 m)	LS-CAB-RS4-TT50=
72-1007-01	100 feet (30.5 m)	LS-CAB-RS4-TT100=

Figure 3-12 is a signal diagram for the RS-449 fantail crossover cable.

Figure 3-12 RS-449 Crossover Cable Signal Diagram



DB-37 female connector

DB-37 male connector

V.35 Interface Straight-Through Cable

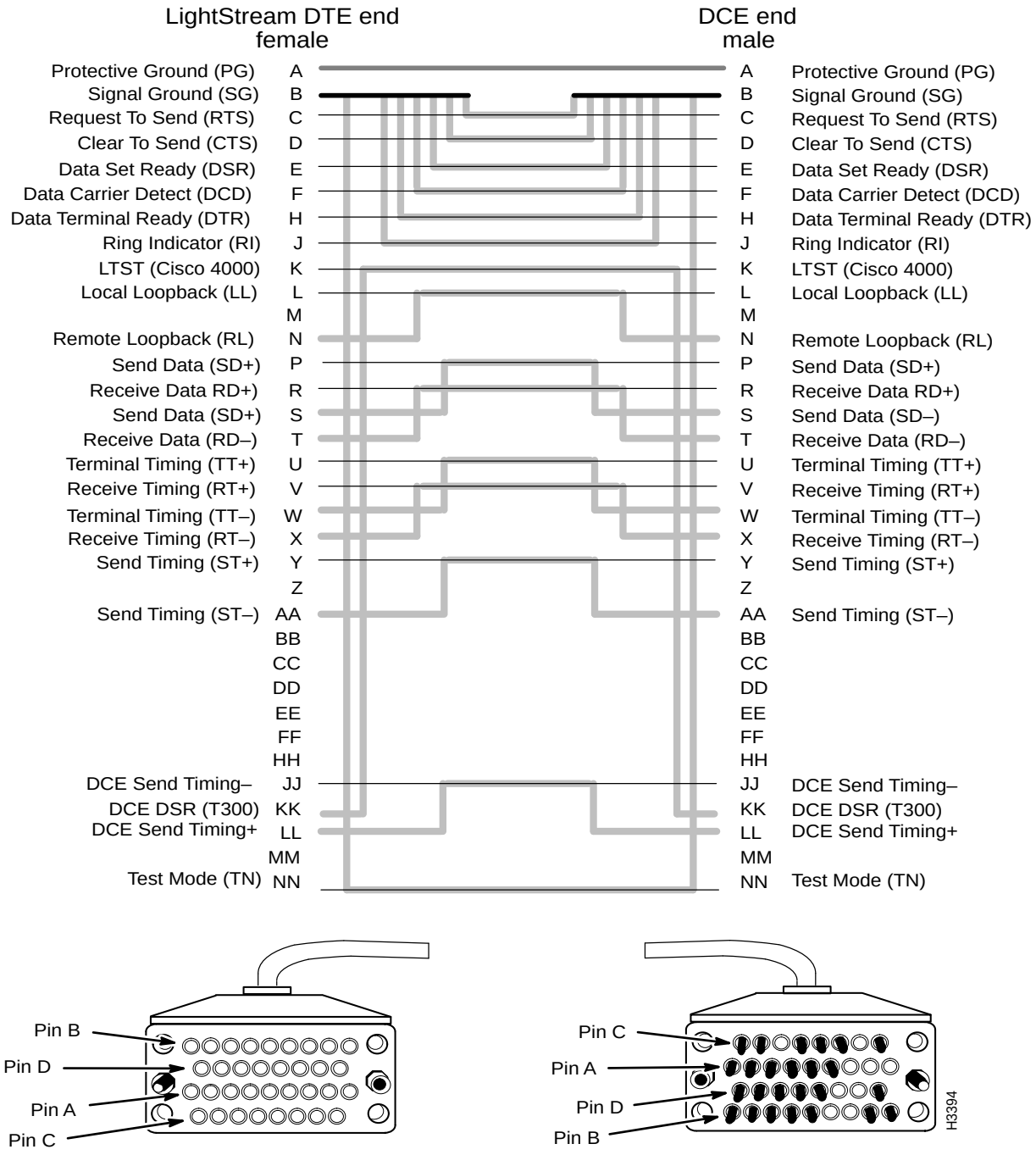
This cable is used to connect a V.35 fantail to an external V.35 DCE device.

The cable is available from Cisco Systems. Use the appropriate order number from the table below.

Manufacturing No.	Length	Order No.
72-1009-01	30 feet (9.1 m)	LS-CAB-V35-TC30=
72-1010-01	50 feet (15.2 m)	LS-CAB-V35-TC50=
72-1011-01	100 feet (30.5 m)	LS-CAB-V35-TC100=

Figure 3-13 is a signal diagram for the V.35 fantail straight-through cable.

Figure 3-13 V.35 Straight-through Cable Signal Diagram



34-position female block connector

34-position male block connector

V.35 Interface Crossover Cable

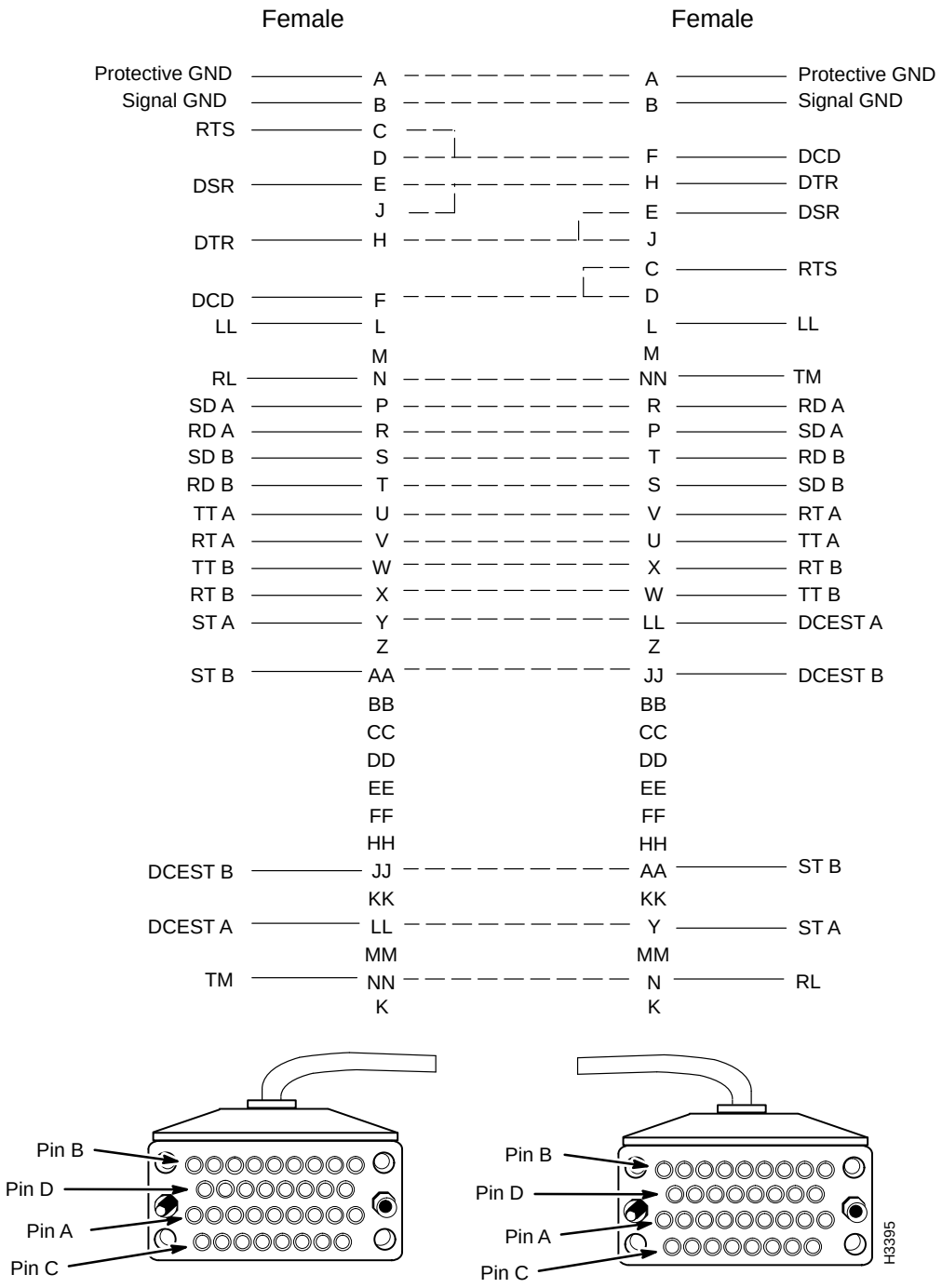
This cable is used to connect two LS2020 switches via their V.35 fantail interfaces, or to connect a V.35 fantail to an external V.35 DTE device.

This cable is available from Cisco Systems. Use the appropriate order number from the table below.

Manufacturing No.	Length	Order No.
72-0997-01	8 feet (2.4 m)	LS-CAB-V35-TT8=
72-0994-01	30 feet (9.1 m)	LS-CAB-V35-TT30=
72-0995-01	50 feet (15.2 m)	LS-CAB-V35-TT50=
72-0996-01	100 feet (30.5 m)	LS-CAB-V35-TT100=

Figure 3-14 is a signal diagram for the V.35 fantail crossover cable.

Figure 3-14 V.35 Crossover Cable Signal Diagram



34-position female block connector 34-position female block connector

Medium-Speed Access Cards, Connectors, and Cables

This section describes the connectors and cables for the medium-speed access card (MSAC), as well as for the T3 and E3 access cards (T3AC and E3AC). These facilities are described in the following order:

- Connectors on the medium-speed, 2-port access card (MSAC). See Figure 3-15.
- The 75-ohm coaxial data cable used to connect the medium speed access cards (MSAC) and the T3/E3 access cards (T3AC and E3AC) to external devices. See Figure 3-16.
- Connectors on the medium-speed, 4-port and 8-port T3 and E3 access cards (T3AC and E3AC). See Figure 3-17.
- Cable harness used to connect the T3/E3 access cards (T3AC and E3AC) to an associated fantail (dressing panel). See Figure 3-18.

T3 Medium-Speed Access Card (Two-Port)

Figure 3-15 shows a physical representation of the two-port T3 medium-speed access card (MSAC). This access card operates in conjunction with a medium-speed line card (MSC).

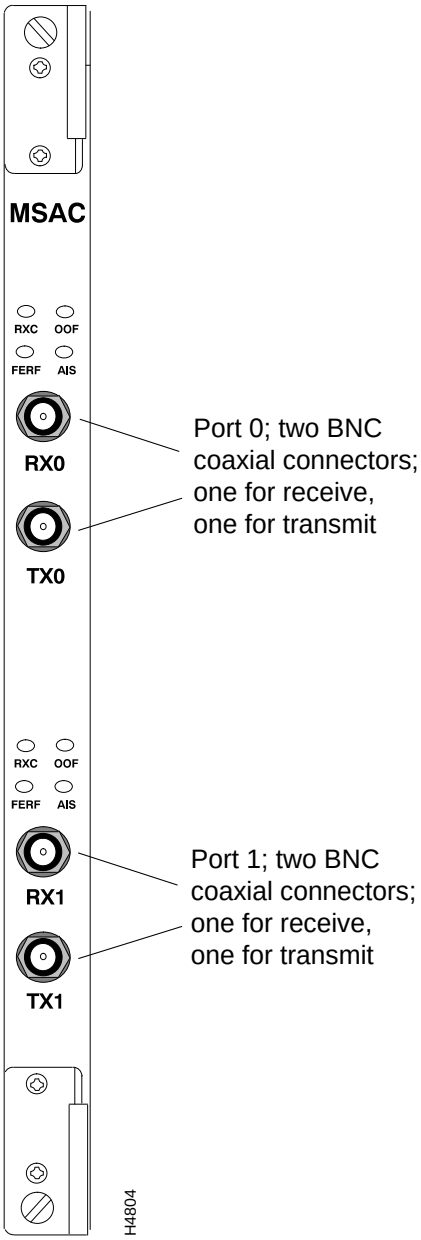
The MSAC is a first-generation access card that is available in three versions for the performing of different types of data transfer services:

- **T3**—Also referred to as DS3 (digital signal level 3); this is a wide-area transmission scheme used by an MSAC for medium-speed communications within an LS2020 network.
- **E3 G.804**—G.804 is a framing standard used by the E3 G.804 version of the MSAC for mapping ATM cells onto physical media.
- **E3 PLCP**—PLCP is a physical layer convergence protocol used by the E3 PLCP version of the MSAC for mapping ATM cells onto physical media.

Although different versions of the MSAC are available for performing different types of data transfer services, the bulkheads of these access cards are identical in appearance and make use of the same cables for interconnection purposes.

Note The first-generation, two-port, T3 medium-speed access cards listed above are no longer orderable. Instead, second-generation, T3/E3 medium-speed access cards are available that provide greater reliability and higher port density. These second-generation cards are described below in the section entitled “T3/E3 Medium-Speed Access Cards (Four-Port/Eight-Port).”

Figure 3-15 Medium-speed Access Card (2-Port)



Interface connector type: 75-ohm coaxial BNC jack

Connectors per MSAC card: four (two receive channels and two transmit channels)

75-Ohm Coaxial Data Cable

Figure 3-16 is a physical representation of the 75-ohm coaxial data cable available for use in making connections directly to the BNC connectors on the medium-speed access card (MSAC). In addition, this cable can be used as a means of external connection to or from the BNC connector on the T3/E3 fantail (see the section entitled "T3/E3 Fantail and Cable Harness" and Figure 3-18).

Figure 3-16 75-ohm Coaxial Data Cable

The 75-ohm coaxial data cable has the following applications:

- Connecting two LS2020 switches via their T3, E3 G.804, or E3 PLCP medium-speed access cards (MSACs)
- Connecting an LS2020 T3, E3 G.804, or E3 PLCP medium-speed access card (MSAC) to an external device
- Connecting two LS2020 switches via their T3/E3 access cards (T3ACs/E3ACs)
- Connecting an LS2020 T3/E3 access card (T3AC/E3AC to an external device

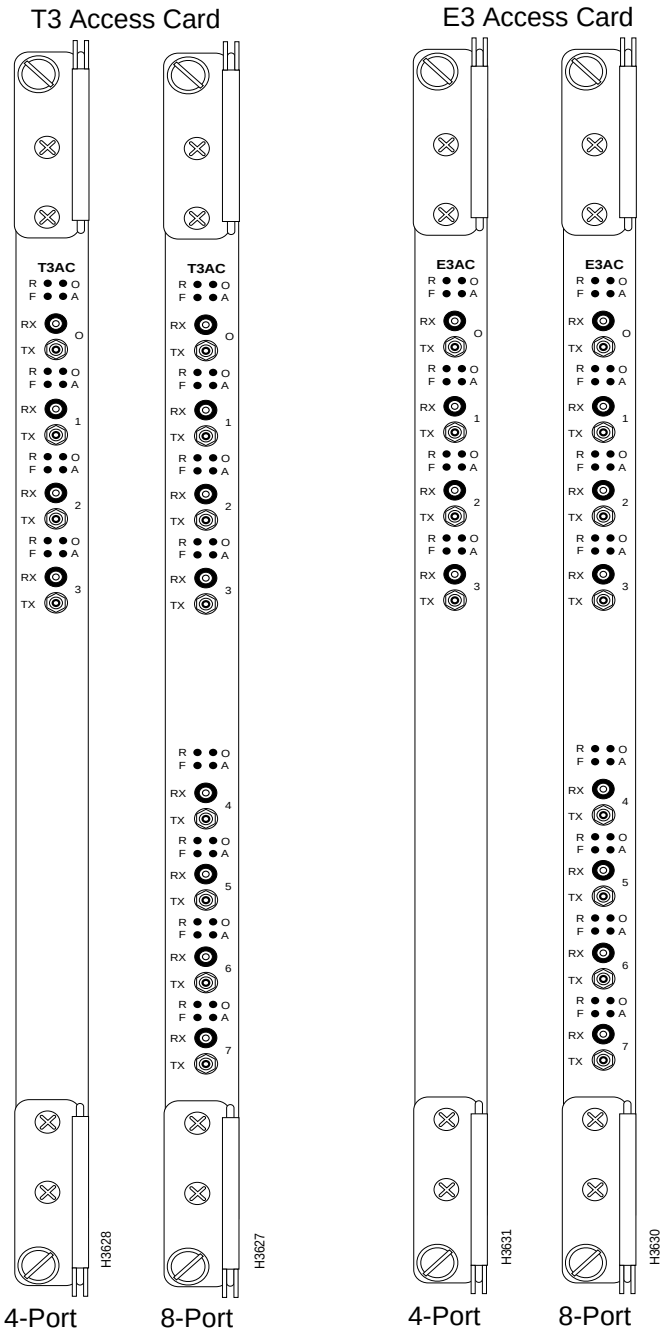
The 75-ohm coaxial cable is available from Cisco Systems in four different lengths. Use the appropriate order number from the table below.

Manufacturing No.	Length	Order No.
72-0998-01	3 feet (0.9 m)	LS-CAB-T3-CX3=
72-0399-01	25 feet (7.6 m)	LS-CAB-T3-CX25=
72-1000-01	50 feet (15.2 m)	LS-CAB-T3-CX50=
72-1001-01	100 feet (30.5 m)	LS-CAB-T3-CX100=

T3/E3 Medium-Speed Access Cards (Four-Port/Eight-Port)

Figure 3-17 shows a physical representation of the medium-speed T3/E3 access cards (T3AC/E3AC). The T3AC and E3AC are second-generation, medium-speed access cards that operate in conjunction with cell line cards (CLCs). These cards, available in either 4-port or 8-port versions, provide greater reliability and higher port density than the 2-port medium-speed access card.

Figure 3-17 Medium-Speed T3/E3 Access Cards (4-Port/8-Port)



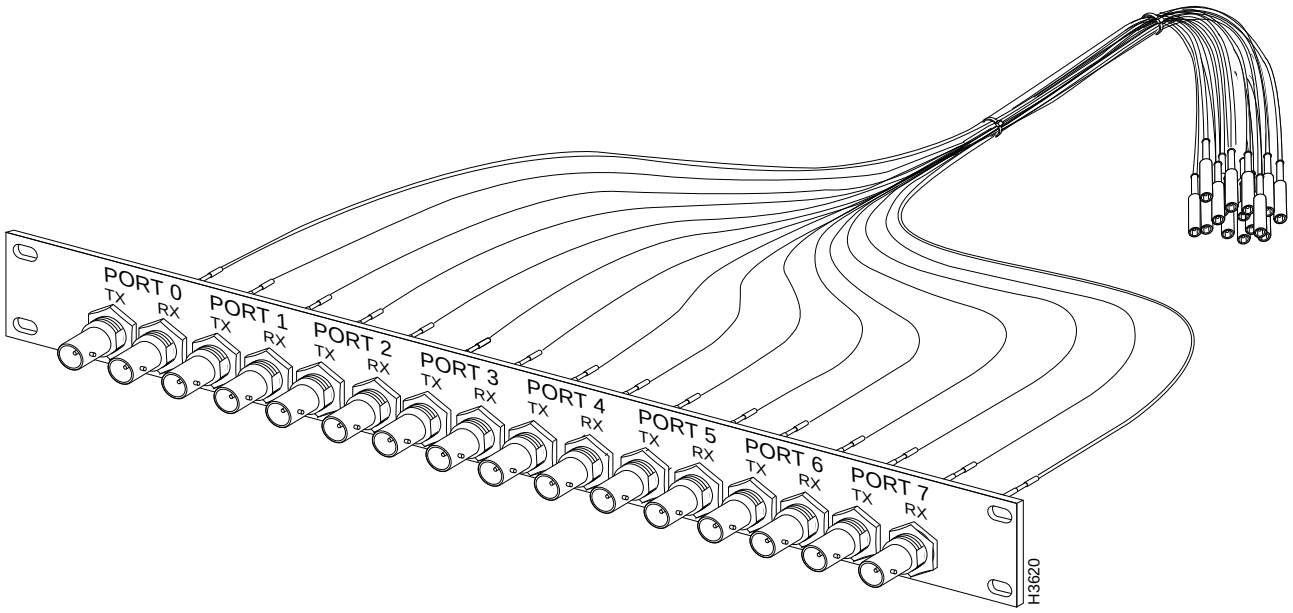
Interface connector type: SMB connectors at the access card bulkhead and the rear of the T3/E3 fantail; BNC connectors at the front of the T3/E3 fantail (see Figure 3-18).

Connectors per access card: 8 or 16 SMB connectors, depending on the number of ports (either 4 or 8) on the T3/E3 access card. Each port has one receive connector and one transmit connector.

T3/E3 Fantail and Cable Harness

Figure 3-18 shows the T3/E3 fantail (dressing panel) containing 16 BNC connectors for external 75-ohm hookup, together with the cable harness that provides the means for direct connection between the back of the T3/E3 fantail and the SMB connectors on a T3AC or an E3AC access card. The T3/E3 fantail and cable harness, although shown together in Figure 3-18, are available separately. Ordering information for these items is provided in the tables below.

Figure 3-18 T3/E3 Fantail and Cable Harness



To interconnect patch panels or T3/E3 fantails to T3AC or E3AC access cards, both 4-port and 8-port coaxial cable harnesses are offered by Cisco Systems. These harnesses are available in 4-, 8-, or12-foot lengths. The table below shows ordering information for the T3 fantail cable harness.

Manufacturing No.	Ports	Length	Order No.
72-1097-01	4	4 feet (1.2 m)	LS-CAB-4T3-4B=
72-1098-01	4	8 feet (2.4 m)	LS-CAB-4T3-8B=
72-1099-01	4	12 feet (3.6 m)	LS-CAB-4T3-12B=
72-1061-01	8	4 feet (1.2 m)	LS-CAB-8T3-4B=
72-1062-01	8	8 feet (2.4 m)	LS-CAB-8T3-8B=
72-1063-01	8	12 feet (3.6 m)	LS-CAB-8T3-12B=

The table below shows ordering information for the E3 fantail cable harness.

Manufacturing No.	Ports	Length	Order No.
72-1097-01	4	4 feet (1.2 m)	LS-CAB-4E3-4B=
72-1098-01	4	8 feet (2.4 m)	LS-CAB-4E3-8B=
72-1099-01	4	12 feet (3.6 m)	LS-CAB-4E3-12B=
72-1061-01	8	4 feet (1.2 m)	LS-CAB-8E3-4B=
72-1062-01	8	8 feet (2.4 m)	LS-CAB-8E3-8B=
72-1063-01	8	12 feet (3.6 m)	LS-CAB-8E3-12B=

The table below shows ordering information for the T3/E3 fantail (dressing panel).

Manufacturing No.	Order No.
700-00605-01	LS2020-T3E3-FT=

Circuit Emulation Access Cards, Connectors, and Cables

The circuit emulation access card (CEMAC) is available in two versions:

- **T1 CEMAC**—For operation as only a 120-ohm interface without a fantail.
- **E1 CEMAC**—For operation as either a 120-ohm interface (the default factory setting) without a fantail or as a 75-ohm interface with an E1 fantail equipped with either BNC or SMZ connectors.

Figure 3-19 shows the T1 and E1 CEMAC cards; the bulkhead views of these cards are identical, except for the identifying “T1” or “E1” nomenclature near the bottom of the bulkhead.

The E1 CEMAC card embodies user-settable jumpers that are configured initially at the factory for 120-ohm operation without a fantail. However, if you wish to configure the E1 CEMAC for 75-ohm operation with an E1 fantail, you must set these on-board jumpers accordingly.

For detailed information about setting the E1 CEMAC card jumpers, see the *LightStream 2020 Hardware Reference & Troubleshooting Guide*.

Figure 3-19 T1 and E1 CEMAC Cards

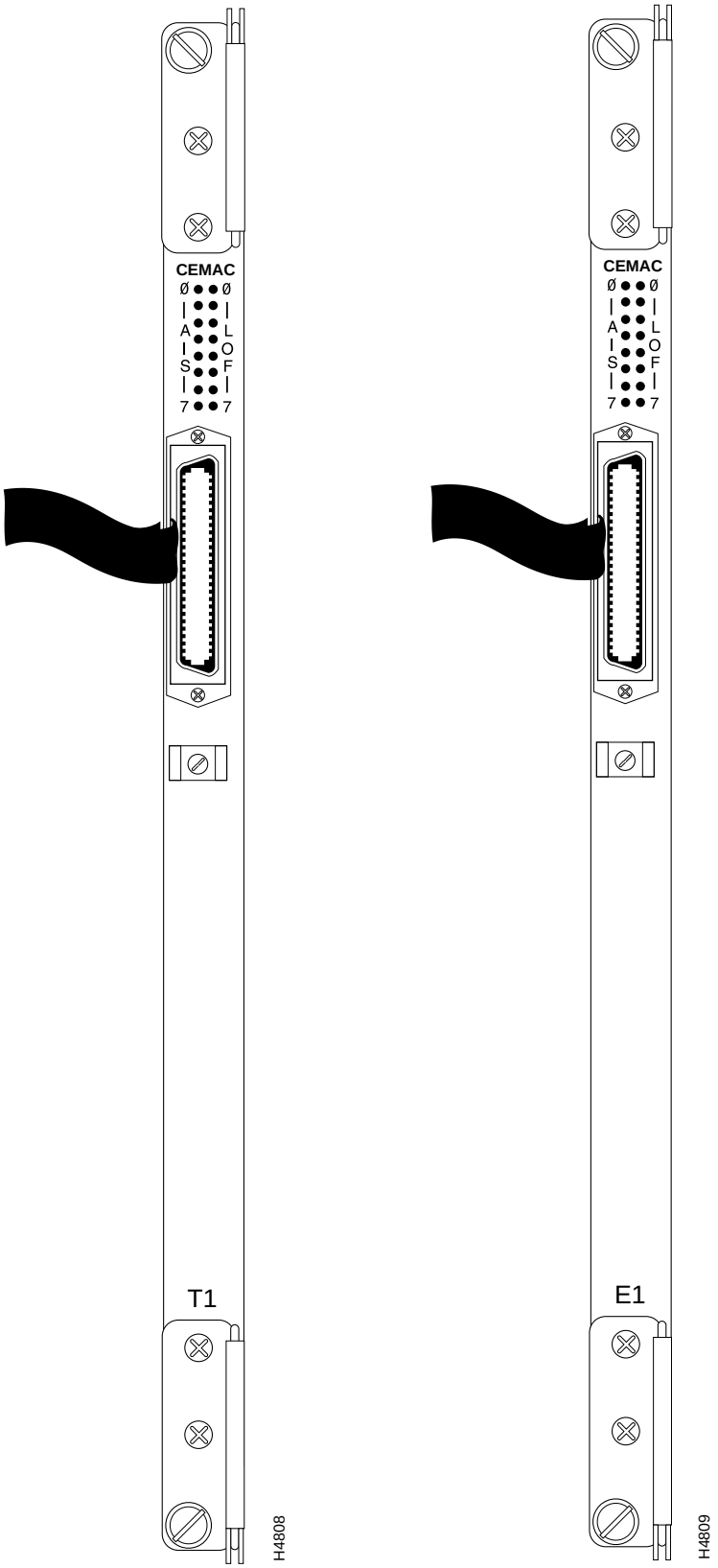


Figure 3-20 shows a component side view of the CEMAC card, together with its bulkhead connector, and an associated data cable.

To securely attach the data cable to the CEMAC card, unscrew the top mounting screw in the connector retention bracket (shown as “1” in Figure 3-20) and reposition it in the connector (as shown in “2”). Tighten down the mounting screw to attach the data cable to the bulkhead (as shown in “3”). Finally, secure the cable to the CEMAC bulkhead with the Velcro strip.

Figure 3-20 Securing Data Cable to CEMAC Bulkhead Connector

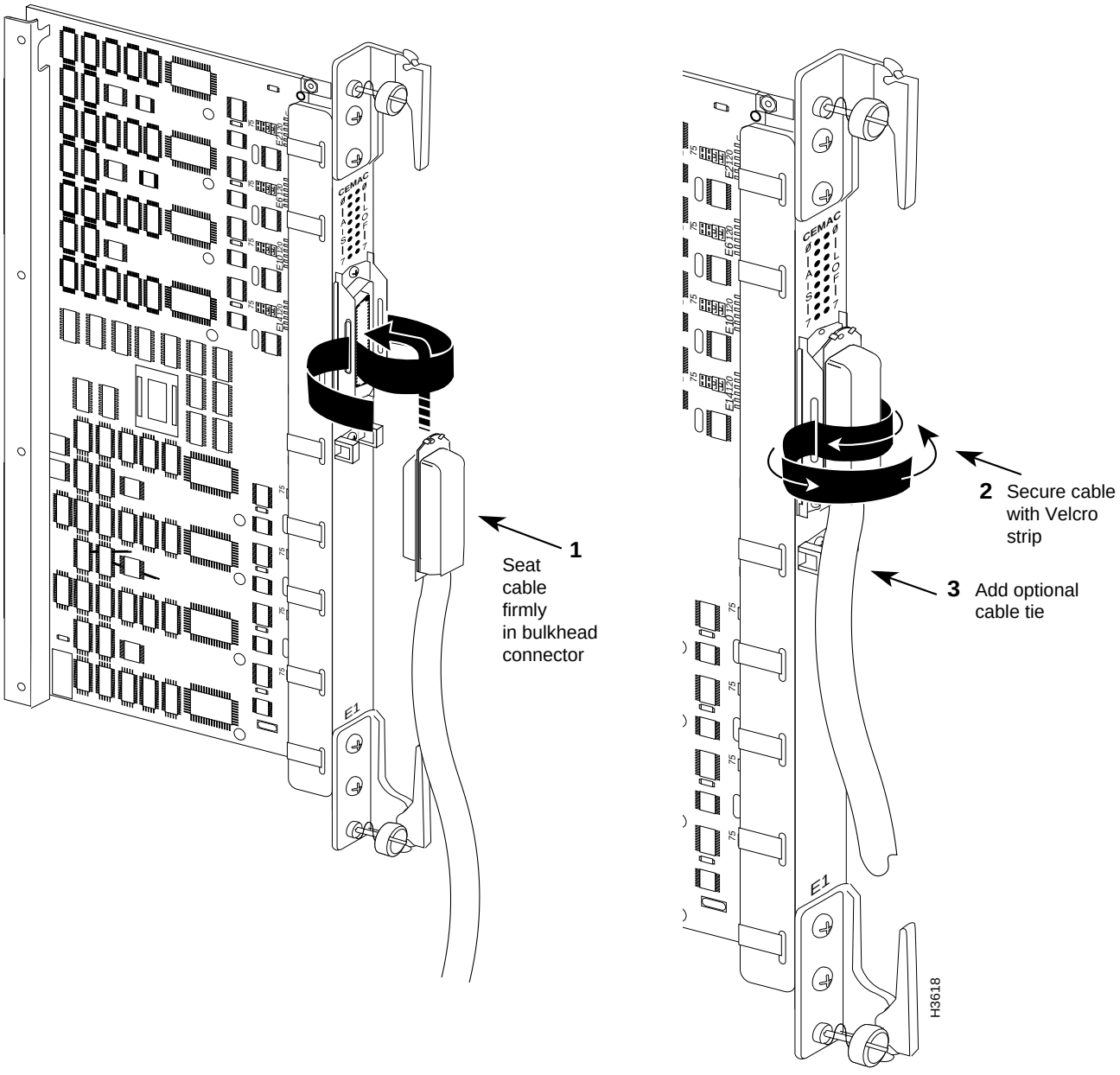


Table 3-2 shows the pin assignments common to the T1 and E1 CEMAC bulkhead connectors.

Table 3-2 T1/E1 CEMAC Bulkhead Connector Pin Assignments[1]

	Receive		Transmit	
Port	**Tip**	**Ring**	**Tip**	**Ring**
0	26	1	39	14
1	27	2	40	15
2	28	3	41	16
3	29	4	42	17
4	30	5	43	18
5	31	6	44	19
6	32	7	45	20
7	33	8	46	21
Not used	34	9	47	22
Not used	35	10	48	23
Not used	36	11	49	24
Not used	37	12	50	25

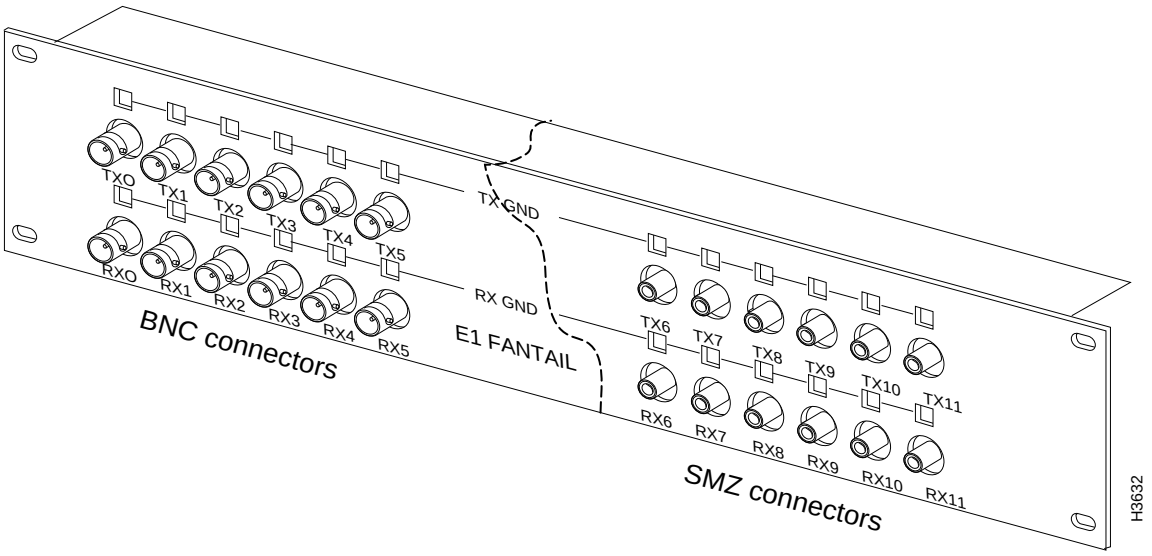
1. The information in this table is an extraction from Figure 10 of American National Standard T1.403-1989.

Note Since the T1 CEMAC card does not support a fantail, the user is responsible for obtaining a suitable cable for 120-ohm hookup to the T1 CEMAC bulkhead. Such a cable is readily available that conforms to the pin assignments outlined in Table 3-2.

E1 Fantail

Figure 3-21 shows the E1 fantail required for using the E1 CEMAC card in a 75-ohm mode of operation. Note that the E1 fantail is available in either of two versions: one equipped with BNC connectors, and one equipped with SMZ connectors. For convenience, Figure 3-21 illustrates both connector types on the fantail, although they are not intermixed in actual use.

Figure 3-21 E1 Fantail



Refer to the *LightStream 2020 Hardware Reference & Troubleshooting Guide* for information about configuring the TX GND and RX GND jumpers on the E1 fantail.

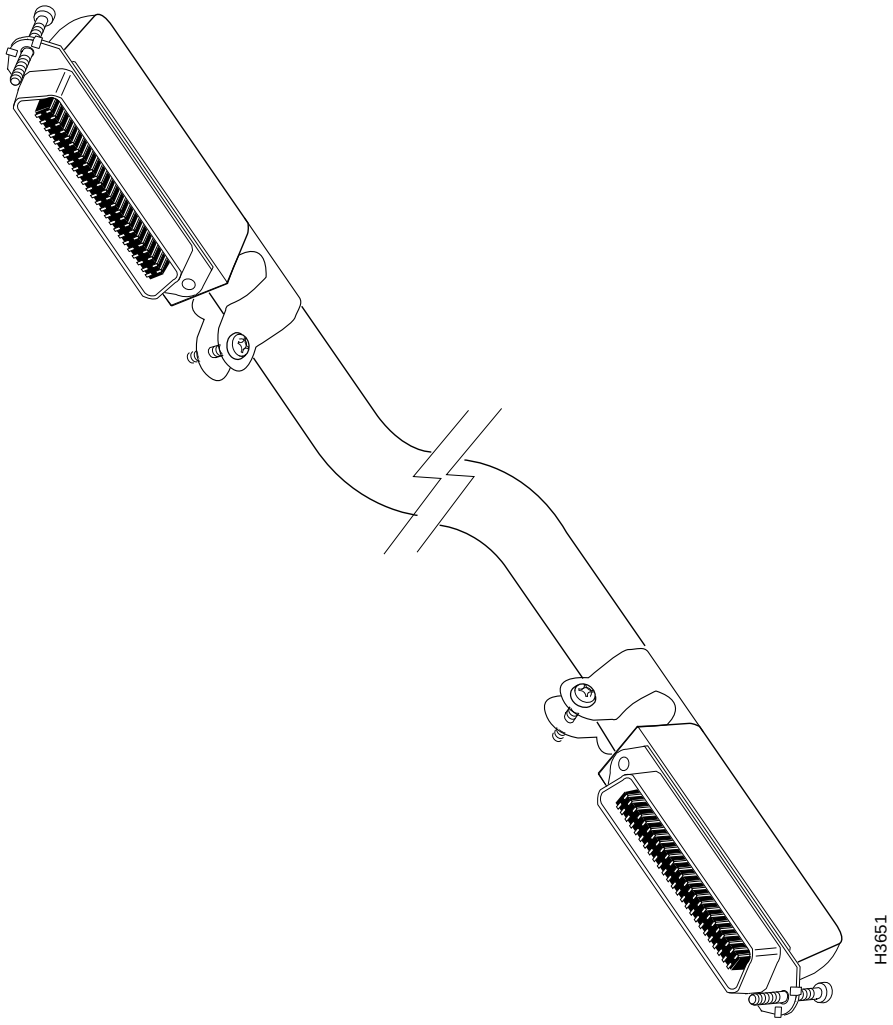
E1 Fantail Cable

A 50-pin data cable is used as the means of interconnection between the bulkhead connector on the E1 CEMAC card and the back of the E1 fantail. Figure 3-22 illustrates this cable.

The E1 fantail data cable is available from Cisco Systems in three lengths. Use the appropriate order number from the table below.

Manufacturing No.	Length	Order No.
72-1094-01	4 feet (1.2 m)	LS-CAB-8E1-4B=
72-1095-01	8 feet (2.4 m)	LS-CAB-8E1-8B=
72-1096-01	12 feet (3.6 m)	LS-CAB-8E1-12B=

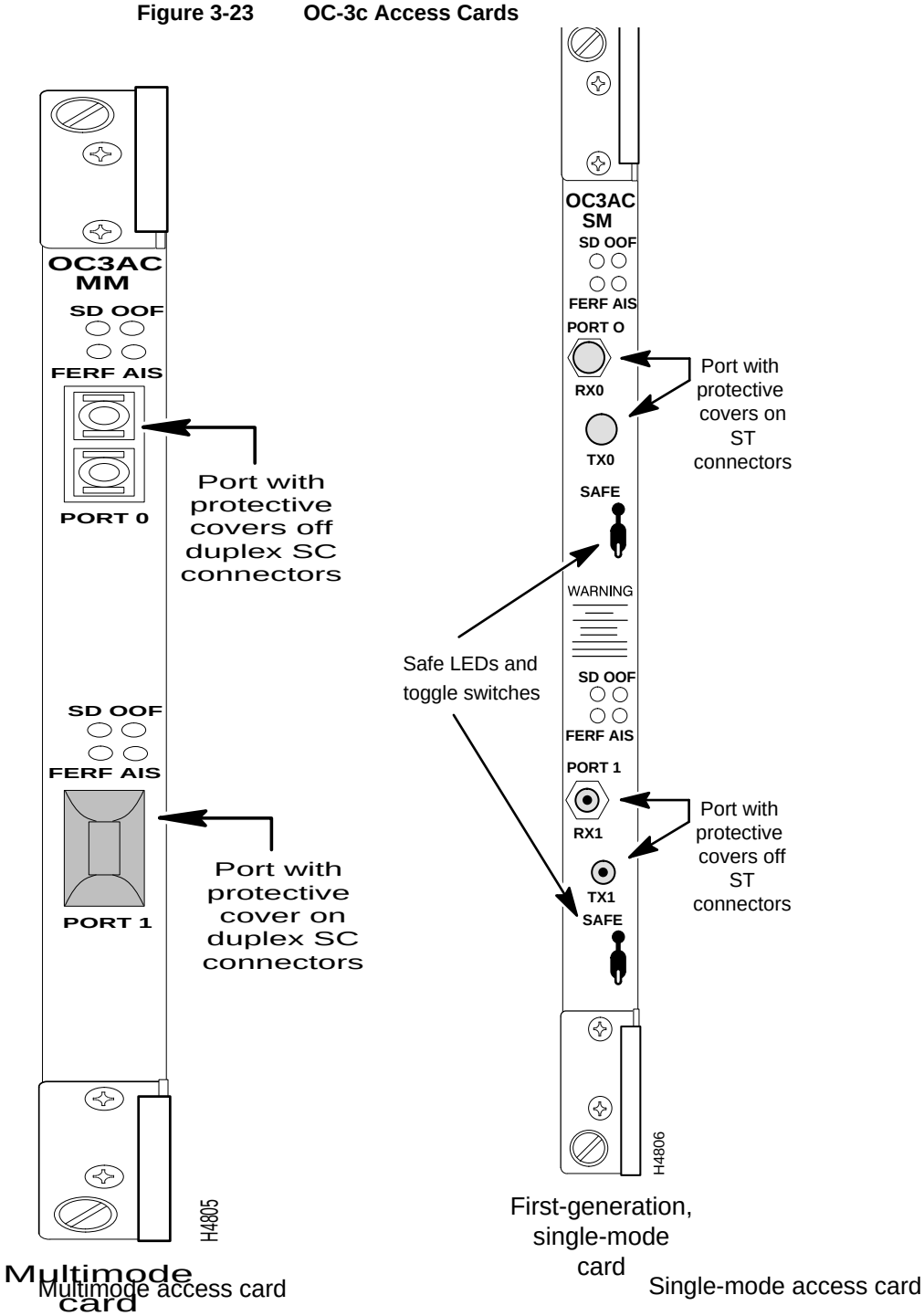
Figure 3-22 E1 Fantail Data Cable



OC-3c Access Cards, Connectors, and Cables

Figure 3-23 shows the bulkhead view of both the OC-3c multimode access card and the OC-3c single mode access card. The cables for these cards are described in separate sections below.

Figure 3-23 OC-3c Access Cards



Multimode interface connector type: Duplex SC

Connectors per multimode access card: four (two connectors per port; two ports numbered 0 – 1)

Single mode interface connector type: ST

Connectors per single mode access card: four (two connectors per port; two ports numbered 0 – 1)

Multimode OC-3c Data Cable

This cable is used to connect a multimode OC-3c access card on an LS2020 switch to another OC-3c device.

Cisco Systems does not provide this cable; it is widely available from other vendors.

The LS2020 OC-3c interfaces operate at a wavelength of 1300 nanometers. Multimode cables should conform to the following specifications:

Standard: ISO/IEC 9314-3

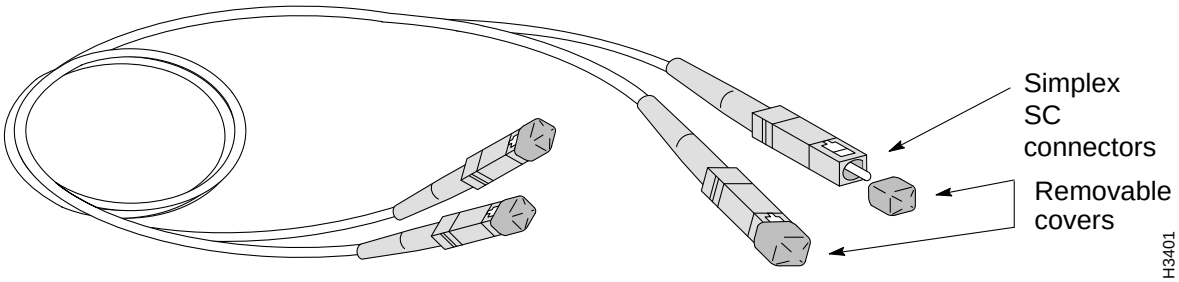
Maximum path length (all cables in a connection, end to end): 2 km

Cabling: 62.5 micron core with an optical loss of 0 – 9 dB, or 50 micron core with an optical loss of 7 dB.

Note A single fiber link should not mix 62.5 and 50 micron cable. Also, protective covers are provided for all OC-3c access cards and cable connectors. To shield connectors from dust and damage, keep covers in place on any connectors that are not being used.

Figure 3-24 shows the simplex SC connectors on the multimode OC-3c data cable for the OC3AC - MM access card.

Figure 3-24 Multimode OC-3c Cable with Simplex SC Connectors



Note Multimode OC-3c cables are available with both simplex SC connectors (shown in Figure 3-24) and duplex SC connectors; both connector types are compatible with LS2020 multimode access cards. However, the use of duplex SC connectors is preferred because they are keyed to prevent improper connections.

Single Mode OC-3c Data Cable

This cable is used to connect a single mode OC-3c access card on an LS2020 switch to another OC-3c device. Cisco Systems does not provide this cable; it is widely available from other sources.

The LS2020 OC-3c interfaces operate at a wavelength of 1300 nanometers. Single-mode cables should conform to the following specifications:

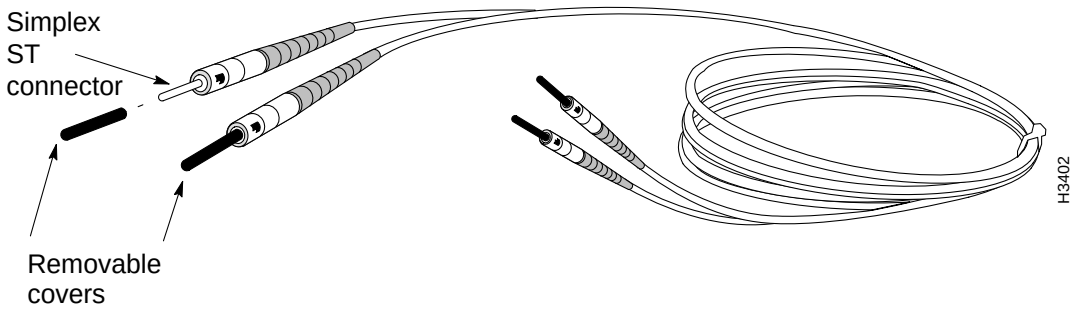
Standard: EIA class IVa

Cabling: 8.3 micron core with optical loss of 0 – 12 dB; maximum attenuation of 500 MHz/km at 1300 nanometers.

Note Protective covers are provided for all OC-3c access cards and cable connectors. To shield connectors from dust and damage, keep covers on any connectors that are not being used.

Figure 3-25 shows the ST connectors on the single mode OC-3c data cable for the OC3AC-SM access card.

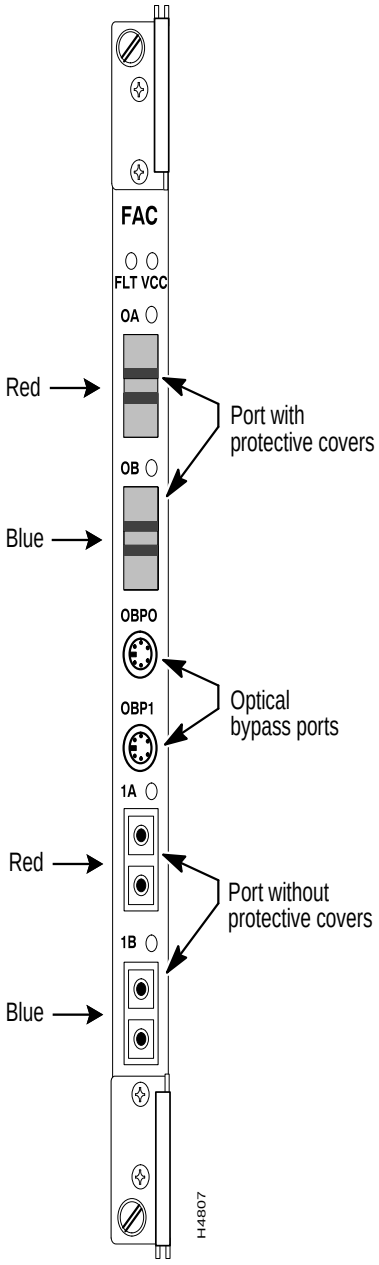
Figure 3-25 Single Mode OC-3c Data Cable with ST Connectors



FDDI Access Card, Connectors, and Cables

Figure 3-26 shows the bulkhead view of an FDDI access card (FAC).

Figure 3-26 FDDI Access Card



Each of the two FDDI ports contains two connectors, labeled A (red) and B (blue). These bulkhead connectors are keyed to ensure proper connection of the cable to the access card.

FDDI Data Cable

This cable is used to connect an LS2020 multimode FDDI access card to another FDDI device. Cisco Systems does not provide this cable; it is widely available from other vendors.

The LS2020 FDDI interface operates at a wavelength of 1300 nanometers. Cables should conform to the following specifications:

Cabling: 62.5 micron core, graded-index fiber with an optical loss of 11 dB and a maximum cable attenuation of 1.5 dB/km at 1300 nanometers.

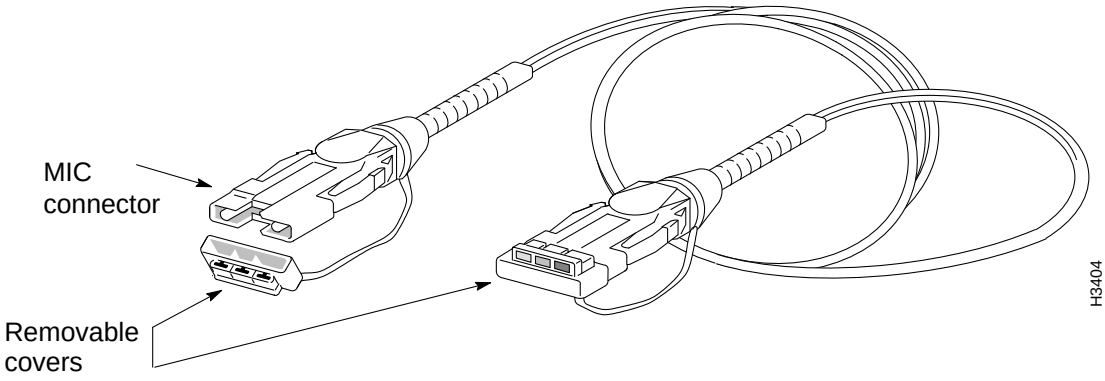
Maximum path length: (all cables in a connection, end to end): 2 km

---

Note Protective covers are provided for all FDDI access card and cable connectors. To shield connectors from dust and damage, keep covers on any connectors that are not being used.

Figure 3-27 shows a physical representation of the FDDI data cable.

Figure 3-27 FDDI Data Cable

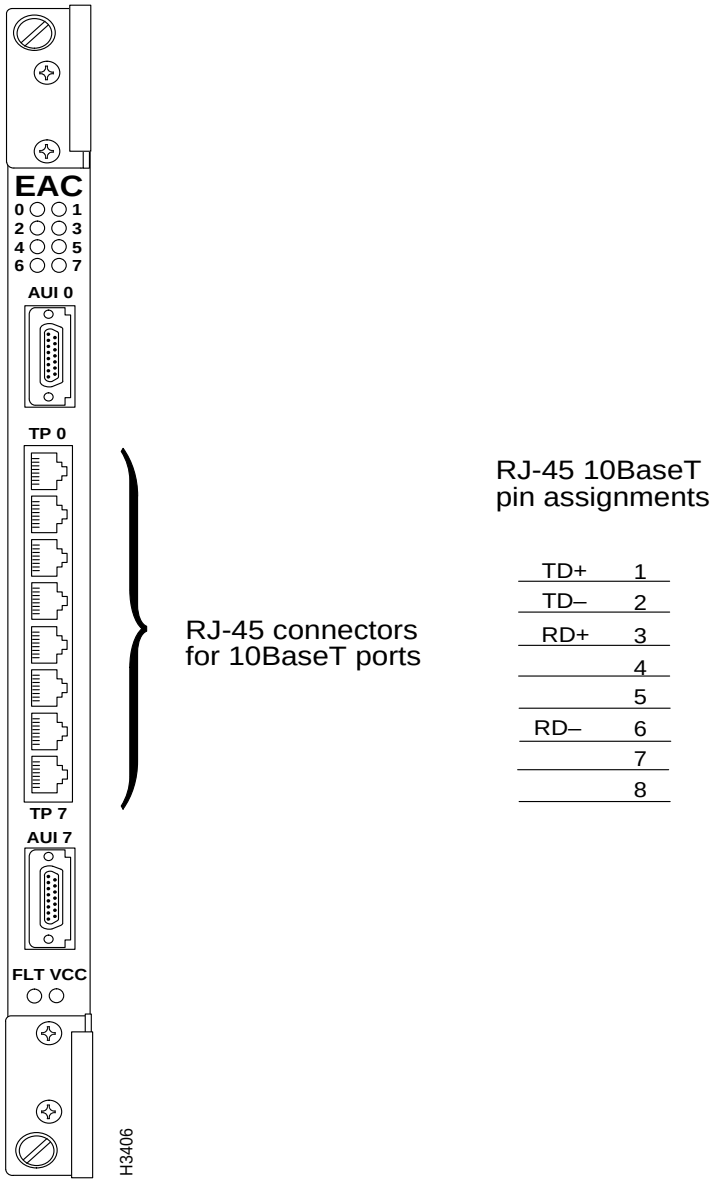


Ethernet Access Card, Connectors, and Cables

This section describes the bulkhead connectors and cables for the Ethernet access card (EAC).

Figure 3-28 shows the bulkhead view of the Ethernet access card, which includes eight RJ-45 connectors and two AUI connectors. The RJ-45 connectors are used for the twisted pair (10BaseT) ports.

Figure 3-28 Ethernet Access Card



Ethernet Access Card 10BaseT (RJ-45) Connectors

Figure 3-28 shows the RJ-45 connectors and pin assignments on the Ethernet access card. These connectors are used by twisted pair (10BaseT) ports.

Data Cables for Ethernet Access Card RJ-45 Connectors

The cables used with the RJ-45 ports on the Ethernet access cards are described in the following sections.

Ethernet 10BaseT Straight-Through Cable

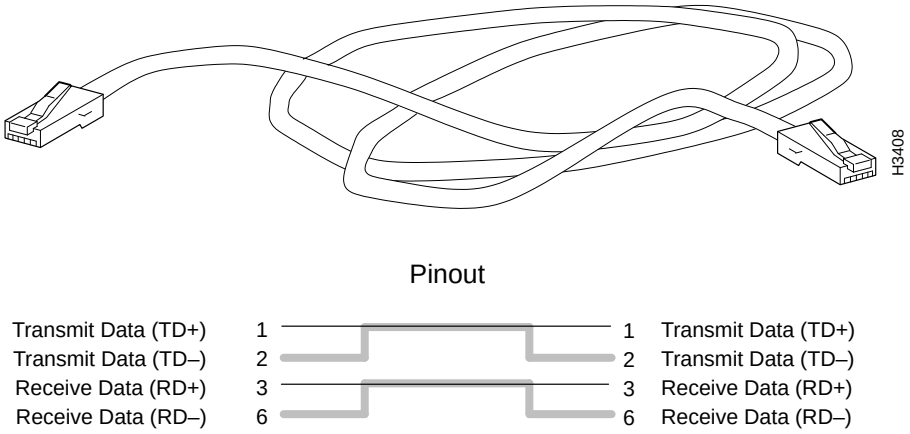
This cable is used to connect the following:

- An Ethernet access card on an LS2020 switch to an Ethernet hub.
- An Ethernet access card on an LS2020 switch directly to another device on the Ethernet, such as a workstation, when the workstation port has a built-in crossover function. (See the note under the Ethernet 10BaseT Crossover Cable section later in this chapter.)

Cisco Systems does not provide this cable; it is widely available from other vendors.

Figure 3-29 shows a physical representation of the Ethernet 10BaseT (twisted pair) straight-through cable and provides a schematic diagram of its pinout assignments.

Figure 3-29 Ethernet 10BaseT Straight-through Cable and Pin Assignments



Ethernet 10BaseT Crossover Cable

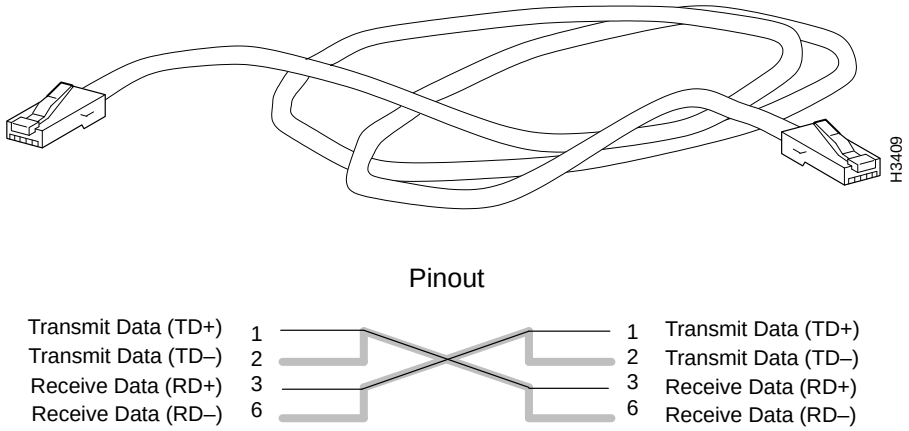
This cable is used to directly connect an Ethernet access card on an LS2020 switch to another device on the Ethernet, such as a workstation.

Note Some MAUs (medium access units) have a built-in crossover function and use straight-through cables, instead of crossover cables. The ports on such MAUs are marked with the letter X.

Cisco Systems does not provide this cable; it is widely available from other sources.

Figure 3-30 shows a physical representation of the Ethernet 10BaseT (twisted pair) crossover cable and provides a schematic diagram of its pinout assignments.

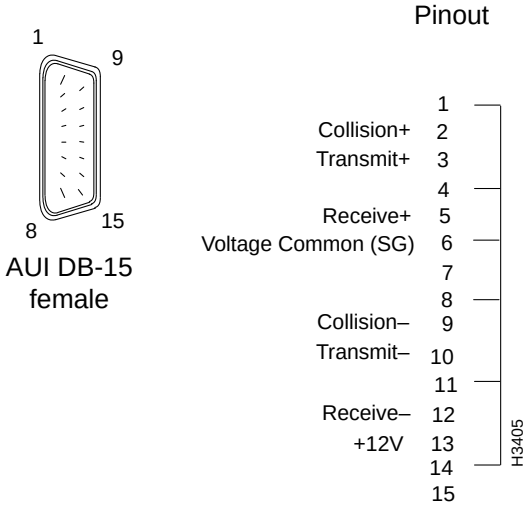
Figure 3-30 Ethernet 10BaseT Crossover Cable and Pin Assignments



Ethernet Access Card AUI Connectors

Figure 3-31 shows the pin assignments for the two 15-pin Ethernet AUI connectors on the Ethernet access card. The top AUI connector is for ports 0 – 3, and the bottom connector is for ports 4 – 7.

Figure 3-31 Ethernet Access Card AUI Connector Pin Assignments

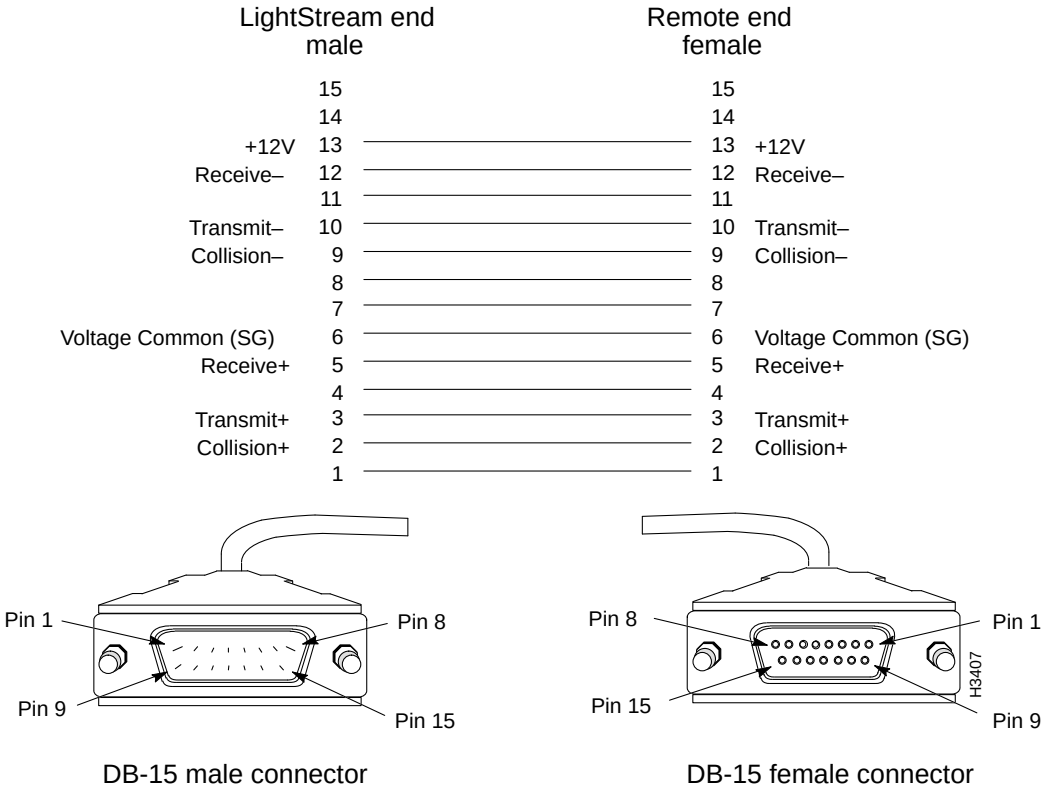


Ethernet Access Card AUI Data Cable

This cable connects an AUI port on the Ethernet access card of an LS2020 switch to an Ethernet 10Base2 or 10Base5 transceiver. Cisco Systems does not provide this cable; it is widely available from other vendors.

Figure 3-32 shows a schematic diagram of the Ethernet access card AUI data cable.

Figure 3-32 Ethernet AUI Data Cable Pin Assignments



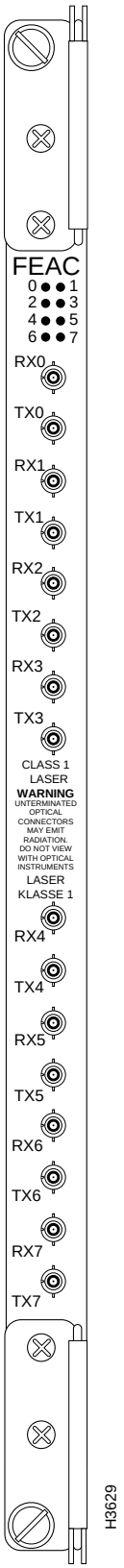
Fiber Ethernet Access Card, Connectors, and Cable

This section describes the fiber Ethernet access card connectors and data cable.

Fiber Ethernet Access Card Connectors

Figure 3-33 shows the bulkhead view of the fiber Ethernet access card (FEAC).

Figure 3-33 Fiber Ethernet Access Card



Fiber Ethernet Access Card Data Cable

This cable is used to connect a multimode fiber (10Base-FL) Ethernet access card in an LS2020 chassis to another fiber Ethernet device.

Cisco Systems does not provide this cable; it is widely available from other vendors.

The LS2020 fiber Ethernet interfaces operate at a wavelength of 850 nanometers. Multimode cables should conform to the following specifications:

Standard: ISO/IEC 9314-3

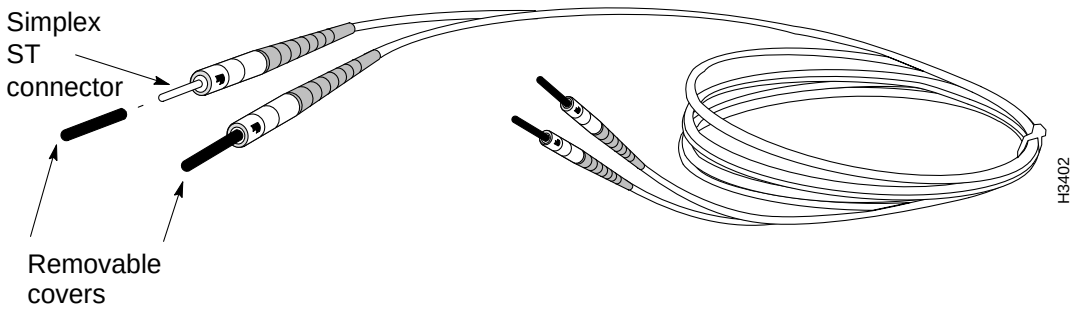
Maximum path length (all cables in a connection, end to end): 2 km

Cabling: 62.5 micron core with an optical loss of 0 – 9 dB, or 50 micron core with an optical loss of 7 dB.

Note A single fiber link should not mix 62.5 and 50 micron cable. Also, protective covers are provided for all fiber Ethernet access card connectors and data cables. To shield connectors and cables from dust and damage (thereby minimizing the potential for signal attenuation and data loss), keep these covers in place on any FEAC ports or cables that are not in use.

Figure 3-34 illustrates the multimode fiber Ethernet access card data cable.

Figure 3-34 Multimode FEAC Data Cable with ST Connectors



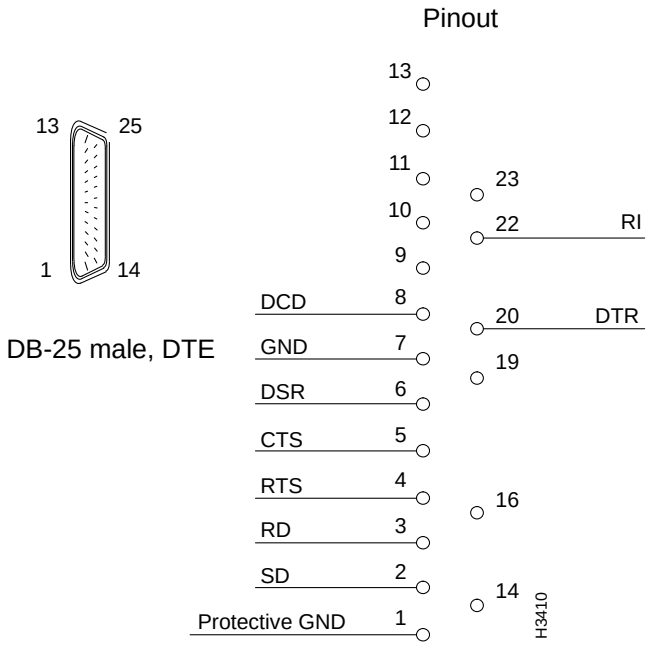
Modem/Console Assembly Connectors and Cable

Figure 3-35 and Figure 3-36 illustrate the modem and the console connectors, respectively, on the bulkhead of the LS2020 switch card console/modem assembly.

RS-232 Modem Connector

Figure 3-35 shows a schematic diagram of the RS-232 modem port (DB25) connector. This port is labeled MODEM on the bulkhead of the switch card console/modem assembly.

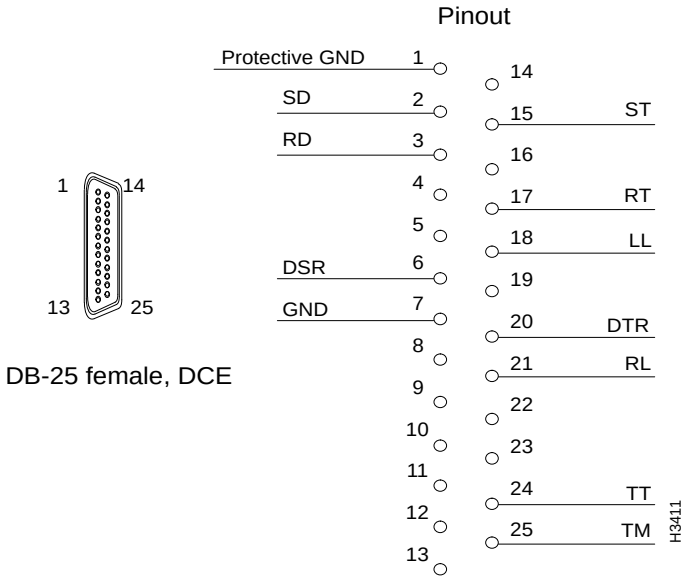
Figure 3-35 RS-232 Modem Port Pin Assignments



RS-232 Console Connector

Figure 3-36 shows a schematic diagram of the RS-232 console port (DB25) connector. This port is labelled CNSL on the bulkhead of the switch card console/modem assembly.

Figure 3-36 RS-232 Console Port Pin Assignments



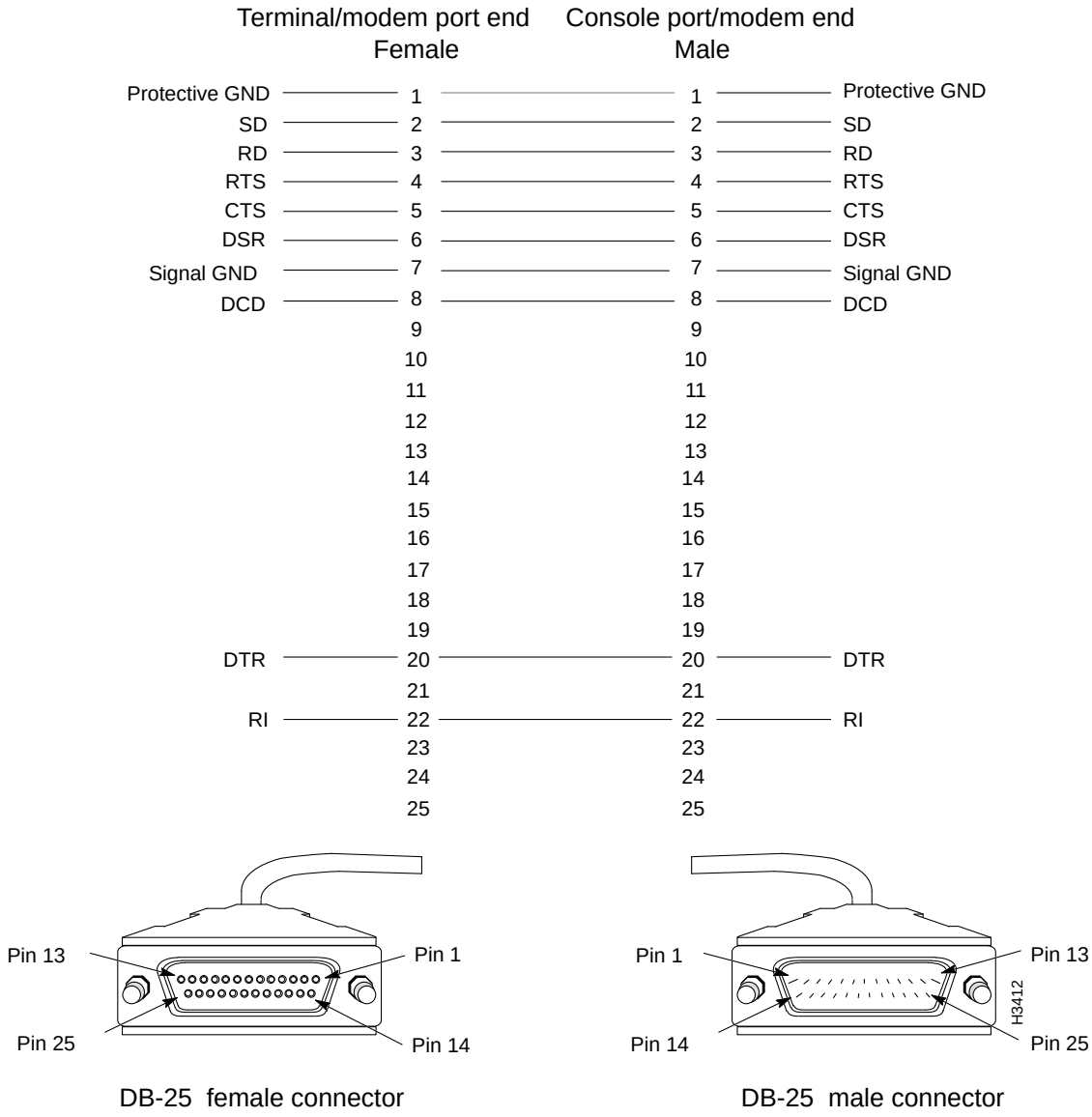
RS-232 Straight-Through Data Cable

This cable is used to connect the LS2020 console port or modem port to an external console or modem.

Cisco Systems does not provide this cable; it is widely available from other vendors.

Figure 3-37 shows a schematic diagram of the RS-232 straight-through data cable.

Figure 3-37 RS-232 Straight-through Data Cable and Pin Assignments



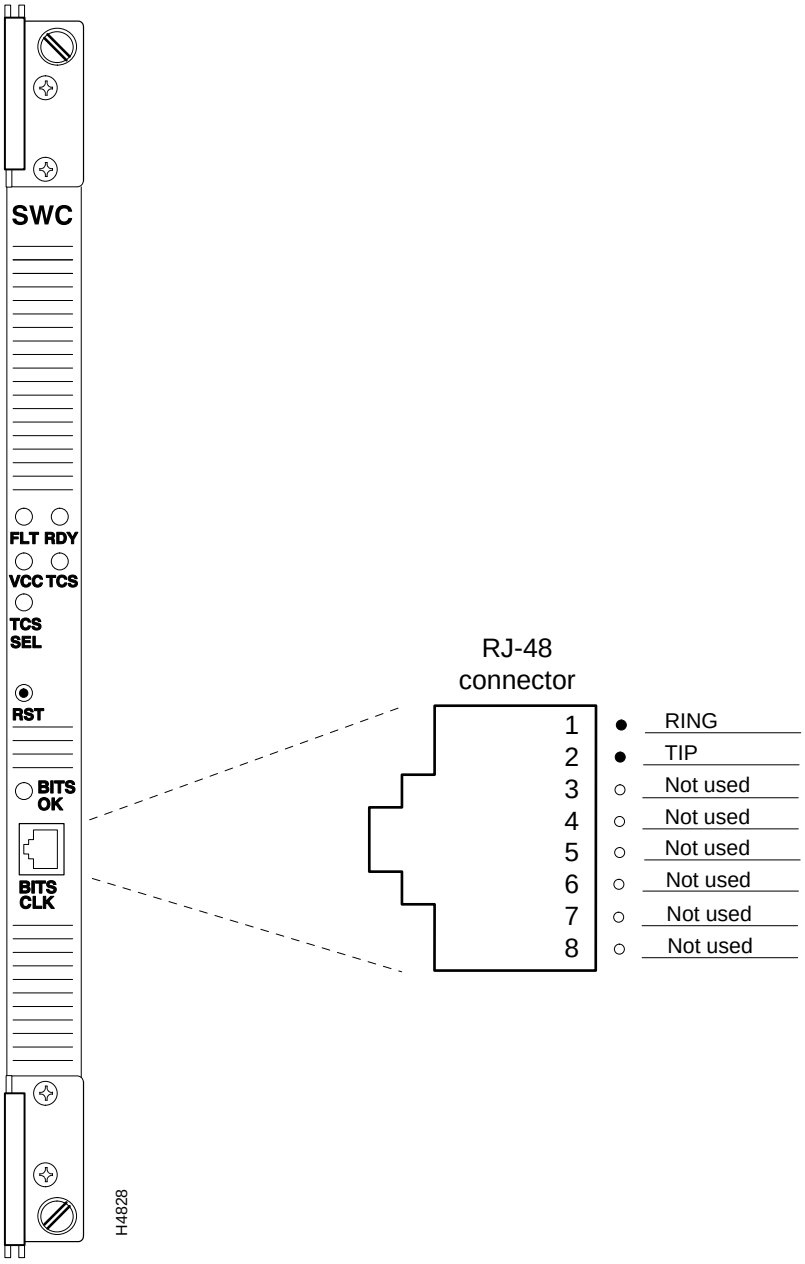
DB-25 female connector

DB-25 male connector

BITS Interface (Release 2 Switch Card)

The Release 2 switch card incorporates a building-integrated timing source (BITS) interface for constant bit rate (CBR) applications. The BITS interface is a receive-only T1 line that extracts only the clock signal from a T1 line (the data is discarded). The clock signals provide a highly stable time reference for use in an LS2020 chassis or network. Figure 3-38 shows the bulkhead view of the Release 2 switch card and defines the pinout assignments of the BITS CLK port.

Figure 3-38 Pinout Assignments of BITS Interface



Country Kits and Power Cordsets

AC-Powered LightStream 2020 Systems

A variety of power cordsets is available for AC-powered LS2020 switches. These cordsets are available either with systems or as spare parts. This section enables you to choose the proper cordset for your LS2020 site.

If you are specifying a cordset as part of a new system order, refer to the LS2020 Price List or the *Products Catalogue* and order the appropriate Country Power Kit. Doing so ensures that you will also receive the appropriate labels and instructions for the country of destination.

If you want to check the cordset included in a specific Country Power Kit, refer to Table 3-3, which cross-references cordset product numbers and Country Power Kit models.

If you need to order a replacement cordset that is not part of a Country Power Kit, you must reference the cordset's part number. This part number (P/N) appears above each cordset illustrated in the following section entitled "LightStream 2020 AC Power Cordsets."

DC-powered LightStream 2020 Systems

A DC-powered system does not use a detachable power cord. The DC power cord must be permanently wired to a DC power source. Therefore, in place of a Country Power Kit, each DC-powered system is shipped with a DC Mounting Kit, Order Number L2020-PWR-DC=.

LightStream 2020 AC Power Cordsets

Each LS2020 AC power tray is equipped with one recessed male power inlet. The power connectors follow IEC Standard 320 C20 and require cordsets with an IEC 320 C19 female connector. (All cordsets offered by Cisco Systems for the LS2020 switch have IEC 320 C19 female connectors.)

Table 3-3 summarizes the specifications of AC power cordsets. The table lists the country of use, cordset rating, plug type, part number, and Country Power Kit for each cordset.

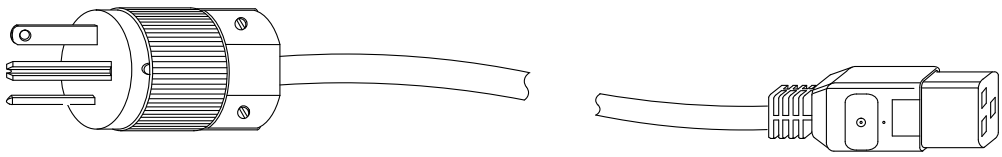
Table 3-3 Specifications for LightStream 2020 AC Power Cordsets

Country of Use	Cordset Rating	Plug Type	Mfg. Part Number	Country Power Kit Order Number
Canada, Mexico, Japan, and USA	125V @ 20A	NEMA 5-20P	37-0037-01	L2020-PWR-NA=
Canada, Mexico, Japan, and USA	125V @ 20A	NEMA L5-20P	37-0038-01	L2020-PWR-NA125=
Canada, Mexico, Japan, and USA	250V @ 20A	NEMA L6-20P	37-0039-01	L2020-PWR-NA250=
Continental Europe, including Austria, Belgium, Finland, France, Germany, Holland, Norway, Portugal, Spain, and Sweden	250V @ 16A	CEE 7/7	37-0040-01	L2020-PWR-E=
Argentina, Australia, New Zealand, and Papua New Guinea	250V @ 15A	AS3112-1981	37-0041-01	L2020-PWR-A=
Denmark	250V @ 10A	107-2-DI	37-0042-01	L2020-PWR-D=
England, Hong Kong, Ireland, Malaysia, Scotland, Singapore, and Wales	250V @ 13A	BS 1363	37-0043-01	L2020-PWR-U=
India and South Africa	250V @ 15A	BS 546	37-0044-01	L2020-PWR-IN=
Israel	250V @ 16A	SI 32	37-0045-01	L2020-PWR-IS=
Italy	250V @ 16A	CEI 23-16	37-0046-01	L2020-PWR-I=
Switzerland	250V @ 10A	SEV 1011	37-0047-01	L2020-PWR-CH=

A physical representation of each power cordset available for use with the LS2020 switch is provided below, together with its specifications. For ease of reference, each diagram contains the part number (P/N) of the cordset in numerical order in the upper-left corner.

P/N 37-0037-01
Cordset Rating: 20A, 125V

Used in Country Kit L2020-PWR-NA=
For Canada, Japan, Mexico, and USA



Plug: NEMA 5-20P

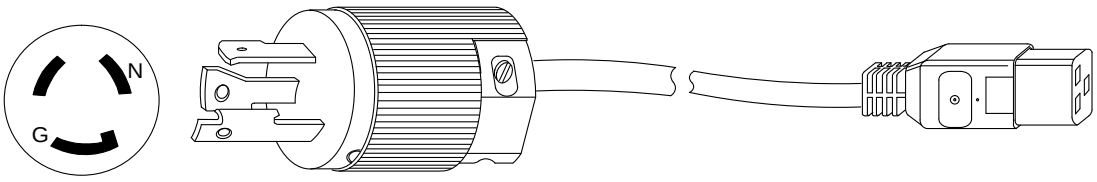
Cordage: 12/3 SJT
Length: 2.5 m (8 feet 2 inches)

Connector: IEC 320 C19

H3413

P/N 37-0038-01
Cordset Rating: 20A, 125V

Used in Country Kit L2020-PWR-NA125=
For Canada, Japan, Mexico, and USA



Plug: NEMA L5-20P
Locking Plug

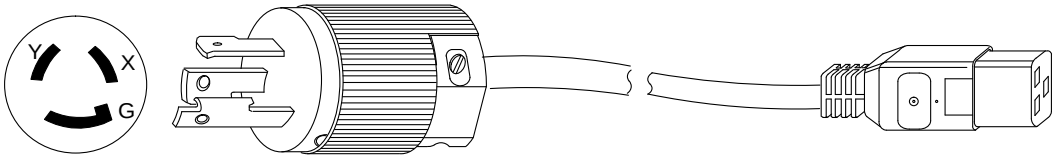
Cordage: 12/3 SJT
Length: 2.5 m (8 feet 2 inches)

Connector: IEC 320 C19

H3414

P/N 37-0039-01
Cordset Rating: 20A, 250V

Used in Country Kit L2020-PWR-NA250=
For Canada, Japan, Mexico, and USA



Plug: NEMA L6-20P
Locking Plug

Cordage: 12/3 SJT
Length: 2.5 m (8 feet 2 inches)

Connector: IEC 320 C19

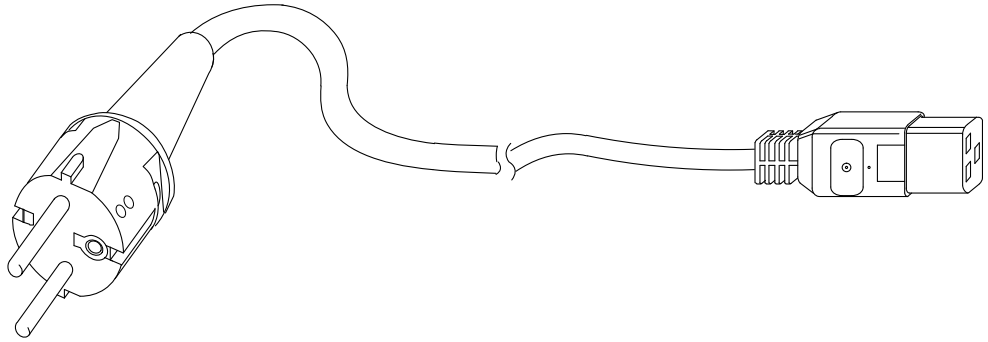
H3415

P/N 37-0040-01

Cordset Rating: 16A, 250V

Used in Country Kit L2020-PWR-E=

For Continental Europe: including Austria, Belgium, Finland, France, Germany, Holland, Norway, Portugal, Spain, and Sweden



Plug: CEE 7/7

Cordage: 3 x 1.5 mm^2

Connector: IEC 320 C19

Length: 2.5 m (8 feet 2 inches)

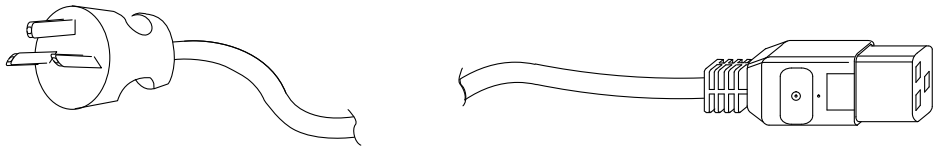
H3416

P/N 37-0041-01

Cordset Rating: 15A, 250V

Used in Country Kit L2020-PWR-A=

For Argentina, Australia, New Zealand, and Papua New Guinea



Plug: AS3112-1981

Cordage: 3 x 1.5 mm^2

Connector: IEC 320 C19

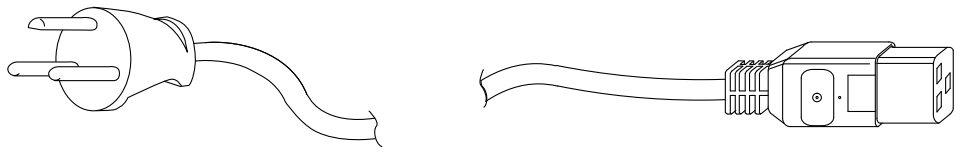
Length: 2.5 m (8 feet 2 inches)

H3656

P/N 37-0042-01

Cordset Rating: 10A, 250V

Used in Country Kit L2020-PWR-D=
For Denmark



Plug: 107-2-DI

Cordage: 3 x 1.5 mm^2

Connector: IEC 320 C19

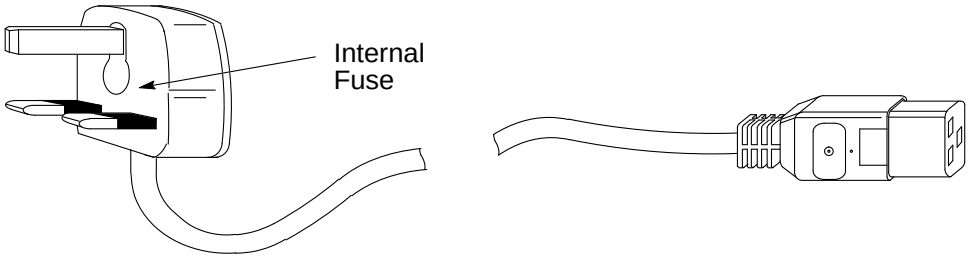
Length: 2.5 m (8 feet 2 inches)

H3655

P/N 37-0043-01

Cordset Rating: 13A, 250V

Used in Country Kit L2020-PWR-U=
For England, Hong Kong, Ireland, Malaysia, Scotland, Singapore, and Wales



Plug: BS 1363

Cordage: 3 x 1.5 mm^2

Connector: IEC 320 C19

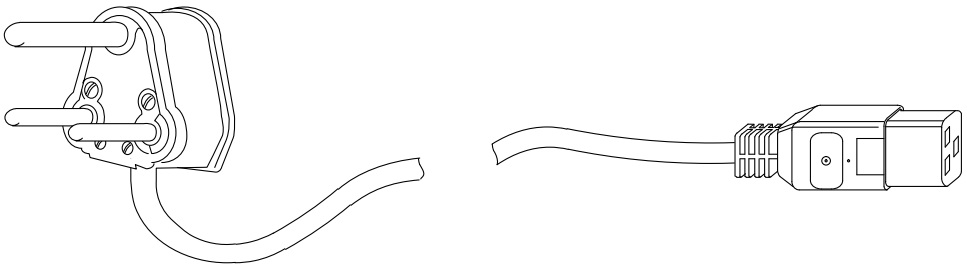
Length: 2.5 m (8 feet 2 inches)

H3417

P/N 37-0044-01

Cordset Rating: 15A, 250V

Used in Country Kit L2020-PWR-IN=
For India, South Africa



Plug: BS 546

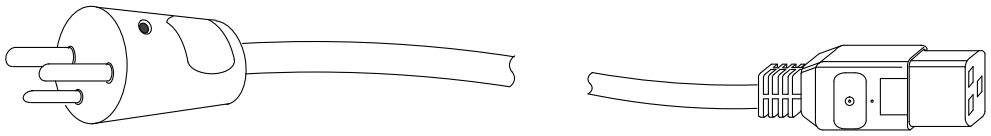
Cordage: 3 x 1.5 mm^2

Connector: IEC 320 C19

Length: 2.5 m (8 feet 2 inches)

H3420

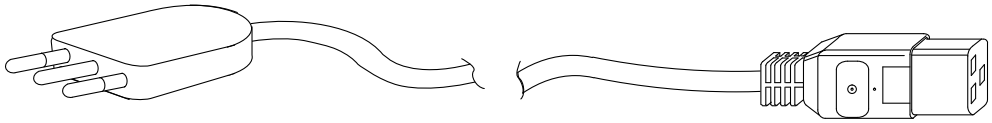
P/N 37-0045-01 Used in Country Kit L2020-PWR-IS=
Cordset Rating: 16A, 250V *For Israel*



Plug: SI 32 Cordage: 3 x 1.5 mm^2 Connector: IEC 320 C19
Length: 2.5 m (8 feet 2 inches)

H3418

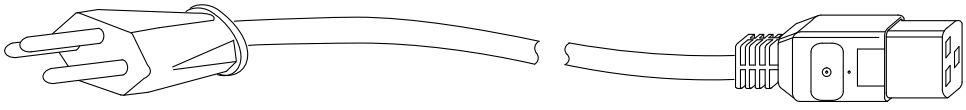
P/N 37-0046-01 Used in Country Kit L2020-PWR-I=
For Italy
Cordset Rating: 16A, 250V



Plug: CEI 23-16 Cordage: 3 x 1.5 mm^2 Connector: IEC 320 C19
Length: 2.5 m (8 feet 2 inches)

H3657

P/N 37-0047-01 Used in Country Kit L2020-PWR-CH=
Cordset Rating: 10A, 250V *For Switzerland*



Plug: SEV 1011 Cordage: 3 x 1.5 mm^2 Connector: IEC 320 C19
Length: 2.5 m (8 feet 2 inches)

H3419