Cables and Connectors

This chapter describes the I/O interfaces, the data cables, and power cordsets required in using the LS2020 enterprise ATM switch. These facilities are described in the following order:

- Low-speed connectors and data cables for X.21, RS-449, and V.35 serial interfaces.

- Circuit emulation access card (CEMAC) connectors and data cables for 75-ohm and 120-ohm interfaces.

- Medium-speed connectors and data cables for the 2-port access card, the 4-port T3/E3 access card, and the 8-port T3/E3 access card.

- OC-3c connectors and data cables

- FDDI connectors and data cables

- Ethernet connectors and data cables

- Fiber Ethernet access card (FEAC) connectors and data cables

- Console and modem connectors and data cables
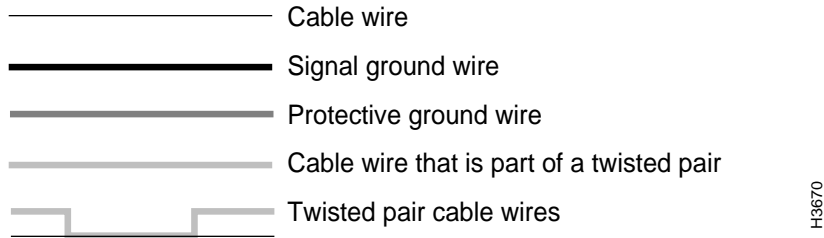
- Country kits and power cordsets

Signal diagrams are provided for each I/O connector and data cable.

For most cables, two part numbers are provided in an associated table in the body of the chapter: the manufacturing number (which appears on the cable itself); and the order number (which is used in ordering the cable from Cisco Systems). Cables without associated order numbers are not available from Cisco Systems; such cables are widely available from other vendors as standard items.

Cable Drawing Conventions

Figure 3-1 shows the conventions used in representing the signal paths in the LS2020 I/O interface connectors and data cables illustrated in this chapter.

Figure 3-1   LS2020 Cable Signal Diagram Conventions

————————	Cable wire
▬▬▬▬▬▬▬▬	Signal ground wire
━━━━━━━━	Protective ground wire
————————	Cable wire that is part of a twisted pair
⌐_⌐_	Twisted pair cable wires

H3670

Low-Speed Connectors and Data Cables

This section presents the specifications for the connectors and data cables for the low-speed X.21, RS-449, and V.35 serial I/O interfaces of the LS2020 switch. This information is presented as follows:

- X.21 fantail connector - see the section "X.21 Fantail Connector."

- RS-449 fantail connector - see the section "RS-449 Fantail Connector."

- V.35 fantail connector - see the section "V.35 Fantail Connector."

- DSU/CSU control ports on V.35 and RS-449 fantails - see the section "DSU/CSU Control Port Connector."

- Internal data cable for connecting a low-speed access card to a fantail - see the section "Low-Speed Access Card Fantail Cable."

- Data cable for connecting an X.21 fantail to an external X.21 device - see the section "X.21 Interface Cable."

- Data cable for connecting an RS-449 fantail to an external RS-449 DCE device - see the section "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 "RS-449 Interface Crossover Cable."

- Data cable for connecting a V.35 fantail to an external V.35 DCE device - see the section "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 "V.35 Interface Crossover Cable."
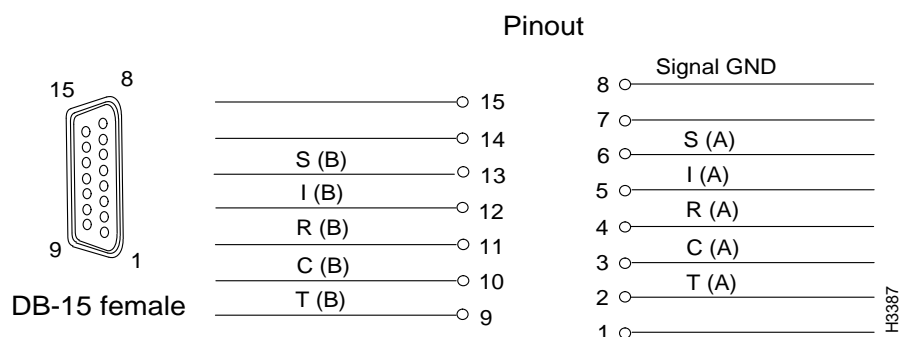
X.21 Fantail Connector

Figure 3-2 shows the pin assignments of the X.21 fantail connector.

Interface connector type: DB15 female

Connectors per fantail: 8 (numbered 0 - 7)

Figure 3-2   X.21 Connector Pin Assignments
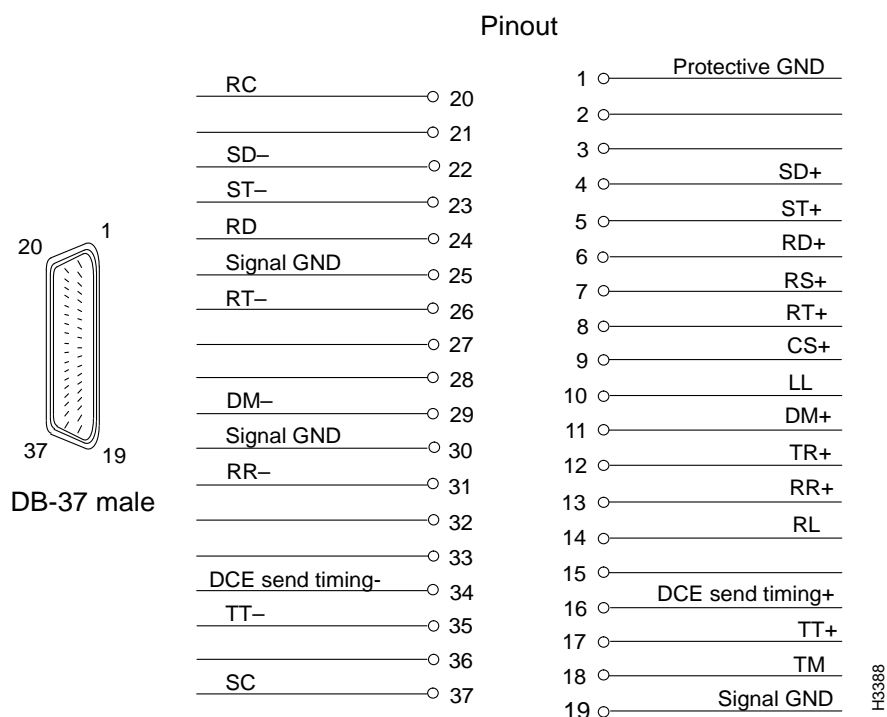
Pinout

DB-15 female

RS-449 Fantail Connector

Figure 3-3 shows the pin assignments of the RS-449 fantail connector.

Interface connector type: DB37 male

Connectors per fantail: 4 (numbered 0 - 3)

Figure 3-3   RS-449 Connector Pin Assignments
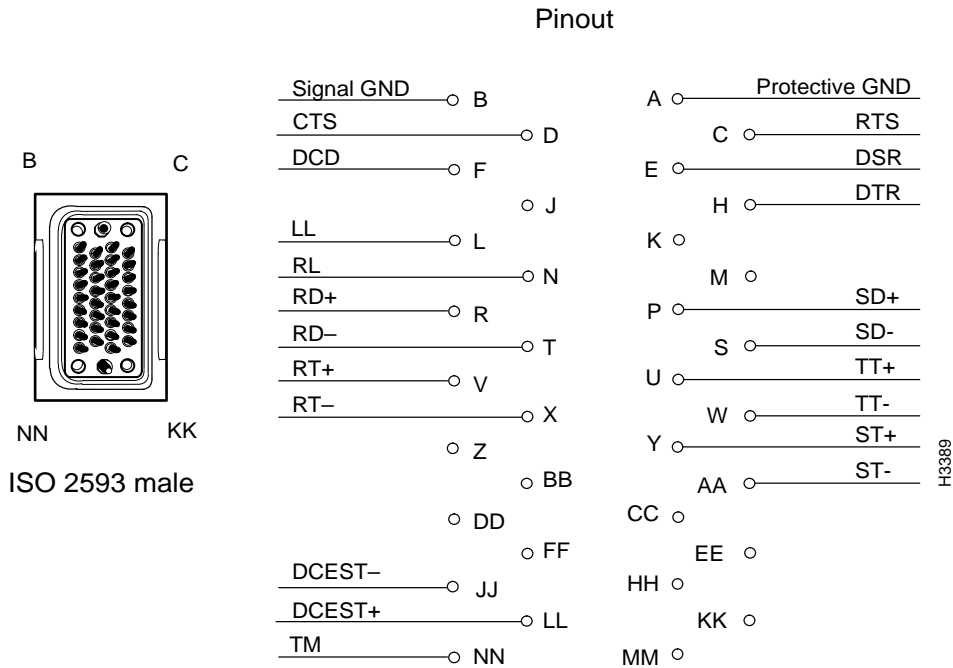
Pinout

DB-37 male

V.35 Fantail Connector

Figure 3-4 shows the pin assignments of the V.35 fantail connector.

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

Connectors per fantail: 4 (numbered 0 - 3)

Figure 3-4   V.35 Connector Pin Assignments

Pinout

Signal GND — B	A — Protective GND
CTS — D	C — RTS
DCD — F	E — DSR
J	H — DTR
LL — L	K
RL — N	M
RD+ — R	P — SD+
RD– — T	S — SD-
RT+ — V	U — TT+
RT– — X	W — TT-
Z	Y — ST+
BB	AA — ST-
DD	CC
FF	EE
DCEST– — JJ	HH
DCEST+ — LL	KK
TM — NN	MM

B   C

NN   KK

ISO 2593 male

H3389

DSU/CSU Control Port Connector

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

Interface connector type: DB9 male

Connectors per fantail: 4 (numbered 0 - 3)

Figure 3-5 shows the pin assignments of the RS-232 DSU/CSU control port connector.

Figure 3-5   RS-232 DSU/CSU Control Port Pin Assignments

Pinout

6 1	1
	2 — RD
	3 — TD
9 5	4
DB-9 male	5 — Signal GND

6
7
8
9

H3390
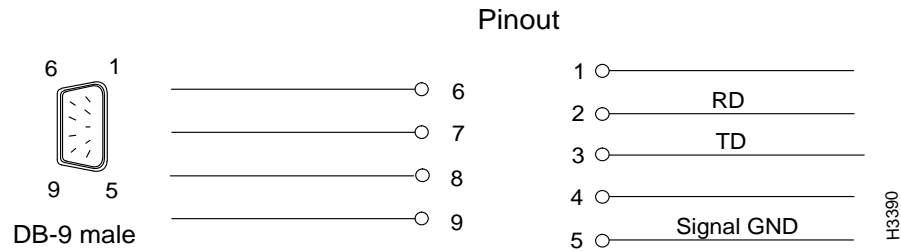
Low-Speed Access Card Fantail Cable

This 100-pin data cable is used as the means of interconnection between the bulkhead connector of a low-speed X.21, RS-449, or V.35 access card and the back of the fantail.

The cable is available from Cisco Systems in three lengths. For ordering purposes, use the appropriate order number from the table below.

Manufacturing No.	Length	Order No.
72-1117-01	4 feet	L2020-CAB-F4=
72-1118-01	8 feet	L2020-CAB-F8=
72-1119-01	12 feet	L2020-CAB-F12=

Note that two such data cables are required to connect one X.21 fantail to a low-speed access card, while one only such cable is required to connect each V.35 or RS-449 fantail to a low-speed access card.

X.21 Interface Cable

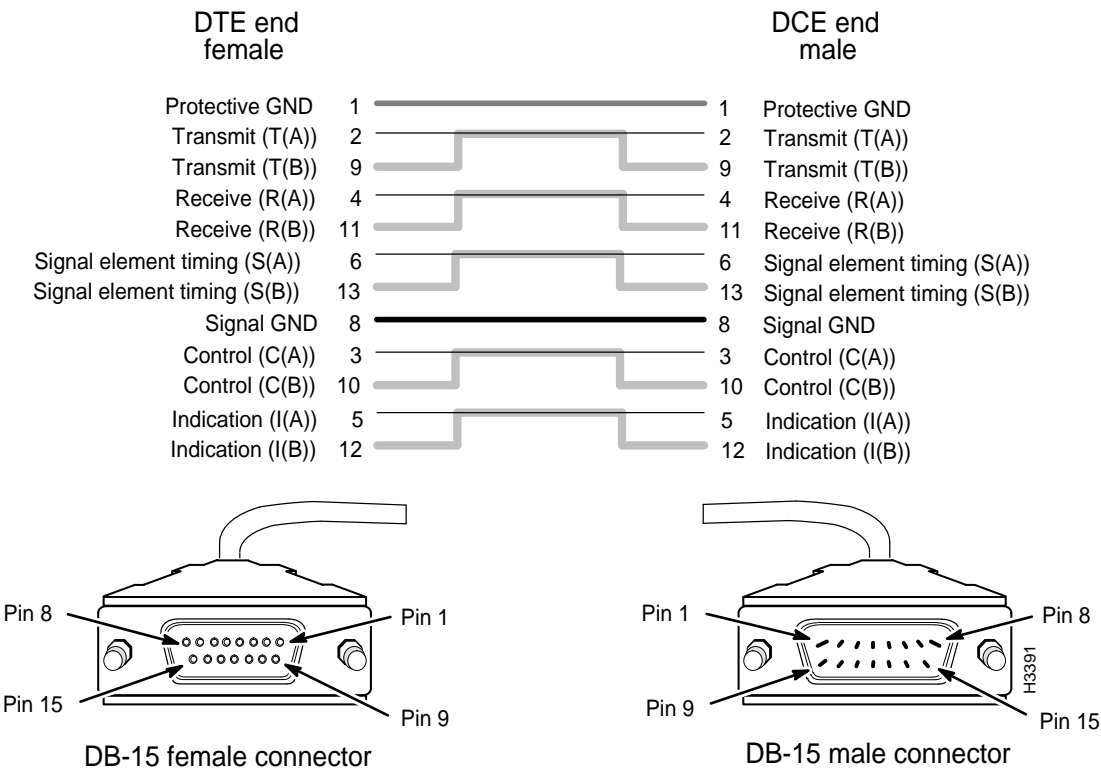This cable is used to connect the X.21 fantail connector to an external X.21 device.

The cable is available from Cisco Systems in three lengths. For ordering purposes, use the appropriate order number from the table below.

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

Manufacturing No.	Length	Order No.
72-0991-01	30 feet	LS-CAB-X21-TC30=
72-0992-01	50 feet	LS-CAB-X21-TC50=
72-0993-01	100 feet	LS-CAB-X21-TC100=

Figure 3-6 is a signal diagram for the X.21 fantail cable.

Figure 3-6   X.21 Cable Signal Diagram

RS-449 Interface Straight-Through Cable
==

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

This cable is available from Cisco Systems. For ordering purposes, use the appropriate order number from the table below.

Manufacturing No.	Length	Order No.
72-1002-01	30 feet	LS-CAB-RS4-TC30=
72-1003-01	50 feet	LS-CAB-RS4-TC50=
72-1004-01	100 feet	LS-CAB-RS4-TC100=

Figure 3-7 is a signal diagram for the RS-449 fantail straight-through cable.

Figure 3-7   RS-449 Straight-through Cables Signal Diagram

LightStream DTE end female		DCE end male
Signal Ground (SG)	19 — 19	Signal Ground (SG)
Send Common (SC)	37 — 37	Send Common (SC)
Test Mode (TM)	18 — 18	Test Mode (TM)
StandBy indicator (SB)	36 — 36	StandBy indicator (SB)
Terminal Timing (TT+)	17 — 17	Terminal Timing (TT+)
Terminal Timing (TT−)	35 — 35	Terminal Timing (TT−)
DCE Send Timing+ (SR/SF)	16 — 16	DCE Send Timing+ (SR/SF)
DCE Send Timing- (NS)	34 — 34	DCE Send Timing− (NS)
Incoming Call (IC)	15 — 15	Incoming Call (IC)
Signal Quality (SQ)	33 — 33	Signal Quality (SQ)
Remote Loopback (RL)	14 — 14	Remote Loopback (RL)
Select Standby (SS)	32 — 32	Select Standby (SS)
Receiver Ready (RR+)	13 — 13	Receiver Ready (RR+)
Receiver Ready (RR−)	31 — 31	Receiver Ready (RR−)
Terminal Ready (TR+)	12 — 12	Terminal Ready (TR+)
Signal Ground (TR−)	30 — 30	Signal Ground (TR−)
Data Mode (DM+)	11 — 11	Data Mode (DM+)
Data Mode (DM−)	29 — 29	Data Mode (DM−)
Local Loopback (LL)	10 — 10	Local Loopback (LL)
terminal In Service (IS)	28 — 28	terminal In Service (IS)
Clear to Send (CS+)	9 — 9	Clear to Send (CS+)
Clear to Send (CS−)	27 — 27	Clear to Send (CS−)
Receive Timing (RT+)	8 — 8	Receive Timing (RT+)
Receive Timing (RT−)	26 — 26	Receive Timing (RT−)
Request to Send (RS+)	7 — 7	Request to Send (RS+)
Signal Ground (RS−)	25 — 25	Signal Ground (RS−)
Receive Data (RD+)	6 — 6	Receive Data (RD+)
Receive Data (RD−)	24 — 24	Receive Data (RD−)
Send Timing (ST+)	5 — 5	Send Timing (ST+)
Send Timing (ST−)	23 — 23	Send Timing (ST−)
Send Data (SD+)	4 — 4	Send Data (SD+)
Send Data (SD−)	22 — 22	Send Data (SD−)
SPARE	3 — 3	SPARE
SPARE	21 — 21	SPARE
Signalling rate Indicator (SI)	2 — 2	Signalling rate Indicator (SI)
Receive Common (RC)	20 — 20	Receive Common (RC)
Protective Ground (PG)	1 — 1	Protective Ground (PG)

DB-37 female connector   DB-37 male connector

H3392

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 interface to an external RS-449 DTE device.
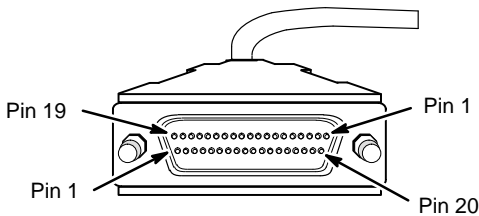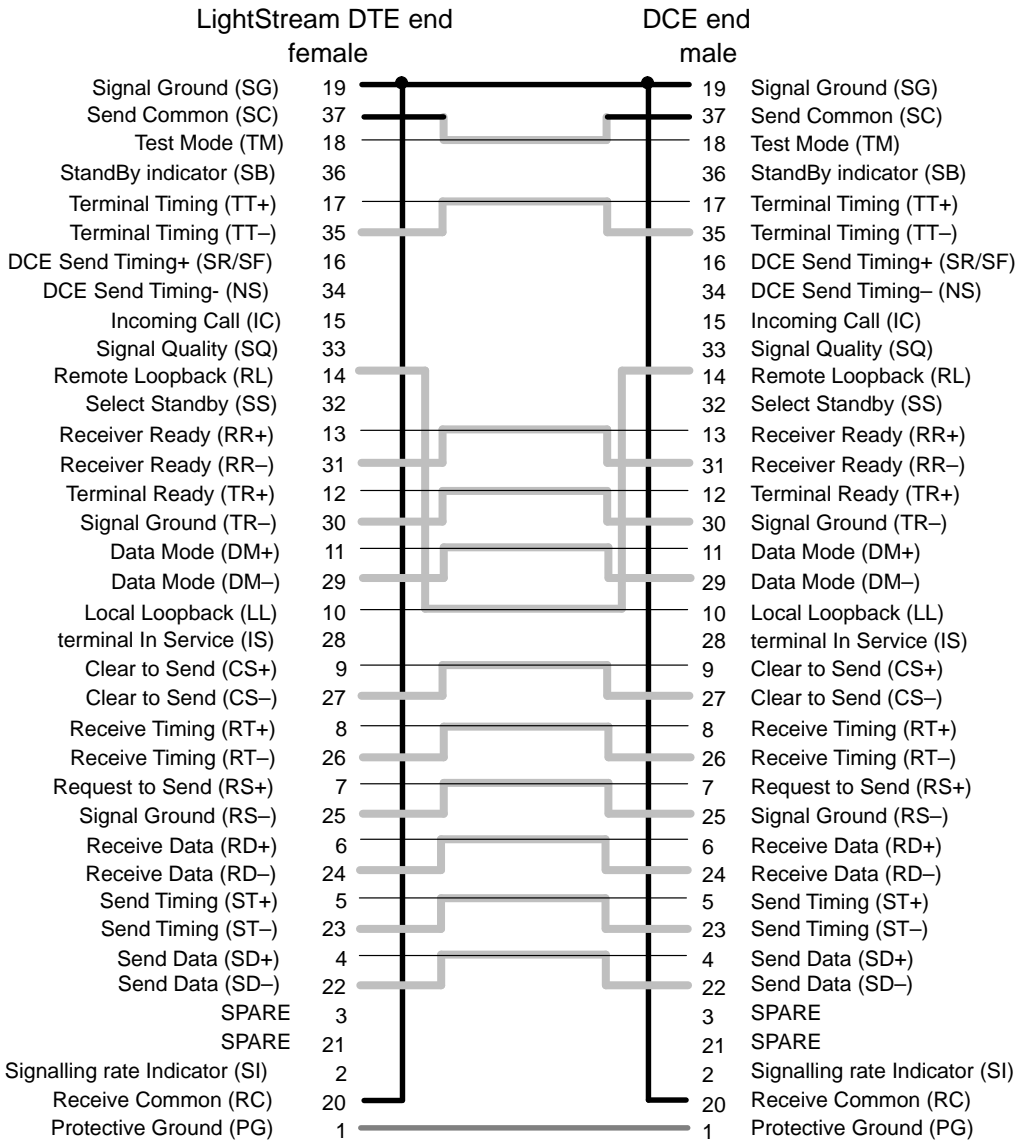
The cable is available from Cisco Systems. For ordering purposes, use an appropriate order number from the table below.
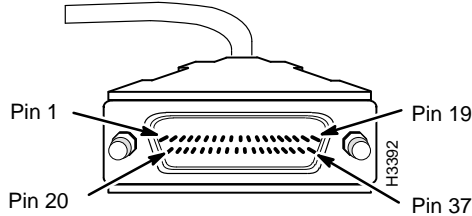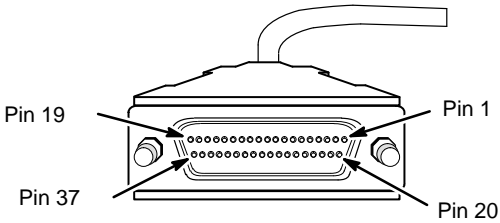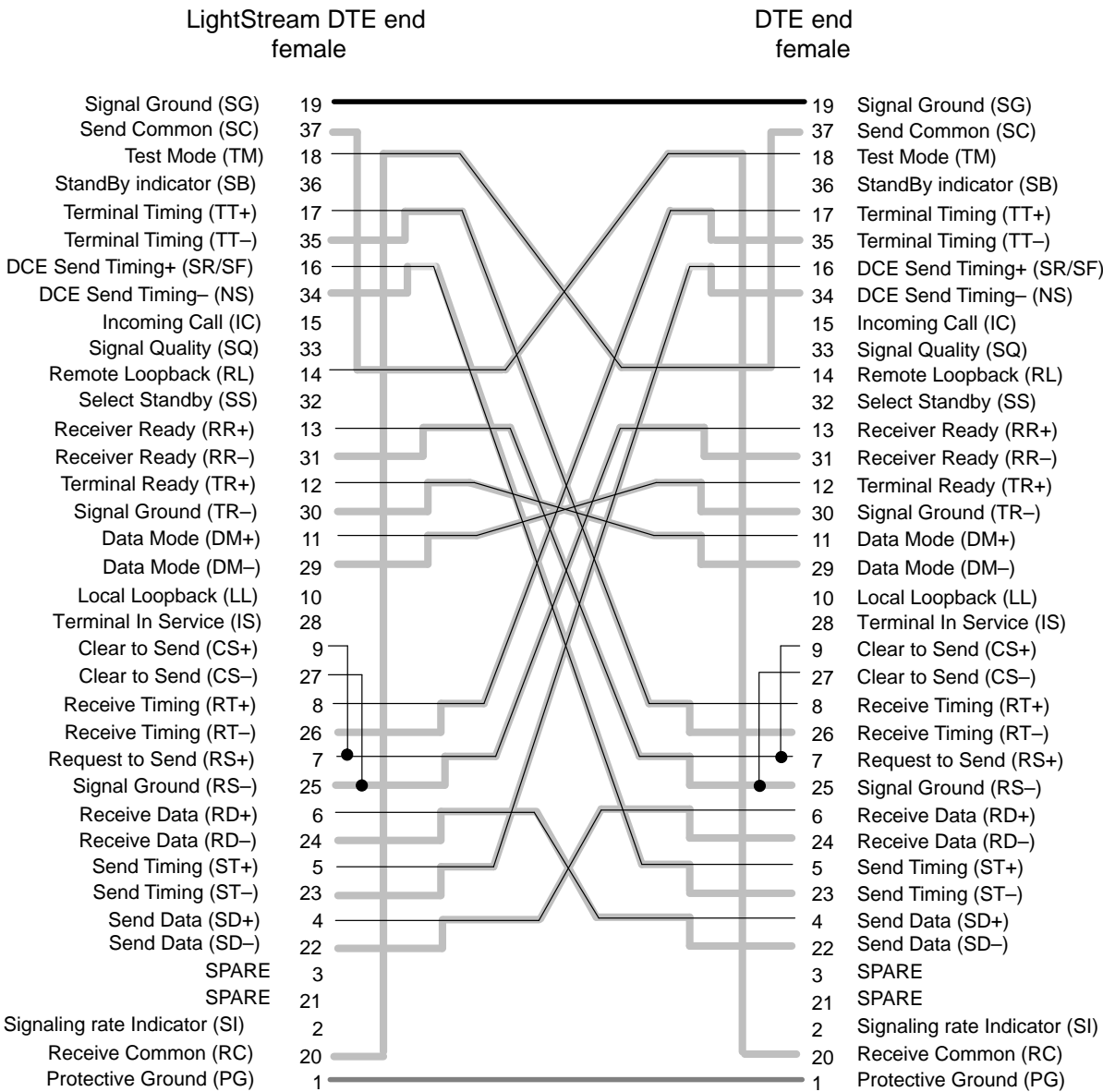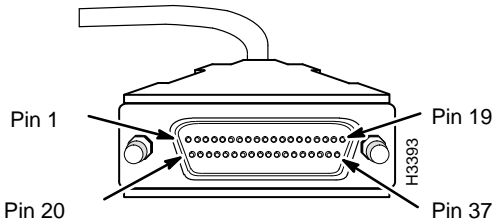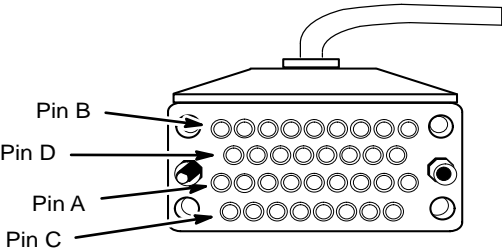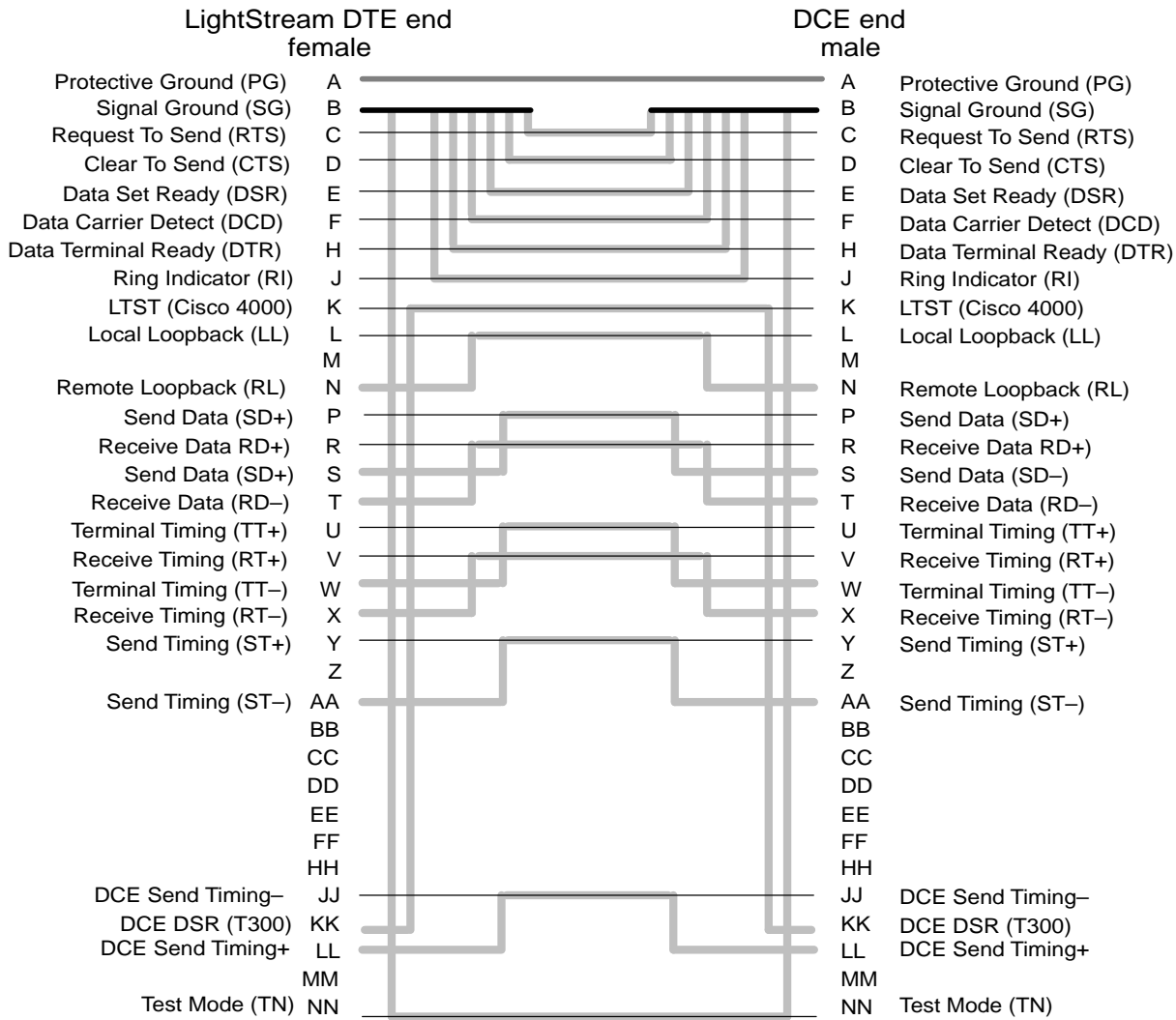
Manufacturing No.	Length	Order No.
72-1008-01	8 feet	LS-CAB-RS4-TT8=
72-1005-01	30 feet	LS-CAB-RS4-TT30=
72-1006-01	50 feet	LS-CAB-RS4-TT50=
72-1007-01	100 feet	LS-CAB-RS4-TT100=

Figure 3-8 is a signal diagram for the RS-449 fantail crossover cable.

Figure 3-8   RS-449 Crossover Cable Signal Diagram

LightStream DTE end
female

DTE end
female

LightStream signal	Pin		Pin	DTE signal
Signal Ground (SG)	19		19	Signal Ground (SG)
Send Common (SC)	37		37	Send Common (SC)
Test Mode (TM)	18		18	Test Mode (TM)
StandBy indicator (SB)	36		36	StandBy indicator (SB)
Terminal Timing (TT+)	17		17	Terminal Timing (TT+)
Terminal Timing (TT–)	35		35	Terminal Timing (TT–)
DCE Send Timing+ (SR/SF)	16		16	DCE Send Timing+ (SR/SF)
DCE Send Timing– (NS)	34		34	DCE Send Timing– (NS)
Incoming Call (IC)	15		15	Incoming Call (IC)
Signal Quality (SQ)	33		33	Signal Quality (SQ)
Remote Loopback (RL)	14		14	Remote Loopback (RL)
Select Standby (SS)	32		32	Select Standby (SS)
Receiver Ready (RR+)	13		13	Receiver Ready (RR+)
Receiver Ready (RR–)	31		31	Receiver Ready (RR–)
Terminal Ready (TR+)	12		12	Terminal Ready (TR+)
Signal Ground (TR–)	30		30	Signal Ground (TR–)
Data Mode (DM+)	11		11	Data Mode (DM+)
Data Mode (DM–)	29		29	Data Mode (DM–)
Local Loopback (LL)	10		10	Local Loopback (LL)
Terminal In Service (IS)	28		28	Terminal In Service (IS)
Clear to Send (CS+)	9		9	Clear to Send (CS+)
Clear to Send (CS–)	27		27	Clear to Send (CS–)
Receive Timing (RT+)	8		8	Receive Timing (RT+)
Receive Timing (RT–)	26		26	Receive Timing (RT–)
Request to Send (RS+)	7		7	Request to Send (RS+)
Signal Ground (RS–)	25		25	Signal Ground (RS–)
Receive Data (RD+)	6		6	Receive Data (RD+)
Receive Data (RD–)	24		24	Receive Data (RD–)
Send Timing (ST+)	5		5	Send Timing (ST+)
Send Timing (ST–)	23		23	Send Timing (ST–)
Send Data (SD+)	4		4	Send Data (SD+)
Send Data (SD–)	22		22	Send Data (SD–)
SPARE	3		3	SPARE
SPARE	21		21	SPARE
Signaling rate Indicator (SI)	2		2	Signaling rate Indicator (SI)
Receive Common (RC)	20		20	Receive Common (RC)
Protective Ground (PG)	1		1	Protective Ground (PG)

Pin 19   Pin 1

Pin 1   Pin 19

H3393

Pin 37   Pin 20

Pin 20   Pin 37

DB-37 female connector

DB-37 male connector

V.35 Interface Straight-Through Cable

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

The cable is available from Cisco Systems. For ordering purposes, use an appropriate order number from the table below.
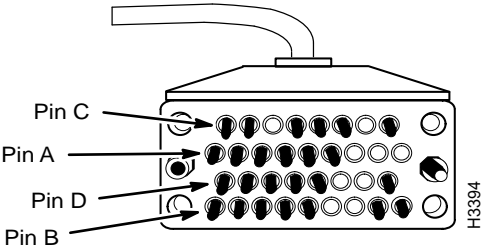
Manufacturing No.	Length	Order No.
72-1009-01	30 feet	LS-CAB-V35-TC30=
72-1010-01	50 feet	LS-CAB-V35-TC50=
72-1011-01	100 feet	LS-CAB-V35-TC100=

Figure 3-9 is a signal diagram for the V.35 fantail straight-through cable.

Figure 3-9   V.35 Straight-through Cable Signal Diagram

LightStream DTE end female			DCE end male
Protective Ground (PG)	A	A	Protective Ground (PG)
Signal Ground (SG)	B	B	Signal Ground (SG)
Request To Send (RTS)	C	C	Request To Send (RTS)
Clear To Send (CTS)	D	D	Clear To Send (CTS)
Data Set Ready (DSR)	E	E	Data Set Ready (DSR)
Data Carrier Detect (DCD)	F	F	Data Carrier Detect (DCD)
Data Terminal Ready (DTR)	H	H	Data Terminal Ready (DTR)
Ring Indicator (RI)	J	J	Ring Indicator (RI)
LTST (Cisco 4000)	K	K	LTST (Cisco 4000)
Local Loopback (LL)	L	L	Local Loopback (LL)
	M	M	
Remote Loopback (RL)	N	N	Remote Loopback (RL)
Send Data (SD+)	P	P	Send Data (SD+)
Receive Data RD+)	R	R	Receive Data RD+)
Send Data (SD+)	S	S	Send Data (SD–)
Receive Data (RD–)	T	T	Receive Data (RD–)
Terminal Timing (TT+)	U	U	Terminal Timing (TT+)
Receive Timing (RT+)	V	V	Receive Timing (RT+)
Terminal Timing (TT–)	W	W	Terminal Timing (TT–)
Receive Timing (RT–)	X	X	Receive Timing (RT–)
Send Timing (ST+)	Y	Y	Send Timing (ST+)
	Z	Z	
Send Timing (ST–)	AA	AA	Send Timing (ST–)
	BB	BB	
	CC	CC	
	DD	DD	
	EE	EE	
	FF	FF	
	HH	HH	
DCE Send Timing–	JJ	JJ	DCE Send Timing–
DCE DSR (T300)	KK	KK	DCE DSR (T300)
DCE Send Timing+	LL	LL	DCE Send Timing+
	MM	MM	
Test Mode (TN)	NN	NN	Test Mode (TN)

Pin B
Pin D
Pin A
Pin C

34-position female block connector

Pin C
Pin A
Pin D
Pin B

H3394

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. For ordering purposes, use the appropriate order number from the table below.

Manufacturing No.	Length	Order No.
72-0997-01	8 feet	LS-CAB-V35-TT8=
72-0994-01	30 feet	LS-CAB-V35-TT30=
72-0995-01	50 feet	LS-CAB-V35-TT50=
72-0996-01	100 feet	LS-CAB-V35-TT100=

Figure 3-10 is a signal diagram for the V.35 fantail crossover cable.

Figure 3-10   V.35 Crossover Cable Signal Diagram

	Female			Female	
Protective GND	A	A		Protective GND	
Signal GND	B	B		Signal GND	
RTS	C				
	D	F		DCD	
DSR	E	H		DTR	
	J	E		DSR	
DTR	H	J			
		C		RTS	
DCD	F	D			
LL	L	L		LL	
	M	M			
RL	N	NN		TM	
SD A	P	R		RD A	
RD A	R	P		SD A	
SD B	S	T		RD B	
RD B	T	S		SD B	
TT A	U	V		RT A	
RT A	V	U		TT A	
TT B	W	X		RT B	
RT B	X	W		TT B	
ST A	Y	LL		DCEST A	
	Z	Z			
ST B	AA	JJ		DCEST B	
	BB	BB			
	CC	CC			
	DD	DD			
	EE	EE			
	FF	FF			
	HH	HH			
DCEST B	JJ	AA		ST B	
	KK	KK			
DCEST A	LL	Y		ST A	
	MM	MM			
TM	NN	N		RL	
	K	K			

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

H3395
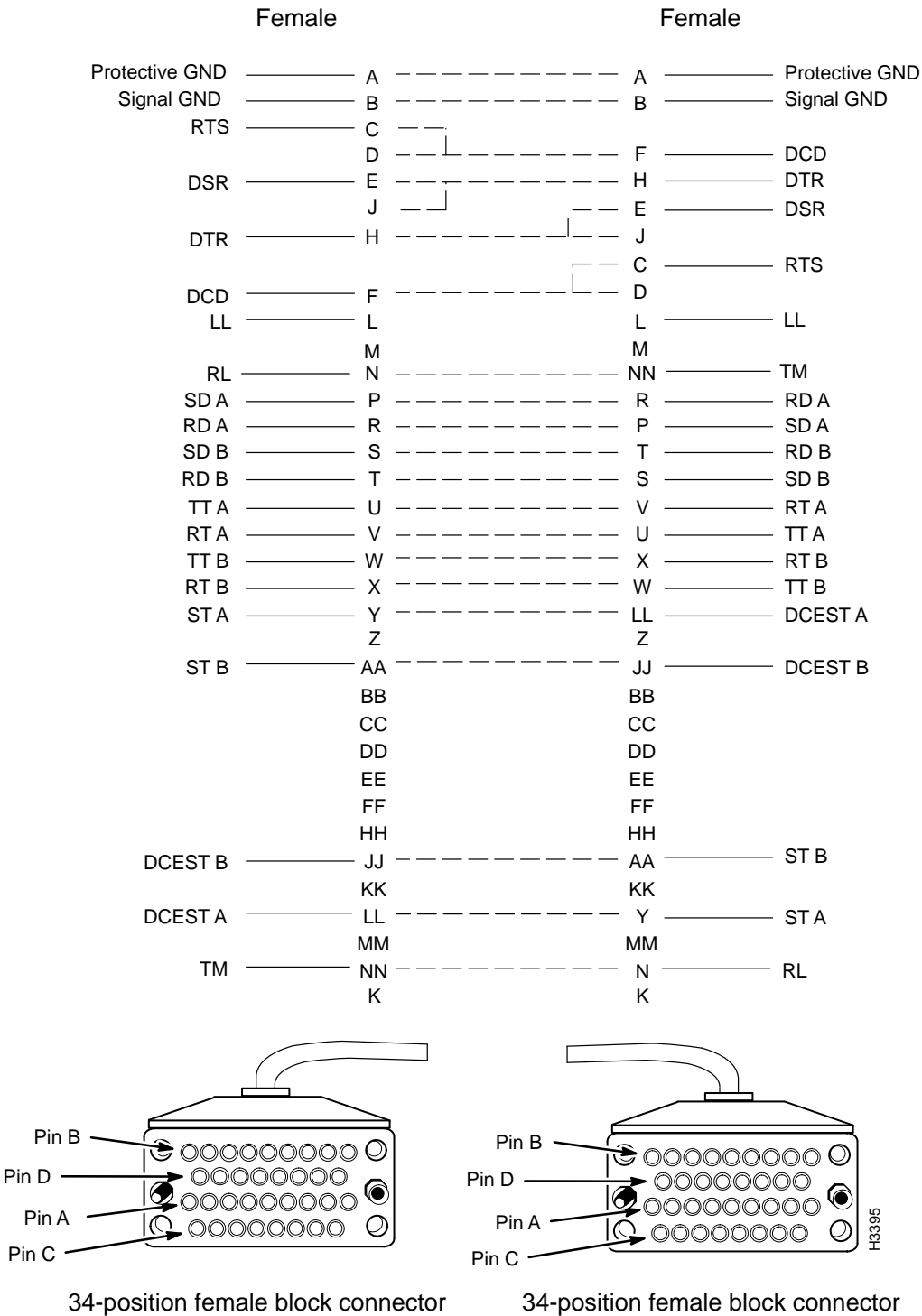
Circuit Emulation Access Card (CEMAC) Connectors and Cables

Figure 3-11 shows the CEMAC card and its associated data cable. To make a more secure connection, unscrew the top mounting screw (shown as "1" in the figure) in the connector retention bracket and reposition it in the connector (as shown by "2" in the figure). Next, tighten down the mounting screw to attach the data cable to the CEMAC card securely (as shown by "3" in the figure). Finally, secure the cable to the CEMAC bulkhead connector with the Velcro strip.

Figure 3-11   CEMAC Access Card and Data Cable Connection

1 Seat
cable
firmly
in bulkhead
connector

2 Secure cable
with Velcro
strip

3 Add optional
cable tie

H3618
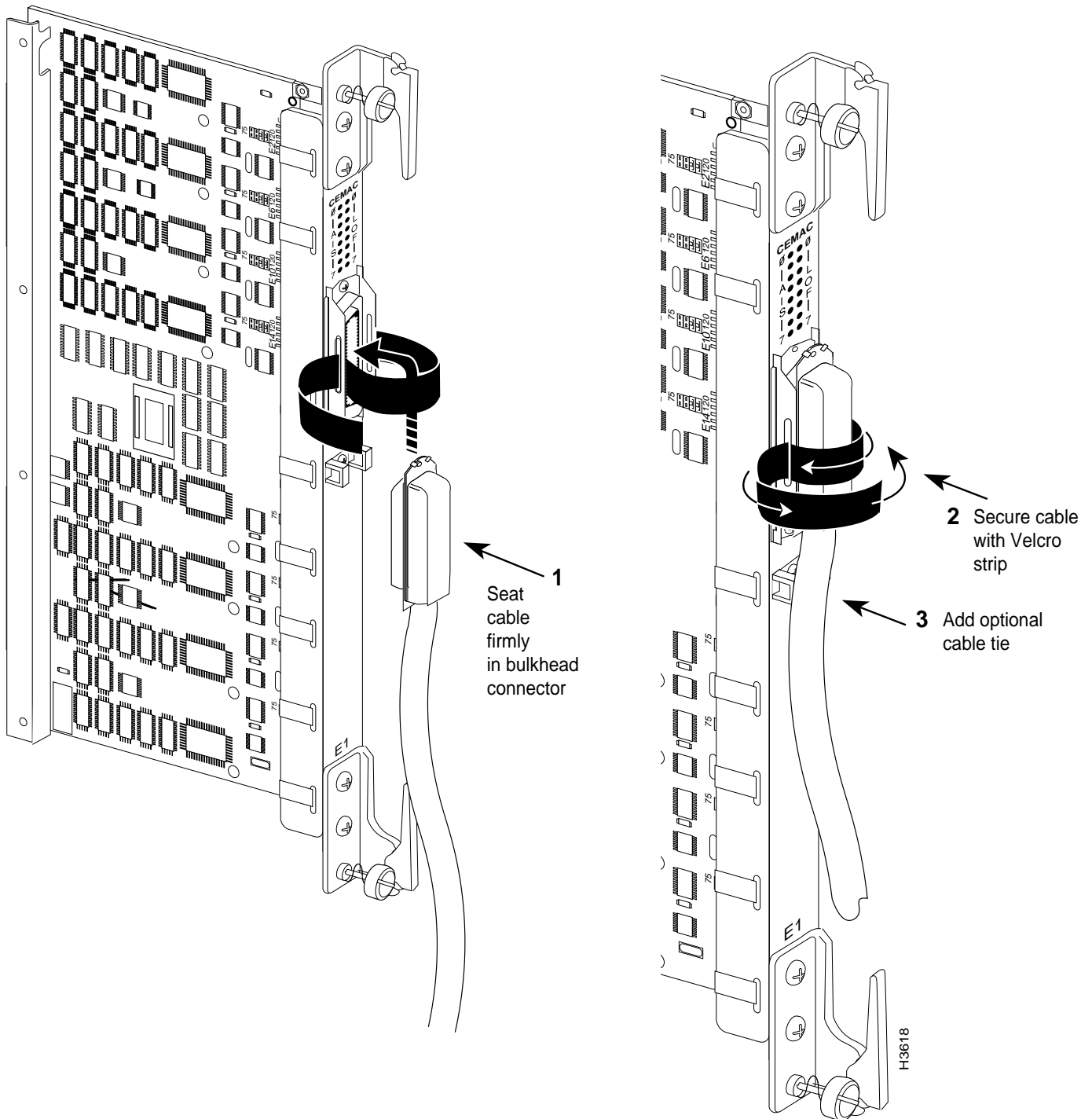
Table 3-1 shows the pinout assignments of the CEMAC access card connector.

Table 3-1   **CEMAC Bulkhead Connector Pinout Assignments**

Port	Receive		Transmit	
	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
Note: The information in this table is an extraction from Figure 10 of American National Standard T1.403-1989.				

CEMAC Fantail

Figure 3-12 shows the E1 fantail for 75-ohm CEMAC applications. For convenience, Figure 3-12 illustrates both the BNC and SMZ connector types that can be used in the E1 fantail.

Figure 3-12   **E1 Fantail (75-ohm)**
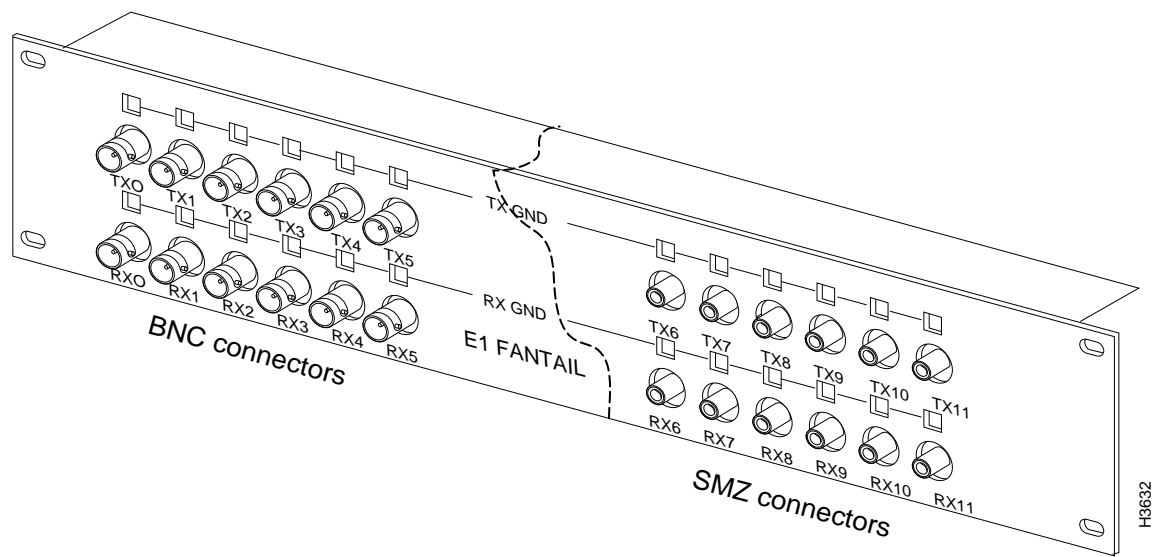
Refer to the *LightStream 2020 Hardware Reference and Troubleshooting Guide* for information regarding the configuration of the TX GND and RX GND jumpers on the E1 fantail.

E1 Fantail Data Cable

This 50-pin cable is used as the means of interconnection between the 8-port bulkhead connectors on the CEMAC card and the back of the E1 fantail. Figure 3-13 illustrates this cable.

The cable is available from Cisco Systems in three lengths. For ordering purposes, use the appropriate order number from the table below.

Manufacturing No.	Length	Order No.
72-1094-01	4 feet	LS-CAB-8E1-4B=
72-1095-01	8 feet	LS-CAB-8E1-8B=
72-1096-01	12 feet	LS-CAB-8E1-12B=

Figure 3-13   E1 Fantail Data Cable
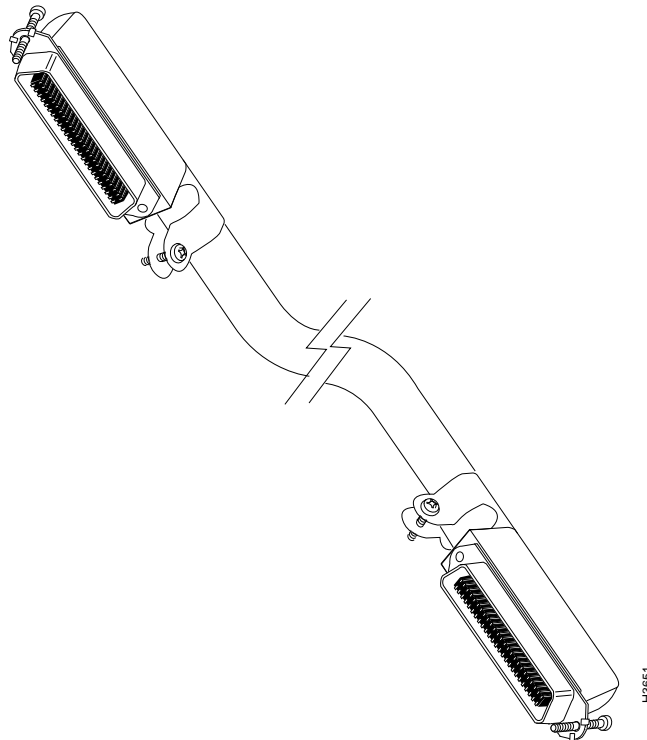
Medium Speed Connectors and Cables

This section describes the connectors and cables for the medium-speed (2-port) access card, as well as the T3 and E3 (4-port and 8-port) access cards, as indicated below:

• External connectors on the medium-speed (2-port) access card - see Figure 3-14.

• External connectors on the T3 and E3 (4-port and 8-port) access cards - see Figure 3-15.

• Cable harness used to connect the T3/E3 access card to its associated dressing panel - see Figure 3-16.

• Data cable used to connect the medium speed access card and the T3/E3 access cards to external devices - see Figure 3-17.

Connectors on Medium-speed Access Card

Interface connector type: 75 ohm BNC jacks

Connectors per access card: 4 (2 receive and 2 transmit)

Figure 3-14 shows the external coaxial connectors for the medium-speed (2-port) access card.

Figure 3-14   Medium-speed Access Card Connectors
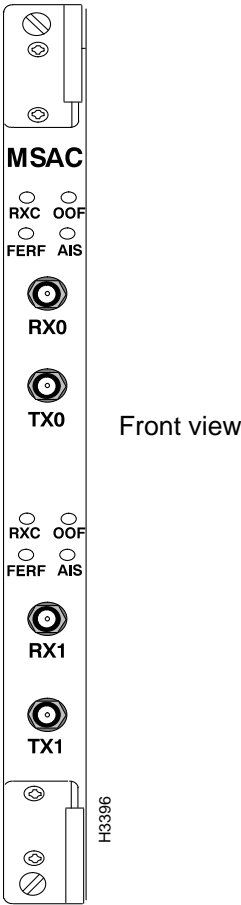
Connectors on T3/E3 Access Card

Interface connector type: SMB connector at card; BNC connector at fantail

Connectors per access card: 8 or 16, 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.

Figure 3-15 shows the external connectors for the 4-port and 8-port versions of the T3 and E3 access cards.

Figure 3-15   T3/E3 Access Card Connectors
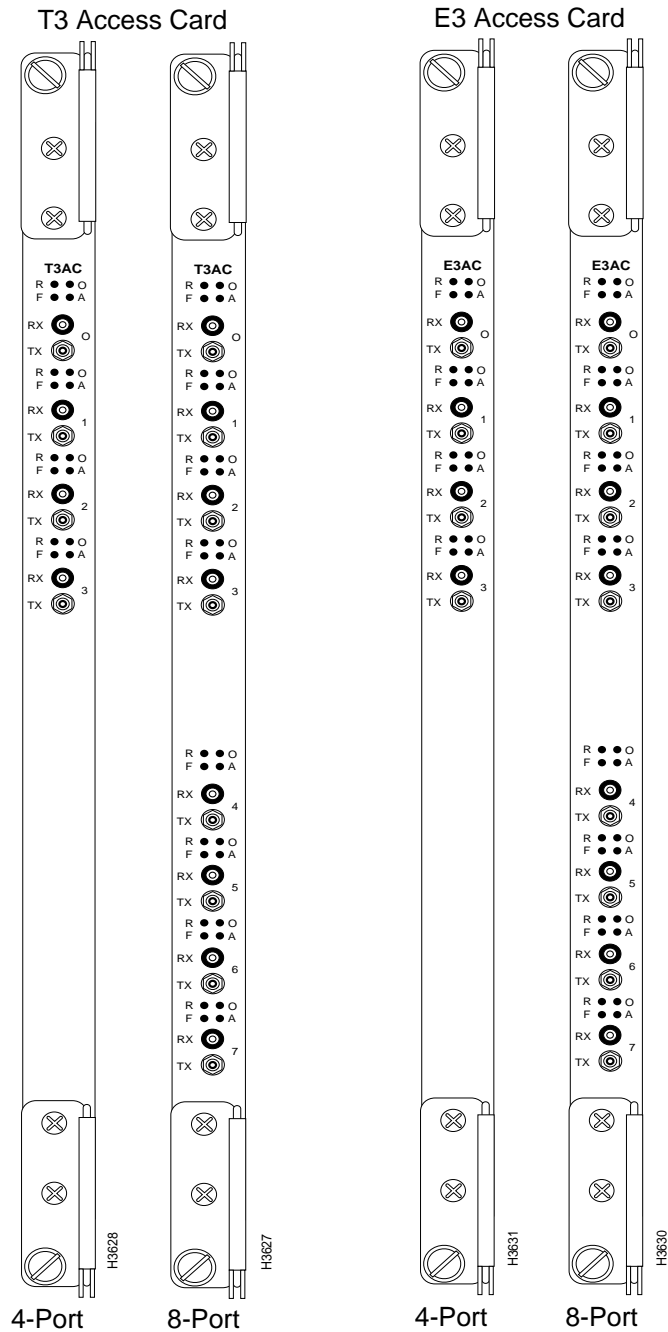
T3/E3 Fantail Cable Harness and Dressing Panel

To interconnect patch panel/fantails to T3/E3 access cards, both 4-port and 8-port coaxial cable harnesses are offered by Cisco Systems. In addition, both the 4-port and 8-port harnesses are available in 4-, 8-, or12-foot lengths.

The table below shows appropriate ordering information for the T3 fantail cable harnesses in desired port and length combinations.

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

The table below shows appropriate ordering information for the E3 fantail cable harnesses in desired port and length combinations.

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

The table below shows appropriate ordering information for the T3/E3 coaxial cable dressing panel.

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

Figure 3-16 shows the T3/E3 coaxial cable dressing panel, together with a T3/E3 fantail cable harness. Note however that these components, although shown as connected in Figure 3-16, are available separately using the ordering information from the tables above.

Figure 3-16   T3/E3 Fantail Cable Harness and Dressing Panel
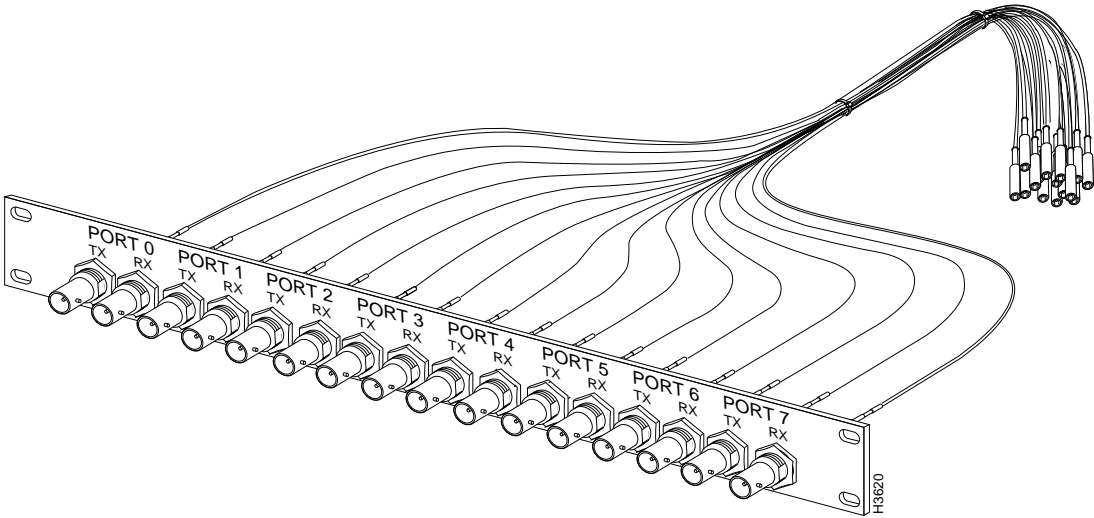
T3/E3 75-Ohm Coaxial Cable

Where used:

- To connect two LS2020 switches via their T3/E3 access cards.

- To connect an LS2020 T3/E3 access card to an external device.

- To connect two LS2020 switches via their T3, E3/PLCP, or E3/G.804 medium-speed access cards.

- To connect an LS2020 T3, E3/PLCP, or E3/G.804 medium-speed access card to an external device.

The T3/E3 75-ohm coaxial cable is available from Cisco Systems in four different lengths. Use the appropriate number from the table below for ordering purposes.

Manufacturing No.	Length	Order No.
72-0998-01	3 feet	LS-CAB-T3-CX3=
72-0399-01	25 feet	LS-CAB-T3-CX25=
72-1000-01	50 feet	LS-CAB-T3-CX50=
72-1001-01	100 feet	LS-CAB-T3-CX100=

Figure 3-17 is a physical representation of 75-ohm T3/E3 coaxial cable.

Figure 3-17   T3/E3 75-ohm Coaxial Cable
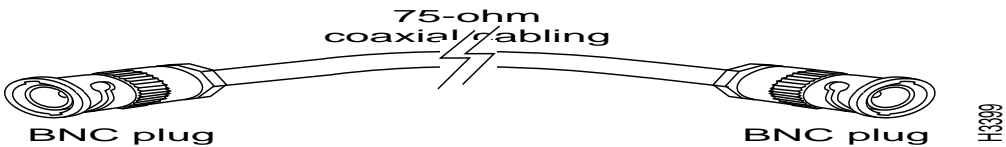
OC-3C Connectors and Cables

Figure 3-18 shows the external connectors on both the multimode and single mode OC-3c access cards. The multimode OC-3c and single mode OC-3c cables are described in separate sections below.

Multimode interface connector type: Duplex SC

Connectors per multimode access card: 4 (2 per port; ports are numbered 0 and 1)

Single mode interface connector type: ST

Connectors per single mode access card: 4 (2 per port; ports are numbered 0 and 1)

Figure 3-18   Connectors on Multimode and Single Mode OC-3c Access Cards
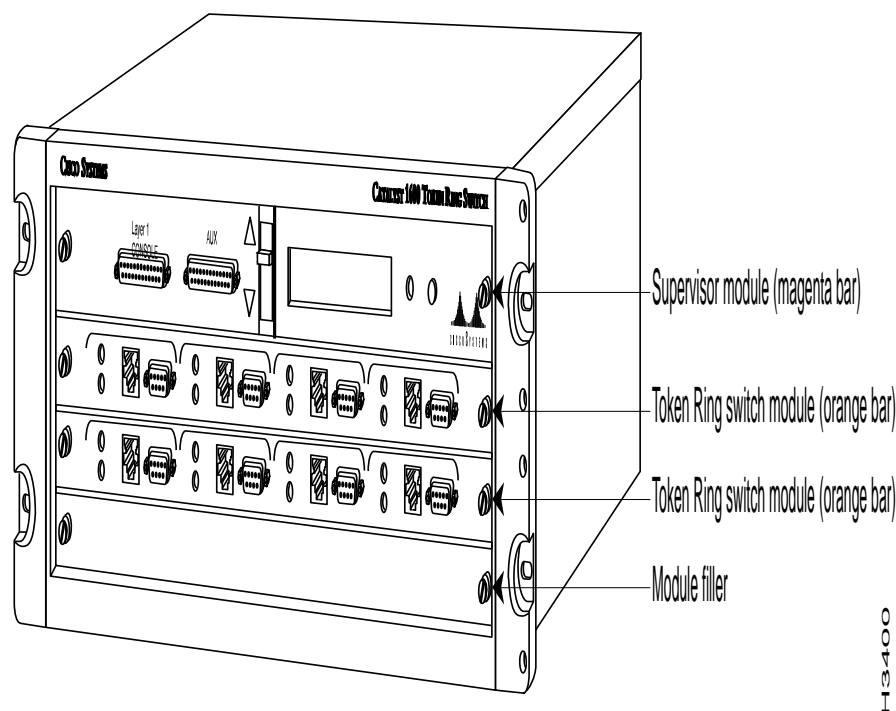
Multimode OC-3c Cable

Where 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.

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 3-19 shows a multimode OC-3c cable with simplex SC connectors.

Figure 3-19   Multimode OC-3c Cable with Simplex SC Connectors
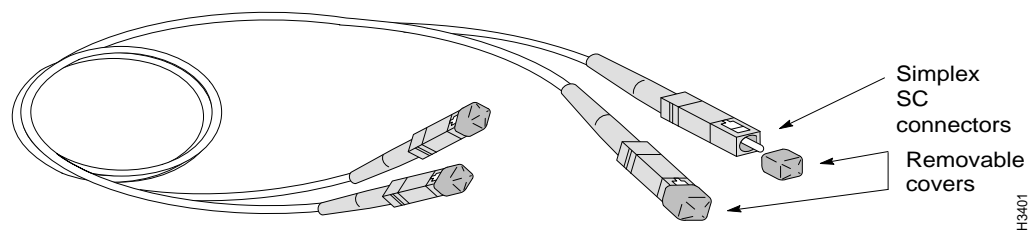
Note Multimode OC-3c cables are available with both simplex SC connectors (as shown in Figure 3-19) and duplex SC connectors; both connector types are compatible with LS2020 multimode access cards. However, the use of duplex SC connectors is preferred because they are keyed in a way that prevents incorrect connections.

Single Mode OC-3c Cable

Where 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 an optical loss of 0-12 dB and a maximum cable 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.

Connector Type: ST

Figure 3-20 shows a single mode OC-3c cable with ST connectors.

Figure 3-20   Single Mode OC-3c Data Cable with ST Connectors
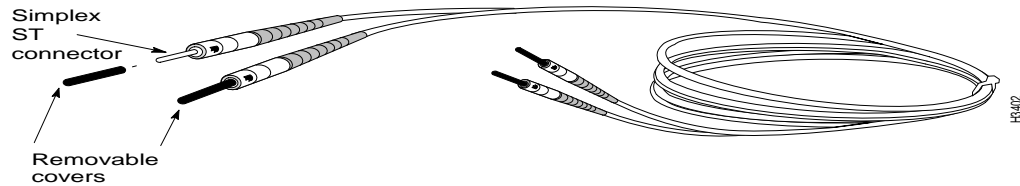
FDDI Connectors and Cables

Figure 3-21 shows the media interface connectors (MICs) on an FDDI access card.

Figure 3-21   Connectors on FDDI Access (FAC) Card
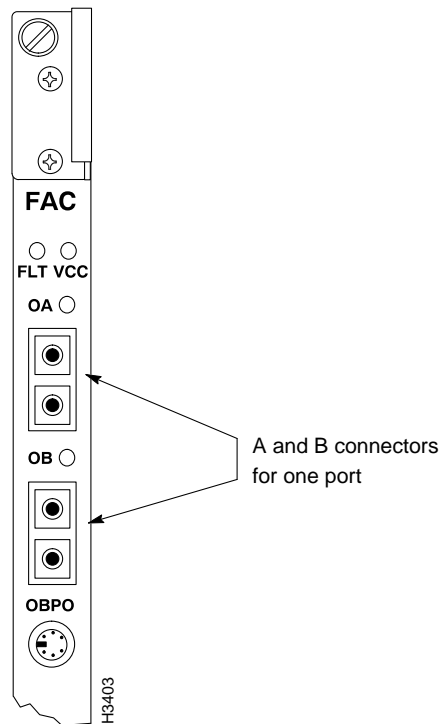
Each FDDI port consists of two connectors, A (red) and B (blue). FDDI connectors are keyed to ensure proper connection of the cable to the access card.

FDDI Cable

Where 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.

Connectors: MIC

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

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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 3-22 shows a physical representation of an FDDI cable.

Figure 3-22   FDDI Cable
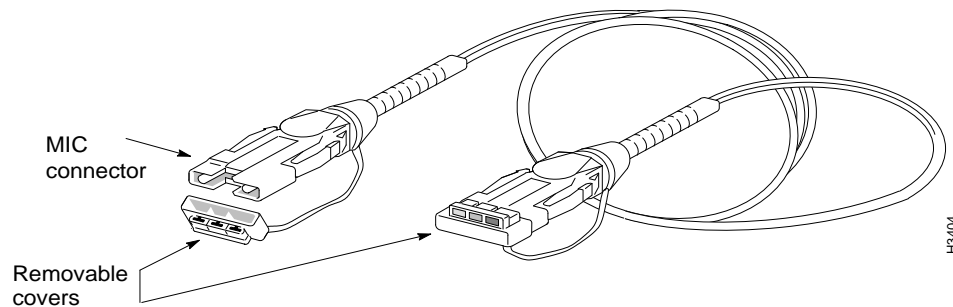
Ethernet Connectors and Cables

This section describes the Ethernet connectors and cables for the NP access card and the Ethernet access card.

15-pin Ethernet AUI Connector

Figure 3-23 is a schematic diagram of the 15-pin Ethernet AUI connector for the NP access card and the Ethernet access card (ports 0 and 7).

The data cable for this connector is described in the section "Ethernet AUI Data Cable" later in this chapter.

Interface connector type: AUI DB15 connector

AUI connectors per NP access card: one

AUI connectors per Ethernet access card: 2 (numbered 0 and 7)

Figure 3-23   Ethernet AUI Connector Schematic Diagram

Pinout

```
     1
        9
                          1
                          ───
          Collision+      2
          Transmit+       3
                          4
                          ───
          Receive+        5
     8   15    Voltage Common (SG)  6
                          7
  AUI DB-15               8
   female                 ───
          Collision−      9
          Transmit−      10
                         11
          Receive−       12
             +12V        13
                         14
                         15
```

H3405
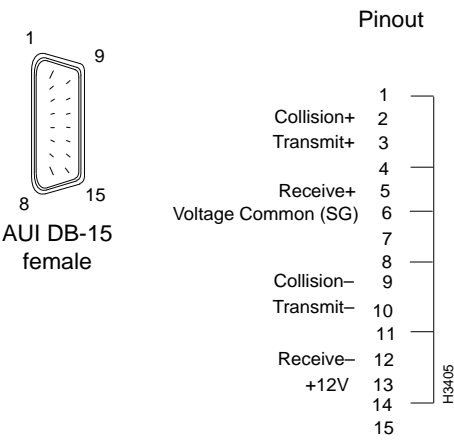
Ethernet 10Base-T (RJ-45) Connector

Figure 3-24 shows the RJ-45 connectors and pinout assignments on the Ethernet access card. These connectors are used by the twisted pair (10Base-T) ports.

The cables used with these ports are described in the section Ethernet 10Base-T Straight-Through Cable and the section Ethernet 10Base-T Crossover Cable.

Figure 3-24   Ethernet RJ-45 Connectors and Pinout Assignments

RJ-45 10BaseT
pin assignments

TD+	1
TD−	2
RD+	3
	4
	5
RD−	6
	7
	8

RJ-45 connectors
for 10BaseT ports
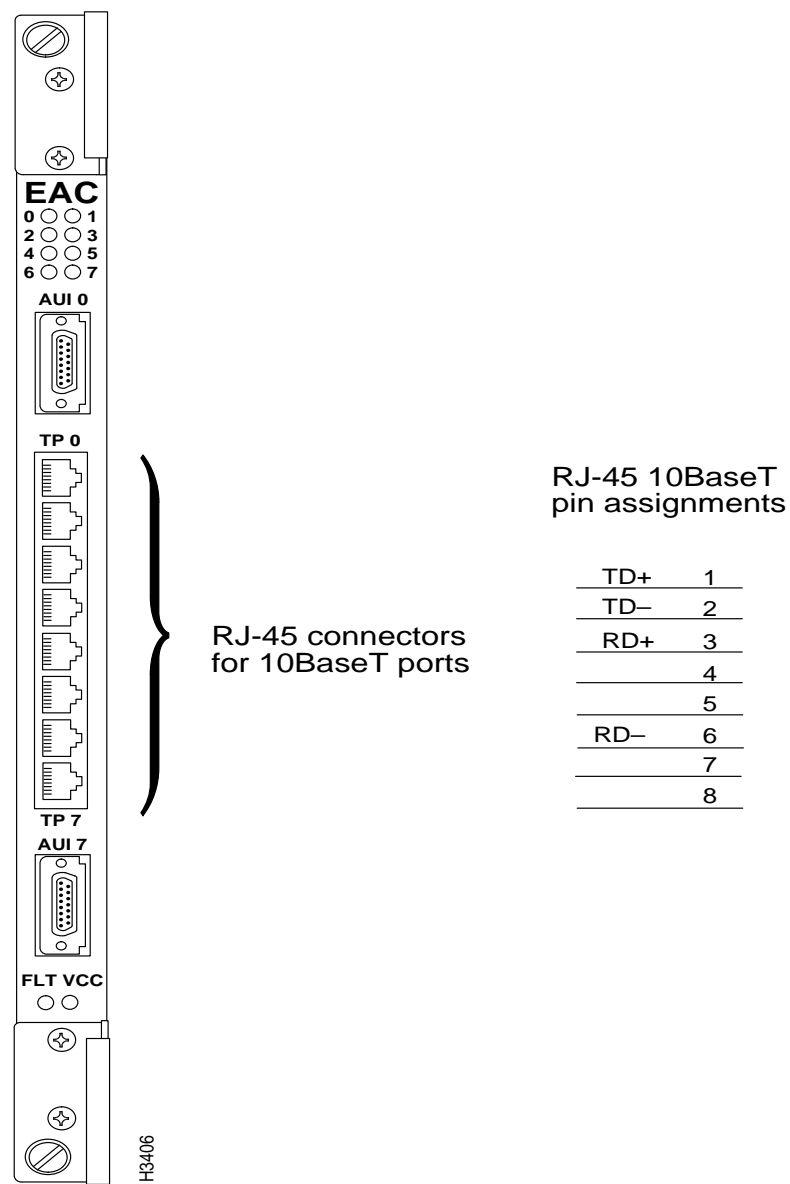
Ethernet AUI Data Cable

Where used: Connects an AUI port on the NP access card or 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 3-25 shows a schematic diagram of the Ethernet AUI data cable.

Figure 3-25   Ethernet AUI Data Cable Schematic Diagram
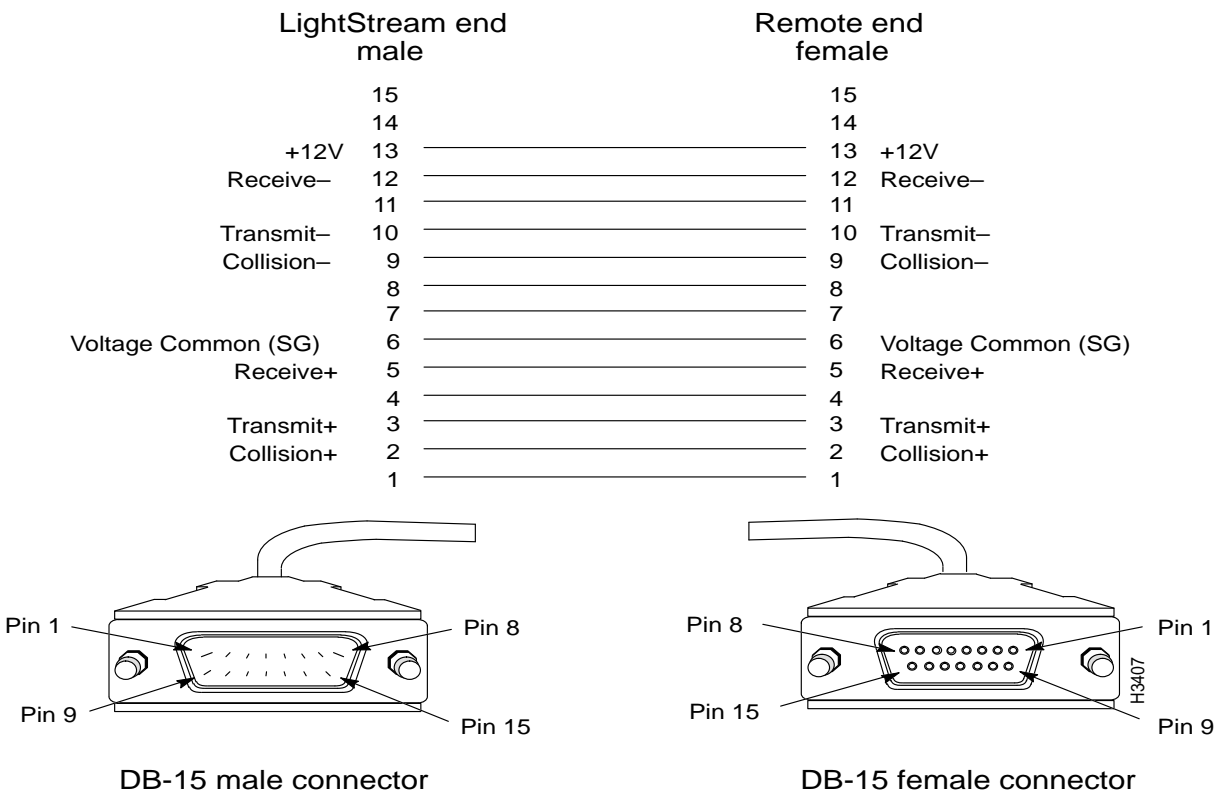
Ethernet 10Base-T Straight-Through Cable

Where used:

- To connect an Ethernet access card on an LS2020 switch to an Ethernet hub.

- To connect 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 10Base-T Crossover Cable section later in this chapter).

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

Figure 3-26 shows a physical representation of the Ethernet 10Base-T (twisted pair) straight-through cable and provides a schematic diagram of its pinout assignments.

Figure 3-26   Ethernet 10Base-T Straight-through Cable and Pinout Assignments

Pinout

Transmit Data (TD+)	1	1	Transmit Data (TD+)
Transmit Data (TD–)	2	2	Transmit Data (TD–)
Receive Data (RD+)	3	3	Receive Data (RD+)
Receive Data (RD–)	6	6	Receive Data (RD–)
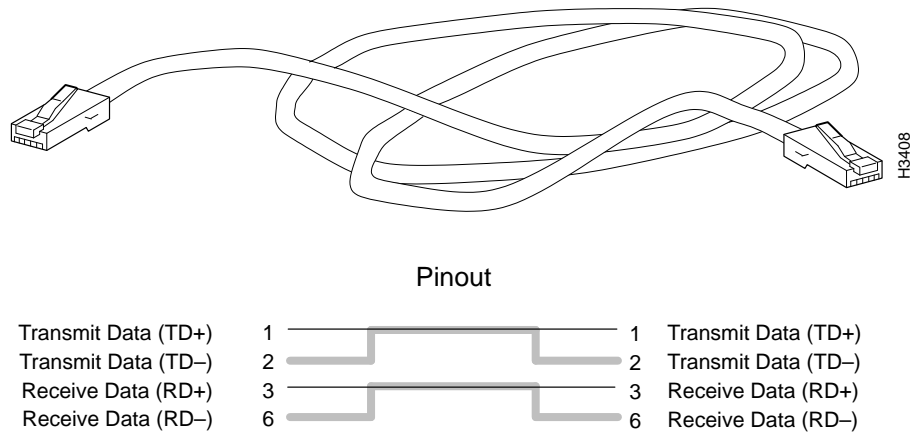
Ethernet 10Base-T Crossover Cable

Where 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, therefore, use straight-through cables instead of crossover cables. 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 3-27 shows a physical representation of the Ethernet 10Base-T (twisted pair) crossover cable and provides a schematic diagram of its pinout assignments.

Figure 3-27   Ethernet 10Base-T Crossover Cable and Pinout Assignments

Pinout

Transmit Data (TD+)	1	1	Transmit Data (TD+)
Transmit Data (TD–)	2	2	Transmit Data (TD–)
Receive Data (RD+)	3	3	Receive Data (RD+)
Receive Data (RD–)	6	6	Receive Data (RD–)
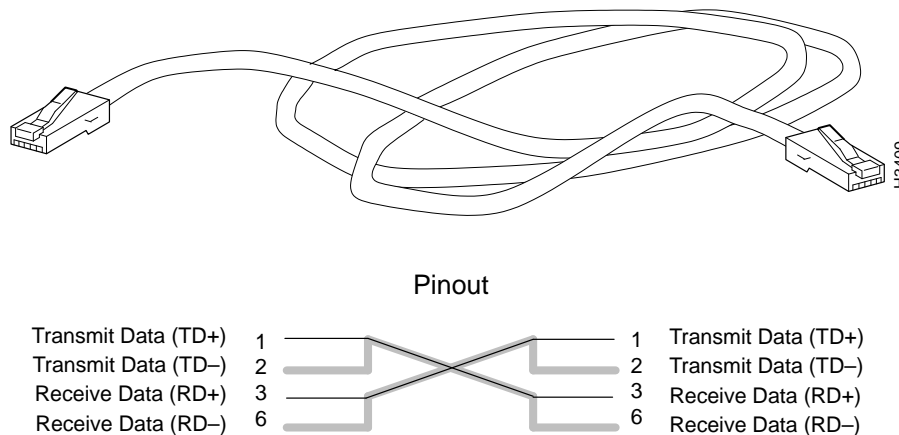
Fiber Ethernet Connectors and Cable

This section describes the fiber Ethernet Connectors and data cable.

Fiber Ethernet Access Card Connectors

Figure 3-28 shows the bulkhead connectors on the fiber Ethernet access card.

Figure 3-28   Fiber Ethernet Access Card Connectors
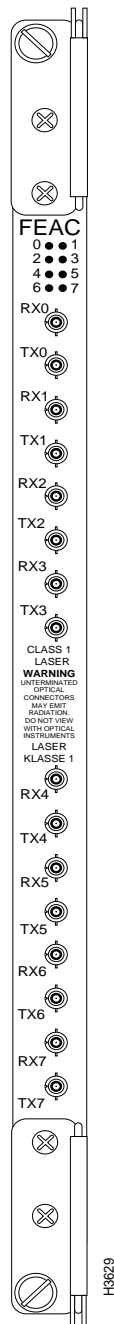
Fiber Ethernet Access Card Data Cable

Where 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.

Connector Type: ST

Note Protective covers are provided for all fiber Ethernet 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 3-29 illustrates the multimode fiber Ethernet access card data cable.

Figure 3-29   Multimode Fiber Ethernet Data Cable with ST Connectors
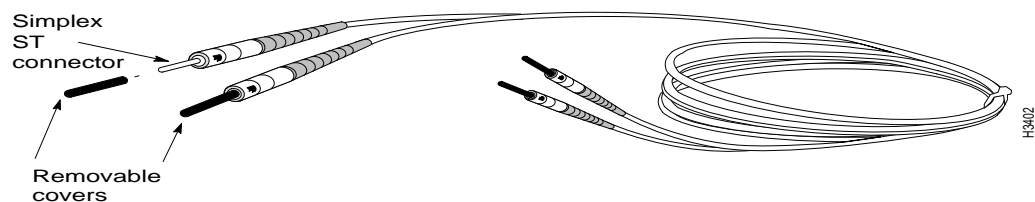
Modem/Console Connectors and Cables

Figure 3-30 and Figure 3-31 illustrate the modem and console connectors, respectively, on the switch card console/modem assembly.

The data cable used for both the console and modem ports is described in the section RS-232 Straight-Through Data Cable.

RS-232 Modem Connector Specification

Interface connector type: DB25 male, DTE

Connectors per assembly: 1, labeled MODEM

Figure 3-30 shows a schematic diagram of the RS-232 modem port connector.

Figure 3-30   RS-232 Modem Port Schematic Diagram
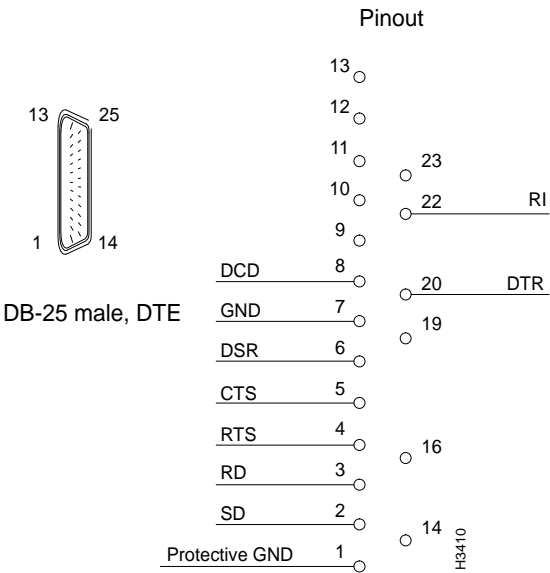
RS-232 Console Connector Specification

Interface connector type: DB25 female, DCE

Connectors per assembly: 1, labeled CNSL

Figure 3-31 shows a schematic diagram of the console port connector.

Figure 3-31   RS-232 Console Port Schematic Diagram
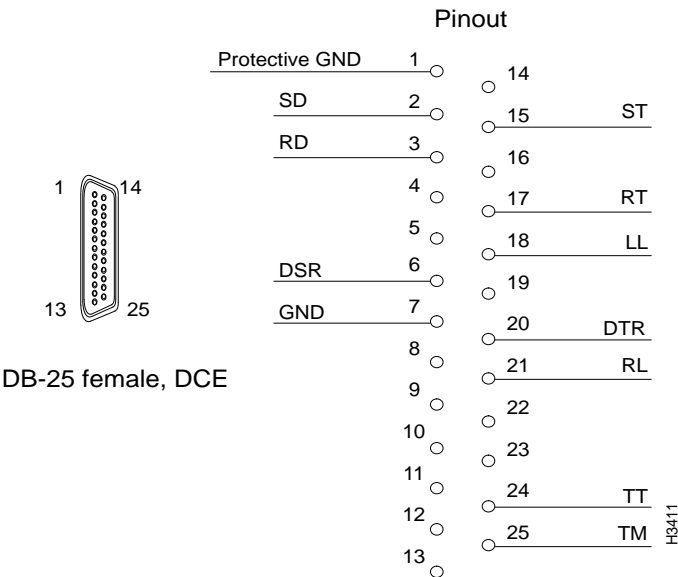
RS-232 Straight-Through Data Cable

Where used: To connect the LS2020 console port or modem port to a console or modem.

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

Figure 3-32 shows a schematic diagram of the RS-232 straight-through data cable.

Figure 3-32   RS-232 Straight-through Data Cable Schematic Diagram
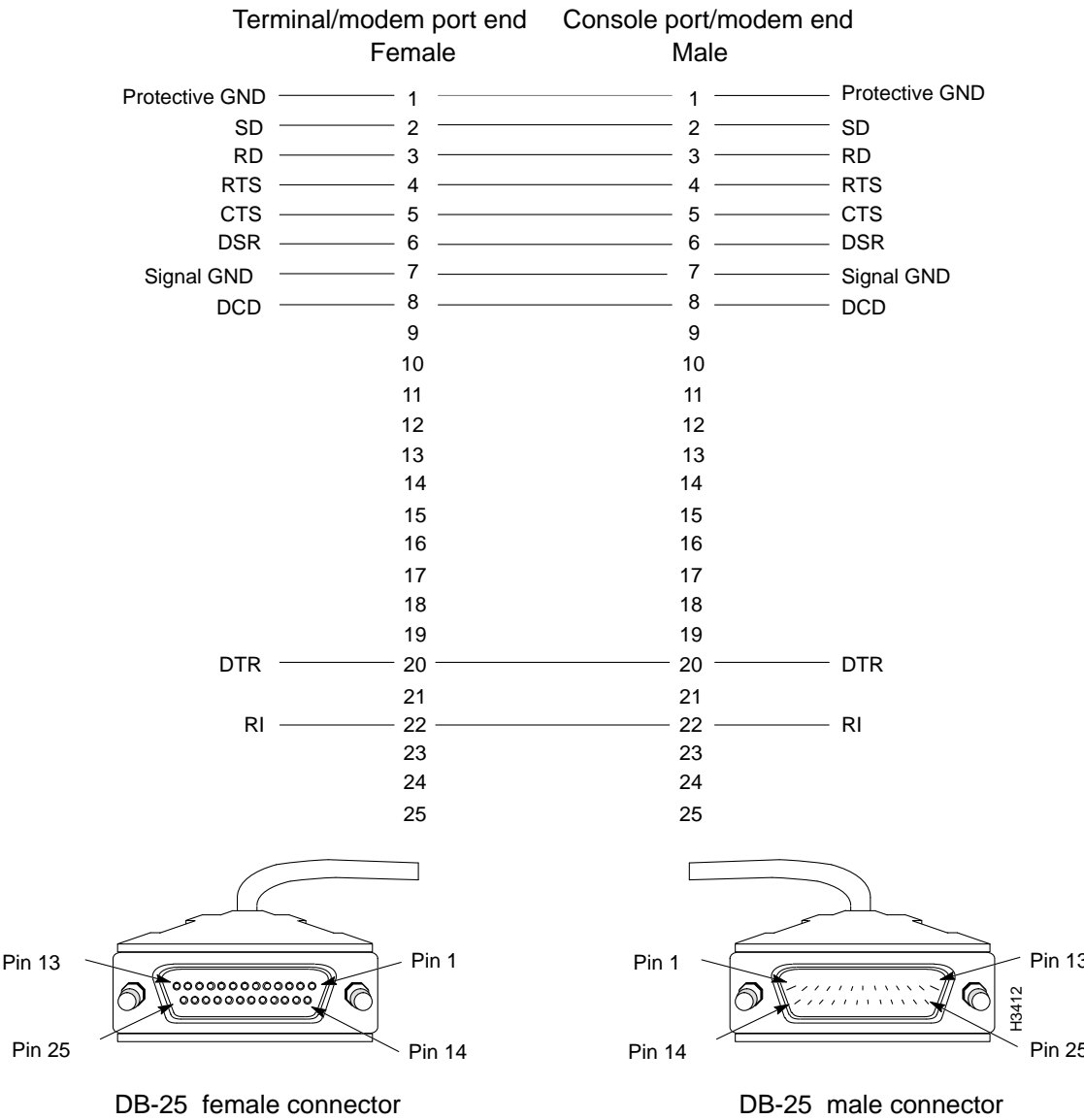
Country Kits and Power Cordsets

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 3-2, 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 3-2 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 3-2   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, the Netherlands, 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=

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

Used in Country Kit   L2020-PWR-NA=
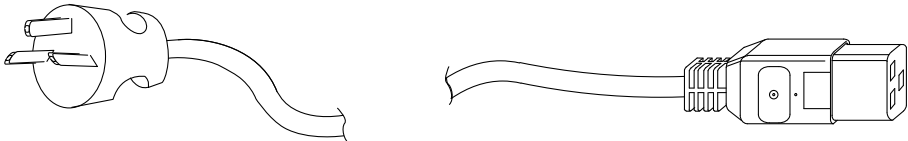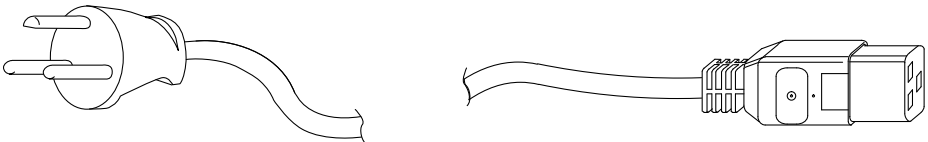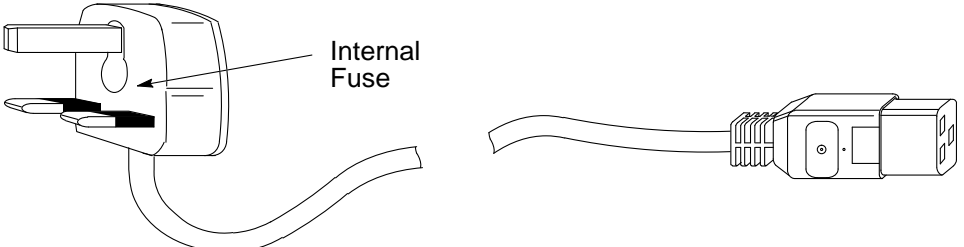*For Canada, Japan, Mexico, and USA*
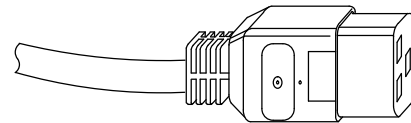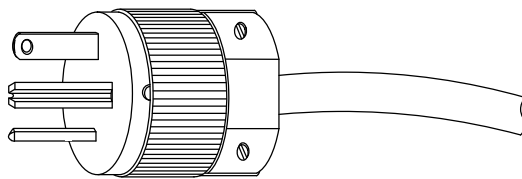
Plug: NEMA 5-20P   Cordage: 12/3 SJT   Connector: IEC 320 C19
Length: 2.5 m (8 feet 2 inches)

H3413

P/N 37-0038-01

Used in Country Kit L2020-PWR-NA125=

Cordset Rating: 20A, 125V
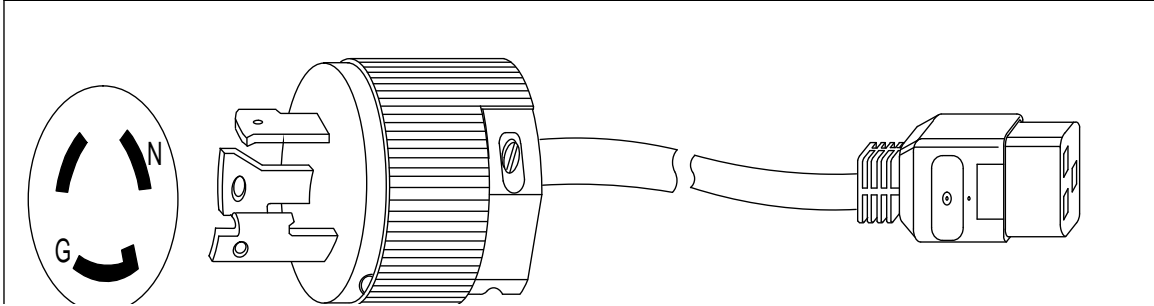
For Canada, Japan, Mexico, and USA

P/N 37-0039-01

Used in Country Kit L2020-PWR-NA250=
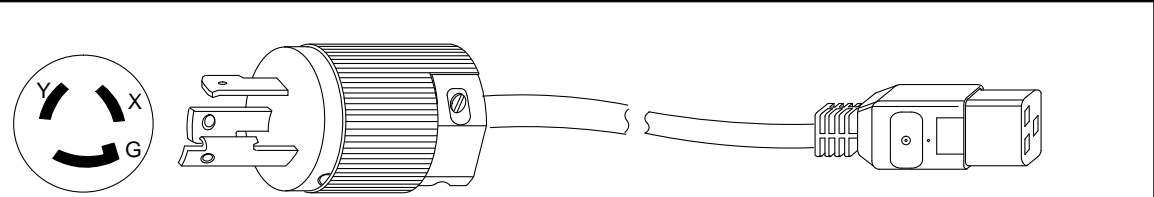
Cordset Rating: 20A, 250V

For Canada, Japan, Mexico, and USA

| Plug: NEMA L6-20P | Cordage: 12/3 SJT | Connector: IEC 320 C19 |
| Locking Plug | Length: 2.5 m (8 feet 2 inches) | |

H3415

P/N 37-0040-01

Used in Country Kit L2020-PWR-E=

Cordset Rating: 16A, 250V

For Continental Europe: including Austria, Belgium, Finland, France, Germany, Holland, Norway, Portugal, Spain, and Sweden
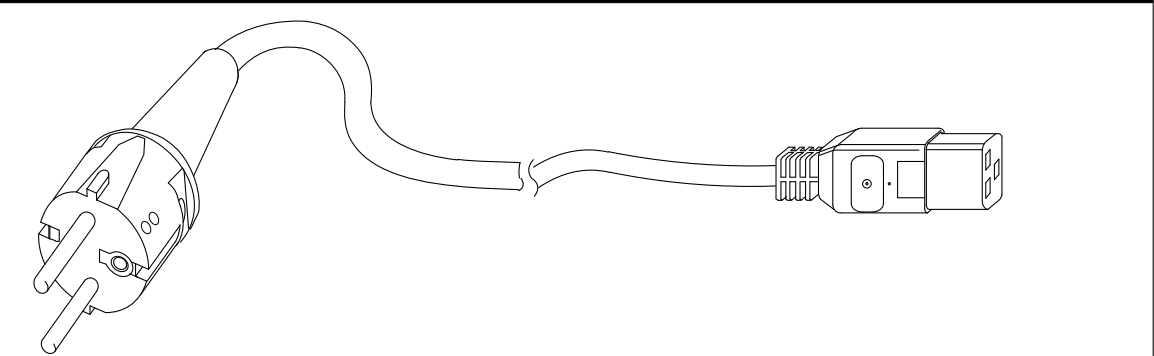
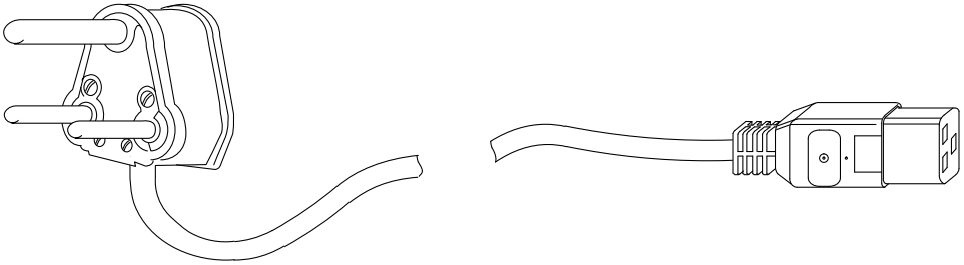| Plug: CEE 7/7 | Cordage: 3 x 1.5 mm^2 | Connector: IEC 320 C19 |
| | Length: 2.5 m (8 feet 2 inches) | |

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

Internal
Fuse

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=
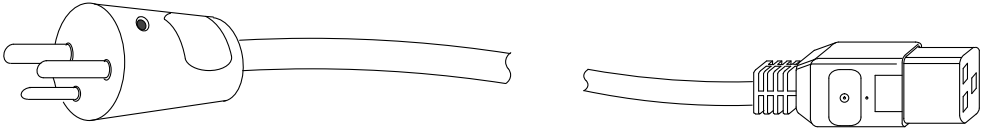*For India, South Africa*

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
Cordset Rating: 16A, 250V
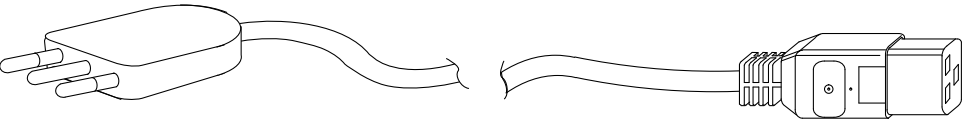
Used in Country Kit L2020-PWR-IS=
For Israel

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

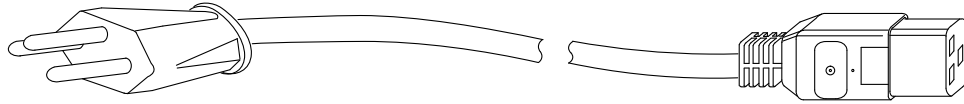Cordset Rating: 16A, 250V

Used in Country Kit L2020-PWR-I=
For Italy

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