APPENDIX A

Cabling Specifications

This appendix lists the pinouts for ports on the RSP2, EIP, FEIP, TRIP, FIP, and MIP, and for the serial interface cables that connect each FSIP, HSSI, and MIP port to the external network.

All pins not specifically listed are not connected.

Following is a list of the signal summaries contained in this appendix:

- RSP2 console port signals
- RSP2 auxiliary port signals
- Interface processor port signals and interface cable pinouts
  - EIP Ethernet AUI pinout
  - FEIP RJ-45 and MII pinouts
  - TRIP Token Ring pinout
  - FIP FDDI optical bypass switch pinout
  - EIA/TIA-232 DTE and DCE serial port adapter cable pinouts
  - EIA/TIA-449 DTE and DCE serial port adapter cable pinouts
  - V.35 DTE and DCE serial port adapter cable pinouts
  - X.21 DTE and DCE serial port adapter cable pinouts
  - EIA-530 DTE serial port adapter cable pinout
  - E1-G.703/G.704 serial port adapter cable pinouts
- HSSI cables
  - HSSI interface cable pinout
  - Null modem cable pinout
- MIP cables

Note All FSIP ports use the same high-density, 60-pin receptacle (except for the E1-G.703/G.704 port adapter, which uses DB-15 connectors). Each port requires a serial port adapter cable, which determines the port's electrical interface type and mode: data terminal equipment (DTE) or data circuit-terminating equipment (DCE). Although all port adapter cables use a high-density 60-pin plug to connect to the FSIP port, the network end of each cable type uses the physical connectors commonly used for the interface. (For example, the network end of the EIA/TIA-232 port adapter cable is a DB-25, which is the most widely used EIA/TIA-232 connector.)

Console Port Signals

The console port on the RSP2 is an EIA/TIA-232, DCE, DB-25 receptacle. Both DSR and DCD are active when the system is running. The RTS signal tracks the state of the CTS input. The console port does not support modem control or hardware flow control. Table A-1 lists the signals used on this port. The console port requires a straight-through EIA/TIA-232 cable.

Table A-1 Console Port Signals

Pin	Signal	Direction	Description
1	GND	–	Ground
2	TxD	<—	Transmit Data
3	RxD	—>	Receive Data
6	DSR	—>	Data Set Ready (always on)
7	GND	–	Ground
8	DCD	—>	Data Carrier Detect (always on)

Auxiliary Port Signals

The auxiliary port on the RSP2 is an EIA/TIA-232, DTE, DB-25 plug to which you can attach a CSU/DSU or other equipment in order to access the router from the network. Table A-2 lists the signals used on this port. The auxiliary port supports hardware flow control and modem control.

Table A-2 Auxiliary Port Signals

Pin	Signal	Direction	Description
2	TxD	—>	Transmit Data
3	RxD	<—	Receive Data
4	RTS	—>	Request To Send (used for hardware flow control)
5	CTS	<—	Clear To Send (used for hardware flow control)
6	DSR	<—	Data Set Ready
7	Signal Ground	–	Signal Ground
8	CD	<—	Carrier Detect (used for modem control)
20	DTR	—>	Data Terminal Ready (used for modem control only)

Console and Auxiliary Y Cable Pinouts

The console and auxiliary Y cables allow you to simultaneously connect the console ports or auxiliary ports on two RSP2s (configured as system master and slave in RSP2 slots 2 and 3) to one console terminal or external auxiliary device (such as a modem).

Note This dual RSP2 functionality is not available with the initial release of the RSP2 processor and the Cisco 7507.

The two cables (CAB-RSP2CON= and CAB-RSP2-AUX=) ship with the Cisco 7507 chassis and are available as spare parts. The console Y-cable pinouts are listed in Table A-3 and the auxiliary Y-cable pinouts are listed in Table A-4.

Table A-3 Console Y Cable Signals (CAB-RSP2CON=)

Female DB-25 Pins	Male3 DB-25 Pins	Signal Description
P1-1	J1-1 and J2-1	Ground
P1-2	J1-2, and J2-2	Receive Data (RxD)
P1-3	J1-3 and J2-3	Transmit Data (TxD)
P1-4	J1-4 and J2-4	Clear To Send (CTS); looped to 5
P1-5	J1-5 and J2-5	Request To Send (RTS); looped to 4
P1-6	J1-6 and J2-6	Data Set Ready (DSR)
P1-7	J1-7 and J2-7	Ground
P1-8	J1-8 and J2-8	Data Carrier Detect (DCD)
P1-13	J1-13 and J2-13	YCBL Detect Ground
P1-19	J1-19 and J2-19	YCBL Detect
P1-20	J1-20 and J2-20	Data Terminal Ready (DTR)

Table A-4 Auxiliary Y Cable Signals (CAB-RSP2AUX=)

Male DB-25 Pins	Female3 DB-25 Pins	Signal Description
P1-1	J1-1 and J2-1	Ground
P1-2	J1-2 and J2-2	TxD
P1-3	J1-3 and J2-3	RxD
P1-4	J1-4 and J2-4	RTS
P1-5	J1-5 and J2-5	CTS
P1-7	J1-7 and J2-7	Ground
P1-8	J1-8 and J2-8	DCD
P1-13	J1-13 and J2-13	YCBL Detect
P1-19	J1-19 and J2-19	YCBL Detect Ground
P1-20	J1--20 and J2-20	DTR
P1-22	J1-22 and J2-22	Ring

Ethernet Connector Signals

Most Ethernet transceivers require an attachment unit interface (AUI) or transceiver cable to connect an Ethernet transceiver to the EIP Ethernet ports. Some unshielded twisted-pair (10BaseT) transceivers are compact enough to connect directly to the EIP ports without impeding other connections. For descriptions of Ethernet transceivers, connectors, and cables refer to the section "Ethernet Connection Equipment" in the chapter "Preparing for Installation."

Table A-5 lists the signals for the 15-pin Ethernet connector used on the EIP.

Table A-5 Ethernet Connector Signals

Pin	Circuit	Description
3	DO-A	Data Out Circuit A
10	DO-B	Data Out Circuit B
11	DO-S	Data Out Circuit Shield (not used)
5	DI-A	Data In Circuit A
12	DI-B	Data In Circuit B
4	DI-S	Data In Circuit Shield
7	CO-A	Control Out Circuit A (not used)
15	CO-B	Control Out Circuit B (not used)
8	CO-S	Control Out Circuit Shield (not used)
2	CI-A	Control In Circuit A
9	CI-B	Control In Circuit B
1	CI-S	Control In Circuit Shield
6	VC	Voltage Common
13	VP	Voltage Plus
14	VS	Voltage Shield (not used)
Shell	PG	Protective Ground

Fast Ethernet Connector Signals

The two connectors on the FEIP are a single MII, 40-pin, D-shell type, and a single RJ-45. You can use either one or the other. Only one connector can be used at one time. Each connection supports IEEE 802.3u interfaces compliant with the 100BASE-X and 100BASE-T standards. The RJ-45 connection does not require an external transceiver; however, the MII connection does. For descriptions of Fast Ethernet connectors and cables refer to the section "Fast Ethernet Connection Equipment" in the chapter "Preparing for Installation." The RJ-45 modular connector has strain-relief functionality incorporated into the design of its standard plastic connector. Table A-6 and Table A-7 list the pinouts and signals for the RJ-45 and MII connectors.

Table A-6 FEIP Port Adapter RJ-45 Connector Pinout

Pin	Description
1	Receive Data + (RxD+)
2	RxD–
3	Transmit Data + (TxD+)
6	TxD–

Note Referring to the RJ-45 pinout in Table A-6, proper common-mode line terminations should be used for the unused Category 5, UTP cable pairs 4/5 and 7/8. Common-mode termination reduces the contributions to electromagnetic interference (EMI) and susceptibility to common-mode sources. Wire pairs 4/5 and 7/8 are actively terminated in the RJ-45, 100BASE-TX port circuitry in the FEIP port adapter.

Table A-7 FEIP Port Adapter MII Connector Pinout

Pin[1]	In	Out	I/O	Description
14–17	–	Yes	–	Transmit Data (TxD)
12	Yes	–	–	Transmit Clock (Tx_CLK)[2]
11	–	Yes	–	Transmit Error (Tx_ER)
13	–	Yes	–	Transmit Enable (Tx_EN)
3	–	Yes	–	MII Data Clock (MDC)
4–7	Yes	–	–	Receive Data (RxD)
9	Yes	–	–	Receive Clock (Rx_CLK
10	Yes	–	–	Receive Error (Rx_ER)
8	Yes	–	–	Receive Data Valid (Rx_DV)
18	Yes	–	–	Collision (COL)
19	Yes	–	–	Carrier Sense (CRS)
2	–	–	Yes	MII Data Input/Output (MDIO)
22–39	–	–	–	Common (ground)
1, 20, 21, 40	–	–	–	+5.0VDC

1. Any pins not indicated are not used.
2. Tx_CLK and Rx_CLK are provided by the external transceiver.

Token Ring Port Signals

A network interface cable provides the connection between the 9-pin Token Ring connectors on the TRIP and a media access unit (MAU). The 9-pin connector at the TRIP end, and the MAU connector at the network end, are described in the section "Token Ring Connection Equipment" in the chapter "Preparing for Installation." Table A-8 lists the signals for the DB-9 Token Ring connector used on the TRIP.

Table A-8 Token Ring Connector Signals

Pin	Signal
1	Ring-In B
5	Ring-Out A
6	Ring-In A
9	Ring-Out B
10 and 11	Ground

FDDI Optical Bypass Switch Signals

Table A-9 lists the signal descriptions for the mini-DIN optical bypass switch available on the multimode/multimode FIP (Cx-FIP-MM) and the single-mode/single-mode (CX-FIP-SS) FIP. The mini-DIN-to-DIN adapter cable (CAB-FMDD) allows connection to an optical bypass switch that uses a DIN connector (which is larger than the mini-DIN connector on the FIP). For descriptions of FDDI connectors and cables, refer to the section "FDDI Connection Equipment" in the chapter "Preparing for Installation."

Table A-9 Optical Bypass Switch Pinout

Pin	Description
1	+5V to secondary switch
2	+5V to primary switch
3	Ground to enable primary switch
4	Ground to enable secondary switch
5	Sense circuit—1 kohm to +5 V
6	Ground—Sense circuit return

Serial Adapter Cable Pinouts

The FSIP supports EIA/TIA-232, EIA/TIA-449, X.21, V.35, and EIA-530 serial interfaces.

All FSIP ports use a universal port adapter, which is a 60-pin receptacle that supports all available interface types. (The exception to this is the E1-G.703/G.704 port adapter, which uses a DB-15 connector.) A special serial adapter cable, which is required for each port, determines the electrical interface type and mode of the interface. The router (FSIP) end of all of the adapter cables is a 60-pin plug; the connectors at the network end are the standard connectors used for the respective interfaces. All interface types except EIA-530 are available in DTE or DCE format: DTE with a plug connector at the network end and DCE with a receptacle at the network end. V.35 is available in either mode with either gender at the network end. EIA-530 is available in DTE only.

Table A-10, Table A-11, Table A-12, Table A-13, and Table A-14 list the signal pinouts for both the DTE and DCE mode serial port adapter cables for each FSIP interface type. For descriptions of serial connectors and cables refer to the section “Serial Connection Equipment” in the chapter “Preparing for Installation.”

Table A-10 EIA/TIA-232 Adapter Cable Signals

FSIP End, HD 60-Position Plug	DTE Cable			Network End, DB-25 Plug	FSIP End, HD 60-Position Plug	DCE Cable			Network End, DB-25 Receptacle
Signal	**Pin**		**Pin**	**Signal**	**Signal**	**Pin**		**Pin**	**Signal**
Shield Ground	46		1	Chas Ground	Shield Ground	46		1	Chas Ground
TxD/RxD	41	—>	2	TxD	RxD/TxD	36	<—	2	TxD
RxD/TxD	36	<—	3	RxD	TxD/RxD	41	—>	3	RxD
RTS/CTS	42	—>	4	RTS	CTS/RTS	35	<—	4	RTS
CTS/RTS	35	<—	5	CTS	RTS/CTS	42	—>	5	CTS
DSR/DTR	34	<—	6	DSR	DTR/DSR	43	—>	6	DSR
Sig Ground	45		7	Sig Ground	Sig Ground	45		7	Sig Ground
DCD/LL	33	<—	8	DCD	LL/DCD	44	—>	8	DCD
TxC/NIL	37	<—	15	TxC	TxCE/TxC	39	—>	15	TxC
RxC/TxCE	38	<—	17	RxC	NIL/RxC	40	—>	17	RxC
LL/DCD	44	—>	18	LTST	DCD/LL	33	<—	18	LTST
DTR/DSR	43	—>	20	DTR	DSR/DTR	34	<—	20	DTR
TxCE/TxC	39	—>	24	TxCE	RxC/TxCE	38	<—	24	TxCE
Mode 0 Ground Mode_DCE	50 51 52			Shorting group	Mode 0 Ground	50 51			Shorting group

Table A-11 EIA/TIA-449 Adapter Cable Signals

FSIP End, HD 60-Position Plug	DTE Cable			Network End, DB-37 Plug	FSIP End, HD 60-Position Plug	DCE Cable			Network End, DB-37 Receptacle
Signal	**Pin**		**Pin**	**Signal**	**Signal**	**Pin**		**Pin**	**Signal**
Shield Ground	46		1	Shield Ground	Shield	46		1	Shield Ground
TxD/RxD+	11	—>	4	SD+	RxD/TxD+	28	<—	4	SD+
TxD/RxD–	12	—>	22	SD–	RxD/TxD–	27	<—	22	SD–
TxC/RxC+	24	<—	5	ST+	TxCE/TxC+	13	—>	5	ST+
TxC/RxC–	23	<—	23	ST–	TxCE/TxC–	14	—>	23	ST–
RxD/TxD+	28	<—	6	RD+	TxD/RxD+	11	—>	6	RD+
RxD/TxD–	27	<—	24	RD–	TxD/RxD–	12	—>	24	RD–
RTS/CTS+	9	—>	7	RS+	CTS/RTS+	1	<—	7	RS+
RTS/CTS–	10	—>	25	RS–	CTS/RTS–	2	<—	25	RS–
RxC/TxCE+	26	<—	8	RT+	TxC/RxC+	24	—>	8	RT+
RxC/TxCE–	25	<—	26	RT–	TxC/RxC–	23	—>	26	RT–
CTS/RTS+	1	<—	9	CS+	RTS/CTS+	9	—>	9	CS+
CTS/RTS–	2	<—	27	CS–	RTS/CTS–	10	—>	27	CS–
LL/DCD	44	—>	10	LL	NIL/LL	29	—>	10	LL
Circuit Ground	45		37	SC	Circuit Ground	30		37	SC
DSR/DTR+	3	<—	11	ON+	DTR/DSR+	7	—>	11	ON+
DSR/DTR–	4	<—	29	ON–	DTR/DSR–	8	—>	29	ON–
DTR/DSR+	7	—>	12	TR+	DSR/DTR+	3	<—	12	TR+
DTR/DSR–	8	—>	30	TR–	DSR/DTR–	4	<—	30	TR–
DCD/DCD+	5	<—	13	RR+	DCD/DCD+	5	—>	13	RR+
DCD/DCD–	6	<—	31	RR–	DCD/DCD–	6	—>	31	RR–
TxCE/TxC+	13	—>	17	TT+	RxC/TxCE+	26	<—	17	TT+
TxCE/TxC–	14	—>	35	TT–	RxC/TxCE–	25	<—	35	TT–
Circuit Ground	15		19	SG	Circuit Ground	15		19	SG
Circuit Ground	16		20	RC	Circuit Ground	16		20	RC
Mode 1 Ground	49 48			Shorting group	Mode 1 Ground	49 48			Shorting group
Ground Mode_DCE	51 52			Shorting group					

Table A-12 X.21 Adapter Cable Signals

FSIP End, HD 60-Position Plug	DTE Cable			Network End, DB-15 Plug	FSIP End, HD 60-Position Plug	DCE Cable			Network End, DB-15 Receptacle
Signal	**Pin**		**Pin**	**Signal**	**Signal**	**Pin**		**Pin**	**Signal**
Ground	46		1		Ground	46		1	
TxD/RxD+	11	—>	2	Transmit+	RxD/TxD+	11	—>	2	Transmit+
TxD/RxD–	12	—>	9	Transmit–	RxD/TxD–	12	—>	9	Transmit–
RTS/CTS+	9	—>	3	Control+	CTS/RTS+	9	—>	3	Control+
RTS/CTS –	10	—>	10	Control–	CTS/RTS –	10	—>	10	Control–
RxD/TxD+	28	<—	4	Receive+	TxD/RxD+	28	<—	4	Receive+
RxD/TxD–	27	<—	11	Receive–	TxD/RxD–	27	<—	11	Receive–
CTS/RTS+	1	<—	5	Indication+	RTS/CTS+	1	<—	5	Indication+
CTS/RTS –	2	<—	12	Indication–	RTS/CTS–	2	<—	12	Indication–
RxC/TxCE+	26	<—	6	Timing+	TxC/RxC+	26	<—	6	Timing+
RxC/TxCE–	25	<—	13	Timing–	TxC/RxC –	25	<—	13	Timing–
Circuit Ground	15		8	Circuit Ground	Circuit Ground	15		8	Circuit Ground
Ground Mode_2	48 47			Shorting group	Ground Mode_2	48 47			Shorting group
Ground Mode_DCE	51 52			Shorting group	Ground Mode_DCE	51 52			

Table A-13 V.35 Adapter Cable Signals

FSIP End, HD 60-Position Plug	DTE Cable			Network End, 34-Position Plug	FSIP End, HD 60-Position Plug	DCE Cable			Network End, 34-Position Receptacle
Signal	**Pin**		**Pin**	**Signal**	**Signal**	**Pin**		**Pin**	**Signal**
Shield Ground	46		A	Frame Ground	Shield Ground	46		A	Frame Ground
Circuit Ground	45		B	Circuit Ground	Circuit Ground	45		B	Circuit Ground
RTS/CTS	42	—>	C	RTS	CTS/RTS	35	<—	C	RTS
CTS/RTS	35	<—	D	CTS	RTS/CTS	42	—>	D	CTS
DSR/DTR	34	<—	E	DSR	DTR/DSR	43	—>	E	DSR
DCD/LL	33	<—	F	RLSD	LL/DCD	44	—>	F	RLSD
DTR/DSR	43	—>	H	DTR	DSR/DTR	34	<—	H	DTR
LL/DCD	44	—>	K	LT	DCD/LL	33	<—	K	LT
TxD/RxD+	18	—>	P	SD+	RxD/TxD+	28	<—	P	SD+
TxD/RxD–	17	—>	S	SD–	RxD/TxD–	27	<—	S	SD–
RxD/TxD+	28	<—	R	RD+	TxD/RxD+	18	—>	R	RD+
RxD/TxD–	27	<—	T	RD–	TxD/RxD–	17	—>	T	RD–
TxCE/TxC+	20	—>	U	SCTE+	RxC/TxCE+	26	<—	U	SCTE+
TxCE/TxC–	19	—>	W	SCTE–	RxC/TxCE–	25	<—	W	SCTE–
RxC/TxCE+	26	<—	V	SCR+	NIL/RxC+	22	—>	V	SCR+
RxC/TxCE–	25	<—	X	SCR–	NIL/RxC–	21	—>	X	SCR–
TxC/RxC+	24	<—	Y	SCT+	TxCE/TxC+	20	—>	Y	SCT+
TxC/RxC–	23	<—	AA	SCT–	TxCE/TxC–	19	—>	AA	SCT–
Mode 1 Ground	49 48			Shorting group	Mode 1 Ground	49 48			Shorting group
Mode 0 Ground Mode_DCE	50 51 52			Shorting group	Mode 0 Ground	50 51			Shorting group
TxC/NIL RxC/TxCE RxC/TxD Ground	53 54 55 56			Shorting group	TxC/NIL RxC/TxCE RxC/TxD Ground	53 54 55 56			Shorting group

Table A-14 EIA-530 DTE Adapter Cable Signals

FSIP End, HD 60-Position Plug	DTE Cable[1]			Network End, DB-25 Plug
Signal	**Pin**		**Pin**	**Signal**
Shield ground	46		1	Shield ground
TxD/RxD+	11	—>	2	TxD+
TxD/RxD–	12	—>	14	TxD–
RxD/TxD+	28	<—	3	RxD+
RxD/TxD–	27	<—	16	RxD–
RTS/CTS+	9	—>	4	RTS+
RTS/CTS–	10	—>	19	RTS–
CTS/RTS+	1	<—	5	CTS+
CTS/RTS–	2	<—	13	CTS–
DSR/DTR+	3	<—	6	DSR+
DSR/DTR–	4	<—	22	DSR–
DCD/DCD+	5	<—	8	DCD+
DCD/DCD–	6	<—	10	DCD–
TxC/RxC+	24	<—	15	TxC+
TxC/RxC–	23	<—	12	TxC–
RxC/TxCE+	26	<—	17	RxC+
RxC/TxCE–	25	<—	9	RxC–
LL/DCD	44	—>	18	LL
Circuit Ground	45		7	Circuit Ground
DTR/DSR+	7	—>	20	DTR+
DTR/DSR–	8	—>	23	DTR–
TxCE/TxC+	13	—>	24	TxCE+
TxCE/TxC–	14	—>	11	TxCE–
Mode_1 Ground Mode_2	49 48 47			Shorting group
Ground Mode_DCE	51 52			Shorting group

1. EIA-530 is not available in DTE mode.

Table A-15 shows the signal pinouts for each type of E1-G.703/G.704 interface cable. All cables use a 15-pin D-shell (DB-15) connector at the FSIP end.

Table A-15 E1-G.703/G.704 Adapter Cable Connector Pinouts

FSIP End		Network End				
DB-15[1]		DB-15	Null Modem DB-15	BNC	Twinax	
Pin	Signal[2]	Pin	Pin	Signal	Pin	Signal
9	Tx tip	1	3	Tx tip	J2-1	Tx
2	Tx ring	9	11	Tx shield	J2-2	Tx
10	Tx shield	2	4	–	J2 shield	Tx shield
8	Rx tip	3	1	Rx tip	J3-1	Rx
15	Rx ring	11	9	Rx shield	J3-2	Rx
7	Rx shield	4	2	–	J3 shield	Rx shield

1. Any pins not described in this table are not connected.
2. Tx = transmit. Rx = receive.

HSSI Connector Signals

Two types of cables are available for use with the HIP: the HSSI interface cable used to connect the HIP HSSI port with an external DSU (and HSSI network) and a null modem cable, which allows you to connect two collocated routers back to back.

HSSI Interface Cable

The HSSI interface cable (Product Number CAB-HSI1) connects the HIP port with an external DSU. The cable comprises 25 twisted pairs and a 50-pin SCSI-II-type plug at each end. Although the HSSI cable is similar to a SCSI-II cable, it is not identical; you cannot substitute a SCSI-II cable for a HSSI interface cable (see the following Caution).

Caution Although the HIP connector and the HSSI interface cable are similar to SCSI-II format, the HSSI cable specification is more stringent than that for a SCSI-II. We cannot guarantee proper operation if a SCSI-II cable is used instead of an HSSI interface cable.

Table A-16 lists the pin signals for the connector.

Table A-16 HSSI Interface Cable Signals

Signal Name	Pin No., + Side (Router End)	Direction[1]	Pin No., – Side (DSU End)
SG - Signal Ground	1	—	26
RT - Receive Timing	2	<—	27
CA - DCE Available	3	<—	28
RD - Receive Data Reserved	4	<—	29
LC - Loopback Circuit C	5	<—	30
ST - Send Timing	6	<—	31
SG - Signal Ground	7	—	32
TA - DTE Available	8	—>	33
TT - Terminal Timing	9	—>	34
LA - Loopback Circuit A	10	—>	35
SD - Send Data	11	—>	36
LB - Loopback Circuit B	12	—>	37
SG - Signal Ground	13	—	38
5 - Ancillary to DCE	14–18	—>	39–43
SG - Signal Ground	19	—	44
5 - Ancillary from DCE	20–24	<—	45–49
SG - Signal Ground	25	—	50

1. Router is + side (DTE). DSU is – side (DCE).

Null Modem Cable

The null modem cable (CAB-HNUL) can connect two routers directly back to back. The two routers must be in the same location and can be two Cisco 7507s, two Cisco 7000s, or one of each. A null modem connection allows you to verify the operation of the HSSI or to link the routers directly in order to build a larger node.

The null modem cable uses the same 50-pin connectors as the HSSI interface cable, but uses the pinouts listed in Table A-17. For null modem cable connection and configuration instructions, refer to the section “HSSI Connection Equipment” in the chapter “Preparing for Installation.”

Table A-17 HSSI Null Modem Cable Signals

Signal Name	From Pins	Direction	To Pins	Signal Name
Receive Timing	2, 27	—>	9, 34	Terminal Timing
DCE Available	3, 28	—>	8, 33	DTE Available
Received Date	4, 29	—>	11, 36	Send Data
Loopback C	5, 30	—>	10, 35	Loopback A
Send Timing	6, 31	—>	6, 31	Send Timing
DTE Available	8, 33	—>	3, 28	DCE Available
Terminal Timing	9, 34	—>	2, 27	Receive Timing
Loopback A	10, 35	—>	5, 30	Loopback C
Send Data	11, 36	—>	4, 29	Receive Data
Ground	1, 26, 7, 32, 13, 38, 19, 44, 25, 50		1, 26, 7, 32, 13, 38, 19, 44, 25, 50	Ground
Loopback (not connected)	12, 37			
			12, 37	Loopback (not connected)
Not used	14–18, 20–24, 39–43, 45–49		14–18, 20–24, 39–43, 45–49	Not used

MIP Interface Cable Pinouts

The MIP interface cables have two, male, 15-pin DB connectors (one at each end) to connect the MIP with the external CSU. Table A-18 lists the pinouts for the null-modem T1 cable, and Table A-19 lists the pinouts for the straight-through T1 cable. Table A-20 lists the pinouts for the E1 interface cables.

Table A-18 T1 Null-Modem Cable Pinouts

15-Pin DB Connector			15-Pin DB Connector
Signal	**Pin**	**Pin**	**Signal**
Transmit tip	1	3	Receive tip
Receive tip	3	1	Transmit tip
Transmit ring	9	11	Receive tip
Receive tip	11	9	Transmit ring

Table A-19 T1 Straight-Through Cable Pinouts

15-Pin DB Connector			15-Pin DB Connector
Signal	**Pin**	**Pin**	**Signal**
Transmit tip	1	1	Transmit tip
Transmit ring	9	9	Transmit ring
Receive tip	3	3	Receive tip
Receive tip	11	11	Receive tip

Table A-20 E1 Interface Cable Pinouts

MIP End		Network End						
DB-15[1]		BNC	DB-15		Twinax		RJ-45	
Pin	**Signal[2]**	**Signal**	**Pin**	**Signal**	**Pin**	**Signal**	**Pin**	**Signal**
9	Tx tip	Tx tip	1	Tx tip	Tx-1	Tx tip	1	Tx tip
2	Tx ring	Tx shield	9	Tx ring	Tx-2	Tx ring	2	Tx ring
10	Tx shield	–	2	Tx shield	Shield	Tx shield	3	Tx shield
8	Rx tip	Rx tip	3	Rx tip	Rx-1	Rx tip	4	Rx tip
15	Rx ring	Rx shield	11	Rx ring	Rx-2	Rx ring	5	Rx ring
7	Rx shield	–	4	Rx shield	Shield	Rx shield	6	Rx shield

1. Any pins not described in this table are not connected.
2. Tx = transmit. Rx = receive.