Cisco 2000 Series Hardware Installation

Following is the information required to install the router chassis.

About This Guide

Follow this procedural path to install your router:

1. Install the router hardware using the procedures described in this publication.
2. After the hardware is installed, refer the *Router Products Getting Started Guide* or to the appropriate software publication to configure the router.
3. Refer to the "Reference" section in this publication for cabling and basic troubleshooting information.

Installation

This section guides you through the installation of the router and includes information on safety, inspecting the system, preventing electrostatic discharge (ESD) damage, tools and parts required, rack mounting, wall mounting, and making external cable connections.

Note If you have questions about agency approvals, basic troubleshooting, system specifications, or specific cable pinout information, review the information in the section "Reference" on page 9.

Safety Recommendations

Follow these guidelines to ensure general safety:

- Keep the router area clear and dust-free during and after installation.
- Put the removed router cover in a safe place.
- Keep tools away from walk areas where you and others could trip over them.
- Do not wear loose clothing that could get caught in the router chassis. Fasten your tie or scarf and sleeves.
- Wear safety glasses when working under any conditions that might be hazardous to your eyes.
- Do not perform any action that creates a potential hazard to people or makes the equipment unsafe.

Warning Before working on equipment that is connected to power lines, remove jewelry (including rings, necklaces, and watches). Metal objects will heat up when connected to power and ground and can cause serious burns or weld the metal object to the terminals.

- Locate the emergency power-off switch in the room in which you are working. Then, if an electrical accident occurs, you can act quickly to shut the power off.
- Before working on the system, turn off the power and unplug the power cord.
- Disconnect all power before doing the following:
  - — Installing or removing a router
  - — Working near power supplies
  - — Performing a software upgrade
- Do not work alone when potentially hazardous conditions exist.
- Never assume that power has been disconnected from a circuit. Always check.
- Look carefully for possible hazards in your work area, such as moist floors, ungrounded power extension cables, and missing safety grounds.
- If an electrical accident occurs, proceed as follows:
  - — Use caution; do not become a victim yourself.
  - — Turn off power to the system.
  - — If possible, send another person to get medical aid. Otherwise, assess the condition of the victim and then call for help.
  - — Determine if the person needs rescue breathing or external cardiac compressions; then take appropriate action.

Inspecting the System

Do not unpack the router until you are prepared to install it. If the final installation site will not be ready for some time, keep the router in the shipping container to prevent accidental damage. When you have determined where you want the router installed, proceed with the unpacking. The router, cables, publications, and any optional equipment you ordered might be shipped in more than one container. When you unpack each shipping container, check the packing list to ensure that you received all of the following items:

- Router
- 6-foot (1.8-meter) power cord

- Optional equipment (which might include network connection cables)
- A warranty card, a service and support card, and optional companion publications as specified by your order

Inspect all items for shipping damage. If anything appears damaged, or if you encounter problems when installing or configuring your system, contact a service representative.

Preventing Electrostatic Discharge Damage

Electrostatic discharge (ESD) can damage equipment and impair electrical circuitry. It occurs when electronic printed circuit cards are improperly handled and can result in complete or intermittent failures. Always follow ESD prevention procedures when removing and replacing cards. Ensure that the router chassis is electrically connected to earth ground. Wear an ESD wrist strap, ensuring that it makes good skin contact. Connect the clip to an unpainted chassis frame surface to safely channel unwanted ESD voltages to ground. To properly guard against ESD damage and shocks, the wrist strap and cord must operate effectively. If no wrist strap is available, ground yourself by touching the metal part of the chassis.

Caution For safety, periodically check the resistance value of the antistatic strap, which should be within the range of 1 and 10 Mohms.

Tools and Parts Required

Following are the tools and parts required to install the router:

- Screwdrivers:
  - No. 1 Phillips
  - Small, 3/16" (0.476 cm), and medium, 1/4" (0.625 cm), flat-blade
- ESD-preventive wrist strap
- Optional rack-mount/wall-mount kit (with documentation)
- One interface cable for each interface you require

In addition, you might need the following additional external equipment:

- Rack- and wall-mount brackets, fasteners, and instructions
- Channel service unit/digital service unit (CSU/DSU) for the serial interfaces
- Ethernet transceiver
- Token Ring media attachment unit (MAU)

- Modem for remote configuration (if required)
- Console terminal (configured for 9600 baud, 8 data bits, no parity, and 2 stop bits) if future reconfiguration is desired

Information on Mounting the Router on a Rack or Wall

Rack and wall mounting procedures are described in a separate publication included with the optional rack mount kit. If you intend to rack mount the router, do so before making the external connections.

Preparing for External Connections

Following are the procedures for making external connections to the router. Figure 1 shows the rear panel of the router with the following connectors:

- Ethernet DB-15 (2102) or Token Ring DB-9 (2202)
- Serial DB-50 (1)
- Console RS-232
- Auxiliary RS-232
- AC power cable

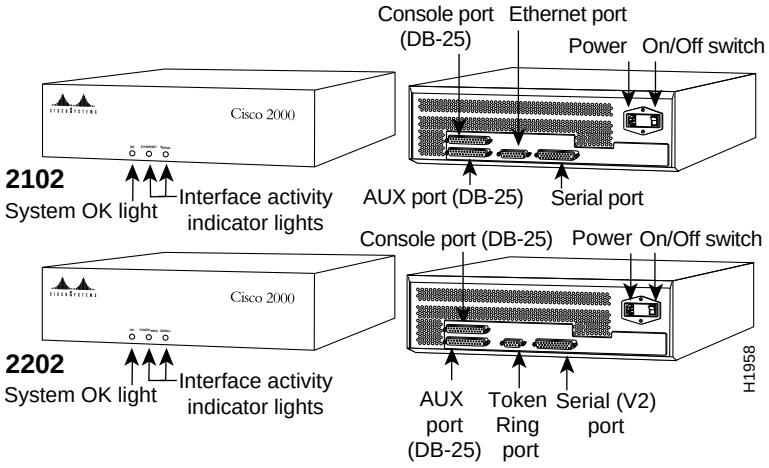

Figure 1 Router Front and Rear View—Models 2102 and 2202

Information for United Kingdom Use Only

Cisco Systems declaration of operating conditions:

The Cisco 2000 is designed to meet the requirements of NET1 and NET2.

Warnings

Interconnection directly, or by way of other apparatus, of ports marked:

“Safety Warning — See instructions for use”

with ports marked or not so marked may produce hazardous conditions on the network and that advice should be obtained from a competent engineer before such a connection is made.

The ports marked “Ethernet,” “Token Ring,” “Console,” and “AUX” have a safety warning applied to them as follows:

“These ports do not provide isolation sufficient to satisfy the requirement of BS6301; apparatus connected to these ports should either have been approved to BS6301 or have previously been evaluated against British Telecommunications plc (Post Office) Technical Guides 2 or 26 and given permission to attach; any that other usage will invalidate any approval given to this apparatus.”

Connection of Power Supply. The Cisco 2000 is intended for use when supplied with power from a supply providing 220-240 VAC, 50/60 Hz up to 5 Amps.

Other usage will invalidate any approval given to this apparatus if as a result it ceases to comply with BS6301: 1989.

The Cisco 2000 is brought into service by the supplier.

Information for European Community Use Only

The ports marked “Ethernet,” “Token Ring,” “Console,” and “AUX” are SELV circuits. SELV circuits should only be connected to other SELV circuits.

Making External Connections

Follow these steps to make external connections to your router:

Step 1 Connect the Ethernet port to the network as shown in Figure 2.

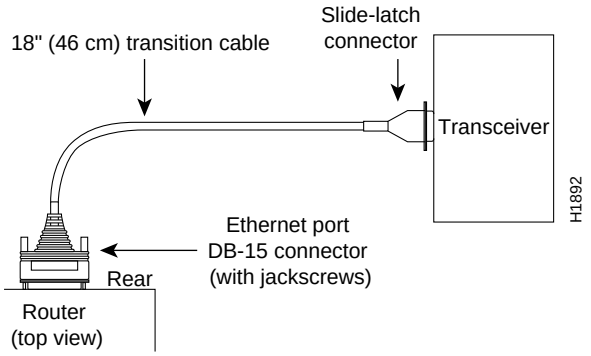

Figure 2 Ethernet Transition Cable Connections

Step 2 Extend the Ethernet cable as shown in Figure 3.

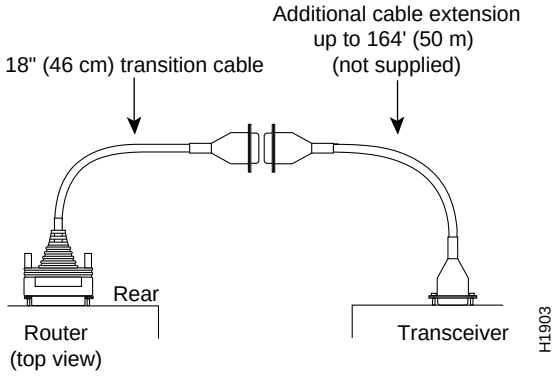

Figure 3 Extending the Transition Cable from the Router's Ethernet Port

Step 3 Connect the Token Ring port to the network as shown in Figure 4.

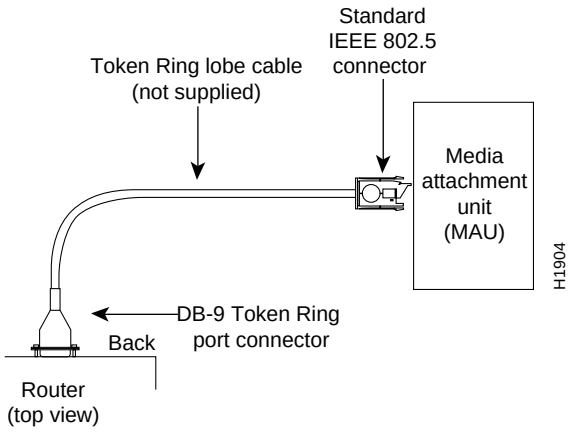

Figure 4 Token Ring Cable Connections

Step 4 Connect the serial ports to the network as shown in Figure 5.

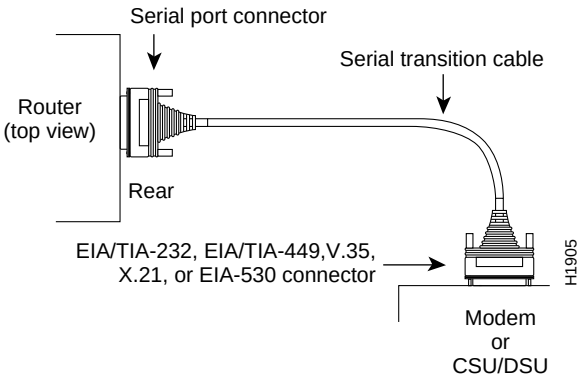

Figure 5 Serial Cable Connections

Step 5 Connect the console and auxiliary ports as required for your method of configuration. Your terminal should be configured for 9600 baud, 8 data bits, no parity, and 1 stop bits.

Step 6 Connect the power cable between the router and the AC source.

What to Do after the Router Hardware Is Installed

After the router hardware is installed, the system is ready to be powered on and configured. For software configuration information, refer to the following publications:

- *Router Products Getting Started Guide, Router Products Configuration Guide* and *Router Products Command Summary*
- *Cisco 2000 Quick-Start Guide* (as needed)
- *Troubleshooting Internetworking Systems* (as needed)

To order these or additional associated publications, refer to the *Service and Support* card that accompanied your router.

Reference

This section includes the following reference information:

- Troubleshooting information
- System specifications
- Cable pinouts

Note For additional information on the Cisco 2000 router, refer to the *Cisco 2000 Quick-Start Guide*. For information on installing the router hardware, refer to the section "Installation" on page 1 of this publication.

Troubleshooting

The key to problem solving in this system is to try to isolate the problem to a specific subsystem. By comparing what the system is doing to what it should be doing, the task of isolating a problem is greatly simplified.

Check the following items to help isolate the problem:

- With the power switch on and system LEDs on, does the fan operate? If no, suspect the fan or the 12-volt (V) power supply.
- Does the system shut down after being on a short time?
  - Suspect a thermal-induced shutdown.
  - Ensure that the chassis intake and exhaust vents are clear.
  - Suspect a power supply failure.
- System does not boot up, but System OK LED is on: suspect the 12V power supply.
- System partially boots, but System OK LED is *not* on: suspect a 5V power supply failure.

The System OK LED should be on after the system initializes correctly. (See Figure 1.)

Note If an interface is extremely busy, the corresponding LED will be on all the time.

System Specifications

Following are the specifications for the router system.

Table 1 System Specifications

Description	Design Specification
Dimensions H x W x D	13" x 14" x 4" (33 x 35.6 x 10 cm)
Weight	15 lb (6.8 kg)
Input voltage, frequency, and power dissipation	110/220 VAC at 50 through 60 Hz 55W (max.) 273 Btu/hr
Processor	Motorola 68EC030—20 MHz
Memory	1-MB primary memory 512-KB shared memory 32-KB nonvolatile configuration RAM
Network interface options	1 Ethernet and 1 synchronous serial (2102) or 1 Token Ring and 1 synchronous serial (2202)
Ethernet interfaces	AUI[1] IEEE 802.3 (DB-15)
Token Ring	IEEE 802.5 (DB-9)
Synchronous serial interfaces	RS-232, RS-449, V.35, X.21, EIA-530
Console port	Asynchronous RS-232 DB-25 female connector
Auxiliary port	Asynchronous RS-232 DB-25 male connector
Operating environment	32 to 104°F (0 to 40°C)
Nonoperating temperature	–40 to 185°F (–40 to 85°C)
Operating humidity	5 to 95%, noncondensing
Noise level	40 dBa

1. AUI = Attachment unit interface.

Cable Pinouts

The following tables list the pinouts for the cables that can be used with the router:

- Console asynchronous serial port, Table 2, on page 11
- Auxiliary asynchronous serial port, Table 3, on page 11
- EIA-530 synchronous serial DTE, Table 4, on page 12
- RS-232 synchronous serial DTE, Table 5, on page 14
- RS-449 synchronous serial DTE, Table 6, on page 15
- V.35 synchronous serial DTE, Table 7, on page 16

- X.21 synchronous serial DTE, Table 8, on page 17
- Ethernet AUI, Table 9, on page 18
- Token Ring, Table 10, on page 17

Note In the following tables, pinouts representing DTE and DCE cables use arrows to indicate signal direction: —> indicates DTE to DCE, <— indicates DCE to DTE.

For more detailed pinout information, refer to the *Cisco 2000 Quick-Start Guide*.

Table 2 Console Asynchronous Serial Port RS-232 Pinout (25-Pin D Connector)

Pin [1]	Signal Name	Direction
1	Frame Ground	–
2	Transmitted Data	Input
3	Received Data	Output
4	Request To Send	Shorted together internally with pin 5
5	Clear To Send	–
6	Shorted to pin 8	Output
7	Ground	–
8	Carrier Detect	Output
20	Data Terminal Ready	Input

1. Any pin not referenced on a connector is not connected.

Table 3 Auxiliary Asynchronous Serial Port RS-232 Pinout (25-Pin D Connector)

Pin [1]	Signal Name	Direction
1	Frame Ground	–
2	Transmitted Data	Output
3	Received Data	Input
4	Request To Send	Output
5	Clear To Send	Input
7	Ground	–

Pin [1]	Signal Name	Direction
8	Carrier Detect	Input
20	Data Terminal Ready	Output
22	Ring Indicator	Input

1. Any pin not referenced on a connector is not connected.

Table 4 EIA-530 DTE Serial Cable Pinout

Part Number 72-0732-01 Connections				
50 Pin[1]	**Signal Name**	**Direction**	**25 Pin**	**Type**
J1-5 J1-38	Looped		NC	Jumper
J1-1 J1-34	TXD + TXD –	—> —>	J2-2 J2-14	Twisted Pair
J1-35 J1-19	RXD + RXD –	<— <—	J2-3 J2-16	Twisted Pair
J1-4 J1-20	RTS + RTS –	—> —>	J2-4 J2-19	Twisted Pair
J1-6 J1-22	CTS + CTS –	<— <—	J2-5 J2-13	Twisted Pair
J1-10 J1-26	RLSD + (RR +) RLSD – (RR -)	<— <—	J2-8 J2-10	Twisted Pair
J1-2 J1-18	SCT + SCT –	<— <—	J2-15 J2-12	Twisted Pair
J1-37 J1-21	SCR + SCR –	<— <—	J2-17 J2-9	Twisted Pair
J1-43 J1-27	SCTE + (TT +) SCTE – (TT –)	<— <—	J2-24 J2-11	Twisted Pair
J1-7	LL	—>	J2-18	Twisted Pair

Part Number 72-0732-01 Connections

50 Pin[1]	Signal Name	Direction	25 Pin	Type
J1-48 J1-36	Ground		J2-23 J2-7	Twisted Pair
J1-15	Shield		J2-1	Single Wire
J1-8 J1-24	DCE Ready Ground	<—	J2-6 J2-23	Twisted Pair
J1-41	DTE Ready	—>	J2-20	Twisted Pair

1. Any pin not referenced on a connector is not connected.

Table 5 RS-232 DTE Serial Cable Pinout

Part Number 72-0670-01 Connections[1]		
50 Pin	**25 Pin**	**Type**
J1-3	J1-36	
J1-39	J2-5	Twisted Pair
J1-40	J2-4	
J1-9	J2-8	Twisted Pair
J1-42	J2-6	
J1-11	J2-2	Twisted Pair
J1-44	J2-7	
J1-46	J2-3	Twisted Pair
J1-30	J2-20	
J1-14	J2-18	Twisted Pair
J1-47	J2-17	
J1-31	J2-15	Twisted Pair
J1-15	J2-1	
J1-16	J2-24	Twisted Pair

1. Any pin not referenced on a connector is not connected.

Table 6 RS-449 DTE Serial Cable Pinout

Part Number 72-0672-01 Connections		
50 Pin[1]	**37 Pin**	**Type**
J1-5	J1-38	
J1-7	J2-10	
J1-1 J1-34	J2-4 J2-22	Twisted Pair
J1-2 J1-18	J2-5 J2-23	Twisted Pair
J1-35 J1-19	J2-6 J2-24	Twisted Pair
J1-4 J1-20	J2-7 J2-25	Twisted Pair
J1-37 J1-21	J2-8 J2-26	Twisted Pair
J1-22 J1-6	J2-27 J2-9	Twisted Pair
J1-8 J1-24	J2-11 J2-29	Twisted Pair
J1-41 J1-25	J2-12 J2-30	Twisted Pair
J1-10 J1-26	J2-13 J2-31	Twisted Pair
J1-43 J1-27	J2-17 J2-35	Twisted Pair
J1-36 J1-15	J2-19 J2-1	Twisted Pair
J1-44 J1-48	J2-37 J2-20	Twisted Pair

1. Any pin not referenced on a connector is not connected.

Table 7 V.35 DTE Serial Cable Pinout

Part Number 72-0671-02
Connections

50 Pin[1]	34 Pin	Type	Signal	Direction
J1-3	J1-36	Jumper	MUX	To Ground
J1-5	J1-38	Jumper	MUX	To Ground
J1-14	J2-K	Twisted Pair	LTST	—>
J1-Shield	J2-Shield		Not Used	
J1-2	J2-Y	Twisted Pair	SCT +	<—
J1-18	J2-AA		SCT –	<—
J1-12	J2-P	Twisted Pair	TXD +	—>
J1-28	J2-S		TXD –	—>
J1-35	J2-R	Twisted Pair	RXD +	<—
J1-19	J2-T		RXD –	<—
J1-37	J2-V	Twisted Pair	SCR +	<—
J1-21	J2-X		SCR –	<—
J1-45	J2-U	Twisted Pair	SCTE +	—>
J1-29	J2-W		SCTE –	—>
J1-42	J2-E	Twisted Pair	DSR	<—
J1-Shield	J2-Shield		Not Used	
J1-9	J2-F	Twisted Pair	RLSD	<—
J1-48	J2-A		Ground	<—
J1-40	J2-C	Twisted Pair	RTS	—>
J1-Shield	J2-Shield		Not Used	
J1-2	J1-3	Resistor	SCT +	R To
J1-18	J1-5	Resistor	SCT –	Ground
J1-35	J1-36	Resistor	RXD +	R To
J1-19	J1-38	Resistor	RXD –	Ground
J1-37	J1-44	Resistor	SCR +	R To
J1-21	J1-48	Resistor	SCR –	Ground
J1-30	J2-H	Twisted Pair	DTR	—>
J1-44	J2-B		Ground	—>
J1-39	J2-D	Twisted Pair	CTS	—>
J1-Shield	J2-Shield		Not Used	
J1-Shield	J2-Shield	Twisted Pair	Not Used	
J1-Shield	J2-Shield		Not Used	
J1-Shield	J2-Shield	Single	Not Used	

1. Any pin not referenced on a connector is not connected.

Table 8 X.21 DTE Serial Cable Pinout

Part Number 72-0683-02 Connections[1]

From	Signal	Type	To	Signal
J1-5	MUX SEL		J1-38	GND
J1-36	449 GND		J2-8	X.21 GND
J1-41 J1-25	449 DTR	Jumper	J1-6 J1-22	449 CTS
J1-41 J1-25	449 DTR	Jumper	J1-8 J1-24	449 DSR
J1-43 J1-27	449 SCTE	Jumper	J1-37 J1-21	449 SCR
J1-1 J1-34	449 TXD	Twisted Pair	J2-2 J2-9	X.21 TXD
J1-4 J1-20	449 RTS	Twisted Pair	J2-3 J2-10	X.21 CTL
J1-35 J1-19	449 RXD	Twisted Pair	J2-4 J2-11	X.21 RXD
J1-10 J1-26	449 RLSD	Twisted Pair	J2-5 J2-12	X.21 IND
J1-2 J1-18	449 SCT	Twisted Pair	J2-6 J2-13	X.21 CLK

1. Any pin not referenced on a connector is not connected.

Table 9 Ethernet (AUI) Port Pinout

Pin[1]	Ethernet Circuit	Signal
1	CI-S	Control In Circuit Shield
2	CI-A	Control In Circuit A
3	DO-A	Data Out Circuit A
4	DI-S	Data In Circuit Shield
5	DI-A	Data In Circuit A
6	VC	Voltage Common
7	CO-A	Control Out Circuit A (not connected)
8	CO-S	Control Out Circuit Shield (not connected)
9	CI-B	Control In Circuit B
10	DO-B	Data Out Circuit B
11	DO-S	Data Out Circuit Shield
12	DI-B	Data In Circuit B
13	VP	Voltage Plus
14	VS	Voltage Shield (L25 and M25)
15	CO-B	Control Out Circuit B (not connected)
Shell	PG	Protective Ground

1. Any pin not referenced on a connector is not connected.

Table 10 Token Ring Port Pinout (DB-9)

9-Pin	Signal
1	–RX
2	NC[1]
3	NC
4	NC
5	–TX
6	+RX
7	NC
8	NC
9	+TX

1. NC stands for *not connected.*