

## Configuring the Router Card

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After installing the Cisco 2517 or Cisco 2519 and connecting a terminal or PC to the EIA/TIA-232 port on the management card, configure the Cisco IOS software.

The following steps are required to configure the router card, and are explained in more detail later in this chapter:

- Connect to the management card.
- Escape to the console prompt.
- Use the **router** command to connect to the router card.
- Configure all interfaces on the router card.
- Escape back to the management card console (**Ctrl-Q**).
- Use the **agent** command to restart the SNMP agent.

The remainder of this chapter explains these procedures in detail.

# Connecting to the Router Card

Connect a terminal or PC to the EIA/TIA-232 console port of the management card as described in the chapter “Installing the Router/hub.”

**Step 1** Apply power to the Cisco router/hub. Wait approximately two minutes for the system to initialize and complete the self-tests.

**Step 2** After the SNMP manager starts, press **Ctrl-E** to exit to the console prompt, <<C>>.

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**Note** If **Ctrl-E** has no effect, the console may have timed out. Type **hellottt** to reactivate the console, then type **Ctrl-E** to escape to the console prompt.

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**Step 3** At the console prompt, enter the following command to connect to the router card console:

**router**

You can now begin configuring the router card.

# Configuring the Router Card

This section describes the following procedures:

- Configuring the router card manually using the automated setup routine
- Configuring the router card using AutoInstall

You should follow the procedure that best fits the needs of your network configuration.

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**Note** When you finish configuring the router card, enter **Ctrl-Q** to return to the console prompt.

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## Configuring the Router Card Manually

If you do not plan to use AutoInstall, do not connect the router card's serial (WAN) cable to the CSU/DSU or the router card itself. This will prevent the router card from attempting to run the AutoInstall process. The router card will attempt to run AutoInstall whenever you start it if the serial (WAN) connection is connected on both ends and the router card does not have a configuration stored in NVRAM.

It can take several minutes for your router card to determine that AutoInstall is not set up on a remote TCP/IP host. After the router card determines that AutoInstall is not configured, it will default to the setup routine. If the serial (WAN) cable is not connected, the router card will boot from Flash memory and go into the setup routine immediately.

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**Note** You can run the setup routine any time you are at the enable prompt (#) by entering the **setup** command.

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After you boot from Flash memory, the following information appears after about 30 seconds.

**Step 1** If you are not connected to the router card, use the **router** command from the management card console:

```
<<C>>router
<<C>>ttt -c4 -i -r -q17

Terminal Emulation Facility. v.1.1.9.

Loading 103-2.0.2 at 0x3000040, size = 5407432 bytes [OK]

F3: 5280172+127228+269448 at 0x3000060

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Software clause at DFARS sec. 252.227-7013.
```

## Configuring the Router Card

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```
cisco Systems, Inc.  
170 West Tasman Drive  
San Jose, California 95134-1706
```

```
Cisco Internetwork Operating System Software  
IOS (tm) 3000 Software (IGS-J-L), Version 10.3(2.0.2)  
Copyright (c) 1986-1995 by cisco Systems, Inc.  
Compiled Tue 21-Mar-95 12:57 by deannaw  
Image text-base: 0x0302CACC, data-base: 0x00001000
```

```
cisco AP-RBC (68030) processor (revision A) with 4092K/2048K bytes of  
memory.  
Processor board serial number 01708657  
SuperLAT software copyright 1990 by Meridian Technology Corp).  
TN3270 Emulation software (copyright 1994 by TGV Inc).  
X.25 software, Version 2.0, NET2, BFE and GOSIP compliant.  
Bridging software.  
Basic Rate ISDN software, Version 1.0.  
Authorized for Enterprise software set. (0x0)  
1 Token Ring/IEEE 802.5 interface.  
2 Serial network interfaces.  
1 ISDN Basic Rate interface.32K bytes of non-volatile configuration  
memory.  
1 PCbus interface.
```

```
8192K bytes of processor board System flash (Read ONLY)
```

```
Notice: NVRAM invalid, possibly due to write erase.
```

```
--- System Configuration Dialog ---
```

```
At any point you may enter a question mark '?' for help.  
Refer to the 'Getting Started' Guide for additional help.  
Use ctrl-c to abort configuration dialog at any prompt.
```

### Step 2 Enter the initial configuration dialog:

```
Would you like to enter the initial configuration dialog? [yes]: yes
```

```
First, would you like to see the current interface summary? [yes]: yes
```

```
Any interface listed with OK? value "NO" does not have a valid  
configuration
```

Interface	IP-Address	OK?	Method	Status	Protocol
BRI0	unassigned	NO	not set	up	up
PCbus0	unassigned	NO	not set	down	down
Serial0	unassigned	NO	not set	down	down
Serial1	unassigned	NO	not set	down	down
TokenRing0	unassigned	NO	not set	reset	down

**Step 3** Configure global parameters. Choose which protocols to support on your Token Ring interface. For IP-only installations, you can accept the default values for most of the questions. A typical configuration follows:

Configuring global parameters:

Enter host name [Router]: **c2517**

The enable secret is a one-way cryptographic secret used instead of the enable password when it exists.

Enter enable secret: **1111**

The enable password is used when there is no enable secret and when using older software and some boot images.

Enter enable password: **2222**

Enter virtual terminal password: **3333**

Configure SNMP Network Management? [yes]: **yes**

Community string [public]: **public**

Configure IP? [yes]: **yes**

Configure IGRP routing? [yes]: **no**

Configure RIP routing? [no]: **no**

Configure Vines? [no]: **no**

Configure IPX? [no]: **yes**

Configure AppleTalk? [no]: **no**

Configure Apollo? [no]: **no**

Configure DECnet? [no]: **no**

Configure XNS? [no]: **no**

Configure CLNS? [no]: **no**

Configure bridging? [no]: **yes**

Configure LAT? [no]: **no**

Enter ISDN BRI Switch Type [none]: basic-**NT11**

Configuring interface parameters:

## Configuring the Router Card

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```
Configuring interface BRI0:
Is this interface in use? [yes]: yes
  Configure IP on this interface? [yes]: yes
    IP address for this interface: x.x.x.x
    Number of bits in subnet field [0]: 0
    Class A network is x.x.x.x, 0 subnet bits; mask is 255.0.0.0
  Configure IPX on this interface? [no]: no
  Configure bridging on this interface? [no]: no
```

- Step 4** Configure the PCbus. The PCbus is used to communicate with the hub manager SNMP agent on the management card. The PCbus must have a unique IP address on a subnetwork. The management card SNMP agent determines its IP address by adding 1 to the PCbus IP address that you assign. For more information, see the section “PCbus ARP” in the chapter “Configuring the Router/hub SNMP Agent with SPSET.”

```
Configuring interface PCbus0:
Is this interface in use? [yes]: yes
  Configure IP on this interface? [yes]: yes
  Configure IP unnumbered on this interface? [no]: no
    IP address for this interface: x.x.x.x
    Number of bits in subnet field [0]: 0
    Class A network is x.x.x.x, 0 subnet bits; mask is 255.0.0.0
  Configure IPX on this interface? [no]: no
  Configure bridging on this interface? [no]: no
```



**Caution** The IP address you assign to the router’s PCbus interface must be at least one less than the maximum.

- Step 5** Configure the serial interfaces:

```
Configuring interface Serial0:
Is this interface in use? [yes]: yes
  Configure IP on this interface? [yes]: yes
  Configure IP unnumbered on this interface? [no]: no
    IP address for this interface: x.x.x.x
    Number of bits in subnet field [0]: 0
    Class A network is 123.0.0.0, 0 subnet bits; mask is 255.0.0.0
  Configure IPX on this interface? [no]: no
  Configure bridging on this interface? [no]: no
```

```
Configuring interface Serial1:
Is this interface in use? [yes]: yes
Configure IP on this interface? [yes]: yes
Configure IP unnumbered on this interface? [no]: no
  IP address for this interface: x.x.x.x
  Number of bits in subnet field [0]: 0
  Class A network is x.x.x.x, 0 subnet bits; mask is x.x.x.x
Configure IPX on this interface? [no]: no
Configure bridging on this interface? [no]: no
```

### Step 6 Configure the Token Ring interface:

```
Configuring interface TokenRing0:
Is this interface in use? [yes]: yes
Tokenring ring speed (4 or 16) ? [0]: 16
Configure IP on this interface? [yes]: yes
  IP address for this interface: x.x.x.x
  Number of bits in subnet field [0]: 0
  Class A network is x.x.x.x, 0 subnet bits; mask is 255.0.0.0
Configure IPX on this interface? [no]: yes
  IPX network number [5]: 5
Configure bridging on this interface? [no]: yes
```

### Step 7 Complete the configuration:

The following configuration command script was created:

```
hostname c2517
enable secret 1111
enable password 2222
line vty 0 4
password 3333
snmp-server community cisco
!
ip routing
no vines routing
ipx routing
no appletalk routing
no apollo routing
no decnet routing
no xns routing
no clns routing
bridge 1 protocol dec
!
```

## Configuring the Router Card

---

```
interface BRI0
no ipx network
interface PCbus0
no ipx network
interface Serial0
no ipx network
interface Serial1
no ipx network
interface TokenRing0
no ipx network
isdn switch-type nti
!
interface BRI0
ip address x.x.x.x 255.0.0.0
ipx network 1
bridge-group 1
!
interface PCbus0
ip address x.x.x.x 255.0.0.0
!
interface Serial0
ip address x.x.x.x 255.0.0.0
!
interface Serial1
ip address x.x.x.x 255.0.0.0
!
interface TokenRing0
ring-speed 16
ip address x.x.x.x 255.0.0.0
ipx network 5
bridge-group 1
!
end
```

**Step 8** Now the configuration you entered is displayed and you are asked if you want to use the displayed configuration. If you answer **no**, you can begin the configuration again and make any changes you want. If you answer **yes**, then this configuration will be entered and saved in the configuration database.

Use this configuration? [yes/no]: **yes**

**Step 9** To allow you to manage the router/hub with an SNMP manager, enable IBM LAN management on the router card:

```
c2517> enable
Password: ****
c2517# config t
c2517(config)# int pcbus 0
c2517(config-if)# local-lnm
c2517(config)# no shut
c2517(config-if)Ctrl-Z
```

**Step 10** Write the configuration to memory:

```
c2517(boot)# copy running-config startup-config
#####
```

The router is now configured.

## Configuring the Router Card Using AutoInstall

The AutoInstall process is designed to configure the router card automatically after connecting to your wide-area network (WAN). For AutoInstall to work properly, a Transmission Control Protocol/Internet Protocol (TCP/IP) host on your network must be preconfigured to provide the required configuration files. The TCP/IP host may exist anywhere on the network if the following two conditions are maintained:

- 1 The host must be on the opposite side of the router card's serial connection to the WAN.
- 2 User Datagram Protocol (UDP) broadcasts to and from the router card and the TCP/IP host must be enabled.

This functionality is coordinated by your system administrator at the site where the TCP/IP host is located. Do not attempt to use AutoInstall unless the required files have been provided on the TCP/IP host.

To prepare your router card for the AutoInstall process:

**Step 1** Shut down the Cisco router/hub.

**Step 2** Place the Cisco router/hub in a location that will allow the serial (WAN) cable to make a connection between the router card and the CSU/DSU without placing a strain on the cable.

## Configuring the Router Card

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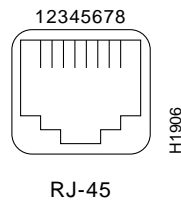
**Step 3** Attach the serial cable or cables to the Cisco router/hub and the CSU/DSU.

**Step 4** The BRI port, which is a female RJ-45 connector (see Figure 4-1), is located on the interface panel of the daughter card to the right of the serial 1 port.

Using the appropriate cable, connect the BRI port to the ISDN through the NT1. The common carrier will provide the NT1 connection worldwide, except in North America where the NT1 is owned by individual customers.

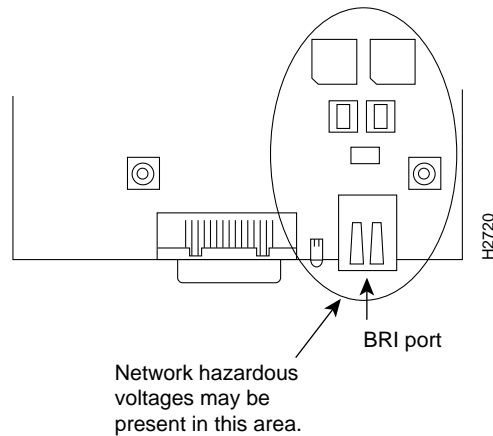
The router card will load the operating system image from Flash memory. If the remote end of the WAN connection is connected and properly configured, the AutoInstall process will begin.

**Figure 4-1**      **BRI Port—RJ-45 Female Connector**



**Warning** Network hazardous voltages are accessible in the BRI cable. If you detach the BRI cable, *detach the end away from the router card first to avoid possible electric shock.* Network hazardous voltages also are accessible on the router card in the area of the BRI port (RJ-45 connector), regardless of when power is turned off. (See Figure 4-2.) See this warning in multiple languages in the appendix “Translated Safety Warnings.”

**Figure 4-2** Network Hazardous Voltage Area Near the BRI Port



The router card will send a Serial Line Reverse Address Resolution Protocol (SLARP) packet over the serial line. When the packet reaches the opposite end of the WAN connection, the remote router will reply with the IP address of its serial interface. The router card will increment the serial interface address by one and assign this address to its own serial interface. This process will take approximately one minute.

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**Note** The remote router's IP address must have a 1 as the fourth byte—for example, 127.100.21.1.

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After the serial interface on the router card has been assigned a valid serial interface IP address, it will resolve its host name. It will send a Trivial File Transfer Protocol (TFTP) request on the serial line for the configuration file called network-config. If the TCP/IP host responds with this file, AutoInstall will search the file's contents for the host name associated with its IP address.

If the TCP/IP host does not respond with the network-config file, AutoInstall will broadcast a reverse domain name server (DNS) request containing the IP address for the router card's serial port that it was assigned over the network. If the DNS services have been set up, AutoInstall will resolve the router card's name from this file. After the IP address and host

## Configuring the Router Card

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name have been found, AutoInstall will broadcast a TFTP request to the TCP/IP host for the file called hostname-config. If this file has been set up by the system administrator, it will be downloaded automatically to the router card's memory, completing the configuration.

If the AutoInstall completed successfully, you still need to write the configuration data to the router card's non-volatile random-access memory (NVRAM) and reset the configuration registers. Perform the following steps to complete these tasks:

- Step 1** Enter the **enable** command to enter enable mode. Configuration changes can only be made in enable mode.

```
Hostname> enable
```

- Step 2** Enter the enable password that was configured into the router card by the AutoInstall process:

```
Password:*****
```

- Step 3** Enter the following command at the prompt:

```
Hostname# copy running-config startup-config
```

This will save the configuration settings that the AutoInstall process created in the router card. If you fail to do this, your configuration will be lost the next time you reload the router card.

- Step 4** You can check the value of these settings by entering the **show version** command at the Hostname# prompt:

```
Hostname# show version
.
.
.
configuration register is 0x0 (will be 0x2102 at next reload)
```

If the AutoInstall feature is not set up, or if your router card is unable to locate the appropriate files, you should use the manual configuration with or without the setup utility.

## For More Information

For more information on router software configuration, refer to UniverCD or the following Cisco publications:

*Configuration Builder Getting Started Guide*

*Router Products Getting Started Guide*

*Router Products Configuration Guide*

*Router Products Command Reference*

*Troubleshooting Internetworking Systems* (as needed)

*Cisco Hub/Ring Manager for Windows Getting Started Guide*

To order UniverCD, Cisco's online library of product information, or paper documentation, refer to the section "Ordering Cisco Documentation," which is in the warranty booklet that accompanied your router card.

## Configuring the Router Card

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