# Router Products
# Getting Started Guide

Digital Equipment Corporation

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# About This Guide

This section describes the objectives, audience, organization, and conventions of the *Router Products Getting Started Guide*. For information about related publications, refer to the Documentation Roadmap.

## Document Objectives

This guide describes the **setup** command facility and its role within the installation and configuration process. The **setup** command facility is a specially designed user interface for performing first-time configuration and other basic configuration procedures on all router products, including AGS+, MGS, CGS, Cisco 2500, Cisco 3000, Cisco 4000, and Cisco 7000 systems.

This guide helps you get your router up and running quickly and uneventfully by providing preinstallation information, hardware installation information, and detailed procedures for configuration planning, first-time startup, and configuration implementation.

Some configuration parameters discussed in this document (and shown on the configuration worksheets) apply only to routers that have the protocol translation option. If your router does not have protocol translation, the interactive **setup** command facility does not prompt you for these parameters.

## Audience

The *Router Products Getting Started Guide* is for customers who are responsible for the initial setup and configuration of their router. These users may have little or no experience with the router. They could be completely new to networking, or they might be familiar with basic concepts and terminology. However, this guide assumes that users

- Understand the purpose for which their router was purchased
- Know which protocols they will route
- Are familiar with the interfaces they will use
- Know whether they will use bridging

This document complements the following publications:

- *Router Products Configuration Guide*
- *Router Products Command Reference*
- *Protocol Translation Configuration Guide and Command Reference*

# Document Organization

The organization of this guide reinforces the ease-of-use of the **setup** command facility and reflects the order in which you perform tasks. It is organized as a step-by-step planning tool that walks you through the process of setting up a router for the first time, describes how to make simple changes to the setup, and directs you to the appropriate documentation for further router configuration. Use the worksheets in Appendix A as planning and information-gathering tools for first-time startup.

The guide is organized as follows:

- Chapter 1, "Overview," provides a general description of the hardware installation and software configuration process.
- Chapter 2, "Preparing for First-Time Startup," helps you plan your configuration by providing worksheets and instructions for filling out the worksheets.
- Chapter 3, "First-Time Startup," explains how to use worksheets to run through a **setup** session.
- Chapter 4, "Where to Go from Here," provides information about using the **setup** command facility to alter a basic configuration after first-time startup; how to use the streamlined **setup** command facility; and where to find information so you can perform advanced configuration on the router.
- Appendix A, "Blank Worksheets," provides blank worksheets to complete during the planning phase and to use during a **setup** command facility session.

# Document Conventions

This document uses the following conventions to convey instructions and information:

- Ctrl- represents the key labeled *Control*. For example, the key combination Ctrl-C means hold down the Control key while you press the C key.
- A string is defined as a nonquoted set of characters. For example, when setting up a community string for SNMP to "public," you do not type the quotes around the string.

Command descriptions use these conventions:

- Vertical bars ( | ) separate alternative, mutually exclusive, elements.
- Square brackets ([ ]) indicate optional elements.
- Braces ({ }) indicate a required choice.
- Braces within square brackets ([{ }]) indicate a required choice within an optional element.
- **Boldface** indicates commands and keywords that are entered literally as shown.
- *Italics* indicate arguments for which you supply values; in contexts that do not allow italics, arguments are enclosed in angle brackets (< >).

Examples follow these conventions:

- Terminal sessions and information the system displays are in `screen` font.
- Information you enter is in **`boldface screen`** font.
- Nonprinting characters, such as passwords, are in angle brackets (< >).
- Default responses to system prompts are in square brackets ([ ]).
- Exclamation points (!) at the beginning of a line indicate a comment line.
- Examples that contain system prompts denote interactive sessions, indicating that the user enters commands at the prompt. The system prompt indicates the current command mode. For example, the prompt `router(config)#` indicates that you are in global configuration mode.

**Caution** Means *reader be careful*. In this situation, you might do something that could result in equipment damage or loss of data.

**Note** Means *reader take note*. Notes contain helpful suggestions or references to materials not contained in this manual.

CHAPTER 1

# Overview

This chapter provides a general description of the hardware installation and software configuration process for the router. It outlines the tasks you must perform to set up your router with the features you need, including protocol translation, if your system image has this option.

With the **setup** command facility, you can start using your router quickly and without extensive background knowledge because the facility prompts you for basic configuration information.

You can use the **setup** command facility both at initial system configuration and later for basic configuration changes at any time. The facility also helps you become familiar with the command sequence as you step through the configuration process. Because of these unique characteristics, **setup** is referred to as a *command facility* rather than simply as a command.

## Installation and Configuration Process

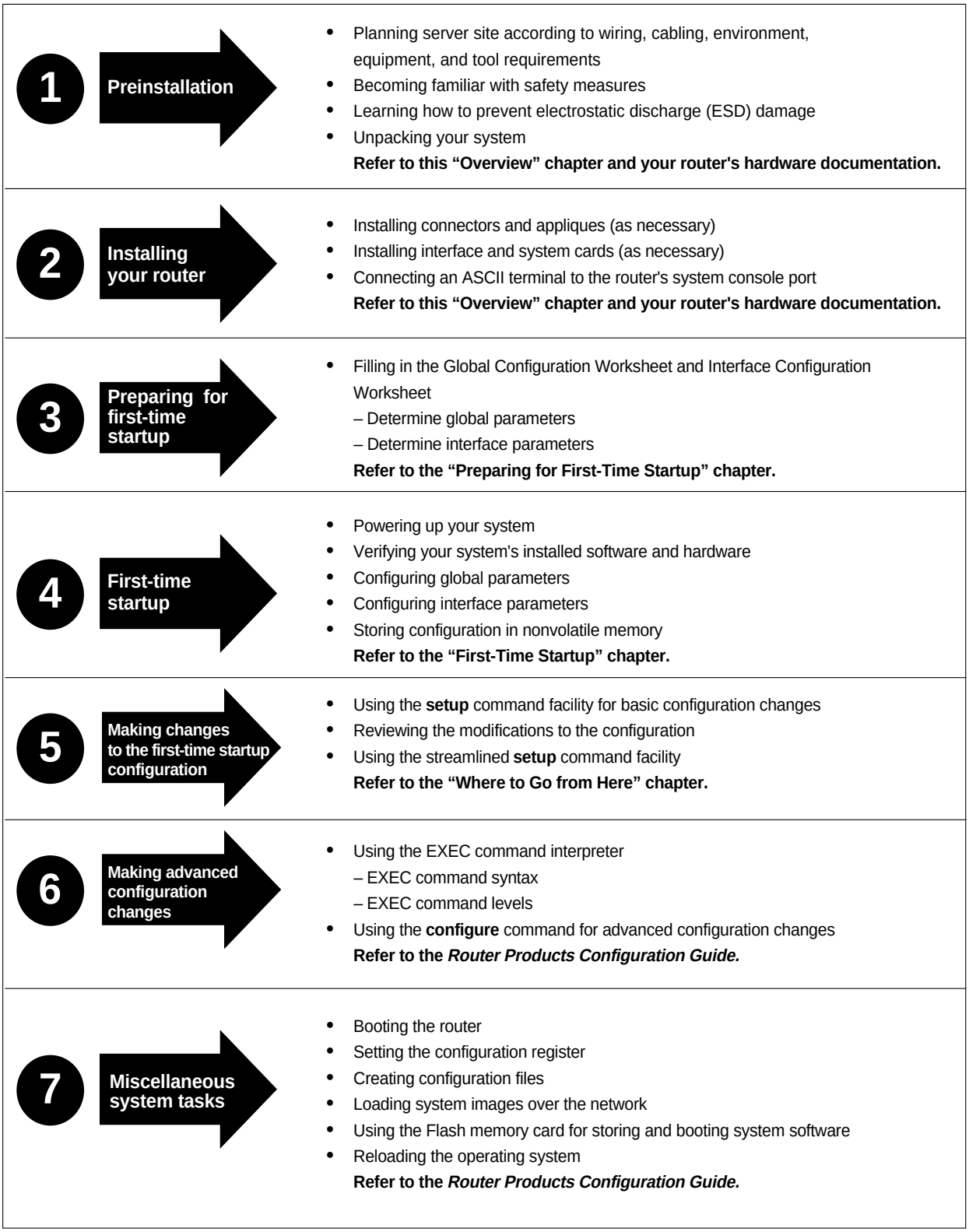
The installation and configuration process has seven phases, as shown in Figure 1-1. Each phase includes tasks that help you use your router to meet your networking needs.

You can find details about each phase of the installation and configuration process in this guide or in other referenced publications. A brief description of phase 1, “Preinstallation,” and phase 2, “Router Installation,” follows Figure 1-1. For detailed information about the tasks in phase 1 and phase 2, refer to the hardware and maintenance documentation for your router.

Phases 3, 4, and 5 are described in this guide, and phases 6 and 7 are described in the *Router Products Configuration Guide* and *Router Products Command Reference* publications.

For information about setting up a router for protocol translation, refer to the *Protocol Translation Configuration Guide and Command Reference* publication.

**Figure 1-1 Installation and Configuration Process**



# Preinstallation

You must perform the following preinstallation tasks before starting actual system hardware installation:

- Plan for the location of the router. Some items you should consider are site environment, cabling requirements of planned connections, modular wiring system requirements, and tool and equipment requirements.
- Familiarize yourself with the safety precautions and specific requirements for working on electrical equipment.
- Learn about electrostatic discharge (ESD) prevention procedures to follow when removing and replacing cards.
- Unpack your system and verify that you have received everything you ordered and that shipping damage has not occurred.

Refer to your router's hardware installation and maintenance publication for more detailed information about preinstallation tasks.

# Router Installation

After you complete the preinstallation tasks, you are ready to install the router components. To install the router on an A+, M, and C chassis, perform the following tasks as necessary:

- Install connectors and appliques.
- Install interface and system cards.
- Install EPROMS, if necessary.

---

**Note** For the A+, M, and C chassis, the factory installs the connectors and appliques on a new system according to customer specifications. If you have an existing system and want to change the factory preconfiguration, you need to order the card, connector, or applique separately, and consult the configuration notes that accompany the new component for installation instructions.

---

To install the router on a Cisco 2500 and Cisco 3000 chassis, perform the following tasks:

- Attach cables.
- Install new system software EPROMs, if necessary.
- Upgrade memory, if necessary.

To install the router on a the Cisco 7000 chassis, perform the following tasks:

- Install the power supply.
- Attach cables.

For detailed information about router installation tasks, refer to the appropriate hardware installation and maintenance publication for your router.

To work with the router, you must attach an ASCII terminal to the system console port at the back of the router. This port functions as a data communications equipment (DCE) device and requires that you use a “straight-through” RS-232 cable. Configure the terminal to operate at the following settings:

- 9600 baud
- 8 data bits
- No parity
- 1 or 2 stop bits

**Note** We recommend that you make network cable connections before first-time startup. Refer to the appropriate hardware installation and maintenance publication for details about cabling considerations and establishing electrical connections.

After you connect an ASCII terminal to the console port, go on to complete the Global Configuration and Interface Configuration worksheets in the “Preparing for First-Time Startup” chapter.

CHAPTER 2

# Preparing for First-Time Startup

This chapter helps you prepare for first-time startup. Read it *before* you power up your router.

By preparing for first-time startup, you can take advantage of the full range of configurations available on your routers, including the protocol translation option. You are not required to plan your network before sitting at the console and using the **setup** command facility for the first time, but you must connect an ASCII terminal to the router's system console port as described in the "Overview" chapter. By separating the planning tasks from the configuration tasks, you can set up the router in one sitting. You can also tailor the router to meet your needs and to fit within a consistent network scheme.

This chapter helps you complete the following tasks:

- Filling in the Global Configuration Worksheet
- Filling in the Interface Configuration Worksheet

Use the blank configuration worksheets in the "Blank Worksheets" appendix to record parameter values, according to the information in this chapter. The Global Configuration Worksheet can accommodate global information about a single router. If you plan to install more than one router, make additional copies of the blank worksheet. The Interface Configuration Worksheet can accommodate four interfaces. If you plan to install more than four interfaces on your router, make additional copies of the blank worksheet.

You use these worksheets to help gather and maintain information about your router. The worksheets map to the two-part configuration process of the **setup** command facility, which is automatically invoked at first-time startup. In the first part of the configuration process, you use the values recorded on the Global Configuration Worksheet to specify *global* or system-wide parameters. In the second part, you configure each individual interface using the values you recorded on the Interface Configuration Worksheet.

## Filling in the Global Configuration Worksheet

The Global Configuration Worksheet, when properly filled in, contains all the values you need to enter when you configure global parameters with the **setup** command facility. Remember, the **setup** command facility is automatically invoked at first-time startup. Preparing the pertinent information before you start up the router enables you to get your system running quickly and uneventfully.

The worksheet lists two levels of information:

- System hardware information
- Global parameters

The **setup** command facility does *not* request system hardware information at first-time startup, but it is useful to write the information on the worksheet to complete your records. The facility *does* request global parameters at first-time startup.

Figure 2-1 shows the Global Configuration Worksheet. Obtain a copy of the blank Global Configuration Worksheet in the "Blank Worksheets" appendix before continuing. As you proceed through the following descriptions, record your information on it.

---

**Note** To configure a specific protocol on an individual interface, you must first specify that protocol as a global parameter. For example, if you specify No to the XNS protocol at the global level, XNS parameters do not appear at the interface level. Likewise, if you specify Yes to the XNS protocol at the global level, you must also provide interface-specific information for XNS at the interface configuration level. For this reason, you should complete both the global and interface configuration worksheets before powering up your system.

---

**Figure 2-1 Global Configuration Worksheet**

**System Type: AGS+ MGS CGS Cisco 2500 Cisco 3000 Cisco 4000 Cisco 7000 Other: _____**
**(circle one)**

**System Serial No.: _____ Number of Interfaces: _____**

## Global Parameters

| |
|---|
| **Host Name:** |
| **Enable Secret:** |
| **Enable Password:** |
| **Virtual Terminal Password:** |
| **SNMP: Yes No Community String:** |
| **XRemote Font Server: Yes No**<br>**IP Address: _____**<br>**IP Address: _____**<br>**IP Address: _____**<br>**IP Address: _____** |
| **DECnet: Yes No**<br>**Area No.: _____**<br>**Node No.: _____**<br>**Area (Level 2) Routing: Yes No** |
| **IP: Yes No**<br>**Routing Protocol (choose one):**<br>**IGRP Yes No IGRP Autonomous System: _____**<br>**RIP Yes No** |
| **IPX: Yes No** |
| **XNS: Yes No** |
| **AppleTalk: Yes No**<br>**Multizone: Yes No** |
| **Apollo: Yes No**<br>**Routing No.: _____** |
| **CLNS: Yes No**<br>**Router Tag: _____**<br>**Domain: _____**<br>**Area: _____**<br>**Station ID: _____** |
| **Banyan VINES: Yes No** |
| **Bridging: Yes No** |
| **LAT (Yes / No)** |
| **ISDN BRI Switch Type: _____** |

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## Determining System Hardware Information

Use this section to determine system hardware information and record the information on the Global Configuration Worksheet.

A **Default**: label marks the factory default and an **Action**: label marks the action you take to fill in the worksheet.

### System Type

Several network routers accommodate a wide variety of connectors, appliques, and interface controller cards. The system type is clearly marked on the front of your router. The following system types are available:

- AGS+
- MGS
- CGS
- Cisco 2500
- Cisco 3000 series
- Cisco 4000 series
- Cisco 7000 series

**Default**: None

**Action**: Circle your system type on the worksheet, or write it in.

### System Serial Number

The serial number is on the bottom or back panel. This number can help you track your physical inventory.

**Default**: None

**Action**: Write your system serial number on the worksheet.

### Number of Interfaces

When you order a system, you specify the number and type of interfaces you want the factory to install. The number of interfaces depends on the type of system you have and the number of interface cards installed. Check the back of your router to verify the number of installed interfaces. For help in identifying the installed interfaces, refer to the installation and maintenance guide for your router.

The number of installed interfaces affects the second part of the configuration process. It determines how many Interface Configuration Worksheets you fill in, and what information you need to provide at first-time startup.

**Default**: None

**Action**: Write the number of interfaces on the worksheet.

## Determining Global Parameters

This section contains information about the global parameters that you can configure through the **setup** command facility. A **Default**: label marks the factory default, and an **Action**: label marks the action you take to fill in the worksheet. Use this information to complete the Global Configuration Worksheet.

### Host Name

The host name is the name of your router. The name you specify is used in system prompts and can contain from 1 to 80 uppercase and lowercase alphanumeric characters. The host name is case sensitive. A number can be the first character. Leading spaces are ignored. For example, “ 4000F2” is interpreted as “4000F2” (without the space).

Use a name that helps you identify the location of the router, or to whom it is providing routing services. If you will be naming more than one host in your network, devise a consistent naming scheme so that host identification is easy.

**Default**: Router

**Action**: Write your host name on the worksheet the way you want it to appear in system prompts.

### Enable Password

Your system has two default levels of security: user and privileged. The commands at the user level are a subset of those at the privileged level. Because many privileged commands are used to set operating parameters, you should password-protect these commands to prevent unauthorized use. Users must enter the correct password, called the “enable password,” to gain access to the privileged-level commands.

There is no factory default enable password. However, the enable password you set during first-time startup appears as the default the next time you run the **setup** command facility.

An enable password can contain from 1 to 80 uppercase and lowercase alphanumeric characters, except that the first character cannot be a number. Some spaces are valid password characters; for example, “two words” is valid. Leading spaces are ignored, but trailing spaces are recognized. For example, “ woolly” is interpreted as “woolly” (without the space). On the other hand, “woolly ” is interpreted as “woolly ” (with the space).

For more information about the enable password, refer to the *Router Products Configuration Guide* or the *Router Products Command Reference* publication.

**Default**: None

**Action**: Write the enable password on the worksheet.

### Virtual Terminal Password

In addition to the enable password, every virtual terminal line requires a password. If you do not set a password, by default the system responds to attempted connections by displaying an error message and closing the connection. (You use virtual terminal lines when you access the router remotely via the Telnet protocol or the DEC Maintenance Operation Protocol [MOP].)

A virtual terminal password can contain from 1 to 80 uppercase and lowercase alphanumeric characters, except that the first character cannot be a number. Some spaces are valid password characters; for example, “two words” is valid. Leading spaces are ignored, but trailing spaces are recognized. For example, “ woolly” is interpreted as “woolly” (without the space). On the other hand, “woolly ” is interpreted as “woolly ” (with the space).

The virtual terminal password is case sensitive. There is no factory default virtual terminal password. However, the virtual terminal password you set during first-time startup appears as the default the next time you run the **setup** command facility.

Although each virtual terminal line requires a password by default, you can disable password checking to allow line connections without passwords. With this configuration, users are not required to give a password, although one may exist. To disable passwords, use the **no login** command. Refer to the *Router Products Configuration Guide* and the *Router Products Command Reference* for more information on disabling passwords.

**Default**: None

**Action**: Write your virtual terminal password on the worksheet. This single password applies to all virtual terminal lines.

### SNMP

The Simple Network Management Protocol (SNMP) is the most widely supported open standard for network management. It provides a means to access and set configuration and run-time parameters of routers and communication servers. SNMP defines a set of functions that can be used to monitor and control network elements.

You configure SNMP on a global basis only; you cannot specify it for individual interfaces.

**Default**: No

**Action**: Circle Yes on the worksheet if you want to configure SNMP on a system-wide basis. At first-time startup, this value configures read-only SNMP with a blank password. Circle No if you do not want to run SNMP.

If you configure SNMP, also specify a community string as follows:

- Community string

  SNMP v.1 message headers contain a version number and a community string. The community string defines an access environment for network management systems that use the community string. Network management systems that do not know the correct community string are precluded from SNMP v.1 operations.

  The community string can be any number of printable characters. Leading, embedded, and trailing spaces are not permitted. For example, “ mycommunity”, “my community”, and “mycommunity ” are invalid community strings due to the leading, embedded, and trailing spaces, respectively. “ThisIsMyCommunity5” is a valid community string because no spaces exist. The community string is case sensitive.

  **Default**: public

  **Action**: Create a community string name that acts as a password. Write the community string on the worksheet.

### XRemote Font Server

Your router supports the Network Computing Device, Inc. XRemote feature on the Cisco 2500, Cisco 3000 series, and Cisco 4000 series of routers. When an NCD terminal does not include in ROM the fonts used by X applications, you must identify one or more font servers from which the router and the NCD terminal can obtain fonts. You can identify as many XRemote font servers as you need; it is unlikely you will reach the maximum number that the software allows.

You can use the **setup** command facility at first-time startup to identify one or more XRemote font servers. If you use **setup** to configure your XRemote font servers, the facility prompts you to enter an IP address for each font server. After first-time startup, you use the **xremote tftp host** command to configure XRemote font servers.

**Default:** No

**Action:** If you want to configure one or more XRemote font servers during first-time startup, circle Yes on the worksheet. If you do not want to configure XRemote font servers on your system or you do not want to configure XRemote font servers using the **setup** command facility, circle No.

Enter an IP address for each XRemote font server.

- IP address for the XRemote font server

  Internet addresses are 32-bit values assigned to hosts that use the IP protocols. Write these addresses in dotted decimal format (four decimal numbers separated by periods) such as 192.17.5.100. Each number is an 8-bit value between 0 and 255. Refer to the *Internetworking Technology Overview* for a detailed discussion of IP addressing.

  **Default:** None.

  **Action:** Enter your Internet address in dotted decimal format on the worksheet. Repeat this for each XRemote font server you plan to configure.

  For information about subnetting parameters, refer to Table 2-1 later in this chapter.

For more information about XRemote configuration and management information, refer to the publication *Protocol Translation Configuration Guide and Command Reference*.

## DECnet

DECnet is a protocol suite developed and supported by Digital Equipment Corporation. The DECnet protocol associates addresses with machines, not interfaces.

A router can have only one DECnet address. DECnet addresses are specified by area number and node number. For example, in DECnet address 53.6, DECnet node 6 is located in area 53.

An area can span many routers, and many areas can be attached to a single cable. If a DECnet host such as a router exists on many cables, its area/node address is the same on all cables. This type of addressing is called DECnet Phase IV addressing.

**Default**: No

**Action**: If you plan to use DECnet Phase IV addressing, circle Yes on the worksheet. If you do not want to use DECnet Phase IV, circle No. If you want Phase V addressing, select the Connectionless Network Services (CLNS) protocol (further down on the worksheet) in addition to circling No.

If you plan to use DECnet Phase IV addressing, provide the area number and node number, and indicate whether you want area routing. Write in values for the following:

- Area number

  Area numbers are values that indicate a contiguous set of network segments.

  **Default**: 1

  **Action**: Assign a decimal number in the range 1 through 63.

- Node number

  Each area consists of machines uniquely identified by their node number.

  **Default**: 1

  **Action**: Assign a decimal number in the range 1 through 1023.

- Area (Level 2) router

  A DECnet router always participates in the routing protocol for its home area. However, it does not necessarily participate in the routing protocol used to get packets into other areas. Instead, it routes packets destined to other areas via an area router.

  **Default**: No

  **Action**: If your router will have direct connections to area routers in other areas, circle Yes. If you do not want to configure area routing, circle No.

## IP and Routing Protocol

The United States Department of Defense originally defined the Internet Protocol (IP) as a standard protocol for interconnecting computers from different manufacturers on a given network. IP is now the de facto standard for vendor-independent networking.

**Default**: Yes

**Action**: If you plan to route IP, circle Yes. If not, circle No.

Select an interior routing protocol for IP. Using the **setup** command facility, you can specify only one of two interior routing protocols to operate on your system: Interior Gateway Routing Protocol (IGRP) or Routing Information Protocol (RIP). These protocols are mutually exclusive.

---

**Note** Other routing protocols are available on your router, but you cannot configure them through the **setup** command facility. You must enable them through other commands. Refer to the *Router Products Configuration Guide* for more information about the other routing protocols.

---

- IGRP routing

  IGRP, developed by Cisco Systems, provides dynamic internetwork routing that automatically adapts to changes in network topology or status. It is especially valuable in large networks with complex topologies that consist of segments with differing bandwidth and delay characteristics.

  If you plan to use IGRP routing, you must also provide an autonomous system number.

  **Default**: Yes

  **Action**: If you plan to route IGRP, circle Yes. If not, circle No.

- IGRP autonomous system number

  An autonomous system number distinguishes different groups within a network, or *autonomous system*. The Internic agency assigns autonomous system numbers. If you are not advertising the autonomous system through external routing protocols, you can assign your own autonomous system number. The system number must be a decimal number between 1 and 65535.

  **Default**: 1

  **Action**: Write the system number for your autonomous system on the worksheet.

- RIP routing

  RIP, used by Berkeley-derived UNIX systems, exchanges routing information dynamically among a small set of computers. Usually, all the participating machines attach to a single local area network. RIP works well for small, isolated networks with simple topologies.

  During first-time startup, the **setup** command facility asks if you want RIP routing only when you specifically answer No to IGRP routing.

  **Default**: No

  **Action**: If you plan to configure RIP routing, circle Yes. If not, circle No.

### IPX

IPX is the network protocol used by Novell's NetWare products. Your router supports IPX. For detailed information on IPX, refer to the *Router Products Configuration Guide*.

**Default**: No

**Action**: If you plan to configure IPX, circle Yes. If not, circle No.

### XNS

Xerox Network Systems (XNS) was originally designed to run over Ethernet. XNS can also be routed over FDDI, Token Ring, and point-to-point serial lines. Your router supports the XNS protocol suite. For detailed information on XNS, refer to the *Router Products Configuration Guide*.

**Default**: No

**Action**: If you plan to configure XNS routing on your system, circle Yes. If not, circle No.

---

**Note** Do not enable XNS and Novell IPX at the same time, or you will have network conflicts.

---

### AppleTalk

AppleTalk is a network protocol developed by Apple Computer. It is a client-server, or distributed, network system. Users share network resources such as files and printers with other users. Interaction with servers is transparent to the user.

Your router supports the AppleTalk network protocol (both extended and nonextended) over FDDI, Ethernet, Token Ring, synchronous serial, and X.25 interfaces. For detailed information on AppleTalk, refer to the *Router Products Configuration Guide*.

**Default**: No

**Action**: If you plan to configure AppleTalk, circle Yes. If not, circle No.

If you plan to configure AppleTalk on your router, you must also decide whether to have multizone networks.

- Multizone networks

  Multiple zones are an option in AppleTalk Phase 2 (extended), but not in AppleTalk Phase 1 (nonextended). If you have Phase 2 and the internetwork compatibility flag is set to "yes," then you must *not* configure a multizone network; compatible internetworks cannot use multiple AppleTalk zones.

**Default**: No

**Action**: If you plan to configure multizone networks, circle Yes. If not, circle No.

### Apollo

The Apollo Domain (Apollo) routing protocol is the native-mode networking protocol for Apollo workstations. This protocol enables an Apollo host to have interfaces on more than one physical network. Each physical network is identified by a unique 32-bit address in hexadecimal format. The address consists of a network number followed by a host number.

Your router supports packet forwarding and routing for Apollo on Ethernet, FDDI, and serial interfaces using HDLC and X.25 encapsulation. Direct attachment to the 12-Mbps Domain Token Ring is not supported.

**Default**: No

**Action**: If you plan to configure Apollo, circle Yes. If not, circle No.

If you plan to configure Apollo on your router, you must also determine the Apollo routing number.

- Apollo routing number

  An Apollo routing number is the Apollo host number. This number must be a unique hexadecimal number between 1 and FFFFE.

  **Default**: 1

  **Action**: Write the routing number you want to assign to your system on the worksheet.

### CLNS

The software on your router supports packet forwarding and routing for the Connectionless Network Services (CLNS) protocol, an International Organization for Standardization (ISO) implementation. CLNS provides the basis for DECnet Phase V.

To understand CLNS routing, you need to be familiar with the hierarchical concepts of domain and area. At the top of the hierarchy is a set of routing domains. The domain address uniquely identifies the routing domain. Within each routing domain are one or more areas. The area address uniquely identifies the area. For detailed information about how your router implements CLNS, refer to the *Router Products Configuration Guide*.

**Default**: No

**Action**: If you plan to configure CLNS, circle Yes. If not, circle No.

If you plan to configure CLNS on your system, you can provide router tag, domain, area, and station ID information, or you can use default values.

- CLNS router tag

  By specifying a router tag, you can refer to an area symbolically, rather than using an area address that can be hard to remember. A router tag can contain from 1 to 80 alphanumeric characters. It is not case sensitive.

  **Default**: area_1

  **Action**: Write your CLNS router tag on the worksheet.

- CLNS domain

  Areas connected to other areas form *routing domains*. A domain can be a 1- to 22-digit hexadecimal number in the form *xx.xxxx.xxxx.xxxx.xxxx.xxxx*.

Avoid the default domain number 49, because this number is not globally unique and you will experience difficulty when connecting to other domains.

**Default**: 49

**Action**: Write your CLNS domain number on the worksheet.

- CLNS area

  In the CLNS protocol, the lowest level of the routing hierarchy is the area. An area is a set of networks connected by routers. An area number is a four-digit hexadecimal number in the range 0001 through FFFF.

  **Default**: 0001

  **Action**: Write your CLNS area number on the worksheet.

- CLNS station ID

  Each host needs a unique number; the CLNS station ID provides it. The station ID is a 12-digit hexadecimal value in the form *xxxx.xxxx.xxxx*.

  **Default**: The default is the MAC layer address of the Ethernet interface (the lowest value is used).

  **Action**: Write your CLNS station ID on the worksheet.

### Banyan VINES

The Banyan Systems Virtual Integrated Network Service (VINES) protocol is designed for PC networks. Your router supports the VINES network protocol over all media types. For detailed information about how your router implements VINES, refer to the *Router Products Configuration Guide*.

**Default**: No

**Action**: If you plan to configure VINES, circle Yes. If not, circle No.

### Bridging

Your router supports transparent and source-route bridging. The **setup** command facility allows you to configure only transparent bridging. You cannot use the **setup** command facility to configure source-route bridging. To configure source-route bridging, you must use the command interpreter. Refer to the *Router Products Configuration Guide* for information on configuring source-route bridging.

You can configure transparent bridging only if the subset image you ordered includes bridging. You can verify that your subset image has bridging capability by looking at the installed hardware banner that appears at first-time startup.

You configure bridging, like routing, for the system as a whole. That is, if you bridge a protocol, you must bridge it on *all* interfaces. For example, you cannot bridge XNS on one interface and route it on another. If you bridge XNS, you must bridge it on all interfaces. However, on the same system, you can bridge some protocols (on all interfaces) and route other protocols (on all interfaces). For example, you can bridge XNS, Vines, and AppleTalk on all interfaces, and route IP, IPX, and DECnet on all interfaces.

For more information about bridging, see the *Router Products Configuration Guide*. For more information about bridging commands, see the *Router Products Command Reference* publication.

**Default**: No

**Action**: If you plan to configure transparent bridging using, circle Yes. If not, circle No.

### LAT

The local area transport (LAT) protocol from Digital Equipment Corporation (Digital) is the protocol used most often to connect to Digital hosts. LAT is a Digital-proprietary protocol. Cisco uses LAT technology licensed from Digital.

With the LAT protocol, you can establish a connection to a host, then pass your keystrokes to the host. A user can establish a LAT connection through a router running protocol translation to a Digital host, simply by entering the host name.

LAT cannot be routed because Digital's LAT protocol includes its own transport protocol (Layer 4 of the OSI reference model), which runs directly over Ethernet (Layer 2 of the OSI reference model) rather than over a standard routing layer. LAT must be bridged to pass between different network segments. The router provides the option of transporting LAT in protocol translation mode. A router with the protocol translation option can translate LAT to Telnet or X.25 for transmission over a WAN, which can be translated back to LAT on the other end of the connection.

You can configure this WAN-to-LAT translation to be transparent to the user. This configuration also avoids LAT time-out problems, which are common in WAN-bridged LAT. For more information about how your router implements LAT, refer to the *Protocol Translation Configuration Guide and Command Reference* publication.

**Default:** No

**Action:** If you plan to use LAT on this system, write Yes on the worksheet. If not, write No.

### ISDN BRI Switch Type

Currently, the Cisco 2500, Cisco 3000, and Cisco 4000 series support the Integrated Services Digital Network (ISDN) Basic Rate Interface (BRI). An ISDN BRI connection consists of two B-channels that are each treated as a single serial line. You can use the B-channels with High-Level Data Link Control (HDLC) and Point-to-Point Protocol (PPP) encapsulation. Although each channel is treated as a separate line, you cannot configure the channels separately. A single switch type must be configured for the router as a whole.

The possible switch types are as follows:

- NET3 basic rate switches in the UK and Europe (basic-net3)
- AT&T 5ESS basic rate switches (basic-5ess)
- NT DMS-100 basic rate switches (basic-dms100)
- French VN2 switches (vn2)
- French VN3 switches (vn3)
- Japanese NTT switches (ntt)
- German 1TR6 switches (basic-1tr6)
- National ISDN-1 switches (basic-nil)
- Australia switches (basic-ts013)

**Default**: None

**Action**: On the worksheet, write the value associated with the switch type you plan to configure. The valid values appear in parentheses in the list above.

# Filling in the Interface Configuration Worksheet

After you complete the Global Configuration Worksheet, fill in the Interface Configuration Worksheet. You will use this information and the **setup** command facility to configure parameters for each installed interface.

The Interface Configuration Worksheet lists two levels of information:

- System hardware information
- Interface parameters

The **setup** command facility does not request system hardware information, but it is useful to write the information on your worksheet to complete your records. The **setup** facility *does* request interface parameters at first-time startup. The interface parameters depend on the decisions you make about the global parameters. For example, if you have not configured a protocol at the global level, you do not need to configure it at the interface level.

Figure 2-2 shows a sample Interface Configuration Worksheet. The “Blank Worksheets” appendix contains a blank worksheet for your convenience. Record information about your interfaces on the blank worksheets as you proceed through the following descriptions.

---

**Note** If you are installing more than four interfaces on your router, you need to make copies of the blank worksheet.

---

**Figure 2-2 Interface Configuration Worksheet**

**System Hardware Information:**

**System Type: _____ System Serial No.: _____ Host Name: _____ No. of Interfaces: _____**

## Interface Parameters

| | | | | |
|---|---|---|---|---|
| **Interface Name** | | | | |
| **Interface In Use (Yes/No)** | | | | |
| **Speed (Token Ring Only)** | | | | |
| **IP: (Yes / No)** | | | | |
| **IP Unnumbered (Yes / No)** | | | | |
| **Interface Name** | | | | |
| **IP Address** | | | | |
| **Subnet Mask Bits** | | | | |
| **DECnet (Yes / No)** | | | | |
| **Cost** | | | | |
| **IPX (Yes / No)** | | | | |
| **Network No.** | | | | |
| **XNS (Yes / No)** | | | | |
| **Network No.** | | | | |
| **AppleTalk (Yes / No)** | | | | |
| **Extended (Ethernet/Serial Only)** | | | | |
| **Starting Cable Range** | | | | |
| **Ending Cable Range** | | | | |
| **Network No. (Nonextended)** | | | | |
| **Zone Name** | | | | |
| **Zone Name** | | | | |
| **Zone Name** | | | | |
| **Apollo (Yes / No)** | | | | |
| **Network No.** | | | | |
| **CLNS (Yes / No)** | | | | |
| **Banyan VINES (Yes / No)** | | | | |
| **Bridging (Yes / No)** | | | | |
| **LAT (Yes / No)** | | | | |

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## Recording System Hardware Information

The values for the following system hardware information should be the same as those you indicated on the Global Configuration Worksheet:

- System type
- System serial number
- Host name
- Number of interfaces

Refer to the "Determining System Hardware Information" section and the "Determining Global Parameters" section earlier in this chapter for information about these values.

## Determining Interface Parameters

This section contains information about the interface parameters that you can configure through the **setup** command facility. Use this information to complete the Interface Configuration Worksheet.

In the following descriptions of the parameters that you determine, a **Default**: label marks the factory default and an **Action:** label marks your task for each parameter.

### Interface Names

The **setup** command facility automatically presents each installed interface for you to configure. The facility presents the interfaces in the same order in which they are installed in the chassis. For example, if you have two Token Ring interfaces, you are prompted to configure interface TokenRing0 and then to configure TokenRing1.

The number of interfaces determines the number of columns in which you need to provide information. If you have more than four interfaces, you will need more than one worksheet.

**Default**: The default is the order in which the interfaces are installed in the chassis.

**Action**: Write each interface name across the top of the worksheet in the row labeled "Interface Name."

### Interface in Use

You can decide whether you want to configure an installed interface at first-time startup. The system shuts down the interfaces that you indicate you will not configure.

**Default**: No

**Action**: If you plan to configure a particular interface at first-time startup, write Yes in the column for that interface. If not, write No.

### Token Ring Speed

If you have a Token Ring board installed, select a speed for your network. You can enter 4 to set the Token Ring speed to 4 Mbps, or 16 to set the Token Ring speed to 16 Mbps. Once you set this value, the **setup** command facility does not ask you for it again.

**Caution** If you select the wrong speed, the ring will be brought down.

**Default**: 16

**Action**: Write the correct Token Ring speed for your network on the worksheet.

### IP Routing for an Interface

Determine whether to use IP routing for a particular interface.

**Default**: No

**Action**: If you plan to use IP routing for an interface, write Yes on the worksheet. If not, write No. Repeat this for each installed interface you plan to configure.

- IP unnumbered (serial only)

  If you plan to use IP routing on a serial interface, you must determine whether it will be unnumbered.

  **Default**: No

  **Action**: If you plan to use IP unnumbered routing on an interface, write Yes on the worksheet. If not, write No. Repeat this for each installed serial interface you plan to configure.

- Interface name

  If you selected IP unnumbered routing, you need to provide an interface name. The interface name is the name of another interface on which the router has an assigned IP address.

  **Default**: None

  **Action**: If you selected IP unnumbered routing, write in an interface name (such as Ethernet0) to be used by the serial interface. Repeat this for each installed serial interface.

If you plan to use IP routing on an interface, provide the IP address and subnet mask bits for that interface. Indicate values on the worksheet as follows:

- IP address

  Internet addresses are 32-bit values assigned to hosts that use the IP protocols. These addresses are in dotted decimal format (four decimal numbers separated by periods) such as 192.17.5.100. Each number is an 8-bit value between 0 and 255. Refer to the *Internetworking Technology Overview* for a detailed explanation of IP addressing. The following is a summary of IP addressing concepts for those who are somewhat familiar with IP addressing.

  The addresses are divided into three classes; the classes differ in the number of bits allocated to the *network* and *host* portions of the address.

  The Class A Internet address format allocates the highest 8 bits to the network field and sets the highest-order bit to 0 (zero). The remaining 24 bits form the host field.

  The Class B Internet address allocates the highest 16 bits to the network field and sets the two highest-order bits to 1, 0. The remaining 16 bits form the host field.

  The Class C Internet address allocates the highest 24 bits to the network field and sets the three highest-order bits to 1, 1, 0. The remaining 8 bits form the host field.

  **Default**: None

  **Action**: Enter your Internet address in dotted decimal format for each installed serial interface you plan to configure.

- Subnet mask bits

  Subnetting is an extension of the Internet addressing scheme, which allows multiple physical networks to exist within a single Class A, B, or C network. The usual practice is to use a few of the far left bits in the host portion of the network address for a subnet field. The subnet mask determines whether subnetting is in effect on a network.

  Internet addressing conventions allow a total of 24 host bits for Class A addresses, a total of 16 host bits for Class B addresses, and a total of 8 host bits for Class C addresses. When you are further subdividing your network (i.e., subnetting your network), the number of host addressing bits is divided between subnetting bits and actual host address bits. You must specify a minimum of two host address bits, or the subnetwork could not be populated by hosts. Therefore, the **setup** command facility permits you to specify up to 22 host bits for Class A subnetting, 14 bits for Class B subnetting, and 6 bits for Class C subnetting. Table 2-1 provides a summary of these subnetting parameters.

**Table 2-1 Summary of Subnetting Parameters**

| | | | Host Bits | |
|---|---|---|---|---|
| **First Class** | **First Byte** | **Network Bits** | **Max Subnet Bits** | **Min Address Bits** |
| A | 1-126 | 8 | 22 | 2 |
| B | 128-191 | 16 | 14 | 2 |
| C | 192-223 | 24 | 6 | 2 |

  Refer to the *Internetworking Technology Overview* for a detailed explanation of IP addressing.

  **Default**: 0

  **Action**: Define subnet mask bits as a decimal number between 0 and 22 for Class A addresses, 0 and 14 for Class B addresses, or 0 and 6 for Class C addresses. Do not specify 1 as the number of bits for the subnet field. That specification is reserved by Internet conventions.

## DECnet for an Interface

Determine whether to use DECnet Phase IV addressing on a particular interface.

**Default**: No

**Action**: If you plan to use DECnet Phase IV addressing for the interface, write Yes on the worksheet. If not, write No. Repeat this for each installed interface you plan to configure.

If you will be using DECnet Phase IV addressing on an interface, you must also provide the route cost for that interface. Indicate a value on the worksheet as follows:

- Cost

  The DECnet routing protocol uses a cost value to determine favorable routing paths. The higher the cost value, the less favorable the path. To enable DECnet on an interface, you must associate a route cost with the interface.

  **Default**: 10

  **Action**: Write a decimal number between 1 and 63 on the worksheet. A suggested cost for the Ethernet is 4, for FDDI it is 1, for Token Ring it is 10, and for serial links it is greater than 10. Repeat this for each installed interface you plan to configure.

### IPX for an Interface

Determine whether to use IPX on a particular interface.

**Default**: No

**Action**: If you plan to use IPX on the interface, write Yes on the worksheet. If not, write No. Repeat this for each installed interface you plan to configure.

If you will be using IPX on an interface, you must also provide the network number for that interface as follows:

- IPX network number

  You must associate a network number with every network segment. An IPX network number is a 32-bit value. It must be a hexadecimal number between 1 and FFFFFFFF.

  **Default**: The default is 1 for the first interface, 2 for the second interface, and so on.

  **Action**: Write the IPX network number on the worksheet for each installed interface you plan to configure.

### XNS for an Interface

Determine whether to use XNS on a particular interface.

**Default**: No

**Action**: If you plan to use XNS on the interface, write Yes on the worksheet. If not, write No. Repeat this for each installed interface you plan to configure.

If you plan to use XNS on an interface, you must also provide the network number for that interface. Indicate the information on the worksheet as follows:

- XNS network number

  XNS requires that you associate a network number with every network segment. An XNS network number is a 32-bit value. It must be a decimal number between 1 and 4294967294.

  **Default**: The default is 1 for the first interface, 2 for the second interface, and so on.

  **Action**: Write the XNS network number on the worksheet for each installed interface you plan to configure.

---

**Note** You should not enable both XNS and Novell IPX at the same time or you will have network conflicts.

---

### AppleTalk for an Interface

Determine whether to use AppleTalk on a particular interface.

**Default**: No

**Action**: If you plan to use AppleTalk on the interface, write Yes on the worksheet. If not, write No. Repeat this for each installed interface you plan to configure.

Remember, during configuration of the global parameters, you specified whether you wanted to configure multizone networks. Your answer applies to every interface you configure.

If you plan to use AppleTalk on an interface, you must also provide the other information for that interface as follows.

- Extended AppleTalk

  Extended AppleTalk networks, a feature of AppleTalk Phase 2, support Token Ring and FDDI protocols and assign a node to a cable range instead of to a single network number. Token Ring and FDDI interfaces are automatically configured for extended AppleTalk networks; therefore, this field applies to Ethernet and serial interfaces only.

  **Default:** No

  **Action**: If you plan to use extended AppleTalk on the interface, write Yes on the worksheet. If not, write No.

---

**Note** If you answer **Yes**, you need to specify the starting and ending cable ranges and multiple AppleTalk zone names. If you answer **No**, specify the AppleTalk network number and a single AppleTalk zone name.

---

- AppleTalk starting cable range

  A cable range specifies a contiguous list of network numbers from which nodes can dynamically assign their addresses. If you have a network with fewer than 100 nodes connected to the same network, you can specify a cable range with the same starting and ending value. If you want the router to obtain its configuration from an existing router directly connected to the segment, specify the value 0.

  If you specify the value 0, you do not need to provide an ending cable range or AppleTalk zone name. A starting cable range value must be a decimal number between 0 and 65279.

  **Default**: 0

  **Action**: Write the starting cable range on the worksheet.

- AppleTalk ending cable range

  An ending cable range value must be a decimal number between 4 and 65279.

  **Default**: The default is the value assigned to the starting cable range.

  **Action**: Write the ending cable range for the extended AppleTalk network on the worksheet.

- AppleTalk network number

  Nonextended AppleTalk networks require AppleTalk network numbers. An AppleTalk network number is a 16-bit value. AppleTalk Phase 2 requires that a network number be associated with every network segment.

  A network number must be a decimal number between 0 and 65279.

  **Default**: The default is 1 for the first interface, 2 for the second interface, and so on.

  **Action**: Write the AppleTalk network number on the worksheet. Repeat this for each installed interface you plan to configure.

- AppleTalk zone name

  An AppleTalk zone name merges arbitrary networks into a single logical collection of services for network users. Take care to assign zone names that are meaningful to users who are not necessarily familiar with the network. Examples of meaningful names include MIS, Menlo Park, and Third Floor. Examples of nonmeaningful names include EtherTalk, T1-Serial, and BOS-12.

Multiple networks can share the same zone name. For Token Ring and FDDI interfaces as well as others for which you specified an extended network, you can enter multiple zone names. When you have entered the final zone name and want to view the next prompt, simply press Return.

**Default**: myzone

**Action**: Write the AppleTalk zone name(s) on the worksheet. Repeat this for each installed interface you plan to configure.

### Apollo for an Interface

Determine whether to use Apollo Domain (Apollo) addressing on a particular interface.

**Default**: No

**Action**: If you plan to use Apollo addressing on the interface, write Yes on the worksheet. If not, write No. Repeat this for each installed interface you plan to configure.

If you plan to use Apollo on an interface, you must also provide the network number for that interface as follows:

- Apollo network number

  An Apollo network number is a 32-bit value. It must be a hexadecimal number between 1 and FFFFFFFF.

  **Default:** 1

  **Action:** Write the Apollo network number for each installed interface you plan to configure on the worksheet.

### CLNS for an Interface

Determine whether to use CLNS on a particular interface.

**Default**: No

**Action**: If you plan to use CLNS on the interface, write Yes on the worksheet. If not, write No. Repeat this for each installed interface you plan to configure.

### Banyan VINES for an Interface

Determine whether to use Banyan VINES on a particular interface.

**Default**: No

**Action**: If you plan to use VINES on the interface, write Yes on the worksheet. If no, write No. Repeat this for each installed interface you plan to configure.

### Bridging for an Interface

Determine whether to use transparent bridging on a particular interface. (Remember that you cannot use the **setup** command facility to configure source-route bridging. To configure source-route bridging, you must use the command interpreter. Refer to the *Router Products Configuration Guide* for information on configuring source-route bridging.)

**Default**: No

**Action**: If you plan to use transparent bridging on the interface, write Yes on the worksheet. If not, write No. Repeat this for each installed interface you plan to configure.

### LAT

The local area transport (LAT) protocol from Digital Equipment Corporation (Digital) is the protocol used most often to connect to Digital hosts. LAT is a Digital-proprietary protocol. Cisco uses LAT technology licensed from Digital.

With the LAT protocol, you can establish a connection to a host, then pass your keystrokes to the host. A user can establish a LAT connection through a router running protocol translation to a Digital host, simply by entering the host name.

**Default:** No

**Action:** If you plan to use LAT on the interface, write Yes on the worksheet. If not, write No. Repeat this for each installed interface you plan to configure.

---

**Note** If you configure LAT for an interface, the Digital Maintenance Operation Protocol (MOP) is automatically configured as well. If you do not configure LAT for an interface, MOP is not configured for that interface.

---

After you complete the Interface Configuration Worksheet, go on to the "First-Time Startup" chapter.

CHAPTER 3

# First-Time Startup

This chapter takes you through first-time startup. Use the information you entered on the Global Configuration Worksheet and the Interface Configuration Worksheet as you interact with the **setup** command facility's System Configuration Dialog. If you have not completed the worksheets, read the "Preparing for First-Time Startup" chapter before starting up.

This chapter includes sample worksheets filled in to show you how this information is used when the **setup** command facility runs through the System Configuration Dialog.

---

**Note** Some configuration parameters discussed in this document (and shown on the configuration worksheets) apply only to routers that have the protocol translation option. If your router does not have protocol translation, the interactive **setup** command facility does not prompt you for these parameters.

---

## Overview of the First-Time Startup Process

The first time you start up the system, the **setup** command facility operates automatically. An interactive dialog called the System Configuration Dialog appears on the system console screen. The dialog navigates you through the configuration process by prompting you for the information you have recorded on the configuration worksheets. The **setup** command facility also provides default values and help text for the configuration parameters, as described later in this section.

The **setup** command facility detects which interfaces are installed and prompts you for configuration information for each installed interface. When you finish configuring one interface, the **setup** command software prompts you for the next interface and continues until they are all configured.

At first-time startup, you must do the following:

- Power up your router and if necessary, test for problems with system memory and CPU.
- Verify software version and installed hardware and software options.
- Configure global parameters.
- Configure interface parameters.
- Store the configuration in nonvolatile memory.

## Default Values Using the Setup Command Facility

Many prompts in the System Configuration Dialog include default answers, shown in square brackets following the question. To accept a default, press the Return key. If the system was previously configured, the defaults that appear are the currently configured values. If you are configuring the system for the first time, the defaults that appear are factory defaults. If no factory default exists, as in the case of passwords, nothing appears after the question mark.

## Help Text Using the Setup Command Facility

At any time during use of the **setup** command facility, you can request help by typing a question mark (?) at a prompt. If the prompt requires a Yes or No answer, no further help is available. If the prompt offers a range of acceptable answers, the help facility gives you some guidance. For example, if the **setup** command facility prompts you to select the number of bits in a subnet mask for your previously entered Class B IP address, the help facility prompts you to choose a decimal number between 0 and 14.

Additionally, if you enter invalid information at a prompt, the help facility automatically asks you for the correct information. For example, if you answer "okay" instead of "yes" at a prompt, the help facility guides you with the following information:

```
%Please answer 'yes' or 'no'.
```

As another example, if you answer a prompt with a value of 0 and the required value must be a decimal between 1 and 65535, then the help facility automatically prompts you with the following message:

```
%A decimal number between 1 and 65535
```

# Powering Up Your System

Before powering up your system, check for correct AC power voltages.

**Caution** Check the voltage rating label at the back of the unit for correct voltage configuration. The factory configures the AGS+ for either 110 VAC or 220 VAC operation, as requested when ordered. MGS, CGS, Cisco 3000, and Cisco 7000 products automatically configure the power supply for the applied input voltage and can be connected to any AC source from 90 to 264 VAC. All U.K. version products are configured at the factory for 240 VAC operation only.

Now you can safely power up your system by flipping the switch on the back of the router.

# Verifying Installed Software and Hardware

When you first power up your console and network router, a script similar to the following appears on the screen. The script shown is for a Cisco 3000 with an IGS-BFPX image. The first section of the script displays the banner information, including the software version and the System Configuration Dialog. (A sample of the complete configuration script is included at the end of this chapter.)

```
Restricted Rights Legend

Use, duplication, or disclosure by the Government is
subject to restrictions as set forth in subparagraph
(c) of the Commercial Computer Software - Restricted
Rights clause at FAR sec. 52.227-19 and subparagraph
(c) (1) (ii) of the Rights in Technical Data and Computer
Software clause at DFARS sec. 252.227-7013.

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



Cisco Internetwork Operating System Software
IOS (tm) 3000 Software (IGS-BFPX), Version 10.3
Copyright (c) 1986-1994 by cisco Systems, Inc.
Compiled Fri 02-Dec-94 17:40 by chansen
Image text-base: 0x03000060, data-base: 0x00001000
```

The next portion of the script lists installed hardware and software options, such as bridging and X.25. The system presents the appropriate interfaces for these options during the configuration process.

```
cisco 3000 (68030) processor (revision A) with 8192K/2048K bytes of memory.
Processor board serial number 00743954
X.25 software, Version 2.0, NET2, BFE and GOSIP compliant.
ISDN software, Version 1.0.
Bridging software.
SuperLAT software (copyright 1990 by Meridian Technology Corp).
1 Ethernet/IEEE 802.3 interface.
2 Serial network interfaces.
1 ISDN Basic Rate interface.
128K bytes of non-volatile configuration memory.
4096K bytes of flash memory sized on embedded flash.
Configuration register is 0x10F
```

**Note** The first two sections of the configuration script (the banner and the installed hardware) appear only at initial system startup. On subsequent uses of the **setup** command facility, the script begins with the System Configuration Dialog.

The System Configuration Dialog appears, and asks whether you want to begin the configuration dialog.

```
          - 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.
Default settings are in square brackets '[]'.

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

At this point, you can choose to exit the System Configuration Dialog by answering No at the prompt. To begin the initial configuration process, answer Yes. If you answer Yes, the System Configuration Dialog asks whether you want to view the current interface summary. Answer Yes to see the summary.

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

In the following example, the summary shows a router at first-time startup. That is, nothing has been configured, and the summary reflects that fact.

```
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    down                  down
Ethernet0    unassigned      NO   not set    up                    down
Serial0      unassigned      NO   not set    down                  down
Serial1      unassigned      NO   not set    down                  down
```

The interface summary contains six columns. The Interface column lists the router's installed interfaces.The IP-Address column lists the IP address for each interface or states that an IP address for an interface is currently unassigned. Because this example shows the summary at first-time startup (that is, prior to configuration), no IP addresses have yet been assigned. The OK? column describes whether an interface has a valid configuration. Again, no configuration exists, so the OK? column contains NO for each interface. The Method column describes where an interface gets its configuration information—manually or from NVRAM. If you have not configured the interface with an IP address, the column shows "not set" for the interface. The Status column indicates whether an interface is up, down, or administratively down. Ethernet interfaces have a default status of up. Therefore, when you power up your router, Ethernet interfaces are usually up. Serial interfaces are not up unless they receive the correct carrier detect signal on the line.The Protocol column lists the line protocol for an interface. A line protocol tells you whether the interface line missed the last three keepalives. If so, the column shows "down" for that interface.

After displaying the interface summary, the dialog begins to prompt you for global configuration parameters. You can press Ctrl-C to abort the process at any time. Ctrl-C returns you to the privileged EXEC prompt (router#). Refer to the *Router Products Configuration Guide* for information about configuring the router. Refer to the publication *Protocol Translation Configuration Guide and Command Reference* for information about configuring protocol translation.

If a --More-- prompt appears during the dialog, press the space bar to continue.

# Configuring Global and Interface Parameters

The System Configuration Dialog prompts you for global parameters, then interface parameters. Enter the values you recorded on the two configuration worksheets. To accept default settings that appear in square brackets, press the Return key.

# Storing the Configuration in Nonvolatile Memory

When you complete the configuration process for all installed interfaces on your router, the **setup** command facility shows you the configuration command script that was created. It also asks you if you want to use this configuration. If you answer Yes, the configuration is saved to nonvolatile memory. If you answer No, the configuration is not saved and the process begins again. There is no default for this prompt; you must answer either Yes or No.

Once you have answered Yes to this last question, your system is now ready for use. If you want to modify the configuration you have just established, see the "Where to Go from Here" chapter.

---

**Note** If there are any problems with the configuration file pointed to in nonvolatile memory, or if the ignore nonvolatile memory bit is set in the configuration register, the router enters the streamlined **setup** command facility. See "Using the Streamlined Setup Command Facility" in the "Where to Go from Here" chapter.

---

# Sample Configuration

Figure 3-1 and Figure 3-2 show sample completed worksheets for a first-time startup configuration. Following the worksheets is the screen output for the **setup** command facility at first-time startup, showing the user responses from the completed worksheets. The screen output includes both the interactive configuration process and the resulting script that was created. The sample output is from a Cisco 3000 running an IGS-BFPX image with an ISDN BRI.

In the sample System Configuration Dialog, when it appears that no response was made, the user pressed the Return key to accept the default.

---

**Note** Although the Cisco 3000 router in the following sample configuration has an ISDN BRI, the system prompts for ISDN parameters only while configuring global parameters. To continue configuring an ISDN BRI, you invoke the **configure** command to enter global configuration mode. Refer to the *Router Products Configuration Guide* for more information about configuring an ISDN BRI.

---

**Figure 3-1 Completed Global Configuration Worksheet**

**System Serial No.:** 12345678 **Number of Interfaces:** 4

## Global Parameters

**Host Name:** sandbox

**Enable Secret:** trowel

**Enable Password:** shovel

**Virtual Terminal Password:** pail

**SNMP:** (Yes) No **Community String:** public

**XRemote Font Server:** (Yes) No

**IP Address:** 123.123.123.243

**IP Address:** 123.123.123.244

**IP Address:** 123.123.123.245

**IP Address:** 123.123.123.246

**DECnet:** (Yes) No

**Area No.:** 1

**Node No.:** 1

**Area (Level 2) Routing:** (Yes) No

**IP:** (Yes) No

**Routing Protocol (choose one):**

**IGRP** (Yes) No **IGRP Autonomous System:** 15

**RIP** Yes No

**IPX:** (Yes) No

**XNS:** (Yes) No

**AppleTalk:** (Yes) No

**Multizone:** (Yes) No

**Apollo:** (Yes) No

**Routing No.:** 123

**CLNS:** (Yes) No

**Router Tag:** pubsgroup

**Domain:** 72.8885

**Area:** 0013

**Station ID:** use default

**Banyan VINES:** (Yes) No

**Bridging:** (Yes) No

**LAT** (Yes / No) **Ethernet0** yes **Serial0** yes

**ISDN BRI** **Switch Type:** none

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**Figure 3-2 Completed Interface Configuration Worksheet**

**System Hardware Information:**

**System Type:** *Cisco 3000* **System Serial No.:** *12345678* **Host Name:** *sandbox* **No. of Interfaces:** *4*

## Interface Parameters

| Interface Name | BRI0 | Ethernet0 | Serial0 | Serial1 |
|---|---|---|---|---|
| Interface In Use (Yes/No) | no | yes | yes | yes |
| Speed (Token Ring Only) | N/A | N/A | N/A | N/A |
| IP: (Yes / No) | N/A | yes | yes | yes |
| IP Unnumbered (Yes / No) | | N/A | no | yes |
| Interface Name | | N/A | N/A | Ethernet0 |
| IP Address | | 131.108.6.67 | 131.108.97.67 | |
| Subnet Mask Bits | | 0 | 0 | |
| DECnet (Yes / No) | N/A | yes | no | no |
| Cost | | 10 | | |
| IPX (Yes / No) | N/A | yes | no | no |
| Network No. | | 10 | | |
| XNS (Yes / No) | N/A | yes | no | no |
| Network No. | | default | | |
| AppleTalk (Yes / No) | N/A | yes | yes | yes |
| Extended (Ethernet/Serial Only) | | yes | no | yes |
| Starting Cable Range | | 0 | | 0 |
| Ending Cable Range | | | | |
| Network No. (Nonextended) | | | 1 | 2 |
| Zone Name | | | twilight | dawn |
| Zone Name | | | | |
| Zone Name | | | | |
| Apollo (Yes / No) | N/A | no | no | no |
| Network No. | | | | |
| CLNS (Yes / No) | N/A | yes | yes | no |
| Banyan VINES (Yes / No) | N/A | yes | yes | no |
| Bridging (Yes / No) | N/A | yes | yes | no |
| LAT (Yes / No) | N/A | yes | yes | no |

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```
--- 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.
Default settings are in square brackets '[]'.
Would you like to enter the initial configuration dialog? [yes]:

First, would you like to see the current interface summary? [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    down                  down
Ethernet0    unassigned      NO   not set    up                    down
Serial0      unassigned      NO   not set    down                  down
Serial1      unassigned      NO   not set    down                  down

Configuring global parameters:

  Enter host name [Router]: sandbox
  Enter enable password: shovel
  Enter virtual terminal password: pail
  Configure SNMP Network Management? [no]: yes
    Community string [public]:
  Configure XRemote font servers? [no]: yes
    Enter a font server IP address or press RETURN to exit: 123.123.123.243
    Enter a font server IP address or press RETURN to exit: 123.123.123.244
    Enter a font server IP address or press RETURN to exit: 123.123.123.245
    Enter a font server IP address or press RETURN to exit: 123.123.123.246
    Enter a font server IP address or press RETURN to exit:
  Configure DECnet? [no]: yes
    Your area number [1]:
    Your node number [1]:
    Area (level 2) routing? [no]: yes
  Configure IP? [yes]:
    Configure IGRP routing? [yes]:
      Your IGRP autonomous system number [1]: 15
    Configure RIP routing? [no]:
  Configure IPX? [no]: yes
  Configure XNS? [no]: yes
  Configure AppleTalk? [no]: yes
    Multizone networks? [no]: yes
  Configure Apollo? [no]: yes
    Apollo routing number [1]: 123
  Configure CLNS? [no]: yes
    CLNS router tag [area_1]: pubsgroup
    CLNS domain [49]: 72.8885
    CLNS area [0001]: 0013
    CLNS station id [0000.0C01.0D1D]:
  Configure Vines? [no]: yes
  Configure bridging? [no]: yes
  Configure LAT? [no]: yes
  Enter ISDN BRI Switch Type [none]:

Configuring interface parameters:

Configuring interface BRI0:
  Is this interface in use? [no]:
Configuring interface Ethernet0:
  Is this interface in use? [no]: yes
  Configure IP on this interface? [no]: yes
    IP address for this interface: 131.108.6.67
    Number of bits in subnet field [0]:
    Class B network is 131.108.0.0, 0 subnet bits; mask is 255.255.0.0
```

```
  Configure DECnet on this interface? [no]: yes
    DECnet cost [10]:
  Configure IPX on this interface? [no]: yes
    IPX network number [2]: 10
  Configure XNS on this interface? [no]: yes
    XNS network number [2]:
  Configure AppleTalk on this interface? [no]: yes
    Extended AppleTalk network? [no]: yes
    AppleTalk starting cable range [0]:
  Configure Apollo on this interface? [no]:
  Configure CLNS on this interface? [no]: yes
  Configure Vines on this interface? [no]: yes
  Configure bridging on this interface? [no]: yes
  Configure LAT on this interface? [no]: yes
!
Configuring interface Serial0:
  Is this interface in use? [no]: yes
  Configure IP on this interface? [no]: yes
  Configure IP unnumbered on this interface? [no]:
    IP address for this interface: 131.108.97.67
    Number of bits in subnet field [0]:
    Class B network is 131.108.0.0, 0 subnet bits; mask is 255.255.0.0
  Configure DECnet on this interface? [no]:
  Configure IPX on this interface? [no]:
  Configure XNS on this interface? [no]:
  Configure AppleTalk on this interface? [no]: yes
    Extended AppleTalk network? [no]:
    AppleTalk network number [1]:
    AppleTalk zone name [myzone]: twilight
  Configure Apollo on this interface? [no]:
  Configure CLNS on this interface? [no]: yes
  Configure Vines on this interface? [no]: yes
  Configure bridging on this interface? [no]: yes
  Configure LAT on this interface? [no]: yes
!
Configuring interface Serial1:
  Is this interface in use? [no]: yes
  Configure IP on this interface? [no]: yes
  Configure IP unnumbered on this interface? [no]: yes
  Assign to which interface?: Ethernet0
  Configure DECnet on this interface? [no]:
  Configure IPX on this interface? [no]: no
  Configure XNS on this interface? [no]: no
  Configure AppleTalk on this interface? [no]: yes
    Extended AppleTalk network? [no]: yes
    AppleTalk starting cable range [0]:
    AppleTalk network number [2]:
    AppleTalk zone name [myzone]: dawn
  Configure Apollo on this interface? [no]:
  Configure CLNS on this interface? [no]:
  Configure Vines on this interface? [no]:
  Configure bridging on this interface? [no]:
  Configure LAT on this interface? [no]:

The following configuration command script was created:

hostname sandbox
enable password shovel
line vty 0 4
password pail
snmp-server community
xremote tftp host 123.123.123.246
!
```

```
ip routing
decnet routing 1.1
decnet node-type area
ipx routing
xns routing
appletalk routing
apollo routing
clns routing
router iso-igrp pubsgroup
net 78.8885.0013.0000.0C01.0D1D.00
vines routing
bridge 1 protocol dec
no mop enabled
!
interface BRI0
no ip address
!
interface Ethernet0
ip address 131.108.6.67 255.255.255.0
ipx network 10
xns network 2
appletalk cable-range 0-0 0.0
appletalk discovery
clns router iso-igrp pubsgroup
vines metric
bridge-group 1
no mop enabled
lat enabled
!
interface Serial0
ip address 131.108.97.67
appletalk address 1.75
appletalk zone twilight
clns router iso-igrp pubsgroup
vines metric
bridge-group 1
no mop enabled
no lat enabled
!
interface Serial1
no ip address
ip unnumbered
interface name Ethernet0
appletalk address 1.75
appletalk cable-range 0-0 0.0
appletalk zone dawn
no mop enabled
no lat enabled
!
router igrp 15
network 131.108.0.0
!
end

Use this configuration? [yes/no]: yes
[OK]
Use the enabled mode ‘configure’ command to modify this configuration.

 Press RETURN to get started!
```

First-time startup is complete. Your router is now ready for use. To modify the configuration you have just established during first-time startup, use the **setup** command facility described in the next chapter, "Where to Go from Here." To perform advanced configurations, use the **configure** command, as described in the publications *Router Products Configuration Guide* and *Router Products Command Reference.* To configure protocol translation, refer to the *Protocol Translation Configuration Guide and Command Reference* publication.

CHAPTER 4

# Where to Go from Here

The "First-Time Startup" chapter described how to get your router started for the first time using the **setup** command facility. This chapter describes the following tasks:

- How to use the **setup** command facility after first-time startup to review and change the basic setup configuration
- How to use the streamlined **setup** command facility to netboot your router when your interfaces are down
- Where to go to perform advanced configuration on the router

For information about using the EXEC command interpreter, refer to the *Router Products Configuration Guide*. For information about specific commands, refer to the *Router Products Command Reference* publication. For information about configuring protocol translation, refer to the publication *Protocol Translation Configuration Guide and Command Reference*.

## Using the Setup Command after First-Time Startup

You can use the **setup** command facility after first-time startup to make basic configuration changes at any time. The changes you make affect only the changed elements in current running memory and in nonvolatile memory (NVRAM).

To run the **setup** command facility, enter the following command from privileged EXEC mode. (Your router's host name followed by a pound symbol (#) signals that you are in privileged EXEC mode.)

```
Router#setup
```

**Note** If you are not already in privileged EXEC mode, you must enter it using the **enable** command. Refer to the "Understanding the User Interface" chapter of the *Router Products Configuration Guide* for instructions on entering the privileged EXEC mode. The **enable** command requires you to enter the enable password you specified during **setup**. If you do not remember the enable password, refer to the "Managing the System" chapter of the *Router Products Configuration Guide* for instructions on recovering a lost enable password.

When you enter the **setup** command facility after first-time startup, you must run through the entire dialog until you come to the element you intend to change. The default values shown in brackets are the values last set using the **setup** command facility or using the **configure** command. Refer to the "Preparing for First-Time Startup" chapter for complete descriptions of the values you can enter during the **setup** command facility dialog.

To return to the privileged EXEC prompt without making changes and without running through the entire System Configuration Dialog, press Ctrl-C.

# Using the Streamlined Setup Command Facility

The streamlined **setup** command facility is available only if your router is running from ROM monitor and has RXBOOT ROMs installed. The following routers can have this type of ROM installed:

- Cisco 2500
- Cisco 3000 running the IGS-RXBOOT image
- Cisco 4000 running the XX-RXBOOT image
- Other routers running the RXBOOT image

The streamlined **setup** command facility permits your router to load a system image from a network server when there are problems with the configuration in NVRAM. The IOS software automatically puts you in the streamlined **setup** command facility when your router is accidentally or intentionally rebooted (or you are attempting to load a system image from a network server) after any of the following circumstances:

- You issued a **write erase** command, thereby deleting the configuration file in NVRAM.
- You have bit 6 (ignore NVRAM configuration) set in the configuration register (refer to the *Router Products Configuration Guide*).
- Your configuration in NVRAM has been corrupted.

The streamlined **setup** command facility differs from the standard **setup** command facility in that the streamlined facility does not ask you to configure global router parameters. You are prompted only to configure interface parameters, which permit your router to boot.

## Example

The following example shows a router entering the streamlined **setup** command facility:

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

Refer to the 'Getting Started' Guide for additional help.
Default settings are in square brackets '[]'.

Configuring interface IP parameters for netbooting:
```

**Note** The message “Configuring interface IP parameters for netbooting” only appears if you are netbooting and your configuration has insufficient IP information.

The streamlined **setup** command facility continues by prompting you for interface parameters for each installed interface. The facility asks if an interface is in use. If so, the facility then prompts you to provide an IP address and subnet mask bits for the interface. Enter the subnet

mask bits as a decimal value, such as 5. The following example shows the portion of the streamlined **setup** command facility that prompts for interface parameters. In the example, the facility is prompting for Ethernet0 interface parameters and Serial0 interface parameters:

```
Configuring interface Ethernet0:
  Is this interface in use? [yes]:
  Configure IP on this interface? [yes]:
    IP address for this interface: 192.195.78.50
    Number of bits in subnet field [0]: 5
    Class C network is 192.195.78.0, 5 subnet bits; mask is 255.255.255.248

Configuring interface Serial0:
  Is this interface in use? [yes]:
  Configure IP on this interface? [yes]:
    IP address for this interface: 192.195.78.34
    Number of bits in subnet field [5]:
    Class C network is 192.195.78.0, 5 subnet bits; mask is 255.255.255.248
```

The system then displays the command script that was created as a result of your configuring the router through the streamlined **setup** command facility.

The configuration information you provide on this screen is *temporary* and exists only so that you can proceed with booting your system. When you reload the system, your original configuration is left intact. If your image in NVRAM is corrupted, enter the **setup** command facility, and configure the basic parameters. Then issue the **write memory** command to write this configuration to NVRAM. Refer to the *Router Products Configuration Guide* for further details.

## Reviewing Your Configuration Changes

You can review the changes you made to the configuration. To display information stored in NVRAM, use the EXEC command **show configuration**.

## Implementing Other Configuration Tasks

After you establish the basic startup configuration for your router, refer to the *Router Products Configuration Guide* or the *Router Products Command Reference* publication for information on using the **configure** command to make advanced configuration changes.

The configuration guide also provides information about the following tasks:

- Understanding and working with the user interface on your router
- Booting and rebooting the router
- Setting the configuration register
- Loading configuration files or system images using TFTP
- Reloading the operating system

To configure your router for protocol translation, refer to the publication *Protocol Translation Configuration Guide and Command Reference*.

APPENDIX A

# Blank Worksheets

This appendix contains blank Global Configuration and Interface Configuration Worksheets. Use these worksheets to plan your startup configuration and to run through a **setup** command facility session. You can make copies of these blank worksheets in case you rework your configuration or install more than four interfaces on your router.

# Global Configuration Worksheet

**System Type: AGS+ MGS CGS Cisco 2500 Cisco 3000 Cisco 4000 Cisco 7000 Other: _____ (circle one)**

**System Serial No.: _____ Number of Interfaces: _____**

## Global Parameters

**Host Name:**

**Enable Secret:**

**Enable Password:**

**Virtual Terminal Password:**

**SNMP: Yes No Community String:**

**XRemote Font Server: Yes No**
**IP Address: _____**
**IP Address: _____**
**IP Address: _____**
**IP Address: _____**

**DECnet: Yes No**
**Area No.: _____**
**Node No.: _____**
**Area (Level 2) Routing: Yes No**

**IP: Yes No**
**Routing Protocol (choose one):**
**IGRP Yes No IGRP Autonomous System: _____**
**RIP Yes No**

**IPX: Yes No**

**XNS: Yes No**

**AppleTalk: Yes No**
**Multizone: Yes No**

**Apollo: Yes No**
**Routing No.: _____**

**CLNS: Yes No**
**Router Tag: _____**
**Domain: _____**
**Area: _____**
**Station ID: _____**

**Banyan VINES: Yes No**

**Bridging: Yes No**

**LAT (Yes / No)**

**ISDN BRI Switch Type: _____**

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# Interface Configuration Worksheet

**System Hardware Information:**

**System Type:** _____ **System Serial No.:** _____ **Host Name:** _____ **No. of Interfaces:** _____

## Interface Parameters

| | | | | |
|---|---|---|---|---|
| **Interface Name** | | | | |
| **Interface In Use (Yes/No)** | | | | |
| **Speed (Token Ring Only)** | | | | |
| **IP: (Yes / No)** | | | | |
| **IP Unnumbered (Yes / No)** | | | | |
| **Interface Name** | | | | |
| **IP Address** | | | | |
| **Subnet Mask Bits** | | | | |
| **DECnet (Yes / No)** | | | | |
| **Cost** | | | | |
| **IPX (Yes / No)** | | | | |
| **Network No.** | | | | |
| **XNS (Yes / No)** | | | | |
| **Network No.** | | | | |
| **AppleTalk (Yes / No)** | | | | |
| **Extended (Ethernet/Serial Only)** | | | | |
| **Starting Cable Range** | | | | |
| **Ending Cable Range** | | | | |
| **Network No. (Nonextended)** | | | | |
| **Zone Name** | | | | |
| **Zone Name** | | | | |
| **Zone Name** | | | | |
| **Apollo (Yes / No)** | | | | |
| **Network No.** | | | | |
| **CLNS (Yes / No)** | | | | |
| **Banyan VINES (Yes / No)** | | | | |
| **Bridging (Yes / No)** | | | | |
| **LAT (Yes / No)** | | | | |

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